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ORIGINAL ARTICLE

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Nursing innovation and patents: a pathway to advancing healthcare and nursing

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The integration of nursing education and clinical practice has always been the goal of academic and industry efforts (Chen, Lee, & Chang, 2018). Knowledge is power. In the era of knowledge economy, knowledge and creativity are the main elements for creating wealth. If any industry can enhance its added value through innovation, it can be transformed into a knowledge economy industry (Liao, & Chang, 2011). How can nurses in the 21st century use their nursing expertise to create economic productivity in the trend of the knowledge economy? This is something that nurses should think deeply about.

In an era of rapid technological advancement and ever-changing healthcare needs, the nursing field must continue to adapt and innovate to meet these challenges. The development and implementation of nursing innovations and patents are critical to improving patient care, increasing the efficiency of medical services, and enhancing the professional status of nurses (Isfahani, et al., 2015).

Research and development (R&D) are the backbone of any innovation. In nursing, research and development creates new tools, techniques and techniques that improve patient outcomes and simplify nursing practice. For example, the development of advanced wound care products, telemedicine solutions, and smart medical devices can completely change the way caregivers provide care (Kuo, Lin, & Tan, 2021). By nurturing a culture of innovation and encouraging continuous professional development, the nursing community can remain at the forefront of progress in the field of personal care.

Patents play a critical role in protecting and promoting innovation in care. They provide legal recognition and protection for the intellectual property rights of nurses and researchers, ensuring their contributions are recognized and rewarded. This not only inspires further innovation but also attracts investment in nursing research.

The integration of nursing innovations and the protection of these innovations through patents can have a transformative impact on the healthcare system. First, it can improve patient care by introducing more effective and efficient nursing practices. For example, implementing telehealth services can increase access to health care in remote and underserved areas and address health care inequalities. Secondly, promoting nursing innovation can enhance the professional status of nurses. When caregivers are seen as innovators and leaders in health care, their role in the health care system is elevated, leading to greater recognition and respect. In turn, this can attract more people into the nursing industry and solve the nursing manpower shortage problem.

Finally, fostering a culture of innovation and patents can stimulate economic growth. By developing and commercializing new nursing products and services, the nursing community can create new business opportunities and generate revenue. This can boost the country's overall economic development while also improving public health outcomes.

Research and development of nursing innovations, coupled with strong patent protection, offer tremendous potential to advance the nursing community (Sun, Yu, Chen, & Liu, 2020). By embracing these concepts, the nursing community can not only improve patient care and health care efficiency, but also enhance the professional status of nursing staff and stimulate economic growth. As we move forward, healthcare industry stakeholders, including government agencies, educational institutions, and healthcare providers, must work together to create an environment that supports and fosters innovation in care. The future of healthcare in Indonesia is bright, and through our

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commitment to R&D and patent filing, we can ensure that our nursing professionals are at the forefront of this transformation.

References

Chen, M. C., Lee, B. O., & Chang, S. H. (2018). Applying the ATDE model to the teaching of nursing innovative works. The Journal of Nursing, 65(6), 20–25. https://doi.org/10.6224/JN.201812_65(6).04

Liao, S. C., & Chang W. C. (2011). Applying Nursing Innovation from a Knowledge Economy Perspective. The Journal of Nursing, 58(4), 93-98.

Isfahani, S. S., et.al. (2015). Nurses’ creativity: Advantage or disadvantage. Iranian Red Crescent Medical Journal, 17(2), e59665. https://doi.org/10.5812/ircmj.20895

Kuo, Y.-M., Lin, Z.-C., & Tan, A. Y. L. (2021). Applying design thinking to the research and development of innovative nursing devices. The Journal of Nursing, 68(6), 13–18.] https://doi.org/10.6224/JN.202112_68(6).03

Sun, J.-C., et al. (2020). The current status and future direction of interdisciplinary learning and creativity development for nursing curricula: An example from a university of science and technology. Chang Gung Nursing, 31(1), 35–46. https://doi.org/10.6386/CGN.202003_31(1).0004

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ORIGINAL ARTICLE

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The predictor of non-suicidal self-injury behavior among adolescents: a cross-sectional study

Dwi Indah Iswanti[1], Lee-Lee Lai[2], I Made Moh. Yanuar Saifudin[3], Kandar Kandar[4], Rian Kusuma Dewi[4], and Dessy Dwi Cahyaningrum[4]

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ABSTRACT

Introduction: Non-Suicidal Self-Injury (NSSI) among adolescents is a prevalent issue in Indonesia. Comprehensive understanding of NSSI is essential for uncovering the factors that trigger and predispose adolescents to such behavior. This knowledge serves as a foundation for crafting targeted nursing interventions to address and mitigate NSSI among this vulnerable population. This study aimed to identify determinant factors contributing to the occurrence of Non-Suicidal Self-Injury behavior in adolescents.

Methods: The study employed a cross-sectional approach conducted between October and December 2023, with 570 respondents selected through simple random sampling. Socio-demographic, precipitating, and predisposing factors were measured using a checklist sheet. The Self-Harm Inventory (SHI) instrument was utilized to assess NSSI. Data analysis involved Pearson correlation and multiple regression to examine the relationships between variables.

Results: The study revealed significant relationships among five variables. Gender (p-value = 0.004), bullying (p-value = 0.002), disappointment (p-value = 0.001), sharing place (p-value = 0.002), and communication pattern (p-value = 0.010) were identified as factors associated with Non-Suicidal Self-Injury behavior in adolescents. On the other hand, personality (p-value = 0.174), environment (p-value = 0.260), coping mechanism (p-value = 0.458), and parenting style (p-value = 0.054) showed no association with Non-Suicidal Self-Injury behavior.

Conclusions: The findings underscore the significance of disappointment and the absence of a supportive environment in influencing NSSI. This highlights important considerations for healthcare professionals, educators, and policymakers. Strategies should encompass comprehensive approaches, early detection, and targeted interventions to foster supportive environments and address the complex nature of NSSI among adolescents.

keywords: adolescents, bullying, Indonesia, non-suicidal self-injury

Introduction

Adolescents go through puberty or sexual maturity involving changes or transitions in hormonal, cognitive, and psychosocial aspects (Apsari et al., 2021). According to Kaligis et al. (2021), adolescents become a vulnerable population to various mental health issues, and the most common ones in Indonesia are anxiety and Non-Suicidal Self-Injury (NSSI). Furthermore, according to Apsari et al. (2021), NSSI is a form of behavior carried out to cope with emotional pressure or emotional pain by deliberately harming oneself without intending suicide. The most frequently employed methods of NSSI include self-cutting and self-hitting, but NSSI methods vary from cutting, burning, or stabbing (Zakaria and Theresa,

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2020), to hitting, digging into scars, pulling hair, and even consuming toxic substances (Kusumadewi et al., 2019). Although NSSI is an unhealthy coping mechanism, some young individuals perceive NSSI as an objective way and can become addicted to repeating it (Alifiando, Pinilih and Amin, 2022).

The actual data on NSSI behavior are like an iceberg phenomenon, making it extremely challenging to identify (Apsari et al., 2021). This is because NSSI is considered a highly personal issue, leading to many cases going undetected, except for those receiving treatment for mental condition (Sivasankari et al., 2016). A prior meta-analysis revealed that. globally, 8.3% of adolescents engaged in episodic NSSI, while 20.3% reported repetitive NSSI (Xiao *et al.*, 2022). However, there is currently no available report regarding the prevalence of NSSI in Indonesia. According to Piarulli et al. (2023), the prevalence of NSSI ranges from 13-28% in community-based samples and up to 80% in inpatient samples. Furthermore, previous studies showed that NSSI is more common in females (Zakaria and Theresa, 2020; Xiao *et al.*, 2022; Piarulli *et al.*, 2023; Putri and Dewi, 2023). The average onset age reported for NSSI behavior is between 12-19 years. Out of 100 participants, 38% had engaged in self-harm 5-10 times, and 28% had self-harmed 11-50 times (Hidayati, Fanani and Mulyani, 2021). NSSI behavior can occur in both the normal population and individuals with diagnosed mental health disorders. Some mental health disorders associated with NSSI behavior include borderline personality disorder, depressive disorders, bipolar disorder, and schizophrenia (Kusumadewi *et al.*, 2019)

Some of the contributing factors to NSSI behavior include the inability to regulate emotions, issues with negative peer relationships such as bullying, and disharmony within family relationships (Zakaria and Theresa, 2020). Emotional dysregulation is a closely related factor to NSSI behavior (Mitchell *et al.*, 2023) Various studies consistently show that individuals engaged in NSSI behavior have higher levels of emotional dysregulation compared to those who do not (Shafti et al., 2021). The exact mechanisms through which emotional dysregulation leads to NSSI behavior are still unknown, but there are several theories attempting to explain, including the experiential avoidance theory, where NSSI is seen as an attempt to escape from stressors (Shafti *et al.*, 2021) and the urgency theory, which suggests that individuals are more prone to NSSI when experiencing negative affect (Piarulli *et al.*, 2023).

The NSSI behavior creates a broad spectrum of losses, encompassing physical, psychological, economic, social, and academic aspects (Hidayati, Fanani and Mulyani, 2021). From a physical perspective, NSSI leads to wounds and bruises on the body, subsequently impacting the economic aspect due to the need for medical care expenses. On the social and psychological fronts, NSSI damages or severs social relationships and gives rise to feelings of shame. Academically, NSSI is directly proportional to lower academic performance. NSSI is carried out without an intent to commit suicide, but it serves as a significant risk factor for suicide attempts across various demographics, especially among adolescents, adolescent psychiatric patients, and students and adults (Apsari et al., 2021). Moreover, many NSSI cases lead to death, with individuals engaging in NSSI having a 1.68 times higher risk of suicide. Additionally, individuals engaging in NSSI cause considerable damage to body tissues, resulting in medical complications and even death (Elvira et al., 2021).

NSSI cannot be regarded as a trivial phenomenon, especially among vulnerable populations such as adolescents. Further studies on NSSI are crucial to understanding the precipitating and predisposing factors that lead adolescents to engage in NSSI, forming the basis for developing appropriate nursing interventions. Therefore, this study aimed to identify determinant factors contributing to the occurrence of NSSI behavior in adolescents.

Materials and Methods

Design

This study was an explanatory survey with a cross-sectional approach. Drawing upon a review of existing literature that has identified known factors related to NSSI, this study analyzes the relationships between socio-demographic factors (including gender, age, type of residence and living status) (Park, In and Hur, 2022), precipitating factors (including bullying, disappointment, sharing places, and communication patterns) (Baiden, Stewart and Fallon, 2017; Geng *et al.*, 2023), and predisposition in adolescents with NSSI behavior, and subsequently identifies the most contributing factor (including personality, environmental influences, coping mechanisms, and parenting styles) (Khazaie *et al.*, 2021; Rosario-Williams, Kaur and Miranda, 2021; Kataria *et al.*, 2023).

Samples and Settings

The population in this study consists of 4000 high school and vocational school students in the Central Java Province of Indonesia. The sample size was 570 respondents, determined using the Raosoft sample size calculator (https://www.raosoft.com/samplesize.htm), considering a population of 4000 teenage students from high schools (SMA-SMK) in the city of Semarang, with a margin of error of 5% and a confidence level of 99%. The sampling technique employed was simple random sampling, with the criteria being active high school and vocational school students in Semarang, aged between 17 and 20 years old.

Research Instruments

The tools employed in this study include a checklist sheet created by the authors, which draws from existing information regarding factors associated with NSSI. Furthermore, the assessment of NSSI behavior in adolescents utilized a validated questionnaire, specifically the Self-Harm Inventory (SHI) instrument.

Checklist sheet

The checklist sheet is utilized to measure socio-demographic variables, including age, gender, type of residence, and domicile. Precipitating factors, consisting of bullying, disappointment, sharing places, and communication patterns, are measured using a checklist sheet with two options: none and unnone. Meanwhile, predisposing factors such as personality, environmental influences, coping mechanisms, and parenting styles are also measured using a checklist sheet with single-answer or dichotomous questions: none and unnone. However, validity and reliability testing were not conducted for this checklist sheet due to the inappropriate context for such assessments.

The Self-Harm Inventory (SHI)

The Indonesian version of the Self-Harm Inventory (SHI) instrument was employed to measure NSSI behavior in adolescents in this study. The SHI comprises 22 open-ended questions with a score range of 0 to 22, where a score of 1 indicates a 'Yes' response and a score of 0 indicates 'No.' A score of 0 signifies the absence of self-harm, a score of 1-5 indicates a risk of self-harm, a cutoff score > 5 is considered valid for mild self-harm, and a cutoff score > 11 indicates a tendency toward psychopathological conditions. This instrument has undergone validity and reliability testing by Kusumadewi (2017), where the results of content validity testing, according to expert consensus, yielded Aiken's validity index ranging from 0.83 to 0.97, indicating good validity. The reliability testing resulted in a Cronbach's alpha value of 0.831, signifying excellent reliability. Therefore, it can be concluded that the Indonesian version of the Self-Harm Inventory is valid and reliable.

Data Collection

The data collection for this study was conducted from October to December 2023. The researcher obtained ethical approval from the Ethical Assessment Team of Regional Mental Hospital of Dr. Amino Gondohutomo from Central Java Province. Permission for the study was also sought from the Department of Education, Central Java Province. An online meeting was held with representatives of guidance counselors from high schools and vocational schools in the city of Semarang. The questionnaires were distributed through a Google Form link provided to the guidance counselors in each high school and vocational school. To maintain data confidentiality, the Google Forms utilized in this study adopt an anonymous response method, wherein respondents are not prompted to provide their names, emails, or any other confidential information. Moreover, access to data analysis and curation is restricted to authorized personnel by the author. Subsequently, the students from high schools and vocational schools in Semarang were invited to fill out the questionnaires after providing informed consent.

Ethical Consideration

Adolescents were provided with comprehensive information regarding the purpose of the study. Prior to completing the questionnaires, verbal and written consent was obtained from the respondents. Participants were guaranteed confidentiality and the freedom to participate in the study. The study obtained approval from the Ethics Review Board at the health research ethics committee of Dr. Amino Gondohutomo Regional Psychiatric Hospital (Ethic approval ID 420/10402), granted on September 19th, 2023.

Table 1. Characteristics of Respondents (n=570)

Variable	Category	n	%
Gender	Male	195	34.2
	Female	375	65.8
Age	Early Adolescence (10-12 years old)	0	0.00
	Middle Adolescence (13-15 years old)	148	26.0
	Late Adolescence (16-19 years old)	422	74.0
Type of Residence	House	553	97.0
	Rental/Boarding House	14	2.5
	Relative's House	3	0.5
Living status	Living with parents	522	91.6
	Living with relatives	41	7.2
	Living/Residing alone	7	1.2

Data analysis

The collected data were processed and analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Univariate and multivariate analyses were conducted on the data. Socio-demographic data, precipitating factors, predisposition, and Non-Suicidal Self-Injury behavior were depicted with frequency distributions. Subsequently, relationships between socio-demographic variables, precipitating factors, and predisposition with NSSI behavior were examined using Pearson correlation. The results of these bivariate analyses were then subjected to multivariate analysis using multiple regression to identify the factors that most contribute to NSSI behavior, with a significance level set at 95%.

Results

The response rate for this study was 100% and 570 respondents' data were recruited for analysis. The analysis was focused on the specific study questions and objectives. The study focused on specific study questions, including "which socio-demographic factors, precipitating elements, and predispositions are associated to Non-Suicidal Self-Injury (NSSI) behavior?" To address this question, the authors provide the following findings.

Respondents' Characteristics

Table 1 illustrates the socio-demographic characteristics of adolescents, where the majority are aged 16-19 years, representing late adolescence. The adolescents are predominantly female, and the type of residence is living together with their parents.

Description of Precipitating Factors, Predisposition, and NSSI Behavior in Adolescents

Table 2 illustrates the description of the precipitating factors, predisposition, and NSSI behavior variables in adolescents. Regarding the precipitating factors for NSSI occurrence, 50.2% of adolescents have experienced bullying, 64.6% have deep-seated feelings of disappointment, and 62.3% lack a sharing place even though their communication patterns are considered good at 58.6%. Predisposing factors for NSSI behavior include 50.2% of adolescents having an introverted personality with an unsupportive environment for NSSI occurrence at 70.7%, adolescents employing adaptive coping mechanisms at 58.6%, and a democratic parenting style in the family at 65.8%. Meanwhile, the majority of adolescents are at risk of engaging in NSSI behavior, accounting for 59.6%.

Table 2. Description of Study Variable

Precipitating Factors	Category	n	%
Bullying	Experienced Bullying	286	50.2
	None	284	49.8
Disappointment	Deep Disappointment	368	64.6
	None	202	35.4
Sharing Place	Has a Sharing Place	215	37.7
	None	355	62.3
Communication Pattern	Good Communication	334	58.6
	Poor Communication	236	41.4
Predisposing Factors	**Category**	**n**	**%**
Personality	Introverted	286	50.2
	Extroverted	284	49.8
Environment	Support NSSI	167	29.3
	Does not support NSSI	403	70.7
Coping Mechanism	Adaptive Coping	334	58.6
	Maladaptive Coping	236	41.4
Parenting Style	Democratic	375	65.8
	Authoritarian	195	34.2
Non-Suicidal Self-Injury		Mean=4.29, SD=3.67	
	None	11	1.9
	NSSI Risk	340	59.6
	Mild NSSI	190	33.3
	Psychopathological NSSI	29	5.1

Correlation among Variables

Table 3 describes the inter-correlation of variables, which was tested using Pearson correlation. It was found that only four variables had a relationship, so these variables were further tested by multiple regression analysis. The variables of personality (p-value = 0.174), environment (p-value = 0.260), coping mechanism (p-value = 0.458), and parenting style (p-value = 0.054)

Table 3. Inter-Correction of the Variables on Predictors of Non-Suicidal Self-Injury Behavior in Adolescents

	1	2	3	4	5	6	7	8	9	10
1. NSSI	1									
2. Gender	0.004*	1								
3. Bullying	0.002*	0.016*	1							
4. Disappointment	0.001*	<0.001*	<0.001*	1						
5. Sharing Place	0.002*	0.007*	<0.001*	<0.001*	1					
6. Communication Pattern	0.010*	0.011*	<0.001*	<0.001*	<0.001*	1				
7. Personality	0.174	0.419	<0.001*	0.051	0.003*	0.104	1			
8. Environment	0.260	0.359	0.015*	0.132	0.011*	0.071	<0.001*	1		
9. Coping Mechanism	0.458	0.343	0.007*	0.009*	<0.001*	0.011*	<0.001*	<0.001*	1	
10. Parenting Style	0.054	0.448	0.289	0.297	0.460	0.411	<0.001*	<0.001*	<0.001*	1

Note: *Significant with p-value <0.05

Table 4. Regression of Non-Suicidal Self-Injury Behavior, Gender, Bullying, Disappointment, Sharing Place, and Communication Pattern

Independent Variables	Dependent Variables: Non-Suicidal Self-Injury	
	Beta	p-Value
Gender	0.085	0.045
Bullying	0.310	0.002
Disappointment	0.203	0.003
Sharing Place	0.194	0.003
Communication Pattern	0.050	0.535
R2=0.55; Adjusted R2=0.40; (p=<0.001)		

showed no relationship with Non-Suicidal Self-Injury behavior in adolescents. The testing results of the five variables indicated a relationship, where gender (p-value = 0.004), bullying (p-value = 0.002), deep disappointment (p-value = 0.001), sharing place (p-value = 0.002), and communication pattern (p-value = 0.010) were found to be associated with Non-Suicidal Self-Injury behavior in adolescents.

Regression Analysis Results

Table 4 outlines the highest strengths in bullying (*p*-value = 0.002; Beta = 0.310), disappointment (*p*-value = 0.003; Beta = 0.203), and sharing place (*p*-value = 0.003; Beta = 0.194), indicating that these factors contribute significantly to the increase in Non-Suicidal Self-Injury (NSSI) behavior in adolescents. All independent variables collectively influence NSSI behavior in adolescents by 47% (R2 = 0.55). The most significant predictor variable for NSSI behavior in adolescents is bullying (Beta = 0.310).

Discussions

The findings of this study indicate that NSSI behavior in adolescents is associated with various causative factors. Socio-demographic factors such as gender are related to NSSI behavior in adolescents. Precipitating factors, such as bullying, disappointment, and the absence of a sharing place, are significantly associated with the occurrence of NSSI behavior in adolescents. Adolescents who have experienced bullying emerge as the strongest predictor for the occurrence of NSSI behavior.

This study took place in Semarang city, predominantly inhabited by the Javanese ethnic group. Javanese culture, characterized by hierarchical parenting dynamics, presents challenges for educators and parents in catering to adolescents' need for autonomy in identity development. Study on parenting practices from Javanese adolescents' perspectives remains scarce. Previous study indicates that parental values instilled since childhood significantly influence Indonesian teenagers' identity development within Javanese culture, with parental control remaining consistent throughout their upbringing (Hasanah *et al.*, 2019).

The results of this study indicate that NSSI behavior is more common among female adolescents. This aligns with several previous studies that suggest female adolescents tend to engage in NSSI (Yue *et al.*, 2023). Additionally, previous study has shown that females are twice as likely to report NSSI behavior compared to males. This condition is associated with higher psychological pressure and a lower ability to regulate emotions effectively among females (Lutz *et al.*, 2023). Similar findings were also demonstrated in a previous cohort study, which revealed that NSSI behavior is more prevalent in females across the sample, increasing since early adolescence, peaking in mid-adolescence (ages 16-17), and gradually declining thereafter (Wilkinson *et al.*, 2022). More specifically, previous study by Yue et al. (2023)· added that gender moderates the relationship between childhood violence and NSSI behavior. Their study suggests that females who have experienced emotional violence have a higher risk of engaging in NSSI behavior.

Moreover, the findings of the study reveal that bullying emerges as the strongest significant predictor of non-suicidal self-injury (NSSI) behavior, compared to other variables, as demonstrated by regression analysis (Beta = 0.310; *p*-value = 0.002). Bullying emerges as a potent predictor of NSSI due to its detrimental effects on psychological well-being, intersections with adverse childhood experiences, and socio-environmental influences. Firstly, bullying inflicts psychological distress and emotional pain, creating a profound sense of helplessness and vulnerability in its victims. This persistent exposure to hostile behavior can lead individuals to resort to NSSI as a maladaptive coping mechanism to alleviate emotional distress and regain a sense of control over their lives (Karneli *et al.*, 2022; Tsuno, 2022; Hahn, 2023; Newman, Alexander and Rovers, 2023).

Furthermore, previous study showed that individuals who have experienced trauma in childhood, such as abuse and neglect, may be more prone to both bullying victimization and engaging in NSSI as a coping mechanism (Zhao *et al.*, 2023). Additionally, adolescents who engage in repetitive NSSI may have a heightened pain threshold, potentially reinforcing NSSI behaviors as a means of seeking relief from emotional pain (Liu *et al.*, 2022; Vishwanath and Praharaj, 2022). Additionally, the prevalence and severity of bullying incidents can be impacted by the geographical and socio-economic characteristics of the areas where adolescents reside. Previous study indicates a comparable intervention rate across all bullying roles and contexts, urban and rural alike. Victimization and physical bullying perpetration are more prevalent in urban school settings, However, victims in rural environments tend to express greater distress compared to those in urban schools (Cabrera, Larrañaga and Yubero, 2022).

Moreover, in today's technological landscape, bullying transcends physical boundaries to manifest in the digital realm, commonly referred to as cyberbullying. Cyberbullying entails individuals or groups repeatedly transmitting hostile or aggressive messages via internet platforms with the aim of inflicting harm or discomfort upon others (Yu *et al.*, 2020). This phenomenon can contribute to predicting NSSI due to the fact that constant exposure to derogatory messages, threats, or harassment online can lead to profound psychological distress among victims, increasing their vulnerability to engaging in NSSI as a maladaptive coping mechanism (Sampasa-Kanyinga, Lalande and Colman, 2020; Gu, Fang and Yang, 2023). Additionally, the public humiliation and shame associated with cyberbullying, often occurring in a highly visible online environment, amplify the psychological trauma experienced by victims, further increasing their susceptibility to engaging in NSSI as a means of coping with overwhelming emotional distress (Mahtani, Melvin and Hasking, 2018; Worsley, McIntyre and Corcoran, 2019).

Several previous studies indicate that exposure to bullying behavior is a significant risk factor for the emergence of NSSI issues, regardless of genetic predisposition (Huang et al., 2022; Serafini et al., 2023; Wu et al., 2021). Other study also suggests that both victims of bullying and perpetrators are more likely to report NSSI behavior, although victims of bullying have a higher likelihood (Wu *et al.*, 2021). Not only direct experiences of bullying are linked to NSSI behavior, but individuals who are victims of cyberbullying are also associated with NSSI behavior (Yu *et al.*, 2020; Wiguna *et al.*, 2021), including engaging in activities in online games (Nursalam *et al.*, 2023). Victims of cyberbullying are exposed to violence in online games and engage in verbal abuse or physical harassment, both directly and through social media chatting with others (Hidayat, Permatasari and Mani, 2022).

Individuals who are victims of bullying may use NSSI behavior as a form of seeking help, stress relief, or even as a form of self-punishment (Huang *et al.*, 2022). Bullying and NSSI behaviors may also be related to impulsivity, self-directed and other-directed anger, seeking sensation relief, and self-punishment (Serafini *et al.*, 2023). The results of this study, along with previous study, consistently show that bullying and NSSI are interconnected. Adolescents who are victims of bullying may engage in NSSI as a form of seeking help or self-punishment because they feel powerless to voice or resist the unpleasant behavior they experience.

In the next variable, the results of this study also indicate that NSSI behavior is associated with deep feelings of disappointment, manifested in self-critical behavior. Previous study shows that self-blaming behavior significantly moderates the relationship between stressors, depression, and NSSI. Self-critical behavior increases an individual's desire to self-punish, lowers positive self-perception, and motivates individuals to directly choose self-harm over other coping behaviors (Gao *et al.*, 2023). Additionally, in another study, self-blaming behavior partially mediated the relationship between poor self-concept and NSSI behavior (Kruzan, Muehlenkamp and Claes, 2022). Based on explanations from previous study findings, experiencing deep disappointment leads adolescents to excessively criticize themselves in a non-objective manner, potentially fostering a desire for self-punishment through engaging in NSSI behavior.

The results of this study also indicate that adolescents who do not have a place to share their stories are associated with NSSI behavior. This is supported by several previous study findings that align with the results of this study. Loneliness is described as a subjective sense of isolation concerning social interaction or a lack of contact with others (Huang *et al.*, 2023). One of the main developmental tasks during adolescence is forming interpersonal relationships with peers, so adolescents with a history of NSSI tend to be more sensitive to social exclusion than their peers (Brown *et al.*, 2020). Additionally, the experience of adolescent loneliness has a significant impact on cognition, emotions, and behavior, with previous study showing that feelings of loneliness are proportional to the tendency for NSSI behavior (Huang *et al.*, 2023).

On the other hand, adolescents with a history of NSSI, based on previous study, are also more likely to keep their experiences to themselves due to feelings of shame and fear of being perceived as manipulative (Brown *et al.*, 2020). Interpersonal interaction is crucial for adolescents, even a major developmental task, so the condition where adolescents do not have a place to share their current conditions and problems can lead to feelings of loneliness, emptiness, and the burden of psychological stress kept within oneself. Such conditions may give rise to maladaptive coping mechanisms in dealing with stressors, including NSSI behavior.

Although some previous study results indicate that addressing bullying issues cannot be achieved solely by intervening with the perpetrators or victims, and requires a comprehensive approach involving various stakeholders (Yulia Rohmana, Estelina and Iskandar, 2020). nursing interventions can still be implemented at various stages, including preventive, promotive, curative, and rehabilitative approaches (Celdrán-Navarro *et al.*, 2023; Yosep, Hikmat and Mardhiyah, 2023). In the preventive and promotive stages, nurses need to raise awareness about the impact of bullying across various layers of society and engage in early detection. In the curative stage, providing a safe environment for victims and delivering mental health nursing care tailored to the patient's condition is essential. Meanwhile, in the rehabilitative stage, interventions such as behavioral therapy, counseling, relational skills training, and referrals to other professionals can be performed.

The implications of this study are significant across various domains. In clinical practice, healthcare professionals, particularly nurses and mental health practitioners, can benefit from the findings to enhance their understanding of factors associated with NSSI in adolescents. This knowledge informs improved assessment skills, early detection, and intervention strategies tailored to the identified risk factors. Public health initiatives stand to gain insights for awareness campaigns and community-based interventions that address socio-demographic factors, precipitating elements, and predisposition, ultimately aiming to reduce the prevalence of NSSI among adolescents.

In the education sector, school counselors and educators can use the study's results to design targeted prevention programs and offer support to at-risk students, fostering a more supportive and protective environment. Policymakers may consider incorporating the study's findings into mental health support policies in schools and communities, emphasizing comprehensive approaches to address NSSI. Additionally, the study lays the groundwork for future study, encouraging more in-depth investigations into specific risk and protective factors, as well as exploring the effectiveness of different interventions and prevention programs. Finally, the implications extend to professional training, where healthcare professionals, educators, and counselors dealing with adolescent mental health can incorporate these findings into their training curricula. Collectively, these implications contribute to a comprehensive approach aimed at addressing and preventing NSSI among adolescents.

Despite the valuable insights gleaned from this study, it is important to acknowledge its limitations. The study's cross-sectional design provides a static view of the relationships between variables at a specific point, thereby constraining the ability to infer causality. Longitudinal studies would be more appropriate for exploring the temporal dynamics and causal pathways linking socio-demographic factors, precipitating elements, predisposition, and Non-Suicidal Self-Injury (NSSI) in adolescents. Future study employing mixed-methods approaches could offer a more nuanced understanding of the phenomenon. Additionally, the study's examination of factors associated with NSSI may not encompass all potential variables, thereby allowing for the possibility of other influential factors not addressed in this study.

Moreover, it is worth noting that this study did not include rural areas in Central Java Province, potentially limiting the generalizability of the findings to diverse geographical settings. Furthermore, the utilization of a self-administered questionnaire introduces a potential source of bias, as participants may interpret questions differently or may not accurately report their experiences. Lastly, another limitation of this study lies in the measurement of precipitating and predisposing variables such as bullying, disappointment, sharing place, communication patterns, personality traits, environment, coping mechanisms, and parenting styles using single-answer or dichotomous questions. This approach may not fully capture the complexity inherent in these constructs.

Conclusion

This study identifies key factors associated with Non-Suicidal Self-Injury (NSSI) among adolescents, including gender, bullying, profound disappointment, and the absence of a sharing space. Bullying emerges as a robust predictor of NSSI, emphasizing the need for targeted interventions. The study underscores the higher prevalence of NSSI among females and highlights the importance of addressing gender-specific factors in mental health strategies. The findings emphasize the role of disappointment and the lack of a supportive space in contributing to NSSI, providing insights for healthcare professionals, educators, and policymakers. Strategies should involve comprehensive approaches, early detection, and tailored interventions to create supportive environments and address the multifaceted nature of NSSI among adolescents.

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Conflict of Interest

There is no conflict of interest to disclose.

References

Alifiando, B. K., Pinilih, S. S. and Amin, M. K. (2022) ‘Gambaran Kecenderungan Perilaku Self-Harm pada Mahasiswa Tingkat Akhir Studi’, *Jurnal Keperawatan Karya Bhakti*, 8(1), pp. 9–15. doi: 10.56186/jkkb.98.

Apsari, C. N. and Thesalonika (2021) ‘Perilaku Self-harm atau Melukai Diri Sendiri Yang Dilakukan Oleh Remaja’, *Jurnal Pekerjaan Sosial*, 4(2), pp. 213–224.

Baiden, P., Stewart, S. L. and Fallon, B. (2017) ‘The mediating effect of depressive symptoms on the relationship between bullying victimization and non-suicidal self-injury among adolescents: Findings from community and inpatient mental health settings in Ontario, Canada’, *Psychiatry Research*, 255, pp. 238–247. doi: 10.1016/j.psychres.2017.05.018.

Brown, R. C. *et al.* (2020) ‘“I just finally wanted to belong somewhere”—Qualitative Analysis of Experiences With Posting Pictures of Self-Injury on Instagram’, *Frontiers in Psychiatry*, 11. doi: 10.3389/fpsyt.2020.00274.

Cabrera, M. C., Larrañaga, E. and Yubero, S. (2022) ‘Bullying/Cyberbullying in Secondary Education: A Comparison Between Secondary Schools in Rural and Urban Contexts’, *Child and Adolescent Social Work Journal*. doi: 10.1007/s10560-022-00882-0.

Celdrán-Navarro, M. del C. *et al.* (2023) ‘Nursing Interventions against Bullying: A Systematic Review’, *International Journal of Environmental Research and Public Health*, 20(4), p. 2914. doi: 10.3390/ijerph20042914.

Elvira, S. R. and Sakti, H. (2021) ‘Eksplorasi Pengalaman Nonsuicidal Self-Injury (NSSI) Pada Wanita Dewasa Awal : Sebuah Interpretative Phenomenological Analysis’, *Jurnal Empati*, 10(5), p. 310.

Gao, Y. *et al.* (2023) ‘The Effects of Self-Criticism and Self-Compassion on Adolescents’ Depressive Symptoms and Nonsuicidal Self-Injury’, *Psychology Research and Behavior Management*, 16, pp. 3219–3230. doi: 10.2147/PRBM.S417258.

Geng, J. *et al.* (2023) ‘Relationship between Cyberbullying Victimization and Non-suicidal Self-Injury: Roles of Basic Psychological Needs Satisfaction and Self-Compassion’, *Social Science Computer Review*, 41(4), pp. 1276–1295. doi: 10.1177/08944393221074602.

Gu, H., Fang, L. and Yang, C. (2023) ‘Peer Victimization and Adolescent Non-Suicidal Self-Injury: The Mediating Role of Alienation and Moderating Role of Mindfulness’, *Journal of Interpersonal Violence*, 38(3–4), pp. 3864–3882. doi: 10.1177/08862605221109903.

Hahn, G. (2023) ‘Bullying’, *Revista Linguagem em Foco*, 15(1), pp. 152–176. doi: 10.46230/2674-8266-15-7127.

Hasanah, E. *et al.* (2019) ‘Indonesian Adolescents Experience of Parenting Processes that Positively Impacted Youth Identity’, *The Qualitative Report*. doi: 10.46743/2160-3715/2019.3825.

Hidayat, Z., Permatasari, C. B. and Mani, L. A. (2022) ‘Cyber Violence and Bullying in Oline Game Addiction : a Phenomenological Study’, *Journal of Theoretical and Applied Information Technology*, 15, p. 2022. Available at: www.jatit.org.

Hidayati, F., Fanani, M. and Mulyani, S. (2021) ‘Prevalensi dan Fungsi Melukai Diri Sendiri pada Mahasiswa’, in *antangan Pembelajaran Komprehensif untuk Mengembangkan Karakter peserta didik : Berdasarkan Pendekatan Psikologi Positif*. Malang.

Huang, H. *et al.* (2022) ‘A meta-analysis of the relationship between bullying and non-suicidal self-injury among children and adolescents’, *Scientific Reports*, 12(1). doi: 10.1038/s41598-022-22122-2.

Huang, X. *et al.* (2023) ‘The Effect of Loneliness on Non-Suicidal Self-Injury Behavior in Chinese Junior High School Adolescents: A Moderated Mediation Model’, *Psychology Research and Behavior Management*, Volume 16, pp. 1831–1843. doi: 10.2147/PRBM.S410535.

Kaligis, F. *et al.* (2021) ‘Mental Health Problems and Needs among Transitional-Age Youth in Indonesia’, *International Journal of Environmental Research and Public Health*, 18(8), p. 4046. doi: 10.3390/ijerph18084046.

Karneli, Y. *et al.* (2022) ‘Use of Behavioral Cognitive-Based Innovative Creative Counseling to Prevent Student Bullying Behavior’, *Jurnal Neo Konseling*, 4(4), p. 36. doi: 10.24036/00699kons2022.

Kataria, L. *et al.* (2023) ‘A Study to Assess the Prevalence of Non-suicidal Self Injury and Reasons for that Behaviour among Adults and their Coping’, *International Neuropsychiatric Disease Journal*, 19(3), pp. 35–43. doi: 10.9734/indj/2023/v19i3375.

Khazaie, H. *et al.* (2021) ‘When Non-Suicidal Self-Injury Predicts Non-Suicidal Self-Injury and Poor Sleep—Results from a Larger Cross-Sectional and Quasi-Longitudinal Study’, *International Journal of Environmental Research and Public Health*, 18(24), p. 13011. doi: 10.3390/ijerph182413011.

Kruzan, K. P., Muehlenkamp, J. J. and Claes, L. (2022) ‘Identity, self-blame, and body regard in NSSI: A test of moderated-mediation’, *Comprehensive Psychiatry*, 116, p. 152322. doi: 10.1016/j.comppsych.2022.152322.

Kusumadewi, A. F. *et al.* (2019) ‘Self-Harm Inventory(SHI) Versi Indonesia Sebagai Instrumen Dini Perilaku Self-Harm’, *Jurnal Psikiatri Surabaya*, 8(1), pp. 21–25.

Liu, J. *et al.* (2022) ‘The potential addictive mechanism involved in repetitive nonsuicidal self-injury: The roles of emotion dysregulation and impulsivity in adolescents’, *Journal of Behavioral Addictions*, 11(4), pp. 953–962. doi: 10.1556/2006.2022.00077.

Lutz, N. M. *et al.* (2023) ‘Why Is Non-suicidal Self-injury More Common in Women? Mediation and Moderation Analyses of Psychological Distress, Emotion Dysregulation, and Impulsivity’, *Archives of Suicide Research*, 27(3), pp. 905–921. doi: 10.1080/13811118.2022.2084004.

Mahtani, S., Melvin, G. A. and Hasking, P. (2018) ‘Shame Proneness, Shame Coping, and Functions of Nonsuicidal Self-Injury (NSSI) Among Emerging Adults’, *Emerging Adulthood*, 6(3), pp. 159–171. doi: 10.1177/2167696817711350.

Mitchell, E. *et al.* (2023) ‘Cognitive emotion regulation strategies among emerging adults with different self-harm histories’, *Journal of Affective Disorders Reports*, 14. doi: 10.1016/j.jadr.2023.100638.

Newman, K. L., Alexander, D. S. and Rovers, J. P. (2023) ‘Sadness, hopelessness and suicide attempts in bullying: Data from the 2018 Iowa youth survey’, *PLOS ONE*, 18(2), p. e0281106. doi: 10.1371/journal.pone.0281106.

Nursalam, N. *et al.* (2023) ‘Factors contributing to online game addiction in adolescents: a systematic review’, *International Journal of Public Health Science (IJPHS)*, 12(4), p. 1763. doi: 10.11591/ijphs.v12i4.23260.

Park, H., In, S. and Hur, J.-W. (2022) ‘Association of socioeconomic status with nonsuicidal self-injury and suicidal ideation in young Korean adults’, *International Journal of Social Psychiatry*, 68(5), pp. 1127–1134. doi: 10.1177/00207640221104691.

Piarulli, F. M. *et al.* (2023) ‘Do Cortisol and Dehydroepiandrosterone Influence Motivational Factors for Non-Suicidal Self-Injury in Female Adolescents?’, *Journal of Clinical Medicine*, 12(5). doi: 10.3390/jcm12051924.

Putri, T. H. and Dewi, V. (2023) ‘Gambaran Perilaku Non-Suicidal Self Injury (NSSI) Pada Remaja di Masa Pandemi: Literature Review’, *Jurnal Keperawatan Jiwa (JKJ) : Persatuan Perawat Nasional Indonesia*, 11(2), pp. 415–428.

Rosario-Williams, B., Kaur, S. and Miranda, R. (2021) 'Examining decentering as a moderator in the relation between non-suicidal self-injury and suicide ideation via cognitive–affective factors', *Suicide and Life-Threatening Behavior*, 51(4), pp. 741–754. doi: 10.1111/sltb.12747.

Sampasa-Kanyinga, H., Lalande, K. and Colman, I. (2020) 'Cyberbullying victimisation and internalising and externalising problems among adolescents: the moderating role of parent–child relationship and child's sex', *Epidemiology and Psychiatric Sciences*, 29, p. e8. doi: 10.1017/S2045796018000653.

Serafini, G. *et al.* (2023) 'The Relationship Between Bullying Victimization and Perpetration and Non-suicidal Self-injury: A Systematic Review', *Child Psychiatry and Human Development*, 54(1), pp. 154–175. doi: 10.1007/s10578-021-01231-5.

Shafti, M. *et al.* (2021) 'The Co-occurrence of Self-Harm and Aggression: A Cognitive-Emotional Model of Dual-Harm', *Frontiers in Psychology*, 12. doi: 10.3389/fpsyg.2021.586135.

Sivasankari, N., Shaiju, B. and Rahman, J. (2016) 'A Study to Assess the Self-Harm Behaviours among Adolescents in a Selected University of Delhi with A View to Develop and Disseminate An Information Booklet on Prevention of Self-Harm Behaviours', *International Journal of Science and Research (IJSR)*, 5(2), pp. 1531–1534. doi: 10.21275/v5i2.NOV161493.

Tsuno, K. (2022) 'Do personal resilience, coping styles, and social support prevent future psychological distress when experiencing workplace bullying? Evidence from a 1-year prospective study', *BMC Psychology*, 10(1), p. 310. doi: 10.1186/s40359-022-00991-6.

Vishwanath, R. and Praharaj, S. (2022) 'Pain threshold and pain tolerance as a predictor of deliberate self-harm among adolescents and young adults: Concerns regarding methodology', *Indian Journal of Psychiatry*, 64(1), p. 112. doi: 10.4103/indianjpsychiatry.indianjpsychiatry_471_21.

Wiguna, T. *et al.* (2021) 'The Effect of Cyberbullying, Abuse, and Screen Time on Non-suicidal Self-Injury Among Adolescents During the Pandemic: A Perspective From the Mediating Role of Stress', *Frontiers in Psychiatry*, 12. doi: 10.3389/fpsyt.2021.743329.

Wilkinson, P. O. *et al.* (2022) 'Age and gender effects on non-suicidal self-injury, and their interplay with psychological distress', *Journal of Affective Disorders*, 306, pp. 240–245. doi: 10.1016/j.jad.2022.03.021.

Worsley, J. D., McIntyre, J. C. and Corcoran, R. (2019) 'Cyberbullying victimisation and mental distress: testing the moderating role of attachment security, social support, and coping styles', *Emotional and Behavioural Difficulties*, 24(1), pp. 20–35. doi: 10.1080/13632752.2018.1530497.

Wu, N. *et al.* (2021) 'Bullying Experiences and Nonsuicidal Self-injury among Chinese Adolescents: A Longitudinal Moderated Mediation Model', *Journal of Youth and Adolescence*, 50(4), pp. 753–766. doi: 10.1007/s10964-020-01380-1.

Xiao, Q. *et al.* (2022) 'Global prevalence and characteristics of non-suicidal self-injury between 2010 and 2021 among a non-clinical sample of adolescents: A meta-analysis', *Frontiers in Psychiatry*, 13. doi: 10.3389/fpsyt.2022.912441.

Yosep, I., Hikmat, R. and Mardhiyah, A. (2023) 'School-Based Nursing Interventions for Preventing Bullying and Reducing Its Incidence on Students: A Scoping Review', *International Journal of Environmental Research and Public Health*, 20(2), p. 1577. doi: 10.3390/ijerph20021577.

Yu, C. *et al.* (2020) 'Cyberbullying Victimization and Non-suicidal Self-Injurious Behavior Among Chinese Adolescents: School Engagement as a Mediator and Sensation Seeking as a Moderator', *Frontiers in Psychology*, 11. doi: 10.3389/fpsyg.2020.572521.

Yue, Y. *et al.* (2023) 'Gender difference in the associations of childhood maltreatment and non-suicidal self-injury among adolescents with mood disorders', *Frontiers in Psychiatry*, 14. doi: 10.3389/fpsyt.2023.1162450.

Yulia Rohmana, D., Estelina, K. and Iskandar, I. (2020) 'The Bullying Phenomenon and Handling Efforts in Reducing Cases of Bullying: A Systematic Review', *Jurnal Ners*, 15(2). doi: 10.20473/jn.v15i2.20479.

Zakaria, Z. Y. H. and Theresa, R. M. (2020) 'Faktor-Faktor Yang Memengaruhi Perilaku Nonsuicidal Self-Injury (NSSI) Pada Remaja Putri', *Jurnal Psikologi Sains dan Profesi*, 4(2), pp. 85–90.

Zhao, K. *et al.* (2023) 'Childhood trauma, peer victimization, and non-suicidal self-injury among Chinese adolescents: a latent variable mediation analysis', *BMC Psychiatry*, 23(1), p. 436. doi: 10.1186/s12888-023-04848-z.

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ORIGINAL ARTICLE

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Factors associated with blood pressure and nutritional status among adolescents: a cross-sectional study

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ABSTRACT

Introduction: The association between obesity and hypertension in adolescents necessitates the identification of potential predictors at an early stage. This study aimed to examine the association of sex and place of residence with nutritional status and blood pressure in adolescents aged 10-18 years.

Methods: A sample of 198 subjects aged 10-18 years was included in this study. Data on demographic characteristics were collected using a structured questionnaire, whereas nutritional status and blood pressure were measured using standardized measures. Statistical analyses, including the independent t-test, Pearson and Spearman correlation test, and linear regression, were conducted to identify potential risk factors, with statistical significance set at $p < 0.05$.

Results: The study revealed a high prevalence of overweight-obesity (24.7%) and hypertension (11.1%) among the subjects. Significant correlations were observed between body weight, height, age, and blood pressure ($p < 0.05$). Boys exhibited higher mean body height and Systolic Blood Pressure (SBP) than girls. Nutritional status was positively associated with Body Mass Index (BMI) and blood pressure, with nutritional status emerging as the primary predictor in both private houses and boarding schools ($p < 0.05$). Furthermore, age at menarche was found to be a predictor of blood pressure in boys, whereas age was a predictor in girls.

Conclusions: BMI predicts nutritional status and blood pressure, whereas age and menarche age are crucial factors that depend on sex. Based on these findings, it is critical to manage obesity and hypertension by considering characteristics such as nutritional status, sex, and age.

Keywords: adolescents, blood pressure, good health and well-being, nutritional status

Introduction

Adolescence plays an essential role in connecting children's health to adult well-being. This transitional phase introduce challenges, including emotional, health, and health-related behavioral concerns, with potential long-term impact on an individual's life (Best & Ban, 2021). The World Health Organization (WHO) has reported that adolescents contribute to 30% of preventable morbidity and mortality due to noncommunicable diseases (NCDs) (WHO, 2022), causing 38 million of 57 million deaths annually (Dick & Ferguson, 2015). Despite these statistics, adolescents remain largely overlooked in global NCD burdens, especially in low- and middle-income countries (LMICs) (Akseer *et al.*, 2020).

Extensive research has attested to the pivotal role of adolescence as a formative period for health outcomes. Notably, risk factors such as unhealthy diet, obesity, high

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blood pressure, and tobacco use significantly contribute to premature mortality and suboptimal adult health (Institute of Medicine and National Research Council, 2015). Research involving over two hundred thousand subjects reveals that 80% of obese adolescents face a persistent risk of retaining obesity into adulthood, with nearly 70% remaining obese over three decades (Simmonds *et al.*, 2016). Effective prevention of obesity and hypertension requires consideration of both lifestyle and inherent individual characteristics. Sex is one such variable associated with obesity and hypertension. Sex differences manifest in the regulation of key biomarkers, such as leptin, which signifies uncontrolled eating in overweight and obesity, and adiponectin, which is inversely linked to body fat mass and visceral adiposity (Benbaibeche, Bounihi, & Koceir, 2021). A study in China also underscores that hypertension in adolescence is primarily determined by sex, age, and body mass index (BMI) (Zhao, Mo, & Pang, 2021). In addition, another study revealed that metabolic syndrome is more prevalent in boys among children and adolescents, whereas it is more common in females among adults (Choi *et al.*, 2021). This highlights the significance of considering both age and sex when devising effective prevention strategies.

Thus, the impact of environmental factors on health is undeniable. A study in Central Poland revealed that socioeconomic conditions, maternal education, and place of residence significantly influenced the occurrence of diet-related diseases (Zadka, Pałkowska-Goździk and Rosołowska-Huszcz, 2019; Astutik *et al.*, 2021). While families generally play a crucial role in shaping children's diets, school food also contributed daily intake among children (Farapti *et al.*, 2019). Furthermore, boarding schools offer unique experiences that impact lifestyles and health outcomes. African studies indicate that boarding students have lower energy adequacy and nutritional status than do non-boarding students (Sunday Ekanah, 2017; Olugbemi *et al.*, 2019). Conversely, in China, boarding students exhibit significantly better nutritional status than their non-boarding counterparts (Wang *et al.*, 2016). In Indonesia, conflicting findings have been reported regarding nutrition knowledge and practices of boarding school students. While some studies indicated poor knowledge and inappropriately balanced nutrition practices (Indriasari *et al.*, 2020), others suggested that students had implemented good nutrition practices, even though the provision of lunch programs and nutrition education was found to improve knowledge, attitude, and practice (Rimbawan *et al.*, 2023). This disparity is attributed not only to consumption patterns, but also to the environment's role in providing appropriate food to adolescents, underscoring the need for a comprehensive analysis of societal factors and their impact on adolescent health.

The interplay of nutritional status, blood pressure, inherent characteristics, and environmental factors in adolescents is a complex and multifaceted issue. Although some studies have been conducted, it is important to thoroughly study how inherent individual characteristics and community factors influence adolescent health, especially in Indonesia. Therefore, this study was conducted to investigate the correlation between sex and place of residence with nutritional status and blood pressure in adolescents aged 10-18 years. Overall, understanding this linkage is crucial for designing interventions addressing individual and environmental factors, leading to evidence-based strategies to reduce noncommunicable disease risk and enhance adolescent well-being.

Materials and Methods

Subjects and Study Design

This was an observational analysis with a cross-sectional study design, conducted from the end of 2020 to 2022 in Surabaya, Indonesia. As many as 198 subjects from 500 populations (aged 10-18 years, both sexes), including those living in private homes and boarding schools, were recruited using the formula proposed by Lemeshow et al. (1990), a well-established method for determining sample sizes in health-related studies. The prevalence of obesity and hypertension among adolescents used in this calculation was 31.3% (Syah *et al.*, 2020) with a desired precision level of 5%. The study was postponed due to the peak of the COVID pandemic in 2021 but continued to recruit subjects directly in 2022. This study used two ethical clearances from the Ethics Committee of the Faculty of Dentistry, Universitas Airlangga, with approval number 409/HRECC. FODM/IX/2020 and 143/EA/KEPK/2022 by the Health Research Ethics Committee of the Faculty of Public Health, Universitas Airlangga. Prior to the study, the teacher and headmaster provided students with informed consent through a clear protocol obtained from both parents and guardians, ensuring that ethical standards were met, and their participation was voluntary.

Anthropometic Measurement

This study examined several independent variables, including age, age at menarche, and place of residence, while the dependent variables were nutritional status and blood pressure. According to the Centers for Disease Control and Prevention, obesity and hypertension in adolescents result from a multifaceted interplay of behavioral, environmental, and genetic factors (CDC, 2018). Age, particularly pubertal age, significantly influences the hormonal profile that governs adolescent growth and maturation (Zhao, Mo and Pang, 2021), while environmental factors such as residence altitude influence optimal growth and development (Zadka, Pałkowska-Goździk and Rosołowska-Huszcz, 2019). Data were collected using a structured questionnaire encompassing demographic information, anthropometric data, and blood pressure. Body weight measurements were acquired by Bioelectrical Impedance Analysis (BIA) using the Karada Scan HBF-375 (OMRON Healthcare Co., Kyoto, Japan), with an accuracy 0.1 kg. Body height was measured using a SECA 213 GEA portable stadiometer (SECA GmbH & Co. KG, Hamburg, Germany) accurate to 0.1 cm and were calibrated by the laboratory staff from the Department of Nutrition at Universitas Airlangga, Indonesia. Body mass index (BMI) was calculated using the WHO AnthroPlus version 1.0.4 as. software to monitor the growth of school-age children and adolescents aged 5-19 years old. Based on age- and sex-specific BMI cut-offs from the Indonesian Ministry of Health in 2020 for ages 5–18 years, subjects were categorized as underweight (-3 SD to <-2 SD), normal (-2 SD to +1 SD), overweight (+1 SD to +2 SD), and obese (>+2 SD) (Indonesian Ministry of Health, 2020).

Blood Pressure Measurement

Blood pressure was measured using an OMRON HEM-7201 digital sphygmomanometer (OMRON Healthcare Co., Kyoto, Japan). Prior to measurements, subjects were instructed to relax for five minutes before initiation of the measurements. The blood pressure was measured twice consecutively, with a two-minute interval between the measurements. If a difference of > 10 mmHg was observed between the first and second measurements, a third measurement was recorded. Blood pressure classifications adhered to the guidelines of the American Academy of Pediatrics (AAP) for children and adolescents, with values categorized as normal (<120/<80 mmHg), pre-hypertension (120/<80 to 129/<80 mmHg), and hypertension (≥130/≥80 mmHg) (Flynn *et al.*, 2017).

Table 1. Characteristics of subjects

Characteristics	Mean ± SD/ n (%)
Sex	
Girl	116 (58.6)
Boy	82 (41.4)
Age (years)	13.08 ± 2.37
Children	61 (30.8)
Early adolescence	77 (38.9)
Late adolescence	60 (30.3)
Puberty (years)	8.15 ± 5.80
Not pubescent	65 (32.8)
Pubescent	133 (67.2)
Place of Residence	
Private house	101 (51.0)
Boarding school	97 (49.0)
Nutritional Status (SD)	0.16 ± 1.38
Underweight	12 (6.1)
Normal	137 (69.2)
Overweight	25 (12.6)
Obese	24 (12.1)
SBP (mmHg)	107.07 ± 14.19
Normal	170 (85.8)
Pre-hypertension	16 (8.1)
Hypertension	12 (6.1)
DBP (mmHg)	72.02 ± 10.47
Normal	156 (78.8)
Pre-hypertension	28 (14.1)
Hypertension	14 (7.1)
Hypertension Status	
Normal	141 (71.2)
Pre-hypertension	35 (17.7)
Hypertension	22 (11.1)
Obesity related Hypertension	
Normal	136 (68.7)
Obesity only	40 (20.2)
Hypertension only	13 (6.6)
Both obesity and hypertension	9 (4.5)

Statistical Analysis

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 25 (IBM Corp., New York, USA). Categorical variables are presented as frequencies and percentages, and continuous variables as means and standard deviations. Univariate analysis was performed to determine the frequency distribution of subject characteristics (sex, age, age at menarche, place of residence), nutritional status, and blood pressure data. Independent t-test was

Table 2. Baseline characteristics stratified by sex and place of residence

Variables	Sex			Residence		
	Boys	Girls	p	Private House	Boarding School	p
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
Age	13.33 ± 2.57	12.91 ± 2.20	0.228	11.44 ± 1.85	14.79 ± 1.45	0.000*
Age at Menarche	8.32 ± 5.98	8.03 ± 5.69	0.737	4.49 ± 6.08	11.46 ± 2.97	0.000*
Body Weight	47.95 ± 16.27	44.49 ± 13.26	0.102	38.65 ± 13.07	53.49 ± 12.19	0.000*
Body Height	152.36 ± 14.08	147.43 ± 9.92	0.007*	142.36 ± 11.06	156.88 ± 7.82	0.000*
BMI/A	0.29 ± 1.30	0.07 ± 1.42	0.267	-0.014 ± 1.51	0.34 ± 1.19	0.064
SBP	111.60 ± 15.12	103.87 ± 12.59	0.000*	106.96 ± 12.89	107.19 ± 15.48	0.907
DBP	70.85 ± 10.36	72.85 ± 10.50	0.187	76.51 ± 10.79	67.35 ± 7.75	0.000*

Independent t-test, significant at *p < 0.05.

Table 3. Correlation of baseline characteristics with nutritional status and blood pressure

Variables	Nutritional Status	Blood Pressure	
		SBP	DBP
	r (p-value)	r (p-value)	r (p-value)
Age	0.073 (0.308)	0.155 (0.029)*	-0.216 (0.002)**
Age at Menarche	0.075 (0.296)	0.082 (0.248)	-0.155 (0.029)*
Body Weight	0.442 (0.000)††	0.408 (0.000)††	-0.023 (0.751)
Body Height	0.161 (0.023)*	0.338 (0.000)**	-0.162 (0.023)*
BMI/A	1	0.142 (0.046)†	0.000 (0.995)

Pearson correlation, significant at †p < 0.05 and ††p < 0.01.
Spearman correlation, significant at *p < 0.05 and **p < 0.01.

performed to evaluate the differences of subject characteristics, nutritional status, and blood pressure stratified by sex and place of residence. The goodness-of-fit of the quantitative variable data to a normal distribution was evaluated using the Kolmogorov-Smirnov test with the Lilliefors correction. Normally distributed data were analyzed using the Pearson correlation test for body weight and BMI/A, while non-normally distributed data were analyzed using the Spearman correlation test (age, age at menarche, and body height). Multiple linear regression was performed to obtain the estimation formula for the most associated risk factors of nutritional status and blood pressure among adolescents defined by sex and place of residence with backward elimination method. A likelihood of error of less than 5% ($p<0.05$) was considered statistically significant for all statistical analyses, and the confidence interval was set at 95%.

Results

Subjects Characteristic

This study enrolled 198 subjects (116 girls and 82 boys) with a mean age of 13.08 ± 2.37 years, placing them in the early adolescence category (38.9%). Puberty was experienced by 67.2% of the subjects when 8.15 ± 5.80 years. Regarding place of residence, subjects were fairly split between those living in a private house (51.0%) and those living in a boarding school (49.0%). Nutritional status revealed that 24.7% of the subjects were classified as overweight and obese (OW-OB). In terms of blood pressure profile, the mean of systolic blood pressure (SBP) was 107.07 ± 14.19 mmHg and diastolic blood pressure (DBP) was 72.02 ± 10.47 mmHg. Notably, approximately 4.5% of subjects had both obesity and hypertension (Table 1).

Baseline characteristics stratified by sex and place of residence

In addition to health indicators, the sex analysis revealed significant differences in only two variables, height and SBP, between boys and girls (Table 2). Boys had higher mean heights (152.36 ± 14.08 cm) and SBP (111.60 ± 15.12 mmHg) compared to girls (147.43 ± 9.92 cm and 103.87 ± 12.59 mmHg), respectively. Subjects living in boarding schools had different mean values from those living in private houses across several variables, including age, age at menarche, body weight, and height ($p < 0.05$). Specifically, subjects living in boarding schools had lower DBP values (67.35 ± 7.75 mmHg vs. 76.51 ± 10.79 mmHg) than their counterparts living in private houses (p=0.000).

Correlation of baseline characteristics with nutritional status and blood pressure

Moreover, the study found a positive correlation between nutritional status and anthropometric indicators such as weight ($r = 0.442$, $p = 0.000$) and height ($r = 0.161$, $p = 0.023$). Additionally, there was a positive correlation between SBP and age, body weight, body height, and BMI/A. In contrast, DBP was negatively correlated with age, age at menarche, and height although the correlation was determined to be very weak ($r < 0.025$). The correlation of baseline characteristics with nutritional status and blood pressure are presented in Table 3.

Multiple linear regression analysis

The results of the multiple linear regression analysis presented in Table 4 identify the final model that

Table 4. Final model of nutritional status and blood pressure associated factor

Variables		B	SE	Beta	t	p-value
BMI/A	Constant	-2.949	0.367		-8.029	0.000
	BMI	0.154	0.018	0.528	8.695	0.000*
SBP	Constant	100.151	4.248		23.574	0.000
	Age at Menarche	-0.620	0.193	-0.254	-3.210	0.002*
	Body Weight	1.007	0.160	1.040	6.301	0.000*
	BMI	-1.695	0.448	-0.564	-3.788	0.000*
DBP	Constant	82.076	4.453		18.433	0.000
	Age	-1.290	0.322	-0.292	-4.008	0.000*
	BMI	0.337	0.161	0.152	2.089	0.038*

B: parameter estimates, SE: standard error, Beta: standardized estimates, significant at *p < 0.05.

Table 5. Final model of nutritional status and blood pressure associated factor based on sex

Variables		B	SE	Beta	t	p-value
Nutritional Status						
Boys	Constant	-0.786	0.985		-0.798	0.428
	BMI	0.149	0.033	0.511	4.499	0.000*
	SBP	-0.017	0.010	-0.199	-1.757	0.083
Girls	Constant	-2.497	0.689		-3.624	0.000
	Age	-0.091	0.050	-0.141	-1.833	0.069
	BMI	0.184	0.022	0.636	8.240	0.000*
SBP						
Boys	Constant	99.722	7.426		13.429	0.000
	Age at Menarche	-1.050	0.322	-0.416	-3.259	0.002*
	Body Weight	1.250	0.804	1.344	4.844	0.000*
	BMI	-1.954	0.258	-0.578	-2.430	0.017*
Girls	Constant	49.886	18.093		2.757	0.007
	Age	-1.659	0.698	-0.290	-2.377	0.019*
	Body Height	0.511	0.156	0.402	3.269	0.001*
	BMI/A	1.319	0.794	0.149	1.663	0.099
DBP						
Boys	Constant	70.289	3.435		20.460	0.000
	Age at Menarche	-0.809	0.233	-0.467	-3.467	0.001*
	Body Weight	0.152	0.086	0.239	1.771	0.080
Girls	Constant	86.002	5.713		15.053	0.000
	Age	-1.019	0.436	-0.214	-2.335	0.021*

B: parameter estimates, SE: standard error, Beta: standardized estimates, significant at $^{*}p < 0.05$.

determines the factors associated with nutritional status and blood pressure in this study. The equation for nutritional status is BMI/A = -2.949 + 0.154 (BMI), while the equations for blood pressure are SBP = 100.151 - 0.620 (Age at Menarche) + 1.007 (Body Weight) - 1.695 (BMI) and DBP = 82.076 - 1.290 (Age) + 0.337 (BMI). When stratifying the analysis by sex, it was evident that BMI was the strongest predictor factor of nutritional status in both boys and girls ($p < 0.05$). In boys, age at menarche was the main predictor of BP, whereas in girls, age was negatively associated with BP (Table 5). Moreover, considering the analysis by place of residence, age and anthropometric indices emerged as the primary predictors of nutrition status for subjects residing in private houses, unlike those in boarding schools. In private houses, BMI/A is the most influential predictor of SBP, whereas in boarding schools, it is BMI. The positive association between BMI/A and BP contrasts with the negative association observed between BMI and BP (Table 6).

Discussions

Subject characteristics

Adolescent overweight and obesity (OW-OB) represent an ongoing public health concern in Indonesia, with a prevalence of 23.9% among children (Farapti *et al.*, 2019) and 28.1% among adolescents (Kandinasti & Farapti, 2019), as indicated in both prior and current studies. However, the prevalence of OW-OB in this study was 24.7%, similar to previous study (23.7%) among adolescents in Surabaya Indonesia (Syifadhiya & Farapti, 2023). OW-OB highlights multifactorial factors, with food being a significant

Table 6. Final model of nutritional status and blood pressure associated factor based on place of residence

Variables		B	SE	Beta	t	p-value
Nutritional Status						
Private House	Constant	-10.525	2.926		-3.597	0.001
	Age	-0.212	0.043	-0.259	-4.895	0.000*
	Body Weight	-0.098	0.038	-0.843	-2.595	0.011*
	Body Height	0.048	0.021	0.348	2.252	0.027*
	BMI	0.532	0.081	1.586	6.525	0.000*
Boarding School	Constant	0.345	0.121		2.842	0.005
SBP						
Private House	Constant	44.919	14.932		3.008	0.003
	Body Height	0.436	0.105	0.374	4.169	0.000*
	BMI/A	2.107	0.764	0.247	2.756	0.007*
Boarding School	Constant	85.291	6.200		13.756	0.000
	Body Weight	1.477	0.552	1.163	7.401	0.000*
	BMI	-2.616	0.200	-0.744	-4.735	0.000*
DBP						
Private House	Constant	66.296	4.494		14.753	0.000
	BMI/A	0.547	0.234	0.229	2.339	0.021*
Boarding School	Constant	58.300	3.409		17.104	0.000
	Body Weight	0.176	0.634	0.277	2.835	0.080
	BMI	-1.120	0.062	-0.173	-1.767	0.006*

B: parameter estimates, SE: standard error, Beta: standardized estimates, significant at $^{*}p < 0.05$.

contributor. Research also shows that students consume high-calorie food on weekends (Kandinasti & Farapti, 2019), although school food still doesn't meet their nutrition requirements (Farapti *et al.*, 2019). Several studies also reported a significant increase in OW-OB among adolescents in Asian countries during the COVID-19 pandemic (Chin, Woon, & Chan, 2022; He et al., 2022; Kim, Lee, & Yoo, 2022; UNICEF, 2022). In Indonesia, UNICEF found that the prevalence of OW-OB has increased across all age groups and income levels during the COVID-19 pandemic, with limited access to healthy foods and reduced physical activity being the primary contributing factors (UNICEF, 2022).

In addition to OW-OB, this study found a high prevalence of hypertension (HT) among adolescents, with 11.1% affected and about 4.5% having both OB and HT. This study showed that the mean SBP and DBP were 107.07 ± 14.19 mmHg and 72.02 ± 10.47 mmHg, respectively. This is higher than previous studies in the same age group in Palembang, Indonesia (Kurnianto *et al.*, 2020) and Central Jakarta, Indonesia (Pardede & Setyanto, 2017), which found prevalence rates of 8% and 9.6%, respectively, but lower than those in Yunnan, China (13.45%) (Yang *et al.*, 2021). The difference may be due to reference, whereby this study used the American Academy of Pediatrics (AAP), and Pardede and Setyanto (2017) used the Fourth Report (2004) that has a lower prevalence of hypertension in stage 1 and 2 (Park & Shin, 2021).

Disparities in subject characteristics based on sex and place of residence

Sex differences can affect physiological conditions, with boys and girls showing significant differences in body height and SBP. A study in Aceh, Indonesia, revealed that boys had an average height 2.3 cm greater than girls (Yusni & Meutia, 2019), and an almost 5 cm height differential between the sexes in this study. Generally, boys tend to have higher mesomorph values, indicating musculoskeletal strength, while girls tend to exhibit higher endomorph values, suggesting greater subcutaneous fat accumulation (Rahmawati & Hastuti, 2021). As a result, boys generally outgrow girls during puberty. Notably, a large-scale study in Bogotá found that girls tend to be taller than boys between the ages of 9 and 11, but this trend reverses as they enter later stages of development (Cossio-Bolaños *et al.*, 2021). Girls typically reach their age at peak height velocity (APHV) approximately 2.2 years earlier than boys, while boys experience peak height velocity (PHV) about 0.4 cm/year earlier than girls during puberty, which is consistent with studies in both Asian and Western populations (Cossio-Bolaños *et al.*, 2021). As nearly 70% of the subjects had already undergone puberty at the time of measurement, this study found that boys had a higher stature than girls and also affected SBP. During puberty, both girls and boys experience a rapid increase in BP, but boys tend to have higher increases in SBP (Poh *et al.*, 2022). In another study, it was found that papilla fungiform density influences blood pressure, being higher in girls, and 4.2% of boys with high saltiness threshold had a higher SBP and DBP (Syifadhiya and Farapti, 2023). However, examining genetics, pregnancy experiences (mediated by birth length and weight), nutritional quality, and environment despite puberty are important for obtaining more comprehensive results (Rodriguez-Martinez *et al.*, 2020).

The environment significantly influences health through health behaviors, with factors like place of residence, family income, and maternal educational level influencing optimal development and growth (Zadka, Pałkowska-Goździk, & Rosołowska-Huszcz, 2019). This study found that adolescents living in boarding schools had higher nutritional status than those living in private houses, despite both being at normal nutritional status and not statistically significant. This aligns with a Nigerian study that found no nutritional status disparity between adolescents from two residences, suggesting adequate school feeding for boarding students (Bolajoko *et al.*, 2014). When examining anthropometric indicators, such as body weight and height, it was observed that boarding school adolescents had higher values, possibly due to the older age of the adolescents and the onset of puberty. Private house adolescents were three years younger, with most not yet reaching puberty. Age at menarche is significantly associated with anthropometric indicators, with adolescents who experience menarche having a 0.30 times higher risk of OW-OB (Asrullah *et al.*, 2022). An Asian study also reported that the average APHV occurs at the age of 13-14 years (Tsutsui *et al.*, 2022), which may explain the differences observed between adolescents living in the two residences. This difference may also have been due to sampling. Adolescents living in private houses were drawn from evening Islamic schools, which tend to have a wider age range than boarding schools with age qualifications.

Correlation between subject characteristics with nutritional status and blood pressure

This study revealed a positive correlation between body weight, height, and BMI/A in adolescents. Similarly, a large-scale study in England, Scotland, and Wales also demonstrated a strong correlation between body weight and nutritional status, while a weak correlation existed between body height and nutritional status in adolescents aged 11–15 years, turning negative at 16 years (Johnson *et al.*, 2020). While BMI/A measurement is widely accepted as an appropriate indicator for determining the nutritional status of adolescents, other body composition measurements, such as body fat, muscle mass, and body water, are also important for understanding body composition distribution. The study found that body composition is similar between boys and girls before age 12, but differences emerge after 12 years (Kobylińska *et al.*, 2022). Therefore, the BIA method needs to be employed for an in-depth assessment of body mass, particularly in adolescents during puberty, to enhance the understanding of the correlation between anthropometric indicators, nutritional status, and physical growth, enabling targeted intervention measures.

In terms of blood pressure, this study demonstrated that age and body height were significantly correlated with both SBP and DBP, consistent with previous studies conducted in Malaysia (Poh *et al.*, 2022), Nigeria (Kobylińska *et al.*, 2022), and Maryland (Devonshire *et al.*, 2016). Furthermore, sex, age, and height are recognized as indicators of blood pressure percentile assessment in children under 13 years old (Galescu *et al.*, 2012; Flynn *et al.*, 2017), and more than 30% of the subjects in this study in these categories. Indian studies have also highlighted that the ratio of blood pressure to height (either SBP/height or DBP/height) is a feasible and accurate method for diagnosing prehypertension in adolescents, considering racial differences (Kurane *et al.*, 2015). In addition to age and height factors, Chinese schoolchildren aged 7-12 years showed a correlation between pubertal development and blood pressure, specifically an increase in SBP and DBP in children experiencing puberty earlier. Children experiencing puberty showed a 3.84 mmHg increase in SBP and 2.24 times increase in DBP (Li *et al.*, 2021), although, in this study, it was more significant in DBP (r = -0.155, p = 0.029). This inverse correlation indicates that adolescents who experience puberty earlier have a higher risk of higher blood pressure, particularly DBP (62% vs. 53% for SBP) (Li *et al.*, 2021). In contrast, this study found that body weight and BMI/A had a linear correlation with SBP but not with DBP. This finding is consistent with a Nigerian study of primary school students, which stated that body weight was the main predictor of SBP (24.8%) and had minimal impact on DBP (1.5%) (Kobylińska *et al.*, 2022). A Korean study evaluating the correlation between high BMI values and blood pressure in adolescents aged 10-19 years showed that changes in body weight correlated with changes in blood pressure (Song, 2014). This study confirmed that a high BMI/A value significantly enhanced the probability of having an elevated SBP (>90th percentile) in both normal and overweight adolescents. This finding implies that changes in nutritional status can influence blood pressure, regardless of initial body weight or the presence of hypertension.

Factors predicting nutrition status and blood pressure

This study revealed that BMI is the most reliable predictor of nutritional status in both private homes and boarding schools for both males and females. However, it is essential to consider that BMI is a key indicator of adolescent nutritional status when interpreted relative to age and sex, as it differs from that of adults. This study utilized age- and sex-specific BMI cut-offs recommended by the Indonesian Ministry of Health and aligned with the World Health Organization (WHO) Z-score criteria for the early detection of nutritional issues. Nonetheless, study in Poland (Słowik *et al.*, 2019) suggests that bioelectromagnetic impedance analysis should be employed to measure adipose tissue content and location, particularly in sports-oriented adolescents. Therefore, evaluating the correlation among BMI, body fat percentage, and nutritional status (BMI/A) is of utmost importance.

This study found that BMI/A was the main predictor of BP in adolescents aged 10-18 years, with a positive association with SBP and DBP. Another study in Malaysia found that nutritional status is a good predictor of hypertension, with an increase in nutritional status contributing to increased SBP and DBP in adolescents (Poh *et al.*, 2022). Previous studies have also identified a correlation between nutritional status and hypertension, as well as the significant impact of elevated sodium intake on both conditions (Furqonia, Farapti and Notobroto, 2023). In China, children with hypertension have higher levels of triglycerides, blood glucose, insulin, and homeostatic index for insulin resistance (HOMA-IR), particularly among those with obesity (Xu *et al.*, 2011). In this study, nutritional status was identified as the main predictor of BP in adolescents living in a private house and those in boarding schools. Previous research has also outlined nutritional status and abdominal circumference as significant risk factors (Tjahjono et al., 2021, 2023), and ABSI (derived from BMI and waist circumference) showed better sensitivity in predicting adolescent BP. ABSI considers the accumulation of visceral fat, and a higher value indicates a higher risk of metabolic syndrome, including increased blood pressure (Mameli *et al.*, 2018). Additionally, age has been identified as a key predictor of BP in girls, whereas age at menarche is a predictor for boys. A study in Malaysia found that age was inversely correlated with SBP and DBP (Poh *et al.*, 2022), and differences in pubertal development between the sexes contributed to a higher prevalence of hypertension in boys. A longitudinal study in southwest England revealed that, during puberty, boys had a 10.19 mmHg higher SBP than girls, but follow-up observations (3 – 5 years after puberty) showed that girls had a higher mean SBP than boys (O'Neill *et al.*, 2022). This study established that early puberty in boys leads to increased blood pressure, as indicated by the negative relationship between age at menarche and blood pressure.

This study has the strength of ensuring a representative sample size and diverse dataset for adolescents in this region. In addition, the study comprehensively explored subject characteristics, including sex, place of residence, and their association with nutritional status and blood pressure. Although the cross-sectional design of this study cannot establish cause-and-effect relationships, the findings may provide guidance for future studies and intervention considerations related to nutritional issues, especially in the context of sex and place of residence. Although the BMI/A was used to measure the nutritional status of adolescents, this study recognized the importance of considering body composition measurements to obtain more comprehensive results. In addition, the lack of information regarding potential confounding factors, such as economic status, dietary habits, birth weight and length, and physical activity, may have affected the relationship between variables. Therefore, other factors associated with nutritional status and blood pressure in adolescents should be investigated in future studies.

Conclusion

This study found that obesity and hypertension were more prevalent among adolescents than among the national average. These findings emphasize the role of BMI as a significant predictor of nutritional status and explain the importance of monitoring nutritional status as a main predictor of blood pressure. These health issues affect both sexes and adolescents who live in private homes and boarding school. Sex differences, such as age at menarche, may influence anthropometric growth and development of hypertension. The place of residence also plays a role in the differences in age, anthropometric indicators, and blood pressure. These findings suggest the need for tailored health interventions like implementation of regular health screening and monitoring (especially nutritional status and blood pressure) for both groups, including nutrition education program into the school curriculum for boarding school adolescents and parental involvement to provide balanced nutrition in private house adolescents. Some practical recommendations, such as providing school lunch programs, conducting health check-ups, promoting physical activity in the school setting, collaborating with community centers to provide sports and recreational activities that are accessible to adolescents living in private homes, and conducting community workshops to educate parents about the importance of promoting healthy lifestyles for their adolescents, seem to warrant consideration. From this result, future studies also should consider variables, such as socioeconomic conditions, dietary habits, physical activity, and maternal experience, to make more accurate predictions. The longitudinal and comparative study designs provide comprehensive insights. Overall, urgent action such as school health campaigns, parental empowerment, and community involvements is needed by school authorities and educators, health professionals, parents and guardians, and community organizations to address the high prevalence of obesity and hypertension in adolescents.

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Conflict of interest

The authors declare that they have no conflict of interest.

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References

Akseer, N. et al. (2020) 'Non-communicable diseases among adolescents: current status, determinants, interventions and policies', BMC Public Health, 20(1), pp. 1–20. doi: 10.1186/s12889-020-09988-5.

Asrullah, M. et al. (2022) 'Trend in age at menarche and its association with body weight, body mass index and non-communicable disease prevalence in Indonesia: evidence from the Indonesian

Family Life Survey (IFLS)', BMC Public Health, 22(1), pp. 1–10. doi: 10.1186/s12889-022-12995-3.

Astutik, E. et al. (2021) 'Differences risk factors for hypertension among elderly woman in rural and urban Indonesia', Yale Journal of Biology and Medicine, 94(3), pp. 407–415.

Benbaibeche, H., Bounihi, A. and Koceir, E. A. (2021) 'Leptin level as a biomarker of uncontrolled eating in obesity and overweight', Irish Journal of Medical Science, 190(1), pp. 155–161. doi: 10.1007/s11845-020-02316-1.

Best, O. and Ban, S. (2021) 'Adolescence: Physical Changes and Neurological Development', British Journal of Nursing, 30(5), pp. 272–275. doi: https://doi.org/10.12968/bjon.2021.30.5.272.

Bolajoko, O. et al. (2014) 'Nutrient adequacy of foods eaten by students attending boarding and day secondary schools in Owo', Current Research in Nutrition and Food Science, 2(2), pp. 84–87. doi: 10.12944/CRNFSJ.2.2.04.

CDC (2018) Behavior, environment, and genetic factors all have a role in causing people to be overweight and obese, Genomics & Precision Health.

Chin, Y. S., Woon, F. C. and Chan, Y. M. (2022) 'The impact of Movement Control Order during the COVID-19 pandemic on lifestyle behaviours and body weight changes: Findings from the MyNutriLifeCOVID-19 online survey', PLoS ONE, 17(1), pp. 1–16. doi: 10.1371/journal.pone.0262332.

Choi, J. et al. (2021) 'Gender and age differences in the prevalence and associated factors of metabolic syndrome among children and adolescents in South Korea', Child Health Nurs Res, 27(2), pp. 160–170. doi: https://doi.org/10.4094/chnr.2021.27.2.160 CHNR.

Cossio-Bolaños, M. A. et al. (2021) 'Estimation of Pubertal Growth Spurt Parameters in Children and Adolescents Living at Moderate Altitude in Colombia', Frontiers in Endocrinology, 12(718292), pp. 1–6. doi: 10.3389/fendo.2021.718292.

Devonshire, A. L. et al. (2016) 'Elevated blood pressure in adolescent girls: Correlation to body size and composition', BMC Public Health, 16(1), pp. 1–7. doi: 10.1186/s12889-016-2717-6.

Dick, B. and Ferguson, B. J. (2015) 'Health for the World's Adolescents: A Second Chance in the Second Decade', Journal of Adolescent Health, 56(1), pp. 3–6. doi: 10.1016/j.jadohealth.2014.10.260.

Farapti, F. et al. (2019) 'Highlighting of urinary sodium and potassium among Indonesian schoolchildren aged 9-12 years: The contribution of school food', Journal of Nutrition and Metabolism, 2019(1028672), pp. 1–9. doi: 10.1155/2019/1028672.

Flynn, J. T. et al. (2017) 'Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents', Pediatrics, 140(3), pp. 1–73. doi: 10.1542/peds.2017-1904.

Furqonia, A. W., Farapti, F. and Notobroto, H. B. (2023) 'Is Excess Sodium Intake a Risk Factor for Overweight?: A Systematic Review', Amerta Nutrition, 7(3), pp. 459–467. doi: 10.20473/amnt.v7i3.2023.459-467.

Galescu, O. et al. (2012) 'Blood Pressure over Height Ratios: Simple and Accurate Method of Detecting Elevated Blood Pressure in Children', International Journal of Pediatrics, 2012, pp. 1–4. doi: 10.1155/2012/253497.

He, Y. et al. (2022) 'Influences of the COVID-19 Pandemic on Obesity and Weight-Related Behaviors among Chinese Children: A Multi-Center Longitudinal Study', Nutrients, 14(18), pp. 1–11. doi: https://doi.org/10.3390/nu14183744.

Indonesian Ministry of Health (2020) Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2020 Tentang Standar Antropometri Anak.

Indriasari, R. et al. (2020) 'Alarming nutrition problems among adolescent students attending islamic boarding school in Indonesia', Enfermeria Clinica, 30(S4), pp. 44–47. doi: 10.1016/j.enfcli.2019.10.037.

Institute of Medicine and National Research Council (2015) 'Measuring the Risks and Causes of Premature Death: Summary of Workshops', in Measuring the Risks and Causes of Premature Death. Washington, D.C: The National Academies Press. doi: 10.17226/21656.

Johnson, W. et al. (2020) 'Differences in the relationship of weight to height, and thus the meaning of BMI, according to age, sex, and birth year cohort', Annals of Human Biology, 47(2), pp. 199–207. doi: 10.1080/03014460.2020.1737731.

Kandinasti, S. and Farapti, F. (2019) 'The Different Intake of Energy and Macronutrient on Weekdays and Weekend among Adolescent in Urban City', Indian Journal of Public Health Research & Development, 10(3), pp. 401–406. doi: 10.5958/0976-5506.2019.00527.8.

Kim, N. H., Lee, J. M. and Yoo, E. (2022) 'How the COVID-19 Pandemic Has Changed Adolescent Health: Physical Activity, Sleep, Obesity, and Mental Health', International Journal of Environmental Research and Public Health, 19(15), pp. 1–12. doi: 10.3390/ijerph19159224.

Kobylińska, M. et al. (2022) 'Body Composition and Anthropometric Indicators in Children and Adolescents 6–15 Years Old', International Journal of Environmental Research and Public Health, 19(18), pp. 1–11. doi: 10.3390/ijerph191811591.

Kurane, A. B. et al. (2015) 'Study of blood pressure to height ratio and its relation with standard BP percentile charts to detect the prehypertension in age group 12 to 15 yrs', Pediatric Review: International Journal of Pediatric Research, 2(4), pp. 120–124. doi: 10.17511/ijpr.2015.i04.15.

Kurnianto, A. et al. (2020) 'Prevalence of Hypertension and Its Associated Factors among Indonesian Adolescents', International Journal of Hypertension, 2020(4262034), pp. 1–7. doi: 10.1155/2020/4262034.

Li, Y. et al. (2021) 'Association between pubertal development and elevated blood pressure in children', Journal of Clinical Hypertension, 23(8), pp. 1498–1505. doi: 10.1111/jch.14315.

Mameli, C. et al. (2018) 'The association between a body shape index and cardiovascular risk in overweight and obese children and adolescents', PLoS ONE, 13(1), pp. 1–12. doi: 10.1371/journal.pone.0190426.

O'Neill, K. N. et al. (2022) 'Puberty Timing and Sex-Specific Trajectories of Systolic Blood Pressure: A Prospective Cohort Study', Hypertension, 79(8), pp. 1755–1764. doi: 10.1161/HYPERTENSIONAHA.121.18531.

Olugbemi, T. B. et al. (2019) 'Nutritional status of day and boarding students attending school for special needs in North-central Nigeria', Research Journal of Health Sciences, 7(1), pp. 19–27.

Pardede, S. O. and Setyanto, D. B. (2017) 'Prevalence and Factors that Influence Hypertension in Adolescents in Central Jakarta', American Journal of Clinical Medicine Research, 5(4), pp. 43–48. doi: 10.12691/ajcmr-5-4-1.

Park, S. J. and Shin, J. Il (2021) 'Comparative Analysis of American Academy of Pediatrics and European Society of Hypertension Guidelines for the Diagnosis and Treatment of Pediatric Hypertension', Childhood Kidney Diseases, 25(2), pp. 71–77. doi: 10.3339/jkspn.2021.25.2.71.

Poh, B. K. et al. (2022) 'Anthropometric indices, but not birth weight, are associated with high blood pressure risk among Malay adolescents in Kuala Lumpur', Dialogues in Health, 1(100006), pp. 1–7. doi: 10.1016/j.dialog.2022.100006.

Rahmawati, N. T. and Hastuti, J. (2021) 'Secular change in body size and somatotype of Indonesian children aged 7–15 years (1999–2019)', Open Access Macedonian Journal of Medical Sciences, 9(E), pp. 419–427. doi: 10.3889/oamjms.2021.6154.

Rimbawan, R. et al. (2023) 'School Lunch Programs and Nutritional Education Improve Knowledge, Attitudes, and Practices and Reduce the Prevalence of Anemia: A Pre-Post Intervention Study in an Indonesian Islamic Boarding School', Nutrients, 15(4), pp. 1–15. doi: 10.3390/nu15041055.

Rodriguez-Martinez, A. et al. (2020) 'Height and body-mass index trajectories of school-aged children and adolescents from 1985 to 2019 in 200 countries and territories: a pooled analysis of 2181 population-based studies with 65 million participants', The Lancet, 396(10261), pp. 1511–1524. doi: 10.1016/S0140-6736(20)31859-6.

Simmonds, M. et al. (2016) 'Predicting adult obesity from childhood obesity: a systematic review and meta-analysis', Obesity Reviews, 17(2), pp. 95–107. doi: 10.1111/obr.12334.

Słowik, J. et al. (2019) 'Nutritional Status Assessment in Children and Adolescents with Various Levels of Physical Activity in Aspect of Obesity', Obesity Facts, 12(5), pp. 554–563. doi: 10.1159/000502698.

Song, Y. H. (2014) 'The association of blood pressure with body mass index and waist circumference in normal weight and overweight adolescents', Korean Journal of Pediatrics, 57(2), pp. 79–84. doi: 10.3345/kjp.2014.57.2.79.

Sunday Ekanah, K. (2017) 'Nutritional Status of Day and Boarding Female Adolescent Secondary School Students in Warri South Local Government Area of Delta State', Journal of Food and Nutrition Sciences, 5(3), p. 131. doi: 10.11648/j.jfns.20170503.20.

Syah, M. N. H. et al. (2020) 'HYPERTENSION AND RELATED FACTORS AMONG FEMALE STUDENTS AT VOCATIONAL HIGH SCHOOL BEKASI, INDONESIA', Media Gizi Indonesia (National Nutrition Journal), 15(3), pp. 219–224. doi: https://doi.org/10.204736/mgi.v15i3. 219–224.

Syifadhiya, Q. and Farapti, F. (2023) 'Association between Salty Taste Threshold and Hypertension among Adolescents in Surabaya', Amerta Nutrition, 7(4), pp. 487–493. doi: 10.20473/amnt.v7i4.2023.487-493.

Tjahjono, C. et al. (2023) 'Hypertension incidence among students at an Islamic boarding school in Malang Regency: A cross sectional study', in AIP Conference Proceedings, p. 20077. doi: 10.1063/5.0111272.

Tjahjono, C. T. et al. (2021) 'Cardiovascular Disease Among Adolescence in Smpn 5 Malang: a Cross-Sectional Survey Study', Journal of Community Health and Preventive Medicine, 1(1), pp. 30–36. doi: 10.21776/ub.jochapm.2021.001.01.5.

Tsutsui, T. et al. (2022) 'Growth until Peak Height Velocity Occurs Rapidly in Early Maturing Adolescent Boys', Children, 9(10), pp. 1–7. doi: 10.3390/children9101570.

UNICEF (2022) Indonesia: Overweight and obesity on the rise in all age and income groups, UNICEF.

Wang, A. et al. (2016) 'To Board or Not to Board: Evidence from Nutrition, Health and Education Outcomes of Students in Rural China', China and World Economy, 24(3), pp. 52–66. doi: 10.1111/cwe.12158.

WHO (2022) Adolescent and Young Adult Health, World Health Organization.

Xu, H. et al. (2011) 'The association of Hypertension with Obesity and Metabolic Abnormalities among Chinese Children', International Journal of Hypertension, 2011(987159), pp. 1–6. doi: 10.4061/2011/987159.

Yang, Y. et al. (2021) 'Prevalence trends of hypertension among 9–17 aged children and adolescents in Yunnan, 2017–2019: a serial cross-sectional surveillance survey', BMC Public Health, 21(1), pp. 1–9. doi: 10.1186/s12889-021-10258-1.

Yusni, Y. and Meutia, F. (2019) 'Anthropometry analysis of nutritional indicators in Indonesian adolescents', Journal of Taibah University Medical Sciences, 14(5), pp. 460–465. doi: 10.1016/j.jtumed.2019.07.001.

Zadka, K., Pałkowska-Goździk, E. and Rosołowska-Huszcz, D. (2019) 'Relation between environmental factors and children's health behaviors contributing to the occurrence of diet-related diseases in central Poland', International Journal of Environmental Research and Public Health, 16(1), pp. 1–14. doi: 10.3390/ijerph16010052.

Zhao, W., Mo, L. and Pang, Y. (2021) 'Hypertension in adolescents: The role of obesity and family history', Journal of Clinical Hypertension, 23(12), pp. 2065–2070. doi: 10.1111/jch.14381.

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ORIGINAL ARTICLE

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Understanding perspective on community health literacy for promoting the health of older adults with hypertension: a qualitative descriptive study

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ABSTRACT

Introduction: Health literacy (HL) has been indicated as producing vigorous effectiveness in improving health practices and health outcomes. Older adults with low HL expressed their difficulty in understanding and acting upon health information, resulting in nonadherence to medical instructions and poor health outcomes. This study aimed to understand the community people's experience of access, understanding, evaluation, and application of health information for self-care of hypertensive older adults, and explore the community's perspective on promoting community health literacy (CHL) on caring for hypertensive older adults.

Methods: This was a qualitative descriptive study. Data were collected through focus groups and in-depth interviews in one sub-district municipality in Mahasarakham, Thailand. A total of 37 participants from older adults with hypertension, families of older adults with hypertension, and community committees were recruited based on inclusion criteria using purposive sampling. Data were then analyzed using a five-step thematic analysis.

Results: Four main themes of community people's experience emerged 1) access to health information limited by the healthcare personnel at the primary care unit (PCU), 2) understanding the health information because it is clear and familiar, and can ask the medical personnel directly, 3) do not evaluate the health information received from healthcare personnel because they trust them, and 4) applied health information to practice only taking medicine and doctor's appointments. Three main themes to promote CHL are 1) usual healthcare activities, 2) community action, and 3) nurses at PCU, village health volunteers, and community committees should be involved in playing a key role in promoting CHL.

Conclusions: Policymakers should establish health-related policies specific to improve hypertension health literacy in community older adults. Cooperation with community leaders is important to promote CHL by using active learning education and creating a supportive environment focusing on encouraging older adults to perform self-care to control their health conditions.

Keywords: community, health literacy, older adults, hypertension, self-care

Introduction

Hypertension is a chronic disease and public health problem in all countries worldwide, including Thailand (WHO, 2013; Aekplakorn, 2020). The incidence of hypertension is rising, accounting for 7.5 million deaths or 12.8% of all deaths worldwide (WHO, 2013). In Thailand, hypertension is a common disease; most patients are older adults. It has been found that hypertension is the number one disease found in this age group (Department of Health, Ministry of Public Health, 2016; Aekplakorn, 2020). Hypertension is a severe medical condition where if a patient cannot keep

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their blood pressure at an average level, the risk of damage to bodily organs, such as the heart, brain, kidneys, etc., is increased (Weber et al., 2013; WHO, 2019). Hypertension in aging affects cognitive abilities (Ladecola et al., 2016) and physical incapacity caused by age-related sarcopenia, which decreases muscle mass and strength (Buford, 2016). If older adults with hypertension cannot control their blood pressure, it can lead to stroke (Sierra et al., 2012; Sinsap, Jankra, & Jaiman, 2017) and small vessel disease (Sierra et al., 2012). This disease causes cognitive impairment and leads to a loss of ability to care for one's health (Sierra et al., 2012), requiring long-term care, resulting in higher national health expenditures in Thailand (Department of Health, 2016).

Hypertensive patients must control their blood pressure levels, which requires appropriate self-care (Ademe, Aga, & Gela, 2019). Health literacy is the key variable that correlates with and predicts healthcare outcomes (Hongkrajok, Pathumarak, & Masingboon, 2016; Chin et al., 2017; Oh & Park, 2017; Panahi, Kazemi, Juyani, & Pishvaei, 2018). Health literacy is the ability to access, understand, evaluate, and apply health information to make health-related decisions to care for the health of oneself and the community (WHO, 1998; Nutbeam, 2000; Sørensen et al., 2012). If people have health literacy, it will affect their healthcare and health outcomes (McDonald and Shenkman, 2018).

In 2019-2021, Thailand found that the number of hypertensions was 2,368, 2413, and 2,329 per 100,000 people, respectively. It can be noted that the rate of hypertension is increasing every year (Statista Research Department, 2023). Although Thailand has a comprehensive public health service system, it is still found that older adults with hypertension have inappropriate self-care behaviors and cannot control their blood pressure. The last survey report on the quality of treatment for hypertension in Thailand in 2013 found that older diagnosed with hypertension have up to 97% follow-up and treatment. However, up to 43% of older are unable to control (Bureau of Health Promotion, 2013).

Currently, interventions promoting health literacy in older adults with hypertension have mostly been focused on health literacy at an individual level and improving only functional and interactional health literacy (Arahung, Hoontrakul, & Roojanavech, 2017; Thepin, Moolsart, & Jantacumma, 2019). The World Health Organization aims to promote health literacy worldwide by supporting community involvement to make the population health literate to achieve its goals by 2030 (WHO, 2016) together with the key factors in the desirable self-care of older people are regular social activities and more proactive activities outside the hospital, with families and communities involved. It is important to encourage older people to have appropriate self-care (Bureau of Health Promotion, 2013), including participation in building and organizing a joint health system to improve the quality of life of older people (Department of Health, 2016).

Thai older adults have insufficient overall health literacy, especially in understanding health information, and accessing health information and services. Although the study found that older adults have good decision-making skills, it is still found that there is not enough access to health information, including a lack of good health communication skills, resulting in poor decisions in self-care (Boonsatean & Reantippayasakul, 2022). The health literacy situation of people in Health Area 7th, including 4 provinces of the Northeastern area of Thailand, shows low health literacy (Roma & Kloyiam, 2019). Mahasarakham is a province in Health Area 7th, which found that at-risk people with hypertension in Mahasarakham have a low health literacy (59.80%) (Sinto, Kamkaew, Chummalee, & Srisaknnok, 2022). Normally, in rural areas of Thailand, the term 'health literacy' is still unclear to people in the community, and previous studies indicated there were still limited strategies to promote community health literacy (Nutbeam, 2000). Therefore, it is necessary to understand the views of older people and the community related to the health literacy components and their perspective on promoting community health literacy. The findings will be beneficial for strengthening community health literacy toward taking care of the hypertensive older people in the community.

The Study Aim is To understand the community people's experience of access, understanding, evaluation, and application of health information for self-care of older adults with hypertension in the community and to explore the community's perspective on promoting community health literacy to taking care of older adults with hypertension in the community.

Materials and Methods

This study used a qualitative descriptive study design (Doyle et al., 2020). Focus-group discussions were used to obtain information from the three purposively sampled groups of community stakeholders. Focus-group discussions were used because they can collect information according to discussions on various aspects to form a structure or concept based on the researcher's needs (Eamtip, 2022). Then in-depth interviews were asked according to individual participants' responses. Probing was done to obtain in-depth clarification from participants. This study is part of an advanced mixed-methods study to develop a community-based health literacy intervention for older adults with hypertension.

The setting of this study was Kosum Phisai sub-district municipality, Kosum Phisai district, Mahasarakham province, in Northeastern, Thailand. The participants were three groups of stakeholders composed of 1) older adults with hypertension aged 60-69 years, have the ability to perform their daily activities, have health literacy scores assessment before the study with low, fair, and high levels, and also have family members in their home; 2) family members aged ≥18 years, have health literacy score assessment with low, fair, and high level; and 3) community committee members who are representatives who serve in agencies established to act as intermediaries between the government and residents of a particular area in the management of Kosum Phisai sub-district municipality. All participants were purposively recruited based on having known information and experience regarding the objective of this study from secondary data of PCU. The researcher requested permission from the Primary Care Supervisor of Kosum Phisai Hospital, then requested a list of possible participants, viewed their health records, and recruited participants through phone calls. Data saturation is an indicator of the number of selected informants discussed by the researcher to determine data saturation among all informants.

This research was approved by the Human Research Ethics Committee of the Faculty of Public Health, Mahidol University (COA. No. MUPH 2020-141), and the Ethical Committee Review Board of the Mahasarakham Provincial Public Health Office. Participants were informed that participation was always voluntary and that they could withdraw at any time. They were also informed of the nature and aims of the research; exactly what participation meant in practice; any risks, inconvenience, or discomfort that could reasonably be expected to result from the study; the benefits for participants; and how privacy and confidentiality would be maintained. All participants were asked to sign a consent form if they were willing to participate. Audio recording was allowed by all participants. The recordings and transcripts have been kept securely and will be destroyed after publishing.

Data collection was conducted between January and April 2021. Participants participated in the focus groups and in-depth interviews at the Kosum Phisai Municipality Office. Focus groups were conducted with 12 older adults and 12 family members, each of which was divided into two groups (six members in each group), and one group of 13 community committee members to explore and understand the experiences regarding the health literacy of community people that affect self-care practices of older adults and the community perspective toward promoting community health literacy. Each focus group meeting was run in a conference room and lasted about 60 minutes in two sessions for each group. The researcher performed the role of group moderator, and a research assistant facilitated the meetings and took notes. The researcher began each focus group meeting by getting acquainted with the participants and then asking essential questions and a series of questions to encourage discussion, such as *"If you want to know how to monitor your symptoms and disease progression, what sources of information should use for taking care of yourself*?" *"When you or your husband/ wife/ father/ mother/ grandparent have hypertension symptoms and receive advice on self-care, do you understand it?" "What action is being taken in your community to promote the healthcare of older adults with hypertension?"*

Then, to gain a deeper insight into the elements of improvement community health literacy that affect health outcomes, individual in-depth interviews were carried out with ten of these 37 participants and were conducted in one session for each informant using questions such as, *"If you would like to develop community health care to improve the accessibility, understanding, evaluating, and applying health information to practice the daily life activities of older adults with hypertension, what should you do?"* and "*How to improve the ability of older adults with hypertension regarding access, understanding, evaluating, and applying health information to practice self-care?*" Additionally, probing questions were used: "*Could you give the details? And can you explain that?"* Each participant was interviewed for 45-60 min; conversation was recorded using an audio recorder. The triangulation was performed by interviewing and reviewing the answers with the other groups until no new ideas or concepts appeared to ensure that data saturation was achieved.

Thematic analysis was performed using the five-step theme analysis techniques described by Creswell (2014). The initial step started with organizing and preparing the data for analysis—the data preparation involved transmitting qualitative data from the focus groups and in-depth interviews, also recording the meetings with a smartphone; for this step the researcher copied and translated data from the Isan dialect to Thai, then translated the data from Thai. The second step was reading or looking at all the data word by word then the third step started with coding all the data: the coding process was performed by categorizing the data. The fourth step was using the coding process to generate a description of people as well as themes for analysis for the coding, which was also used to assess the saturation of concepts and recurring patterns when comparing the similarities and differences of collected data on the ability to access, understand, evaluate, and use health information to perform the self-care of older adults, and the community perspective to promoting community health literacy. The final step was interpreting the findings; the data were then presented using themes and subthemes to verify the data. The researcher got the participants to confirm the data to clarify the interpretations and findings of the second focus group and in-depth interviews.

In maintaining accurate interpretation (credibility), the researcher used triangulation in informants and methods. The data triangulation technique, given the complete results, was achieved by many groups of focus groups (two older adults' groups, and two family members groups) and in-depth interviews at different times. Also, the researcher did member checking by involving 37 informants to provide feedback on the theme that had been made. Ensuring that the results can be transferred to other contexts (transferability), the researcher conducted an audit trail to maintain the stability of findings (dependability and confirmability). The researcher recorded the research process from the beginning to the end of the research process.

Results

The key informants were 12 older adults with hypertension, 12 family members, and 13 community committee members; the characteristics of all participants are shown in Table 1. Of the older adults, 10 were female, half were aged 60-64, and the other half were aged 65-69. Of the family members, the majority (n=10) were female and aged 21-60, and their relationship with older adults varied; however, most of them were a child of the older adult. Most of the community committee members were female (n=10), whose ages ranged from 31-70; the community committee positions were composed of the headman, head of the health volunteers, health volunteer, public health nurse, health director of the municipality, and the chairman of the village heads.

Table 1. Characteristics of subjects

Characteristics		**Number**	**Percentage**
Older adults with hypertension		**n=12**	
Gender	Male	2	16.67
	Female	10	83.33
Age	60-64 years	6	50.00
	65-69 years	6	50.00
Family members		**n=12**	
Gender	Male	2	16.67
	Female	10	83.33
Age	21-30 years	3	25.00
	31-40 years	2	16.67
	41-50 years	4	33.33
	51-60 years	3	25.00
Relationship	Child	4	33.33
	Grandchild	3	25.00
	Cousin	3	25.00
	Spouse	2	16.67
Community committee		**n=13**	
Gender	Male	3	23.08
	Female	10	76.92
Age	31-40 years	2	15.38
	41-50 years	5	38.47
	51-60 years	4	30.77
	61-70 years	2	15.38
Position	Headman	3	23.08
	Head of the health volunteers	3	23.08
	Health volunteer	3	23.08
	Public health nurse	2	15.38
	Health director of the municipality	1	7.69
	Chairman of the village heads	1	7.69

The community people's experience of access, understanding, evaluation, and application of health information for self-care of older adults with hypertension in the community.

Key informants were older adults with hypertension and family members living in the context of a semi-urban community in the sub-district municipality. All older adults with hypertension continuously follow up with the doctor and nurses at the Primary Care Unit (PCU), which is under the responsibility of the district hospital. Nurses in the PCU coordinate with the sub-district municipality to provide healthcare services to the community people in the area under the responsibility of the sub-district municipality. The findings from group discussions and in-depth interviews with older adults with hypertension and their family members revealed four themes:

Theme I: The most accessible health information related to hypertension comes from the advice of healthcare personnel at PCU.

The key informant explained that, when receiving a medical appointment, they usually receive advice about various symptoms of the disease and how to take care of themselves in terms of adjusting nutrition habits, exercising, taking medicine, and health follow-up by receiving health information from nurses and doctors at the primary care unit where older adults regularly use the healthcare services. In addition, older adults with hypertension mentioned that there are ways to access health information other than the advice of health personnel, saying that some older adults read health information from educational signs posted in the PCU while waiting for treatment**.** As for searching from various online sources, it was found that there were very few searches because most older adults do not have phones or smartphones because of economic limitations. Like most family members, they do not use smartphones much for the same reason. Only a few older adults who used smartphones said they looked for more general health information on YouTube. In addition, in the community, there are community nurses of the PCU who come to organize health promotion activities in the community regarding chronic disease issues about once a year, which is health education about disease and healthcare; this activity is organized by rotation in each village according to the plan of Village Health Fund. In addition, health information, mostly about seasonal diseases, was received from the village headman or a team of village health volunteers via the community's public relations, as stated in the following.

"*Healthcare professionals usually advise about how to take care of myself when I go for my appointment*." (Older Female, 62 years).

"*When I go to the hospital, I read health information from the health information board at the hospital.*" (Family Female, 59 years).

Theme II: The received health information regarded hypertension was simple and understandable.

Most of the key informants explained that older adults had been receiving treatment continuously for a considerable time and thus received repeated advice about hypertension or other health advice from the nurse or doctor who takes care of them. The health information is not complicated, the advice given is easy to understand, and when in doubt or they do not understand something, they can ask the nurse or doctor immediately because they have been familiar with each other for a long time, so they have the courage to ask questions**.** A few older adults who use smartphones to search for health information said that most of the health information obtained from YouTube is video clips with illustrations such as various exercise methods and exercise postures for the older adults; the information is visual and animated so it is easy to understand. Likewise**,** the health information obtained from the community's public relations by the village headman and the village health volunteers' team is easily understood because they used the local folk language, as stated in the following.

"*I understand what the nurse or the doctor said, but if I don't understand, I ask the nurse or the doctor for more clarity because I have been treated for a long time***."** (Older Male, 67 years).

"*In the past, the village headman or the village health volunteers publicize health information about seasonal diseases using local language and messages that were easy to understand.*" (Family Female, 54 years).

Theme III: Unnecessary to analyze or evaluate the received health information from healthcare personnel.

The key informants explained that, when receiving advice on hypertension, and self-care guidelines on taking medication from doctors or nurses who take care of older adults and family members, they felt that the advice was appropriate and unnecessary to evaluate or analyze whether it is true because the healthcare personnel providing advice or information are knowledgeable and reliable. As for health information posted on educational signs within the PCU, it is information from healthcare personnel in the PCU and is therefore reliable so that information can be used as a guideline for self-care practices. The key informants who had received health information from YouTube said that when they saw various health video clips, they did not immediately trust the information they contained. They had to bring that information to inquire with the nurse or doctor at the PCU when they came for follow-up. Asking questions to the nurse or doctor is a way to assess whether or not they will be followed, and if there is any danger. Information received will only be trusted after it has been confirmed as correct and appropriate by a nurse or doctor before applying health information to daily life, as stated in the following.

"*From the Internet, I looked at it, but we didn't pay attention because our lives were already with the doctor, just watching and not following***.** *I would not believe it and put it into practice until I asked the doctor or nurse at my follow-up appointment.***"** (Older Female, 64 years).

"*I heard from the doctor, read from the health information sign in the hospital it should be reliable***.** *I don't have to evaluate anything***."** (Family Male, 32 years).

Theme IV: Only taking medicines and following up on doctor's appointments is the health information that is the most concerning to regularly practice.

The key informants explained that, when receiving advice from a nurse or doctor about how to behave regarding hypertension, they would apply it to their own healthcare. Older adults with hypertension often pay more attention to taking medicine and keeping up with appointments than adjusting health behavior such as nutrition, exercise, or monitoring their blood pressure regularly; only some older adults have to adjust their own behavior as well. Older adults who adjust their own behavior are older adults who have family members providing close care and who have access to health information by bringing older adults to regular medical appointments at the PCU, as stated in the following.

"*I only take medication and go to health check by appointment but still eat salty food and rarely exercise because I don't have time*." (Older Female, 62 years).

"*My sister only takes medicine and health follow-up by appointment*." (Family Female, 55 years).

The community's perspective on promoting community health literacy to taking care of older adults with hypertension in the community.

Focus group discussions and in-depth interviews with the key informants showed that older adults with hypertension, family members, and the community committee reflected on previously practiced methods for taking care of older adults with hypertension in the community and the opinion on ways to promote a community health literacy to caring for older adults with hypertension. This revealed three themes:

Theme I: Usual healthcare activities in the community

Activities that community committees used to carry out in each village include:

1) Health screening for non-communicable diseases among people at risk aged 35 years and over, providing health education, and home visits to patients with complications. The key informants explained that, in the past, there have been public health activities in the community, including screening for non-communicable diseases among people at risk aged 35 years and over, including diabetes, hypertension, and metabolic syndrome according to the national health policy. When people are found to have abnormal symptoms according to the screening criteria, they are referred for diagnosis and treatment from a doctor and receive continuous treatment at the PCU. In addition, activities are carried out to provide health education to the people about chronic diseases that are a problem in the country, such as chronic kidney disease, diabetes, hypertension, etc. Health activities are activities for the general public that involve health education to large groups of people and sometimes organizing small groups to talk and exchange health information. In the past, there were no health activities organized specifically for older adults with hypertension, as stated in the following.

"*Healthcare providers from PCU come out to give health education about hypertension, diabetes, and chronic kidney disease in the village in the large group and sometimes in the small group.*" (Older Female, 69 years).

"*Village health volunteer teams are responsible for health screening for diabetes and hypertension and providing group health education to at-risk people in the community*." (Female Committee Member,54 years).

In addition, the community committee has organized a team of village health volunteers to visit the patients who have complications from chronic non-communicable diseases (NCDs), at their home, to continuously monitor their symptoms at least once a month, as stated in the following.

"*People with non-communicable diseases who have complications are visited at home to monitor their health conditions; monitor their blood pressure, and they are asked about their self-care*." (Female Committee Member, 41 years).

"*A team of village health volunteers do home visits patients with hypertension who have complications once a month to monitor and evaluate their symptoms*." (Female Committee Member, 45 years).

2) Organizing common areas, and supporting exercise and recreational activities in the community. In the past, the community committee has taken steps to adjust the physical environment in the community, such as arranging common areas as places for people to exercise and encouraging physical activity by teams of village health volunteers. That exercise activity is aerobic dancing 3-4 days per week. The majority of participants are residents of each community, approximately 10-20 people per village. This activity is not organized throughout the year but is organized according to the time period of receiving health budget support in each village. This common area can be used as a place for other recreational activities of the people in the community as well, as stated in the following.

"The village committee team organizes areas for exercise and recreational activities in the village and at certain times each year, they organize aerobic dancing activities by the village health volunteers." (Female Committee Member, 45 years).

Theme II: The community action for promoting community health literacy to caring for older adults with hypertension.

The informants' opinions regarding how the community should take action in promoting community health literacy for taking care of hypertensive older adults in the community are as follows.

1) Providing health knowledge to older adults in the community by setting up small group learning activities. The key informants explained that the way to organize activities to provide information and knowledge to groups of older adults or people in the community that are likely to result in a better understanding of older adults with hypertension is to do so in small groups. Older adults have the opportunity to exchange and talk to learn from each other, listen to the opinions of many older adults' friends, do activities together, and practice various activities together. It should give older adults a lot more knowledge and understanding. It is more than just listening or giving individual explanations, as stated in the following.

"*When we come together as a small group, we advise each other not to eat sweet or salty food. It lets us talk and exchange ideas.*" (Older Female, 64 years).

"*Organizing small groups to learn gives everyone a chance to talk more, making the older adults more courageous to ask questions about their own issues than in a large group.*" (Family Male 24 years).

"*In the past, we made a cooking group that lets people in the community know how to cook a portion of healthy food should be set up; they're more clear about how to cook the healthy food.*" (Female Committee Member, 32 years).

2) A community health literacy policy regarding hypertension should be set up, and improving physical and social of community environment to promote the health literacy of hypertensive older adults. The outlook of the community committee was there must be a community policy to promote community health literacy related to hypertension in older adults. The physical environment in the community should be improved as the main road in the community must be planned to be established as a health road for posting the policy on community health literacy related to hypertension, this will inform community people to understand together. This road, in addition, should also be used to install a health information board, especially about hypertension knowledge, allowing the public to know health policies and health information together.

"*The policy for promoting health literacy in our village should also be announced for the people in the village to know. It is likely that we need to designate health roads in villages to post policy announcements, which we should call health roads*." (Female Committee Member, 52 years).

The key informants further commented that there should be improvements to the environment within the community that support people in the community to be health literate, such as providing knowledge about hypertension within the community, information and knowledge on how to behave for patients with hypertension should be provided by publicize via the community broadcasting, a campaign about walking street markets and health shops within the community. As such, older adults can access health information more easily, be able to apply the health information to practice daily life, and it can serve as a reminder to older adults with hypertension to take care of themselves appropriately. In addition, there should be more village health volunteers to home visit older adults with hypertension in the community to monitor and encourage them to take proper care of themselves, as stated in the following.

"*In the past, there were various health information signs on the road in the villages; this benefited people in the villages because they could read those signs and gain health knowledge to them.*" (Female Committee Member, 54 years).

Theme III: Nurses at PCU, village health volunteers, and community committees should be involved in playing a key role in promoting community health literacy.

The key informants have opinions about the people who should be involved in playing a role in promoting community health literacy regarding hypertension in older adults as follows: Nurses at PCU, village health volunteers, and community committees are the people who should play a key role in creating community health literacy about older adults with hypertension. This activity is the responsibility of the community committee, especially nurses, village health volunteers, and community leaders including mayors of the local administrative organization, sub-district headman, and village headman. These groups of people should play the main role in initiating activities in the community, because they are a group of reliable key people who are trusted by older adults and community people, especially the nurses of the PCU, who the people believe are health knowledgeable. Village health volunteers have been trained as community health assistants; moreover, community leaders have the authority to help and take care of the welfare of the people in the village. Thus, these groups are the key people in the community to take the role in creating community health literacy. As stated in the following:

"Who will help? Probably the public health nurses, village health volunteer team, and the village headman because they are the ones who have taken care of the villagers' health all along." (Older Female, 68 years).

"A team of community committee members, such as the village headman, should also come to help; they have the power to invite the village people to participate in health care practice because everyone in the village respects them." (Family Female, 50 years).

After confirming interviews with older adults with hypertension and their families on the issue of people who should play a role in building community health literacy, the key informants commented that it should be nurses at PCU, village health volunteers, and community committees because they are groups of people that older adults can easily access and can talk to at any time when they have questions, doubts or do not understand various information. As stated in the following:

"It should be the team of village health volunteers because they encourage people in the community to exercise, and they take care of the health of the people in the village." (Older Male, 67 years).

"A team of community committee members, such as the village headman, should also come to help; they have the power to invite the village people to participate in health care practice because everyone in the village respects them." (Family Female, 50 years).

Discussions

Themes of community people's experience

According to the community people's experience of access, understanding, evaluation, and application of health information for self-care of older adults with hypertension in the community, the results revealed four themes related to health literacy: these are the cognitive and social abilities composed of (1) Access, which refers to the ability to seek, find, and obtain health information; (2) Understanding refers to the ability to comprehend the health information that is accessed; (3) Appraise describes the ability to interpret, filter, judge, and evaluate the health information that has been accessed; and (4) Apply refers to the ability to communicate and use the information to decide to maintain and improve health (Sorensen et al., 2012). It can be discussed as follows:

Theme I: The most accessible health information related to hypertension comes from the advice of healthcare personnel at the PCU.

Based on this theme relevant to the component of access to health information, in Thailand, which is a middle-income country, people who live in rural areas have insufficient income, and most of them do not have smartphones, and they have a limited budget to use the internet to access health information from online media. Therefore, the available source of health information that is easily accessed in rural community areas usually comes from health personnel, especially medical doctors or nurses at the PCU, the healthcare services that are close to community people. This finding is consistent with a survey of Thai people's health literacy that found having insufficient income affects access to health information, causing most of them to receive health information from healthcare personnel (Roma & Kloyiam, 2019).

Theme II: The received health information regarding hypertension was simple and understandable.

Based on this theme relevant to the component of understanding health information, older adults and family members in the community normally receive health education directly from healthcare personnel at the PCU. They might communicate in simple terms and the same matters related to hypertension and health behavior that are not difficult and easy to understand. The older patients feel familiar with healthcare providers at the PCU; thus, they can directly and immediately ask questions if they are not clear in the message. This is in line with the U.S. Department and Human Services' methods for promoting health literacy which states that promoting health literacy among individuals and families should use language that is easily understood so that individuals can apply that information to appropriate self-care (U.S. Department of Health and Human Services, 2010).

Theme III: Unnecessary to analyze or evaluate the received health information from healthcare personnel.

Based on this theme relevant to the component of appraising skill, usually in rural areas community people rely on health professionals; they call every health personnel a “Doctor” even though they are not the medical doctor. In Thai rural communities, people trust and view all health personnel at the PCU as the experts in health; these make them feel more confident and less likely to double-check the received health information. This is consistent with studies on trust in information sources which found that, despite new communication channels, healthcare professionals remain the most trusted source of information for patients (Hesse et al., 2005). Moreover, a systematic literature review found that patients have good health behaviors and quality of life because they trust in health professionals (Birkhäuer et al., 2022).

Theme IIII: Only taking medicines and following up as medical appointments is the health information that is the most concerning to regularly practice.

Based on this theme relevant to the component of applying health information to practice, people with chronic diseases, especially older people, always believe in taking medicine more than changing their behaviors. They have had hypertension for a long time and are continually educated about taking medicine to control their disease. Moreover, they are scheduled to follow up every two or three months for physical checkups and continue medication. The PCU in Thailand is located in the community and not far from the residential area, people in the community are comfortable visiting as an appointment as it is convenient and easily accessible. On the other hand, performing healthy behavior is quite difficult for them, they need discipline and support from peers or others to encourage them. This is consistent with the study of factors affecting cooperation in treatment in that the convenience of traveling to receive services has a positive effect on cooperation in treatment (Taengsakha, Maneesriwonggul, & Putawatana, 2019). A study of the relationship between health literacy and the behavior of taking medicine and coming to doctor’s appointments found that health information assistance affected taking medicine and coming to doctor’s appointments for diabetic and hypertensive patients (Chaiyata, Numkham, & Rakkapao, 2020).

Based on the contradictory findings, although consistent with the four components of health literacy, it was still found that older adults with hypertension were still unable to take care of themselves appropriately. It is seen that in regard to the component of appraisal of health information, older adults with hypertension still have to rely heavily on healthcare professionals. In addition, in the area of application of health information, it was found that most older adults with hypertension still do not change their self-care appropriately, focusing only on taking medicine and following up as medical appointments, which may result in poor health outcomes.

The community's perspective on promoting community health literacy to taking care of older adults with hypertension in the community

The community's perspective on promoting community health literacy to taking care of older adults with hypertension in the community can be discussed as follows:

Theme I: Usual healthcare activities in the community

The finding revealed usual healthcare activities in the community were composed of 1) health screening for non-communicable diseases among people at risk aged 35 years and over, providing health education, and home visits to patients with complications. In these activities the usual responsibility of all health personnel at the PCU is to function for monitoring community people's health to find cases and refer to received diagnoses for early treatment. These are the activities that deploy the national action plans/projects according to the 5-year national strategic plan for prevention and control of non-communicable diseases of the Department of Disease Control, Ministry of Public Health of Thailand on biological risk factors. This plan aims to reduce the rate of non-chronic communicable diseases (Division of Non-Communicable Diseases, 2020), which is considered to be carried out according to the plan. 2) Organizing common areas, and supporting exercise and recreational activities in the community. In Thailand, health promotion was launched in the community, and well-known activities implemented for community people were exercise, especially aerobics dance which is suitable for general people but not for older adults in the community. Therefore, the activities that were implemented in the community were in line with the national health policy that supports the prevention and control of non-communicable diseases in specific target groups to reduce people's risky behaviors for non-communicable diseases (Division of Non-Communicable Diseases, 2020).

Theme II: The community action for promoting community health literacy to caring for older adults with hypertension.

The findings demonstrated that the community action for promoting community health literacy to caring for older adults with hypertension should be composed of *1) Providing health knowledge to older* *adults in the community by setting up small group learning activities*. This type of activity allows for discussion and exchange of health information in terms of knowledge and experiences between each other, especially in older people who are in the declining process of cognitive function. Active learning is the learning activity that lets the older have a chance to ask, talk, practice, and discuss; all these are the learning strategies that will let the patient obtain more health literacy (U.S Department of Health and Human Services, 2010). This is consistent with a result from a systematic literature review that found interactive learning strategies are methods that increase public health literacy (Meherali, Punjani, & Mevawala, 2020). *2) A community health literacy policy regarding hypertension should be set up, and the physical and social community environment improved to promote the health literacy of hypertensive older adults.* Healthy public policy is one strategy that has a concern for health impact and aims to create a supportive environment for the good health of all citizens equally; posting no direct negative health consequences, nor impeding access to basic healthcare services (WHO, 1986).

Theme III: Nurses at PCU, village health volunteers, and community committees should be involved in playing a key role in promoting community health literacy.

In this, the community has a clear health policy leading to action that has concrete results and also creating an environment that is conducive to both physical and social health, such as posting plain information signs, while organizing areas for exercise and recreation has another effect that helps create more health literacy in the community (Matsee & Waratwichit, 2017). In addition, *the people who should be involved in playing a role in promoting community health literacy regarding hypertension in older adults were nurses at PCU, village health volunteers, and community committees*. In rural or suburban contexts, all these mentioned groups are the key people who take responsibility for taking care of the health and welfare of the community people. In addition to that, community people feel familiar and have close relationships with all the mentioned persons as well as trust them. Therefore, the activity that will make the community people have good health and quality of life should be their responsibility (de Wit et al., 2018). This supports the WHO's suggested strategies for improving health literacy in the population and provides a foundation where citizens can perform their health improvement roles, engage in community actions for health, and urge the government to fulfill their health and wellness management responsibilities (WHO, 2016).

The policy implications of the findings, particularly regarding promoting community health literacy for older adults with hypertension have been carried out in response to the National Health Policy. Although a policy has been established to create health literacy, in the actual situation this policy has not yet been implemented. Most of the activities are focused on screening for at-risk disease or promotion/ prevention in every age group in an overall manner without specifying specific solutions. As a result, there are still problems with health outcomes that have not yet been achieved. Therefore, developing this issue of community health literacy through healthcare professionals (nurses) collaborating with community committees to encourage older adults with hypertension in the community to have better health literacy will affect self-care and lead to good health outcomes.

Through the barriers discovered, the researcher was able to see the problems and reflect the findings to the community committee so that they could see areas that needed to be developed, that is, practices that were more specific to the problems. Moreover, the finding reflects who should take part in promoting health literacy in the community to create an environment conducive to changing appropriate self-care, which will have a good result in health outcomes for older adults with hypertension.

Strengths of this research is the information obtained from various sources of stakeholders reveals both depth and width of perspective on community health literacy that benefits promoting the health of older adults with hypertension in the community

Limitation of this research is This study was done with only one setting in the Northeastern area of Thailand; the result might not be generalized to other different cultural settings.

The local geographic limitations of this study may not be transferable to large populations. Further study is needed to determine whether these results apply to older adults with hypertension and communities across the country and around the world.

Conclusion

Older adults with hypertension in rural or suburban communities rely on health information from healthcare personnel at the PCU to perform self-care practices. They focus on medication more than behavior modification. The current activities in the community were routine health screening for finding new cases of non-communicable disease in the population at risk. The approaches to creating community health literacy should include various methods focusing on active learning and interactive group activities for hypertensive older people to improve cognitive and social skills. The community actions taken to improve health literacy should include involvement in facilitating a healthy environment. The people responsible for the community should comprise community committee members, village health volunteers, and comm Buford unity nurses. According to these findings, strengthening community action by enhancing community health literacy is needed to improve the health of older adults with hypertension.

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Conflict of interest

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References

Ademe, S., Aga, F., & Gela. (2019). D. Hypertension self-care practice and associated factors among patients in public health facilities of Dessie town, Ethiopia. BMC Health Services Research, 19:51. https://doi.org/10.1186/s12913-019-3880-0

Aekplakorn W. (2022). The Thai National Health Examination Survey VI (NHES VI). Accessed June 1, 2022. https://www.hsri.or.th/media/printed-matter/detail/13443

Arahung, R., Hoontrakul, S., Roojanavech, S. (2017). The effects of Health Literacy Enhancement Program on hypertensive preventive behavior of pre-hypertensive risk group at a community in Nakhon Pathom Province. Royal Thai Medical Journal, 45(3); 509-526.

Birkhäuer, J., Gaab, J., Kossowsky, J., Hasler, S., Krummenacher, P., Werner, C., and Gerger, H. (2017). Trust in the health care professional and health outcome: A meta-analysis. PLoS One, Feb 7;12(2):e0170988. doi: 10.1371/journal.pone.0170988. PMID: 28170443; PMCID: PMC5295692.

Boonsatean, W., and Reantippayasakul, O. (2022). Health Literacy: Situation and Impacts on Health Status of the Older Adults. APHEIT Journal of Nursing and Health, 2(1): 1-19. doi 10.14456/ajnh.2020.1

Buford, T. W. (2016). Hypertension and aging. Ageing Res. Rev., 2016:26: 96-111. doi: 10.1016/j.arr.2016.01.007.

Bureau of Health Promotion, Elderly Health Group, Department of Health. (2013). Report of the Thai Elderly Health Survey 2013, under the health promotion program for the elderly and the disabled. Watcharin P.P. Printing House

Chaiyata, E., Numkham, L., and Rakkapao, N. (2020). The Relationship between Health Literacy, Medication Intake, and Doctor's Appointment Behavior among Patients with Diabetes Mellitus and Hypertension in Lamphun Province. Thai Science and Technology Journal, Jan; 28(1): 182-196. doi: 10.14456/tstj.2020.15

Chin, J., Madison, A., Gao, X., Graumlich, J. F., Conner-Garcia, T., Murray, M. D., et al. (2017). Cognition and Health Literacy in Older Adults' Recall of Self-Care Information. The Gerontologist, 57(2): 261–268. https://doi.org/10.1093/geront/gnv091

Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. New York, NY: SAGE Publications, Inc.

de Wit, L., Fenenga, C., Giammarchi, C. et al. (2018). Community-based initiatives improving critical health literacy: a systematic review and meta-synthesis of qualitative evidence. BMC Public Health. https://doi.org/10.1186/s12889-017-4570-7

Department of Health of Ministry of Public Health. (2016). Development of health promotion and environmental health systems under the National Health Development Plan during the 12th National Economic and Social Development Plan (2017-2021). Available from: https://www.anamai.moph.go.th/download//2560

Division of Non-Communicable Diseases of Department of Disease Control, Ministry of Public Health, Thailand. (2020). Lessons learned: Implementation of the 5-year national strategic plan for prevention and control of non-communicable diseases (2017 - 2021). Graphic and Design Publishing House: Bangkok. (in Thai)

Doyle, L., McCabe, C., Keogh, B., Brady, A., & McCann, M. (2020). An overview of the qualitative descriptive design within nursing research. Journal of research in nursing: JRN, 25(5), 443–455. https://doi.org/10.1177/1744987119880234

Du, S., Zhou, Y., Fu, C., Wang, Y., Du, X., & Xie, R. (2018). Health literacy and health outcomes in hypertension: An integrative review. International journal of nursing sciences, 5(3), 301–309. https://doi.org/10.1016/j.ijnss.2018.06.001

Eamtip, M. (2022). Focus Group Discussion: Qualitative Data Collection Technique. Journal of Liberal Arts and Services Industry. 5(1): 96-104. (in Thai)

Hesse, B.W., Nelson, D.E., Kreps, G.L., Croyle, R.T., Arora, N.K., Rimer, B.K., Viswanath, K. (2005). Trust and sources of health information: the impact of the Internet and its implications for health care providers: findings from the first Health Information National Trends Survey. Arch Intern Med, Dec 12-26;165(22):2618-24. doi: 10.1001/archinte.165.22.2618. PMID: 16344419.

Hongkrajok, H., Pathumarak, N., & Masingboon, K. (2016). Influences of Health Literacy, Perceived Self-Efficacy, on Self-Care Behaviors among Patients with Primary Hypertension. Royal Thai Navy Medical Journal, 43(2), 39-54. (in Thai) https://www.cdc.gov/healthliteracy/learn/

Ladecola, C. et. al. (2016). Impact of Hypertension on Cognitive Function: A Scientific Statement from the American Heart Association. HHS Public Access, 68(6): e67–e94. doi: 10.1161/HYP.0000000000000053

Lincoln, Y.S., and Guba, E.G. (1985). Naturalistic inquiry. Newbury Park CA: Sage.

McDonald, M., and Shenkman, L.J. (2018). Health Literacy and Health Outcomes of Adults in the United States: Implications for Providers. The Internet Journal of Allied Health Sciences and Practice, Jan 01;16(4), Article 2.

Matsee, C., and Waratwichit, C. (2017). Promotion of Health Literacy: From Concept to Practice. Boromarajonani College of Nursing, Uttaradit Journal, Jul-Dec 9(2): 96-111. (in Thai)

Meherali, S., Punjani, N.S., and Mevawala, A. (2020). Health Literacy Interventions to Improve Health Outcomes in Low- and Middle-Income Countries. Health Lit Res Pract, Dec 11;4(4): e251-e266. doi: 10.3928/24748307-20201118-01. PMID: 33313935; PMCID: PMC7751448.

Nutbeam, D. (2000). Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. Health Promotion International, 15(3): 259-267. doi:10.1093/heapro/15.3.259

Oh, J. H., and Park, E. (2017). The impact of health literacy on self-care behaviors among hypertensive elderly. Korean Journal of Health Education and Promotion, Mar 31;34(1):35–45. Available from: http://dx.doi.org/10.14367/kjhep.2017.34.1.35

Panahi, R., Kazemi, S.S., Juyani, A.K., and Pishvaei, M. (2018). Health literacy and self-care in patients. Journal of Research and Health, 8: 392-393.

Roma, W. and Kloyiam, S. (2019). Thai Health Literacy Survey (THL-S) of Thais aged 15 years and above. Nonthaburi: Health System Research Institute.

Sentell, T., Zhang, W., Davis, J., Baker, K. K., and Braun, K. L. (2014). The influence of community and individual health literacy on self-reported health status. J Gen Intern Med, 29(2): 298-304. doi:10.1007/s11606-013-2638-3

Sierra, C., Doménech, M., Camafort, M. et al. (2012). Hypertension and Mild Cognitive Impairment. Curr Hypertens Rep, 14: 548. https://doi.org/10.1007/s11906-012-0315-2

Sinsap, N., Jankra, J. and Jaiman, B. (2017). Hypertension in elderly: Silence killer should be aware. Journal of Phrapokklao Nursing College, 28(1):100-111.

Sinto N., Kamkaew W., Chummalee I., and Srisaknnok T. (2022). Health Literacy And Health Behaviors Among Risk Group Of Hypertension Disease, Mahasarakham Province. Research and Development Health System Journal, 15(3). https://he02.tci-thaijo.org/index.php/RDHSJ/article/view/257944/177167

Sørensen, K., Van den Broucke, S., Fullam, J. et al. (2012). Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health, 12:80, doi:10.1186/1471-2458-12-80

Statista Research Department. (2023). Number of hypertension patients Thailand 2016-2021. Available from: https://www.statista.com/statistics/1104418/thailand-number-of-hypertension-patients/

Taengsakha, K., Maneesriwonggul, W., and Putawatana, P. (2019). Factors Related to Adherence to Treatment in Essential Hypertensive Patients with Early Renal Insufficiency. Rama Nurs J, Jan-Apr; 25(1): 87-101. (in Thai)

Thepin, K., Moolsart, S., and Jantacumma, N. (2019). Effectiveness of a Health Literacy Developmental Program in Patients with Uncontrolled Hypertension. Boromarajonani college of Nursing, Uttaradit Journal, 11(1):197-212.

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2010). National Action Plan to Improve Health Literacy. Available from: https://www.cdc.gov/healthliteracy/learn/

Weber, M. A., et al. (2013). Clinical practice guidelines for the management of hypertension in the community: A statement by the American Society of Hypertension and the International Society of Hypertension. Available from: http://www.ash-us.org/documents/ ash_ish-guidelines_2013.pdf

World Health Organization; WHO. (1986). The Ottawa Charter for Health Promotion. Available from https://www.who.int/teams/health-promotion/enhanced-wellbeing/first-global-conference

World Health Organization; WHO. (1998). Health literacy. Available from: https://www.who.int/healthpromotion/conferences/7gchp/Track1_Inner.pdf

World Health Organization; WHO. (2013). Health Literacy: the solid facts. 2013. Available from: https://www.euro.who.int/__data/assets/pdf.file/0008/190655/e96854.pdf?ua=1

World Health Organization; WHO. (2016). The mandate for health literacy 9th Global Conference on Health Promotion, Shanghai 2016. Available from : https//:www.who.int/healthpromotion/conferences/9gchp/health-literacy/en/

World Health Organization; WHO. (2019). World Hypertension Day 2019. Available from: https://www.who.int/news-room/events/world-hypertension-day-2019

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ORIGINAL ARTICLE

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Caregiver burden and depression among caregivers of patients with chronic disease

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ABSTRACT

Introduction: Caring for people with chronic diseases is physically and emotionally demanding. It can also have adverse effects on the caregiver, such as depression. Caregiver burden describes the psychological and financial strains of providing care. Depression in caregivers manifests as concern, indecision, and an inability to feel the future. Chronic disease is a condition that takes a long time to treat and may progressively worsen over time. This study aimed to identify the level of caregiver burden and depression and the correlation between burden and depression among caregivers of patients with chronic diseases.

Methods: A cross-sectional study using a self-administered questionnaire containing the Caregiver Burden Inventory and Beck Depression Inventory was used to measure caregiver burden and depression. The study involved 217 caregivers of patients with chronic diseases who were selected through a purposive sampling in a teaching hospital in Selangor, Malaysia.

Results: The findings showed that the majority of caregivers experienced a mild burden (n = 168, 77.4%), a moderate burden (n = 43, 19.8%), and severe burden (n = 6, 2.8%). Following mild depression (n = 17, 7.8%), moderate depression (n = 15, 6.9%), and severe depression (n = 4, 1.8%), some caregivers experienced minimal depression (n = 181, 83.4%). According to Pearson's analysis, the correlation between caregiver burden and depression was statistically significant ($p<0.000$) and with a positive correlation ($r = 0.408$).

Conclusions: In this study, caregivers experienced burdens and depression due to providing care. Future studies should incorporate support and resources for caregivers, including respite care and counseling that can promote overall well-being.

Keywords: caregivers, caregiver burden, chronic disease, depression

Introduction

In Malaysia, around 2.3 million people will experience depression at some point that remains underdiagnosed (Collaborators, 2018). In 2015, the latest National Health Morbidity Survey (NHMS) statistic found a 29.2% prevalence of mental health problems among Malaysians aged 16 and older (Institute for Public Health, 2015). Whereas in 2011, 1.7% reported generalized anxiety disorders, 1.8% reported current depression, 1.7% reported suicidal ideation, and 1.1% reported having attempted suicide in the past (Institute for Public Health (IPH), 2012). Such data show a marked increase in mental health issues in Malaysia, thereby exposing a threat to the Malaysian mental health system. As we concerned about the increasing level of depression among Malaysians, the researchers would like to determine the impact of caregiver burden on mental health.

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Caregiver burden is the perception of hardship in physiological and psychological well-being, socialization, and economic status resulting from caring for people that they look after (Kellner *et al.*, 2017). Meanwhile, caregiver depression, which is a failure to feel the future, anxiety, and indecision can affect both formal and informal caregivers as a result of caregiving (Strang *et al.*, 2019). Caregivers will directly or indirectly experience significant burdens and depression due to the patient's daily activities, appointments, and treatments based on the patient's diagnosis. As caregivers often take on burdens they are not expected to confront, they become unprepared to handle them. This responsibility or duty becomes more difficult when they have no professional training from the beginning and are typically less experienced in the care of specific illnesses (Olagundoye and Alugo, 2018). Therefore, this situation makes the caregiver think that caregiving is a complex burden and that they must meet the patient's needs until the end of their life.

Chronic diseases are ailments that last a year or longer, necessitating continuing medical care or impeding everyday activities (National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 2019a). In this research, the level of caregiver burden and depression among patients with diabetes mellitus, cardiovascular disease, chronic obstructive pulmonary disease, arthritis, hypertension, stroke, renal disorder, cancer, asthma, eyes, and ear disease will be identified. Chronic disease patients, especially those with heart failure, suffer functional limitations and experience polypharmacy, which causes caregiving to become more burdensome. Ninety percent of the $3.5 trillion in yearly healthcare spending in the United States is used to treat people with chronic illnesses and mental problems (National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), 2019b). Chronic diseases can affect health deterioration and burden financial expenses. People with chronic conditions are spending more on healthcare, but these expenses can be reduced by preventing chronic diseases or managing symptoms. Changes in lifestyle and diet can avoid chronic diseases, thus decreasing the need for costly treatments.

Providing care among patients with chronic diseases is long-term care, which is why caregivers need to adapt to physical and mental pressure. Caregivers are required to provide high-quality care to patients with chronic illnesses and functional impairments. However, the caregiver usually gives insufficient personal care to the thought that there was insufficient time to form such arrangements or that the guardian was too exhausted to renew the appointment because the caregiver was sick of medical visits. Both caregivers and patients' health mostly impact the caregiver burden. The functional status of the patient, the caregiver's depressive symptoms, and social support were revealed to be the main predictors of the caregiver burden in research involving stroke patient carers (Othman *et al.*, 2014).

A cross-sectional study revealed that about one in four caregivers of patients who received oncologic treatment in Kuala Lumpur Hospital were stressed (Chai *et al.*, 2018). The caregivers have to conduct various caregiving duties, such as handling the patient's symptoms of illness, coping with the side effects of treatment, attending hospital appointments, and assisting in household chores (Chai *et al.*, 2018). Another study showed that the progression of chronic disease and physical disabilities could cause stress to both patient and caregivers (Etemadifar *et al.*, 2018). Thus, it is essential to understand the main factor influencing the caregiver's burden as both the caregiver and patient's health outcomes depend on the caregiver's experience (Lum *et al.*, 2014).

Therefore, the results of this study can be utilized to holistically discuss the levels of burden and depression experienced by caregivers of patients with chronic diseases. Thus, existing, or newly created support systems should be strengthened and made easier to use by nurses and other healthcare providers to lessen caregivers' emotional stress. This research will recognize strategies that can help establish programs that minimize the burden on caregivers, increase the quality of caregivers' lives, and be an informational resource for nurses and other medical practitioners. Early detection by having the right tools to evaluate caregiver burden and depression is beneficial to caregivers and patients. However, studies which have identified the effect of caregiver burden on depression levels are scarce. Thus, this study aims to determine the level and correlation between burden and depression among those who care for patients with chronic diseases.

Materials and Methods

Design and Settings

A cross-sectional study using a self-administered questionnaire was employed. A caregiver of patients with chronic diseases who met the inclusion and exclusion criteria at a teaching hospital, Universiti Teknologi MARA Medical Specialist Centre (UiTMMSC), Selangor, Malaysia. UiTMMSC provides primary and secondary prevention treatments, assessments, investigations, diagnosis, and information for patients with or who have a risk factor of chronic disease, thus providing information on their caregivers.

Samples

A purposive sampling was used in this study, which was done among 217 caregivers of patients with chronic diseases who met the inclusion and exclusion criteria at a teaching hospital in Selangor, Malaysia. The inclusion criteria included caregivers over 18 years old who could read, speak, or understand Malay and English. The respondents should be caregivers of patients with communicable and non-communicable diseases, and care for patients most of the time. Meanwhile, caregivers who have a psychiatric history or physical deformities are excluded.

Research Instruments

This study used a self-administered questionnaire consisted of closed-ended questions divided into three sections: Sections A, B, and C. The demographic data for Section A consisted of the caregiver's details, such as age, gender, marital status, relationship with the patient, employment status, academic background, level of revenue, and total hours of daily care.

Thereby, to identify the level of caregiver burden in Section B, the caregiver burden inventory (CBI) developed by Novak and Guest (1989) and translated into the Malay version by Mulud, McCarthy and Mohamad (2018) was used. This questionnaire is made up of 24 items and has a 4-point Likert scale with a total score of 96, ranging between 0 and 32 (mild burden), 33 to 64 (moderate burden), and 65 to 96 (severe burden). of the higher the scores indicates an intense level of the burden faced by the caregiver (Zhu and Jiang, 2018).

To evaluate the symptoms and severity of depression in section C, the 20-item self-report multiple-choice inventory of the Beck depression inventory (BDI) in the Malay edition by Mukhtar and Oei (2011) was used. Meanwhile, the English BDI edition was adapted by Beck et al. (Beck, 1961). Every single item was scored on a four-point Likert scale ranging from without symptom (0) to existing symptoms ranged 1 to 3, with an overall score reached between 0 and 63. Minimal depression score was 0-13, mild depression (14-19), moderate depression (20-28), and severe depression (29-63) (Beck, Steer and Brown, 1996). The higher the score reflected more severe depressive symptoms among respondents. The questionnaire was proven with a high level of reliability with Cronbach's alpha coefficients of 0.86 and 0.87 for the BDI and CBI, respectively (Lahlou-Laforêt *et al.*, 2015; Pucciarelli *et al.*, 2018)

Data Collection

The respondents' eligibility in accordance with the inclusion and exclusion criteria was verified before the data were gathered. The aims of the study were explained to the respondents. The printed questionnaires (BDI and CBI) had to be completed by the respondents. Researchers were available throughout the session to guide the respondents who needed clarification about the study. The time duration for each of the respondents to answer the questionnaire was approximately 15 – 20 minutes. The completed surveys were returned. The data were collected for three months from January to March 2022.

Ethical Consideration

Ethical approval to conduct the study was obtained from Universiti Teknologi MARA (UiTM) Research Ethics Committee in UiTM Shah Alam with referral number REC/336/19 and the permission from UiTMMSC with referral number 500-FPR (PT.14/5). The data were collected after obtaining the research permit. The respondents' eligibility in accordance with the inclusion and exclusion criteria was verified before the data were gathered.

Data analysis

Data were analyzed using Statistical Programme Package for Social Sciences (SPSS) version 25.0. The statistical analyses included descriptive statistics to identify the level of burden and level of depression among caregivers of patients with chronic illness. The researchers used Pearson's correlation coefficient to determine the correlation between the level of burden and depression among caregivers and parametric test of one-way ANOVA to determine the relationship between the level of burden and demographic data among caregivers. Data were analyzed using Statistical Programme Package for Social Sciences (SPSS) version 25.0. The statistical analyses included descriptive statistics to identify the level of burden and level of depression among caregivers of patients with chronic illness. The researchers used Pearson's correlation coefficient to determine the correlation between the level of burden and depression among caregivers and parametric test of one-way ANOVA to determine the relationship between the level of burden and demographic data among caregivers.

Table 1. Demographic Data among Caregivers of Patients with Chronic Disease

Variables	Frequency (n)	Percentage (%)
Age		
18 to 24	31	14.3
25 to 54	143	65.9
55 to 64	28	12.9
65 and above	15	6.9
Gender		
Man	75	34.6
Woman	142	65.4
Caregiver's marital status		
Single	61	28.1
Married	151	69.6
Divorced	3	1.4
Widow	2	0.9
Caregiver's relationship with a patient		
Spouse	68	31.3
Other family members	124	57.1
Paid caregiver	25	11.5
Caregiver's employment status		
Employed	139	64.1
Retired	35	16.1
Unemployed	43	19.8
Caregiver's educational background		
No education	1	0.5
Primary school	5	2.3
Secondary school	58	26.7
College/University	153	70.5
Caregiver's income per month		
≤ USD200	52	24
USD200 – USD600	72	33.2
USD600 – USD1000	60	27.6
≥ USD1000	33	15.2
Total hours of caregiving per day		
3 – 13 hours	123	56.7
12 - 24 hours	94	43.3

Results

Demographic Data

The demographic characteristics included the caregiver's age, gender, marital status, relationship with the patient, employment status, educational background, income per month, and total hours of caregiving per day, as shown in Table 1. The mean (SD) age of caregivers was 40.73 (14.50). More than half of the caregivers were women (65.4%) and married (69.6%). Caregiving roles are dominated by the patient's other family members (57.1%), employed caregivers (64.1%), and with education from college or university level (70.5%). Most caregivers generated monthly income within USD200 – USD600 (33.2%) and carried out caregiving tasks between 3 to 13 hours per day (56.7%).

Level of Caregiver Burden

This study found a range of scores for the level of burden among caregivers, with an average overall score representing a mild burden of 168 (77.4%). Besides that, 6 out of 217 total caregivers experience a severe burden of 2.8%, while for moderate burden, this accounted for 43 (19.8%) of caregivers. The mean total caregiver burden score in this study was = 21.92 (SD=17.21).

Table 2. Correlation between the Level of Burden and Depression among Caregivers of Patients with Chronic Disease

Variables	Level of Depression	
	Correlation Coefficient	p-level
Level of Burden	0.408**	0.000

Bold indicates a relationship significant at p<0.05.
**Correlation is significant at the 0.01 level (2-tailed)

Level of Caregiver Depression

The BDI questionnaire inquired about the caregiver's level of depression. The descriptive analysis shows 83.4% or 181 out of 217 caregivers of patients with chronic disease experienced minimal depression, followed by mild depression, which is 7.8%, equivalent to 17 caregivers. Fifteen caregivers, representing 6.9%, encountered moderate depression, and only four (1.8%) caregivers showed symptoms of severe depression.

Correlation between the Level of Burden and Depression

Table 2 illustrates that the correlation between the level of burden and depression among caregivers of chronic disease patients was calculated using Pearson's correlation coefficient. Results indicated that the two variables were significant (p=.000) and positively correlated (r=0.408).

Relationship between the Level of Burden and Demographic Data

Based on the one-way ANOVA test, the relationship between the level of caregiver burden with age, gender, and employment status is not significant (p>0.05), as shown in Table 3. Kolmogorov-Smirnov and Shapiro-Wilk Normality tests presented a significance value <0.001, meaning the data were not normally distributed. Non-parametric Kruskal Wallis test was used to measure the relationship between the level of caregiver burden with marital status, income per month, educational background, and total hours of caregiving per day, with p-value 0.643, 0.192, 0.529, and 0.194, respectively. The test result for the relationship between the caregiver burden level and the patient's relationship showed a statistically significant difference with p=0.000. The Kruskal Wallis test also found the mean rank of paid caregiver (155.94) was higher compared to the spouse (114.34) and other family members (96.61). Post hoc test (Dunnett T3 procedure) was tested. The result suggested that the relationship with the patient was significantly different between the caregiver's relationships "spouse and other family members," "spouse and paid caregiver," and "other

Table 3. Relationship between the Level of Burden and Demographic Data among Caregivers of Patients with Chronic Disease

Variables	n	Mean (SD)/ Median (IQR)	F-stats (pdf)/ H-stats (pdf)	p-value
Age			0.218 (3;213)	0.884
18-24	31	1.23 (0.425)		
25-54	143	1.27 (0.533)		
55-64	28	1.21 (0.418)		
65 and above	15	1.20 (0.414)		
Gender			0.750 (1;215)	0.387
Man	75	1.21 (0.444)		
Woman	142	1.27 (0.521)		
Marital status			1.673 (3)	0.643*
Single	61	1.00 (0)		
Married	151	1.00 (0)		
Divorced	3	1.00 (0)		
Widow	2	1.00 (0)		
Relationship with patient			36.530 (2)	0.000*
Spouse	68	1.00 (1)		
Other family members	124	1.00 (0)		
Paid caregiver	25	2.00 (1)		
Employment status			0.112 (2;214)	0.894
Employed	139	1.25 (0.512)		
Retired	35	1.29 (0.519)		
Unemployed	43	1.23 (0.427)		
Educational background			2.215 (3)	0.529*
No education	1	a		
Primary school	5	1.00 (0)		
Secondary school	58	1.00 (0)		
College/University	153	1.00 (0)		
Income per month			4.743 (3)	0.192*
≤ USD200	52	1.00 (0)		
USD200-USD600	72	1.00 (0)		
USD600-USD1000	60	1.00 (1)		
≥ USD1000	33	1.00 (0)		
Total hours of caregiving per day			1.686 (1)	0.194*
3 – 13 hours	123	1.00 (0)		
12 - 24 hours	94	1.00 (1)		

Bold indicates a relationship significant at $p<0.05$.

a. Interval Burden is constant when the caregiver's educational background = No education. It has been omitted.

*Kruskal Wallis test used with values expressed in terms of medians and IQR.

Pairwise, posthoc Kruskal Wallis expressed the caregiver's relationship with the patient "spouse and other family members," "spouse and paid caregiver," and "other family members and paid caregiver" significant difference at $p<0.05$.

family members and paid caregiver," with p-value 0.034, 0.007, and 0.000, respectively.

Relationship between the Level of Depression and Demographic Data

Table 4 represents the caregiver's demographic data analyzed by using the Fisher's exact test to determine the relationship between the level of caregiver depression with age, gender, marital status, association with a patient, employment status, educational background, income per month, and total hours of caregiving per day. From the result obtained, the relationship between the level of caregiver depression with age, association with a patient, employment status, educational background, income per month, and total hours of caregiving per day among caregivers of patients with chronic disease showed no statistically significant differences ($p > 0.05$). There is only a significant difference between the level of caregiver depression and gender and marital status, with a p-value of 0.04 and 0.01, respectively.

Discussions

The study aimed to determine the level and correlation between burden and depression among caregivers of patients with chronic disease. According to the study's findings, about three-quarters of caregivers scored mild burden. The prevalence of mild burden among caregivers implies that a substantial proportion of this caregiving population is grappling with challenges. This finding aligns with the understanding that caring for individuals with chronic diseases is inherently demanding, both physically and emotionally. The caregivers' experiences, as reflected by the mild burden scores, indicate a discernible yet manageable level of strain in fulfilling their caregiving responsibilities. This result matches those observed in earlier research that stated that 72% of caregivers reported mild burden (Gbiri, Olawale and Isaac, 2015).

The majority of caregivers in this study providing care for patients with chronic diseases had minimal depression, suggesting a noteworthy resilience or coping capacity within this caregiving population,

Table 4. Relationship between the Level of Depression and Demographic Data among Caregivers of Patients with Chronic Disease

Variables	Minimal Depression n (%)	Mild Depression n (%)	Moderate Depression n (%)	Severe Depression n (%)	Value	Exact Sig. (2-sided)
Age					10.68	0.19
18 to 24	23(74.2)	3(9.7)	2(6.5)	3(9.7)		
25 to 54	117(81.8)	13(9.1)	12(8.4)	1(0.7)		
55 to 64	26(92.9)	1(3.6)	1(3.6)	0(0)		
65 and above	15(100)	0(0)	0(0)	0(0)		
Gender					7.98	0.04
Man	68(90.7)	6(8)	1(1.3)	0(0)		
Woman	113(79.6)	11(7.7)	14(9.9)	4(2.8)		
Marital status					23.16	0.01
Single	45(73.8)	8(13.1)	5(8.2)	3(4.9)		
Married	134(88.7)	7(4.6)	9(6)	1(0.7)		
Divorced	1(33.3)	1(33.3)	1(33.3)	0(0)		
Widow	1(50)	1(50)	0(0)	0(0)		
Relationship with patient					7.99	0.18
Spouse	61(89.7)	2(2.9)	5(7.4)	0(0)		
Other family members	99(79.8)	14(11.3)	7(5.6)	4(3.2)		
Paid caregiver	21(84)	1(4)	3(12)	0(0)		
Employment status					6.20	0.35
Employed	115(82.7)	14(10.1)	8(5.8)	2(1.4)		
Retired	32(91.4)	1(2.9)	2(5.7)	0(0)		
Unemployed	34(79.1)	2(4.7)	5(11.6)	2(4.7)		
Educational background					8.30	0.71
No education	1(100)	0(0)	0(0)	0(0)		
Primary school	4(80)	1(20)	0(0)	0(0)		
Secondary school	49(84.5)	4(6.9)	3(5.2)	2(3.4)		
College/University	127(83)	12(7.8)	12(7.8)	2(1.3)		
Income per month					7.14	0.60
≤ USD200	41(78.8)	4(7.7)	5(9.6)	2(3.8)		
USD200-USD600	57(79.2)	8(11.1)	5(6.9)	2(2.8)		
USD600-USD1000	54(90)	2(3.3)	4(6.7)	0(0)		
≥ USD1000	29(87.9)	3(9.1)	1(3)	0(0)		
Total hours of caregiving per day					0.96	0.84
3 – 13 hours	104(84.6)	10(8.1)	7(5.7)	2(1.6)		
12 - 24 hours	77(81.9)	7(7.4)	8(8.5)	2(2.1)		

Bold indicates a relationship significant at p<0.05.
Fisher's Exact test results expressed in value and exact significance two-sided

despite the inherent challenges associated with caring for individuals with chronic illnesses. Understanding the prevalence of minimal depression is crucial in recognizing the diverse array of responses and coping strategies employed by caregivers in the face of the demanding nature of chronic disease caregiving. Another study found that 28% of carers had mild signs of depression, with a rating of BDI-II ≥14 (Chung *et al.*, 2010). This finding contrasts with a previous study in Chengdu, China, in which the result may be due to some of the respondents caring for the dependent patients (Liang *et al.*, 2017). Hence, the level of dependence and hardship was higher compared to the sensation of the burden felt by the caregivers in the present study (Liang *et al.*, 2017). However, it is essential to interpret the prevalence of minimal depression with caution. While it indicates a positive aspect of caregivers' mental health, it does not negate the potential existence of more subtle emotional distress or the need for ongoing support. Furthermore, individual experiences of minimal depression may fluctuate over time, necessitating continuous attention to caregivers' well-being.

The current study sheds light on a significant association between the level of caregiver burden and the level of depression among individuals providing care to patients with chronic diseases. The observed connection underscores the intricate interplay between the challenges inherent in caregiving for individuals with chronic illnesses and the psychological well-being of the caregivers. The burden perceived by the caregivers is seen to be rising, and the depressive symptom is also increasing (Lin, Chen and Li, 2013). Similarly, another study also clarified that caregivers with a much greater burden score had higher depression scores (Zincir *et al.*, 2014), and caregiver burden is very probable given that caregivers may experience anxiety and depression (Denno *et al.*, 2013). As a result, the researchers conclude that a higher burden can contribute to a greater level of depression experienced by the caregiver.

In this study, more than half of the caregivers were identified as the patient's close family members. This finding holds significance as it underscores the prevalent role assumed by close family members in the caregiving responsibilities for individuals with chronic diseases. The caregivers had to suffer from caregiver burden because of the lack of other family members to share caregiving responsibilities (Park *et al.*, 2012). However, in the Iranian culture, family members and relatives try to help the patient because they are highly committed to the patient (Vahidi *et al.*, 2016). The current study's findings are consistent with another study, which stated that the patient's other family members, such as daughters (45.8%), were the ones that spent most of their time in caregiving (Ghazali *et al.*, 2015). The prominence of close family members as caregivers in this study aligns with broader trends documented in caregiving literature, where familial bonds often play a central role in assuming caregiving responsibilities. The family unit, being a primary source of social support, tends to be a natural and accessible resource for patients requiring care, especially in the context of chronic illnesses.

This study shows there is no relationship between the level of caregiver burden with educational background. The influence of caregivers' educational background on the level of burden has been a subject of considerable interest in caregiving research. The existing literature presents varying perspectives on the association between education and caregiver burden. Notably, Vahidi et al. (2016) found a significant correlation, suggesting that low educational status was linked to higher caregiver burden. This finding corroborates an earlier study by Akgul and Ozdemir (2014), which specifically highlighted that individuals with an educational level lower than high school experienced increased burden in their caregiving roles. However, the present study diverges from these findings, revealing no significant relationship between caregiver burden and educational background, despite 70.5% of caregivers reporting education until the college or university level. This observation is consistent with the results reported by Yoon et al. (2014). One plausible explanation for the absence of a significant relationship in the present study is the hypothesis that caregivers with higher academic levels may employ more effective coping strategies when faced with the challenges inherent in caregiving. Caregivers with advanced education may possess a broader range of resources, both tangible and psychological, allowing them to navigate the complexities of caregiving more adeptly.

In the demographic analysis of this study, the findings indicate that three-quarters of women caregivers who reported experiencing minimal depression exhibited a statistically significant association between gender and depression. Women, traditionally assuming a prominent role in caregiving responsibilities, may navigate unique challenges and exhibit distinct patterns of psychological well-being compared to their male counterparts. Another study stated that, consistently, those who were predicted to implement direct responsibility for their family and often stay at home were women (Faronbi *et al.*, 2019). Women were believed to care for their loved ones if the caregiver got sick due to their sympathetic nature and were ideally suited to deliver personal care. It emphasizes the importance of considering gender as a specific factor when addressing mental health in caregiving contexts.

The highest percentage of caregivers who confronted minimal depression were married caregivers and marriage has been linked positively to depression. Spousal caregivers had to take responsibility for their own families besides looking after the care recipients (Shakya, 2017), meaning they had a lot of obligations, which might cause depression. Nonetheless, this finding differed slightly from a study in Jordan, which stated that caregiver depression was associated with marital status. However, they declared that divorced, separated, widowed, or single caregivers have more signs of depression than married caregivers.

While providing delicate care for patients with chronic diseases, tremendous sacrifice and stress will lie with the informal caregivers, mainly if they live with their care recipient. Ninety-nine (79.8%) of other family members who delivered care had minimal depression, while four (3.2%) experienced severe depression. Other family members can be a daughter-in-law, son, or daughter (Zhang *et al.*, 2014). The Asian family is expected to have a sense of responsibility, especially in caring for their parents when they are getting older (Limpawattana *et al.*, 2013; Miyawaki, 2015).

Almost half of the caregivers in this study implemented care between 3-13 hours. There were 104 (84.6%) giving care between 3-13 hours, while 77 (81.9%) for 12-24 hours and faced minimal depression. However, a critical interpretation of these results is essential, recognizing the potential limitations and complexities associated with the relationship between caregiving hours and mental health. This outcome was similar to the studies (Malik, Gysels and Higginson, 2013; Abdul Hadi, Pasi and Yousef, 2018), where depressive symptoms were independent of the period of delivering care. In contrast, other research found that the hours of close supervision were highly significant for depression (Braich *et al.*, 2012). An extra hour required to implement the care each week can lead to greater depressive symptoms and preparedness influences caregiver depression and depression influences caregiver mental health. (Petruzzo *et al.*, 2019).

Furthermore this study also found that the CBI score was significantly and positively fair correlated with the BDI-II score, which was equivalent to a previous study with r=0.394 (Wang *et al.*, 2016). As caregivers may feel sadness, worry, and anxiety due to the caregiving task that burdened them, this may indirectly cause depression in themselves. The only one related to the level of burden was the caregiver's relationship with a patient, which was consistent with previous research that stated that the patient's other family members, such as daughters (45.8%), were the ones that spent most of their time in caregiving (Ghazali *et al.*, 2015). Moreover, the level of depression was statistically associated with both gender and marital status, which is in contrast with other studies (Lin, Chen and Li, 2013; Abdul Hadi, Pasi and Yousef, 2018). Women were believed to take care of their loved ones if they got sick due to women's sympathetic nature, and they were ideally suited to deliver personal care. Additionally, married caregivers had to take responsibility for their own families besides looking after the care recipients, meaning many obligations might cause depression (Shakya, 2017).

Controlling the burden and depression is essential as mental disorders, such as depression, are common, widespread ailments and influence over 264 million individuals worldwide (Collaborators, 2018). In line with our findings, the assessment of depression should routinely be integrated as an initial suicide risk screener as suicidal ideation was found to be most relatable in surprisingly low signs of depression (Rogers, Ringer and Joiner, 2018).

Several limitations exist in this study, one being that the researchers did not investigate the period of chronic disease that the patients experienced. Moreover, the caregivers were recruited from only one region of hospital service. As a result, the findings may not be generalized.

Conclusion

In conclusion, the present study illuminates the substantial challenges faced by caregivers providing support to patients with chronic diseases, revealing a notable prevalence of both caregiver burden and depression within this caregiving population. The majority of caregivers are experiencing a mild burden and minimal depression. The level of caregiver burden of patients with chronic diseases was substantially connected with the level of depression. The results suggest that early detection of caregiver burden could serve as a critical indicator for potential depressive symptoms. Integrating such support systems into healthcare practices may offer relief to caregivers, ultimately promoting their overall well-being and, consequently, enhancing the quality of care provided to individuals with chronic diseases. As a recommendation for future research, it is suggested to explore the specific challenges faced by caregivers in chronic disease settings and develop targeted interventions to reduce burden and prevent depression.

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References

Abdul Hadi, A. B., Pasi, H. B. and Yousef, N. E. E. A. A. (2018) 'Prevalence of Depression amongst Caregivers of Stroke Patients Attending Hospital Universiti Sains Malaysia', *IIUM Medical Journal Malaysia*, 17(2 SE-). doi: 10.31436/imjm.v17i2.983.

Abdul Mulud, Z., Mccarthy, G. and Mohamad, N. (2018) 'Translation, Cross-Cultural Adaptation, Reliability and Validity of the Malay Version Caregiver Burden Inventory (CBI) for Caregivers of Individuals with Mental Illness', *Advanced Science Letters*, 24, pp. 293–295. doi: 10.1166/asl.2018.11988.

Akgul, N. and Ozdemir, L. (2014) 'Caregiver burden among primary caregivers of patients undergoing peripheral blood stem cell transplantation: A cross sectional study', *European Journal of Oncology Nursing*, 18(4), pp. 372–377. doi: 10.1016/j.ejon.2014.03.013.

Beck, A. T. *et al.* (1961) 'An inventory for measuring depression', *Arch. Gen. Psychiatry*, 4(6), pp. 561–571. doi: 10.1001/archpsyc.1961.01710120031004.

Braich, P. S. *et al.* (2012) 'Burden and Depression in the Caregivers of Blind Patients in India', *Ophthalmology*, 119(2), pp. 221–226. doi: https://doi.org/10.1016/j.ophtha.2011.07.038.

Chai, Y. C. *et al.* (2018) 'Caregiver depression: The contributing role of depression in patients, stigma, social support and religiosity', *International Journal of Social Psychiatry*, 64(6), pp. 578–588. doi: 10.1177/0020764018792585.

Chung, M. L. *et al.* (2010) 'Predictors of depressive symptoms in caregivers of patients with heart failure', *J. Cardiovasc. Nurs.*, 25(5), pp. 411–419. doi: 10.1097/JCN.0b013e3181d2a58d.

Collaborators, G. B. D. 2017 D. and I. I. and P. (2018) 'Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017', *Lancet*, 392(10159), pp. 1789–1858. doi: 10.1016/S0140-6736(18)32279-7.

Denno, M. S. *et al.* (2013) 'Anxiety and Depression Associated With Caregiver Burden in Caregivers of Stroke Survivors With Spasticity', *Archives of Physical Medicine and Rehabilitation*, 94(9), pp. 1731–1736. doi: https://doi.org/10.1016/j.apmr.2013.03.014.

Etemadifar, S. *et al.* (2018) 'Effects of family-centered empowerment intervention on stress, anxiety, and depression among family caregivers of patients with epilepsy', *Epilepsy Behav.*, 88, pp. 106–112. doi: 10.1016/j.yebeh.2018.08.030.

Faronbi, J. O. *et al.* (2019) 'Caring for the seniors with chronic illness: The lived experience of caregivers of older adults', *Archives of Gerontology and Geriatrics*, 82, pp. 8–14. doi: https://doi.org/10.1016/j.archger.2019.01.013.

Gbiri, C. A., Olawale, O. A. and Isaac, S. O. (2015) 'Stroke management: Informal caregivers' burdens and strians of caring for stroke survivors', *Ann. Phys. Rehabil. Med.*, 58(2), pp. 98–103. doi: 10.1016/j.rehab.2014.09.017.

Ghazali, S. B. *et al.* (2015) 'Burden of caregivers of the elderly with chronic illnesses and their associated factors in an urban setting in Malaysia', *Malaysian Journal of Public Health Medicine*, 15, pp. 1–9.

Institute for Public Health (2015) 'Summary for Policymakers', in (IPCC), I. P. on C. C. (ed.) *Climate Change 2013 – The Physical Science Basis: Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, pp. 1–30. doi: DOI: 10.1017/CBO9781107415324.004.

Institute for Public Health (IPH) (2012) *National Health and Morbidity Survey (NHMS) 2011 (NMRR-10-757-6837) Volume III : Healthcare Demand and Out-of-Pocket Health Enpenditure*. Edited by Nordin Saleh et al. The National Health and Morbidity Survey 2011.

Kellner, S. *et al.* (2017) 'Perceived embarrassment and caregiver burden in essential tremor caregivers', *J. Neurol. Sci.*, 383, pp. 205–210. doi: 10.1016/j.jns.2017.11.020.

Lahlou-Laforêt, K. *et al.* (2015) 'Validity of Beck Depression Inventory for the assessment of depressive mood in chronic heart failure patients', *J. Affect. Disord.*, 184, pp. 256–260. doi: 10.1016/j.jad.2015.05.056.

Liang, Y.-D. *et al.* (2017) 'Caregiving burden and depression in paid caregivers of hospitalized patients: a pilot study in China', *BMC Public Health*, 18(1), p. 53. doi: 10.1186/s12889-017-4563-6.

Limpawattana, P. *et al.* (2013) 'Caregivers Burden of Older Adults with Chronic Illnesses in the Community: A Cross-Sectional Study', *Journal of Community Health*, 38(1), pp. 40–45. doi: 10.1007/s10900-012-9576-6.

Lin, W. F., Chen, L. H. and Li, T.-S. (2013) 'Adult Children's Caregiver Burden and Depression: The Moderating Roles of Parent–Child Relationship Satisfaction and Feedback from Others', *Journal of Happiness Studies*, 14(2), pp. 673–687. doi: 10.1007/s10902-012-9348-0.

Lum, H. D. *et al.* (2014) 'Caregiving in heart failure: Relationship quality is associated with caregiver benefit finding and caregiver burden', *Heart Lung*, 43(4), pp. 306–310. doi: 10.1016/j.hrtlng.2014.05.002.

Malik, F. A., Gysels, M. and Higginson, I. J. (2013) 'Living with breathlessness: A survey of caregivers of breathless patients with lung cancer or heart failure', *Palliative Medicine*, 27(7), pp. 647–656. doi: 10.1177/0269216313488812.

Miyawaki, C. E. (2015) 'A Review of Ethnicity, Culture, and Acculturation Among Asian Caregivers of Older Adults (2000-2012)', *SAGE Open*, 5(1), p. 2158244014566365. doi: 10.1177/2158244014566365.

Mukhtar, F. and P. S. Oei, T. (2011) 'A review on the prevalence of depression in Malaysia', *Curr. Psychiatry Rev.*, 7(3), pp. 234–238. doi: 10.2174/157340011797183201.

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) (2019a) *About Chronic Diseases*, *Center for Disease Control and Prevention (CDC)*. Available at: https://www.cdc.gov/chronicdisease/about/index.htm.

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) (2019b) *Health and Economic Costs of Chronic Diseases*, *Center for Disease Control and Prevention (CDC)*. Available at: https://www.cdc.gov/chronicdisease/about/costs/index.htm.

Novak, M. and Guest, C. (1989) 'Application of a multidimensional caregiver burden inventory', *Gerontologist*, 29(6), pp. 798–803. doi: 10.1093/geront/29.6.798.

Olagundoye, O. and Alugo, M. (2018) 'Caregiving and the Family', in Mollaoglu, M. (ed.). Rijeka: IntechOpen, p. Ch. 1. doi: 10.5772/intechopen.72627.

Othman, Z. *et al.* (2014) 'Caregiver Burden is Associated with Cognitive Decline and Physical Disability of Elderly Post-Stroke Patients', *Middle-East Journal of Scientific Research*, 22(9), pp. 1265–1271. doi: 10.5829/idosi.mejsr.2014.22.09.9216.

Park, C. H. *et al.* (2012) 'Determinants of the burden and positivity of family caregivers of terminally ill cancer patients in Korea', *Psycho-Oncology*, 21(3), pp. 282–290. doi: 10.1002/pon.1893.

Petruzzo, A. *et al.* (2019) 'Influence of preparedness on anxiety, depression, and quality of life in caregivers of heart failure patients: Testing a model of path analysis', *Patient Education and Counseling*, 102(5), pp. 1021–1028. doi: https://doi.org/10.1016/j.pec.2018.12.027.

Pucciarelli, G. *et al.* (2018) 'Quality of life, anxiety, depression and burden among stroke caregivers: A longitudinal, observational multicentre study', *Journal of Advanced Nursing*, 74(8), pp. 1875–1887. doi: 10.1111/jan.13695.

Rogers, M. L., Ringer, F. B. and Joiner, T. E. (2018) 'The association between suicidal ideation and lifetime suicide attempts is strongest at low levels of depression', *Psychiatry Res.*, 270, pp. 324–328. doi: 10.1016/j.psychres.2018.09.061.

Shakya, D. (2017) 'Burden and Depression among Caregivers of Hemodialysis Patients', *Palliative Medicine & Care: Open Access*, 4(1), pp. 1–6. doi: 10.15226/2374-8362/4/1/00131.

Strang, S. *et al.* (2019) 'Support to informal caregivers of patients with severe chronic obstructive pulmonary disease: a qualitative study of caregivers' and professionals' experiences in Swedish hospitals', *BMJ Open*, 9(8), p. e028720. doi: 10.1136/bmjopen-2018-028720.

Vahidi, M. *et al.* (2016) 'Other Side of Breast Cancer: Factors Associated with Caregiver Burden', *Asian Nursing Research*, 10(3), pp. 201–206. doi: https://doi.org/10.1016/j.anr.2016.06.002.

Wang, L.-J. *et al.* (2016) 'Depression, caregiver burden and social support among caregivers of retinoblastoma patients in China', *Int. J. Nurs. Pract.*, 22(5), pp. 478–485. doi: 10.1111/ijn.12458.

Yoon, S.-J. *et al.* (2014) 'Modifiable factors associated with caregiver burden among family caregivers of terminally ill Korean cancer patients', *Supportive Care in Cancer*, 22(5), pp. 1243–1250. doi: 10.1007/s00520-013-2077-z.

Zhang, Q. *et al.* (2014) 'Factors Influencing Sleep Disturbances among Spouse Caregivers of Cancer Patients in Northeast China', *PLOS ONE*, 9(10), p. e108614. Available at: https://doi.org/10.1371/journal.pone.0108614.

Zhu, W. and Jiang, Y. (2018) 'A meta-analytic study of predictors for informal caregiver burden in patients with stroke', *J. Stroke Cerebrovasc. Dis.*, 27(12), pp. 3636–3646. doi: 10.1016/j.jstrokecerebrovasdis.2018.08.037.

Zincir, B. S. *et al.* (2014) 'Burden and depressive symptoms associated with adult-child caregiving for individuals with heart failure', *ScientificWorldJournal*, 2014, p. 641817. doi: 10.1155/2014/641817.

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ORIGINAL ARTICLE
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Body mass index as the main predictor for length of stay in COVID-19 patients with mild and moderate symptoms: a cross-sectional study in COVID-19 emergency hospital in Indonesia

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ABSTRACT

Introduction: COVID-19 emerged as a novel global health crisis. While it has since been downgraded from its status as a public health emergency of international concern, the virus persists as a global health challenge. Thus, understanding the factors affecting length of stay (LoS) is pivotal to be considered in hospital capacity planning. Meanwhile, increasing evidence shows that obesity is one of the most common conditions recently associated with COVID-19. This study was aimed to analyze the predictors of LoS in COVID-19 patients based on nutritional status and patient characteristics data.

Methods: Participants of this study were the COVID-19 patients with mild to moderate symptoms who registered in COVID-19 Emergency Hospital, East Java, Indonesia. This study involved 2850 patients extracted from medical records for further analysis. Body mass index (BMI) was generated following the standard formula measured on the first day of hospitalization. LoS was determined by the number of days of hospitalization. The Chi-square automatic interaction detection (CHAID) algorithm was employed for model building.

Results: Most participants were overweight (34.6%) and obese (17.2%). Only a few participants were hospitalized with comorbidities such as hypertension (11.6%) and diabetes mellitus (4.1%). The predictive model of LoS indicated that BMI was the main predictor of COVID-19 LoS, with higher BMI showed to prolong the LoS of mild to moderate symptoms patients. Other than BMI, gender and symptoms were also indicated as COVID-19 LoS predictors.

Conclusions: Nutritional status is one of the predictors of LoS in COVID-19 patients. Having higher BMI tends to prolong the LoS, especially in male and having fever. LOS was also seen among those with lower BMI less than 18.5, in patients who had cold and flu.

Keywords: covid-19, length of stay, nutritional status, obesity, predictive model

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Introduction

COVID-19 was a new global health emergency. Although the disease epidemiology has changed and COVID-19 is no longer a public health emergency of global concern, it continues to pose a worldwide threat. The World Health Organization (WHO) received reports (cumulative total) of over 775 million COVID-19 cases as of April 2024, and over 7 million COVID-19-related deaths (WHO, 2024a). In Indonesia, the WHO received reports (cumulative total) of over 6.8 million COVID-19 cases as of April 2024 and over 100 thousand COVID-19-related deaths (WHO, 2024a). Previous research has shown that, despite long-term recovery, some COVID-19 survivors may still have sequelae, such as pulmonary fibrosis, chronic debilitating symptoms, and/or psychological issues, which affect their quality of life (Liao et al., 2022).

Obesity is a chronic disease that is rising in prevalence and is currently considered to be a global epidemic. Since 1990, the global rate of adult obesity has more than doubled, while the rate of adolescent obesity has quadrupled. In 2022, about 2.5 billion adults (18 years of age and above) were overweight, and 890 million of them were obese at the time (WHO, 2024c). The prevalence of obesity in Indonesia in the adult age group tends to increase every year. Based on data from the Basic Health Research (RISKESDAS) in 2018, the prevalence of obesity in Indonesia increased by 6.4% from RISKESDAS in 2013, from 15.4% to 21.8% (Ministry of Health Republic Indonesia, 2018).

Increasing evidence shows that obesity is one of the most common conditions currently associated with COVID-19 (Boutari and Mantzoros, 2022). According to epidemiological data from the US Centers for Disease Control and Prevention, among obese COVID-19 patients, 69% of them had a BMI between 30 and 40 kg/m^2, and 30.1% were severely obese (BMI ≥40 kg/m^2). Furthermore, it is known that 40% of COVID-19 hospitalized patients were obese (Garg et al., 2020; Rees et al., 2020; Richardson et al., 2020). In particular, obesity appears to be associated with a severe clinical course (Klang et al., 2020; Simonnet et al., 2020) and a longer length of stay (LoS) (Klang et al., 2020).

Obesity is defined by BMI classification criteria that has a high specificity but low sensitivity in identifying individuals with a high body fat index (Okorodudu et al., 2010). According to research from Yu et al. (2021), patients with obesity had a higher average length of hospital stay than patients without obesity (20.6 vs 16.0 days). This shows that the recovery time of COVID-19 patients with obesity may be different from patients with normal-weight, with longer discharge time (Yu et al., 2021). The link between obesity and the severity of COVID-19 has shown consistent evidence. However, there is no strong evidence of the relationship between the body weight of COVID-19 patients with LoS in Indonesia.

The COVID-19 Emergency Hospital of East Java government is aimed for patients COVID-19 with mild and moderate symptoms. Established since June 2020, the hospital has treated more than 5000 patients as per January 2021. The COVID-19 pandemic caused by SARS-CoV-2 has resulted in more than 7 million reported deaths as of April 7, 2024 (WHO, 2024b). A systematic review and meta-analysis from Vekaria et al. (2022) showed that the mean of hospital LoS for COVID-19 patients across different continents was 14.49 days or more than 10 days. The LoS is an important indicator of hospital management efficiency. A decrease in the number of days of hospitalization will have an impact on decreasing risk of infection and treatment side effects, improve quality of care, and increase hospital benefits with more efficient bed management (Baek et al., 2018). Patient characteristics such as age and comorbidities have an impact on the severity of the disease and are likely to affect the LoS. If a significant difference in LoS is observed, then the hospital capacity planning may need to consider the characteristics to provide accurate predictions on the number of beds required at each level of the care units (Rees et al., 2020).

Prospective cohort studies of the LoS index based on the nutritional status and COVID-19 patients' characteristics are still limited. To the author's knowledge, this current study is the first to predict the COVID-19 LoS in Indonesia with consideration on the nutritional status calculated by body mass index. The current study was aimed to analyze the LoS index based on COVID-19 patients' nutritional status, changes in body weight, comorbidities and socio-demographics characteristics. Subsequently, a prediction of LoS in COVID-19 patients with mild and moderate symptoms according to the patient's characteristic can be formulated.

Materials and Methods

Study Design and Participants

This retrospective study investigated data that were consecutively collected from medical records of patients treated at the COVID-19 Emergency Hospital in Surabaya, East Jawa, Indonesia, a temporary hospital that served COVID-19 patients during the COVID-19 outbreak. A total of 2850 patients who tested positive for COVID-19 using real-time RT-PCR and were hospitalized between November 2020 and January 2021, whose medical record data were complete, who were not discharged against medical approval, and who were not patients entrusted from another hospital, were included. Participants' records were anonymized prior to access to ensure their privacy.

Data Collection

Data were extracted from the patients' medical records and comprised of clinical and non-clinical data. Clinical data included diagnosis-related data such as comorbidities and clinical symptoms. The clinical symptoms were categorized as severe and mild. Non-clinical data included age and gender. Nutritional attributes that were collected comprised body weight, height, and BMI. BMI was calculated, then the nutritional status was categorized according to the WHO standard for the Asian population. Body weight and height were measured on the first and last day of hospitalization. The LoS was the total number of days the patients stayed in the hospital.

Predictive Modeling

A decision tree was constructed to predict the LoS of COVID-19 patients based on a patient's clinical and non-clinical data, as well as nutritional attributes. In total, 2850 patients' information was used as input for both sample and training of the model. The Chi-square automatic interaction detection (CHAID) algorithm with a maximum tree depth of 5 with validation using 10 fold cross-validation was employed for model building. The CHAID algorithm can construct a predictive tree that determines how independent variables merge to explain the outcome of the dependent variable. The dependent variable of our model was the LoS, with the independent variables being nutritional status, age, gender, and symptoms of the patients. In this study, all independent variables were determined, and included in CHAID analysis. All the procedures of merging, splitting, and stopping criteria were done by using statistical software.

Ethics Declarations

This study was reviewed and ethically approved by the ethical board of Universitas Airlangga Faculty of Dental Medicine Health Research Ethical Clearance Commission with certificate number 238/HRECC.FODM/V/2021. The requirement for written informed consent was waived by the ethical board of Universitas Airlangga Faculty of Dental Medicine Health Research Ethical Clearance Commission because the dataset comprises de-identified secondary data for research purposes. All methods were carried out in accordance with relevant guidelines and regulations.

Table 1. Characteristics of COVID-19 patients treated in Emergency Hospital of East Java participated in the prospective cohort study (n = 2850)

	Mean	SD
LoS (Length of Stay)	8.04	3.10
Age	36.74	12.16
	n	**%**
Gender		
Men	1656	58.1
Woman	1194	41.9
BMI		
Underweight	138	4.8
Normal	1234	43.3
Overweight	987	34.6
Obesity	491	17.2
Symptoms		
Dry cough	394	13.8
Wet cough	712	25.0
Fever	418	14.7
Muscle pain	79	2.8
Headache	297	10.4
Shortness of breath	145	5.1
Diarrhea	87	3.1
Nausea	222	7.8
Vomiting	43	1.5
Have a cold	479	16.8
Anosmia	573	20.1
Stomach pain	41	1.4
Comorbidities		
Hypertension	331	11.6
Diabetes mellitus	118	4.1
Total Comorbid/patient	**Median**	**Range**
	0	0-4

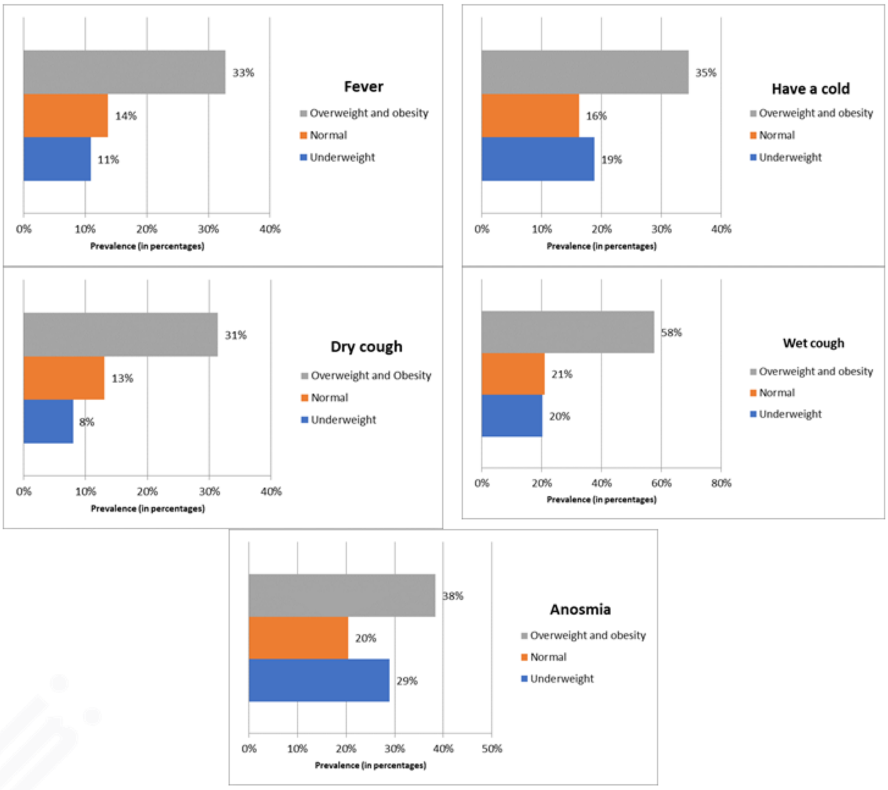

Figure 1. The cross-tabulation analysis of the nutritional status and COVID-19 symptoms. Data were presented as the percentage of patients who have the symptoms in each nutritional status groups. The nutritional status was determined from BMI and was categorized following WHO standards for Asian population.

Results

Characteristics of COVID-19 Patients

Participants majority were at productive age, ranged from 26 to 40 years old, with both male and female were in the comparable number. The proportion of patients with malnutrition was 56.6% of 2850, with 1,478 participants were overnutrition. In total, 15.7% of the participants were hospitalized with comorbidities. The total comorbidities that each patient experienced ranged from 0-4 comorbidities. We recorded hypertension and diabetes mellitus as the most prevalence comorbid during the study period. Wet cough was observed as the most prevalence symptoms and later was anosmia. Patients' characteristics were summarized in Table 1.

Cross tabulation analysis of the nutritional Status and COVID-19 Symptoms

The five most prevalent COVID-19 symptoms were selected for cross=tabulation analysis with the nutritional status of the participants, comprises of fever, wet cough, dry cough, anosmia and cold (Figure 1). The results indicated those patients who were overnutrition had the higher prevalence of having the symptoms, with wet cough was the highest. Those in normal and underweight group were less likely to experience the symptoms. Anosmia and wet cough were the most prevalent symptoms in normal and underweight groups.

Prediction of COVID-19 Patients' Length of Stay in the Emergency Hospital

From CHAID algorithm analysis a decision tree model of LoS in Emergency Hospital for COVID-19 patients was constructed (Figure 2). Decision tree models are perceived as the most simple-to-interpret and easy-to-apply predictive model for medical use. In this test, the independent variables included in the test were BMI, age, gender, and some symptoms such as the presence of fever, wet cough, dry cough, headache, muscle soreness, anosmia, and stomach-ache. Based on the results in Figure 2., only the variables BMI, gender, the presence of fever, wet cough, dry cough, and anosmia play a role in LoS. According to the data collected, the predictive LoS of for COVID-19 patients in Emergency Hospital was eight days. BMI was the main predictor that contributes to the LoS in our model (p-value = 0.006). Patients with higher BMI need more time for hospitalization compared to those with lower BMI. However, some other factors were also predicted to increase the length of stay: the groups with lower BMI who experience fever were more likely to have longer LoS. The predictors of LoS in higher BMI group from the strongest to weakest were gender, the presence of

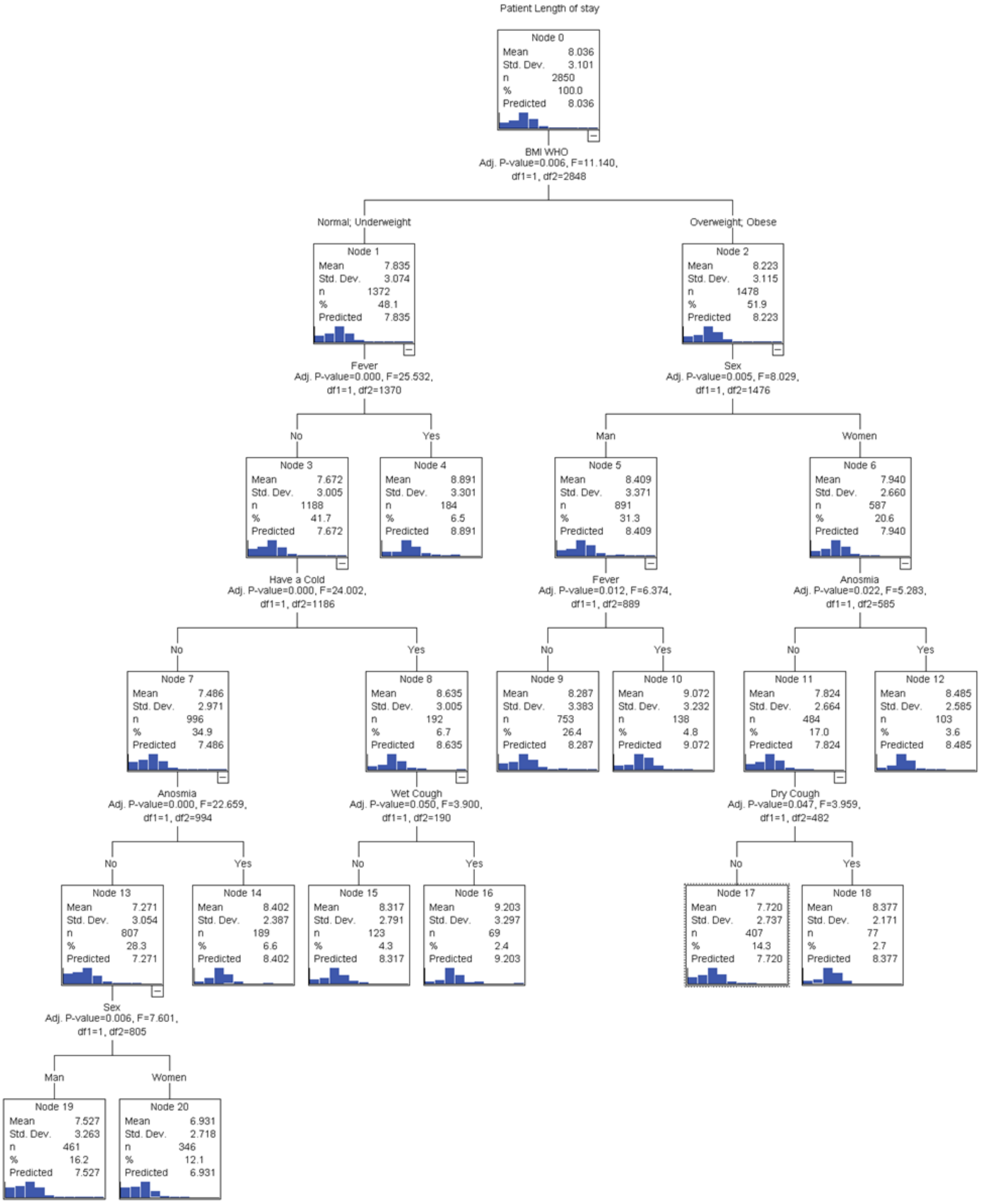
Patient Length of stay
Node 0
Mean 8.036
Std. Dev. 3.101
n 2850
% 100.0
Predicted 8.036
BMI WHO
Adj. P-value=0.006, F=11.140,
df1=1, df2=2848
Normal; Underweight
Overweight; Obese
Node 1
Mean 7.835
Std. Dev. 3.074
n 1372
% 48.1
Predicted 7.835
Node 2
Mean 8.223
Std. Dev. 3.115
n 1478
% 51.9
Predicted 8.223
Fever
Adj. P-value=0.000, F=25.532,
df1=1, df2=1370
Sex
Adj. P-value=0.005, F=8.029,
df1=1, df2=1476
No
Yes
Man
Women
Node 3
Mean 7.672
Std. Dev. 3.005
n 1188
% 41.7
Predicted 7.672
Node 4
Mean 8.891
Std. Dev. 3.301
n 184
% 6.5
Predicted 8.891
Node 5
Mean 8.409
Std. Dev. 3.371
n 891
% 31.3
Predicted 8.409
Node 6
Mean 7.940
Std. Dev. 2.660
n 587
% 20.6
Predicted 7.940
Have a Cold
Adj. P-value=0.000, F=24.002,
df1=1, df2=1186
Fever
Adj. P-value=0.012, F=6.374,
df1=1, df2=889
Anosmia
Adj. P-value=0.022, F=5.283,
df1=1, df2=585
No
Yes
No
Yes
No
Yes
Node 7
Mean 7.486
Std. Dev. 2.971
n 996
% 34.9
Predicted 7.486
Node 8
Mean 8.635
Std. Dev. 3.005
n 192
% 6.7
Predicted 8.635
Node 9
Mean 8.287
Std. Dev. 3.383
n 753
% 26.4
Predicted 8.287
Node 10
Mean 9.072
Std. Dev. 3.232
n 138
% 4.8
Predicted 9.072
Node 11
Mean 7.824
Std. Dev. 2.664
n 484
% 17.0
Predicted 7.824
Node 12
Mean 8.485
Std. Dev. 2.585
n 103
% 3.6
Predicted 8.485
Anosmia
Adj. P-value=0.000, F=22.659,
df1=1, df2=994
Wet Cough
Adj. P-value=0.050, F=3.900,
df1=1, df2=190
Dry Cough
Adj. P-value=0.047, F=3.959,
df1=1, df2=482
No
Yes
No
Yes
No
Yes
Node 13
Mean 7.271
Std. Dev. 3.054
n 807
% 28.3
Predicted 7.271
Node 14
Mean 8.402
Std. Dev. 2.387
n 189
% 6.6
Predicted 8.402
Node 15
Mean 8.317
Std. Dev. 2.791
n 123
% 4.3
Predicted 8.317
Node 16
Mean 9.203
Std. Dev. 3.297
n 69
% 2.4
Predicted 9.203
Node 17
Mean 7.720
Std. Dev. 2.737
n 407
% 14.3
Predicted 7.720
Node 18
Mean 8.377
Std. Dev. 2.171
n 77
% 2.7
Predicted 8.377
Sex
Adj. P-value=0.006, F=7.601,
df1=1, df2=805
Man
Women
Node 19
Mean 7.527
Std. Dev. 3.263
n 461
% 16.2
Predicted 7.527
Node 20
Mean 6.931
Std. Dev. 2.718
n 346
% 12.1
Predicted 6.931

Figure 2. Decision tree of predictive LoS of COVID-19 patients. The decision tree was generated using CHAID algorithm. All data were used for the test. Independent variables inputted to the test were BMI, age, gender, the presence of fever, wet cough, dry cough, headache, muscle soreness, anosmia, and stomach-ache.

fever, anosmia and wet cough, respectively. In the lower BMI group the presence of fever, cold, anosmia, wet cough and gender, respectively, assisted as the predictors. Apparently in our predictive model, the risk of having longest LoS would emerge when a patient was in lower BMI group with cold and wet cough. Also, a patient assigned in higher BMI group would have longest LoS in male and having fever.

Discussions

The emerging of COVID-19 causes significant impact in many aspects, not only health but also sociological and economic burden. In developing countries, most of the health facilities were not prepared for COVID-19 management at its first emerging, including Indonesia. The disparities among healthcare facilities in every region of Indonesia are wide. Only big cities were equipped with facilities for COVID-19 treatments, yet few met the standards. For Indonesia, in which the number of COVID-19 cases was not under control, managing the healthcare facilities efficiently was pivotal. During the first wave of COVID-19, the Indonesian government adopted the policy of building an emergency hospital for COVID-19 (Menkes RI, 2021). Patients who were treated in the emergency hospital were those with mild and moderate COVID-19 symptoms (Widyawati, 2021). It is reported that, during the peak of COVID-19 cases, the hospital beds were not sufficient enough to accommodate the number of patients (Saputra, Sodiq and Mustopa, 2021). Therefore, it is necessary to predict the LoS of COVID-19 patients in order to develop the hospital capacity planning for appropriate management.

The current study observed the characteristic of patients in the COVID-19 Emergency Hospital of East Java, Indonesia, during November 2020 to January 2021. It is important to notice that LoS is affected by many aspects of a patient's characteristics, including age, gender, severity of the symptoms, nutritional status and the presence of comorbidities (Wu et al., 2020; Di Filippo et al., 2021). Approximately half of the study participants were overweight/obese. Therefore, we conducted a cross-tabulation analysis to observe the correlation of nutritional status and the COVID-19 symptoms (Figure 1). The findings showed that, in overweight/obese group, the symptoms are more prevalent compared to the normal and underweight group. It is more likely that overweight/obese patients experience more severe symptoms due to obesity-derived inflammation. Consequently, immunological dysfunction of COVID-19 patients may be present in overweight/obese patients (Moriconi et al., 2020; Mahboub et al., 2021). Furthermore, obesity can lead to hypoxemia, which increases the severity of the symptoms when infected by SARS-COV2. We can conclude that the longer LoS might be observed in patients with obesity.

We found a mean LoS of eight days in the current study, which is shorter compared to the study in North Sumatera, Indonesia, with the LoS of 11 days (Lestari, Yurina and Lyrawati, 2022), yet comparable to the LoS of COVID-19 patients without ICU in the UK (Vekaria et al., 2021). Study in North Sumatera was conducted in patients with more severe COVID-19 symptoms; this explains the difference of LoS to the current study. Early diagnostic and prediction of LoS by patients' data can enhance the therapeutic options available and enable the effective allocation of resources to treat the patients. Subsequently, the patients' characteristics data were employed to build a predictive model of LoS. The mean LoS of our study was confirmed by predictive modelling, which showed consistent results (Figure 2).

The most important predictor of LoS according to our model was nutritional status (BMI). Those with higher BMI tend to stay longer in the hospital. Especially when male and fever are present, the LoS is predicted to be one day longer. Male is expected to develop more severe symptoms due to gender-related factors that worsen the disease evolution (Foresta, Rocca and Di Nisio, 2021; Vahidy et al., 2021). The actors that may play a role in the manifestation of SARS-COV2 infection are ACE2 and TMPRSS2, which are regulated by sex hormones. These actors accompany a protective effect to the development of disease in women (Foresta, Rocca and Di Nisio, 2021), which explain the shorter LoS prediction in the female group. Also, in Indonesia the prevalence of smoker is higher in men than in women, which might explain the longer LoS in male due to severity of the symptoms. Interestingly, when overweight/obese was absent, the LoS was not affected by gender.

For patients with underweight/normal nutritional status, the presence of fever became the aggravating factor that affected the LoS. According to our data, patients with fever had LoS of one day longer. Previous study in China observed that patients with fever had LoS of 3.5 days longer (Wu et al., 2020). However, when fever was absent, the cold and wet cough could also prolong the LoS of underweight/normal patients from 7.6 to 9.2 days. Our finding indicated that cold and wet cough could exacerbate the COVID-19 outcome in lower but not in higher BMI patients.

Based on the results of the model, nutritional status is one of the main factors affecting the severity and LoS of COVID-19 patients. Patients with poor nutritional status, especially patients with higher BMI or obesity, will be associated with various comorbid diseases which will affect the severity of COVID-19 disease (Noor and Islam, 2020; Vera-Zertuche et al., 2021). Therefore, the need to maintain healthy status with a good BMI can be an effort to prevent metabolic diseases while avoiding adverse effects on COVID-19 patients in the future (Kang and Kong, 2021). Implementation of proper patient management is needed as a form of good service to patients. Hospitals can update treatment service protocols for COVID-19 patients based on WHO guidelines, health ministry regulations, and regional policies (Modjo et al., 2023).

Our data may provide a novel prediction for COVID-19 LoS; however, the limitation of the CHAID algorithm is its sensitivity to the change of the variables. The predictors might be changed if more variables and samples were added. Therefore, it is necessary to validate the algorithm with other predictive modeling. We also recommend to add more variable-related symptoms and treatment to the analysis, so that a complete picture of predictive model for COVID-19 LoS can be obtained.

Conclusion

Our findings indicated that nutritional status could affect the LoS of COVID-19 patients. The LoS could be extended when overweight/obese, male, and fever were present. However, for patients with underweight/normal nutritional status, the presence of cold and wet cough could be the aggravating factors. Referring to our findings, studies to explore other variables that are related to the COVID-19 symptoms and affecting LoS with regards to nutritional care need to be performed in the future.

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Conflict of interest

This study was funded by Universitas Airlangga, Indonesia.

Acknowledgments

We declare that there is no conflict of interest in this study.

References

Baek, H. *et al.* (2018) 'Analysis of length of hospital stay using electronic health records: A statistical and data mining approach', *PLoS ONE*, 13(4), pp. 1–16. doi: 10.1371/journal.pone.0195901.

Boutari, C. and Mantzoros, C. S. (2022) 'A 2022 update on the epidemiology of obesity and a call to action: as its twin COVID-19 pandemic appears to be receding, the obesity and dysmetabolism pandemic continues to rage on', *Metabolism: Clinical and Experimental*. doi: 10.1016/j.metabol.2022.155217.

Di Filippo, L. *et al.* (2021) 'COVID-19 is associated with clinically significant weight loss and risk of malnutrition, independent of hospitalisation: A post-hoc analysis of a prospective cohort study', *Clinical Nutrition*, 40(4), pp. 2420–2426. doi: 10.1016/j.clnu.2020.10.043.

Foresta, C., Rocca, M. S. and Di Nisio, A. (2021) 'Gender susceptibility to COVID-19: a review of the putative role of sex hormones and X chromosome', *Journal of Endocrinological Investigation*, 44(5), pp. 951–956. doi: 10.1007/s40618-020-01383-6.

Garg, S. *et al.* (2020) 'Hospitalization Rates and Characteristics of Patients Hospitalized with', *Morbidity and Mortality Weekly Report, US Department of Health and Human Services/Centers for Disease Control and Prevention*, 69(15), pp. 458–464.

Kang, I. S. and Kong, K. A. (2021) 'Body mass index and severity/fatality from coronavirus disease 2019: A nationwide epidemiological study in Korea', *PLoS ONE*, 16(6 June). doi: 10.1371/journal.pone.0253640.

Klang, E. *et al.* (2020) 'Severe Obesity as an Independent Risk Factor for COVID-19 Mortality in Hospitalized Patients Younger than 50', *Obesity*, 28(9), pp. 1595–1599. doi: 10.1002/oby.22913.

Lestari, I., Yurina, V. and Lyrawati, D. (2022) 'Length of Hospital Stay and Oseltamivir in Mild or Moderate Degree COVID-19 Patients in North Sumatra, Indonesia', *Journal of Pharmaceutical Research International*, (February), pp. 71–76. doi: 10.9734/jpri/2022/v34i13b35582.

Liao, T. *et al.* (2022) 'Long-Term Effects of COVID-19 on Health Care Workers 1-Year Post-Discharge in Wuhan', *Infectious Diseases and Therapy*, 11(1). doi: 10.1007/s40121-021-00553-0.

Mahboub, B. *et al.* (2021) 'Prediction of COVID-19 Hospital Length of Stay and Risk of Death Using Artificial Intelligence-Based Modeling', *Frontiers in Medicine*, 8(May), pp. 1–9. doi: 10.3389/fmed.2021.592336.

Menkes RI (2021) 'Peraturan Menteri Kesehatan Nomor 230 Tahun 2021 tentang Pedoman Penyelenggaraan Rumah Sakit Darurat selama Covid-19', *Menteri Kesehatan Republik Indonesia*, 2019, pp. 1–46.

Ministry of Health Republic Indonesia (2018) 'Riset Kesehatan Dasar Riskesdas 2018. Badan Penelitian dan Pengembangan Kesehatan Kementrian Kesehatan RI', *Badan Penelitian dan Pengembangan Kesehatan*, (Id).

Modjo, R. *et al.* (2023) 'COVID-19 infection prevention and control for hospital workers in Indonesia', *Frontiers in Public Health*, 11. doi: 10.3389/fpubh.2023.1276898.

Moriconi, D. *et al.* (2020) 'Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information', (January).

Noor, F. M. and Islam, M. M. (2020) 'Prevalence and Associated Risk Factors of Mortality Among COVID-19 Patients: A Meta-Analysis', *Journal of Community Health*, 45(6). doi: 10.1007/s10900-020-00920-x.

Okorodudu, D. O. *et al.* (2010) 'Diagnostic performance of body mass index to identify obesity as defined by body adiposity: A systematic review and meta-analysis', *International Journal of Obesity*. doi: 10.1038/ijo.2010.5.

Rees, E. M. *et al.* (2020) 'COVID-19 length of hospital stay: A systematic review and data synthesis', *BMC Medicine*, 18(1). doi: 10.1186/s12916-020-01726-3.

Richardson, S. *et al.* (2020) 'Presenting Characteristics, Comorbidities, and Outcomes among 5700 Patients Hospitalized with COVID-19 in the New York City Area', *JAMA - Journal of the American Medical Association*, 323(20), pp. 2052–2059. doi: 10.1001/jama.2020.6775.

Saputra, Y., Sodiq, F. and Mustopa (2021) *Covid di Indonesia: IGD dan ICU sejumlah rumah sakit penuh, pasien dirawat di tenda - 'Kondisinya darurat mirip perang*.

Simonnet, A. *et al.* (2020) 'High Prevalence of Obesity in Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) Requiring Invasive Mechanical Ventilation', *Obesity*, 28(7), pp. 1195–1199. doi: 10.1002/oby.22831.

Vahidy, F. S. *et al.* (2021) 'Sex differences in susceptibility, severity, and outcomes of coronavirus disease 2019: Cross-sectional analysis from a diverse US metropolitan area', *PLoS ONE*, 16(1 January), pp. 1–14. doi: 10.1371/journal.pone.0245556.

Vekaria, B. *et al.* (2021) ‘Hospital length of stay for COVID-19 patients: Data-driven methods for forward planning’, *BMC Infectious Diseases*, 21(1), pp. 1–15. doi: 10.1186/s12879-021-06371-6.

Vera-Zertuche, J. M. *et al.* (2021) ‘Obesity is a strong risk factor for short-term mortality and adverse outcomes in Mexican patients with COVID-19: a national observational study’, *Epidemiology and Infection*, 149. doi: 10.1017/S0950268821001023.

WHO (2024a) *Number of COVID-19 Cases Reported to WHO, WHO COVID-19 Dashboard*.

WHO (2024b) *Number of COVID-19 Deaths Reported to WHO, WHO COVID-19 Dashboard*.

WHO (2024c) *Obesity and Overweight, Newsroom*.

Widyawati (2021) *Jatim Bentuk RS Lapangan Tangani Pasien Covid-19*.

Wu, S. *et al.* (2020) ‘Understanding factors influencing the length of hospital stay among non-severe COVID-19 patients: A retrospective cohort study in a Fangcang shelter hospital’, *PLoS ONE*, 15(10 October), pp. 1–14. doi: 10.1371/journal.pone.0240959.

Yu, W. *et al.* (2021) ‘Impact of obesity on COVID-19 patients’, *Journal of Diabetes and its Complications*. doi: 10.1016/j.jdiacomp.2020.107817.

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ORIGINAL ARTICLE

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Knowledge about cholera and its prevention among household heads in a highly urbanized city in Western Philippines: a cross-sectional study

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ABSTRACT

Introduction: Cholera remains a significant public health threat globally, but its impact can be significantly reduced with the right knowledge and correct preventive practices. Conducting a study to provide baseline data and identify knowledge gaps on cholera will benefit at-risk and vulnerable communities. This research aimed to determine the household heads' knowledge about cholera and its prevention in a barangay in the Western Philippines.

Methods: A cross-sectional survey using a questionnaire was conducted in an urban barangay in Iloilo City in Western Philippines among 252 randomly selected household heads in May 2023. Data were described, and t-Test for independent samples and one-way ANOVA were used to test for differences.

Results: The majority of household heads were generally knowledgeable about cholera and its prevention, but only 51.2% knew that oral rehydrating solution (ORS) could help manage symptoms of cholera. Furthermore, there was a significant difference in knowledge about cholera and its prevention based on sex ($t = 2.92$; $p = 0.004$).

Conclusions: Household heads understood well and were informed of cholera and its prevention, although there were still some misconceptions. Continuous health education and knowledge assessment are recommended to raise awareness and ensure correct and timely information dissemination regarding cholera.

Keywords: cholera, cross-sectional studies, family characteristics, health education, philippines

Introduction

Cholera is an acute diarrheal infection caused by the *Vibrio cholerae,* and about 10% of individuals with cholera will experience or encounter severe symptoms (Center for Disease Prevention and Control, 2020). At present, cholera is endemic in many nations, and researchers have reported that, on a yearly basis, there are approximately 1.3 to 4.0 million cases of cholera, and 21,000 to 143,000 fatalities are attributed to cholera worldwide (World Health Organization, 2022). In 2017, the global strategy to reduce cholera targeted reducing cholera deaths by 90% (World Health Organization, 2022).

Over the last decades to the present time, cholera continues to pose a worldwide risk to public health, serving as an indicator of both inequality and insufficient social development (World Health Organization, 2022). Cholera outbreaks typically occur in regions where food or water is contaminated due to poor sanitary practices (Alkhaledi, 2016). The primary strategy for preventing outbreaks involves enhancing public hygiene, ensuring clean water sources, upgrading sewage systems, and administering cholera vaccines (Ali, Mohamed and Tawhari, 2021; Centers for Disease Prevention and Control, 2020; Ratnayake et al., 2021)

The Philippines continues to witness communicable, infectious, or transmissible disease outbreaks across

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regions (Philippine Genome Center, 2018). Cholera is an example of an illness condition that is causing multiple outbreaks in the country. The disease has become a significant issue in the Philippines since the start of widespread outbreaks in the 1820s, which claimed numerous lives of Filipinos (Acevedo, 2021). It is estimated that there are 24,295,524 people at risk for cholera, with a case fatality rate of 1.00 and an estimated number of annual deaths of 24 (Ali *et al.*, 2015). A 2019 report on waterborne diseases confirmed five cases of cholera in Western Visayas alone (Philippine Statistics Authority, 2021). In September 2022, the Iloilo City government announced a state of calamity after 282 cases of acute gastroenteritis (AGE) and eight confirmed cases of cholera in 77 *barangays* in Iloilo City were reported (Philippine Daily Inquirer, 2022).

Despite being a threat to the health of individuals, families, and communities, nearly all cholera incidents can largely be prevented with adequate and proper knowledge or awareness of its preventive practices (Ali, Mohamed and Tawhari, 2021). Disease knowledge is crucial in shaping preventive behavior for selected vector-borne diseases (Aerts *et al.*, 2020). Good health knowledge and a sound understanding of health information provide a conceptual and objective grasp of health-related topics, enhancing the probability of performing measures of health protection and prevention (Rincón Uribe *et al.*, 2021). Having high literacy about cholera would additionally aid communities in understanding diverse risk factors and prompt them to quickly respond to control the spread of infection outbreaks, such as cholera (Aerts *et al.*, 2020). Also, with proper knowledge, controlling cholera epidemics can prevent the exacerbation of the already overwhelmed healthcare systems in places lacking medical facilities, improving the capacity to deliver essential care to individuals afflicted by the disease (Lopez *et al.*, 2015).

Notwithstanding the Philippines being a cholera-endemic country, data about the disease remain limited (Lopez *et al.*, 2015). A review of the literature demonstrated that the majority of the studies on cholera knowledge and literacy levels were conducted abroad, such as in Bangladesh (Wahed *et al.*, 2013), Yemen (Dureab *et al.*, 2021), Nigeria (Anetor and Abraham, 2020), Kenya (Orimbo *et al.*, 2020), Tanzania (Nauja, Bugoye and Rongo, 2020), Ghana (Tutu, Gupta and Busingye, 2019), Lebanon (Akel *et al.*, 2023) and Saudi Arabia (Ali, Mohamed and Tawhari, 2021). There remain insufficient published studies examining the knowledge about cholera and its prevention among residents in highly urbanized cities in Western Philippines. The researchers only found one published research (Joseph *et al.*, 1965) that was conducted within Western Visayas in Bacolod City and Talisay, Negros Occidental.

As healthcare professionals, nurses play a significant part in the preventative healthcare of cholera through various activities aimed at controlling the spread of the disease and providing care to affected individuals, families, and communities. By primarily realizing how community awareness impacts public health, salient vital factors and their interrelationships are explored and crucial for proper assessment, planning, and evaluation (Fooladi, 2017). Consequently, adequate assessment of knowledge and preventive measures about cholera, encompassing its transmission routes, early diagnosis measures, and treatment of symptoms, is necessary for proper planning and evaluation (Ali, Mohamed and Tawhari, 2021). Performing a research investigation to provide current baseline data and identify knowledge gaps about cholera will undoubtedly benefit communities at risk of cholera in the Philippines.

Hence, this study assessed the knowledge about cholera and its prevention among household heads in a *barangay* in Iloilo City, Philippines. It also analyzed whether there were significant differences in household heads' knowledge based on selected socio-demographic characteristics.

Materials and Methods

Study Design

This study utilized quantitative cross-sectional research.

Samples, sampling

The study participants were household heads in one *barangay* in Iloilo City, Western Visayas, Philippines, where an outbreak of cholera was recorded. A *barangay* is a village or district and is the smallest administrative unit in the Philippines. A household head is an adult male or female person responsible for the organization and care of the household or who is regarded as such by the household members (Philippine Statistics Authority, 2021). Inclusion for the study entailed: a) household heads who are 18 years old and above; b) have been a registered *barangay* inhabitant or resident for a minimum of six months before the declaration of the cholera outbreak last August 31, 2022; c) have given their informed consent; and d) can understand either English or Hiligaynon. Based on the data provided by the *barangay,* household heads who are 18 years old and above residing in the *barangay* the sample constitutes 550 individuals. Yamane's (1967) formula was utilized to determine the minimum sample size required, obtaining 232 of the sample needed. An additional 10% of the sample, giving a total of 255 questionnaires which were distributed to accommodate non-response in the study. The participants of the study were selected using the simple random sampling technique. Out of the 255 participants, 252 questionnaires were completed. Two participants refused to participate in the study, while one was no longer residing in the area at the time of the survey.

Instruments

The data collection was done through a two-section questionnaire. Part I consisted of the socio-demographic data, which included age, sex, marital status, highest educational level, monthly income level, and occupation. Part II consisted of 16 questions that were used to measure knowledge about cholera and its prevention. The items were based on the studies conducted by Wahed et al. (2013), Tutu, Gupta and Busingye (2019), Ali Mohamed and Tawhari (2021) and Dureab et al. (2021). The questions were adapted and revised to match the current context of the participants. There were 16 questions: questions one to seven pertained to cholera cause, signs and symptoms, and transmission, while questions eight to 16 were related to cholera prevention. The participants were asked to choose between three responses: "True," "False," and "Do not Know". "True" means the statement is correct, and "False" means the statement is incorrect. "Do not Know" means they have no idea whether the statement is correct or incorrect. One point was given to every correct answer and zero to every incorrect and do not know answers. The scoring system was based on Bloom's Cut-Off Categories: high if the score was between 80 and 100%, moderate if the score was between 60 and 79%, and low if the score was less than 60% (Feleke, Wale and Yirsaw, 2021). All items were translated into *Hiligaynon*, the dialect commonly used in Iloilo City. The instrument was submitted for content and face validation to a panel of three jurors: medical doctors and nurses. All authors approved the items in the instrument with an equivalent index of 1.00. The research instrument underwent pilot testing and was carried out on 30 selected household heads who were not included in the final survey. A reliability testing analysis using the Kuder-Richardson Formula was done, revealing a score of 0.881.

Data Collection and Ethical Considerations

The researchers secured administrative and ethical permission and approval from the WVSU Unified Research Ethics Review Committee (Protocol Number WVSU-URERC-2023.CONS_002). Upon the approval of the *Barangay* Captain, the researchers and the *Barangay* Health Workers went house to house to distribute the informed consent forms and questionnaires. After securing the participants' consent, the researchers gave instructions on how to fill out the questionnaire. Each participant was provided with a ballpoint pen. For most of the participants, however, the researchers read each question in the interview schedule and wrote the answers dictated by the participants. The participants were given 15-20 minutes to answer. For participants who answered the questionnaires themselves, these were retrieved immediately after responding. After that, the participants' responses were encoded, monitored, consolidated, and organized using an MS Excel spreadsheet.

Statistical Data Analysis

Statistical computations were calculated with the help of the IBM Statistical Package for the Social Sciences (SPSS) software version 26. Descriptive statistics were used along with inferential data analysis (Independent Samples t-Test and one-way ANOVA). The Independent Samples t-Test was used to test significant differences in knowledge according to sex, marital status, and family income level while one-way ANOVA was used to test significant differences in knowledge according to age, educational level, and occupation. Data were assumed normally distributed based on the sampling technique used (random) and a relatively large sample size. Moreover, the data points were close to the diagonal line in the Q-Q Plot matching a normal distributed data set. The significance level was set at 0.05 alpha.

Results

Table 1 reflects the sociodemographic profile of the household heads in the *barangay.* The mean age among the 252 household heads is 47.45 years old. The majority of the household heads were young (38.9%) to middle adults (39.3%), female (64.3%), married (69.4%), with high school (59.5%) as their highest educational attainment, and had a low income of PHP 10,957 or less (72.2%). The occupation of the household heads reveals

Table 1. Participants' Sociodemographic Profile and Differences in Knowledge (N=252)

Demographics	n	%	M	SD	Test statistics	p-value
Age (M= 47.45, SD= 14.89)					0.466	0.628
Young Adult (40 years old and below)	98	38.9	12.39	2.31		
Middle Adult (41 to 60 years old)	99	39.3	12.54	2.06		
Older Adult (61 years old and above)	55	21.8	12.75	2.25		
Sex					2.92*	0.004
Female	162	64.3	12.82	2.10		
Male	90	35.7	11.99	2.28		
Marital Status					1.27	0.207
Married	175	69.4	12.64	2.22		
Single	77	30.6	12.26	2.14		
Educational Level					1.532	0.218
Elementary	20	7.9	11.70	2.78		
Highschool	150	59.5	12.59	2.1		
College	82	32.5	12.61	2.22		
Income Level (M= PHP 10,486, SD= 13,351)					-1.302	0.194
Lower Income (PHP 10,957 or less)	182	72.2	12.41	2.28		
Higher Income (PHP 10,958 and above)	70	27.8	12.81	1.97		
Occupation					0.405	0.749
White Collar Occupation	13	5.2	12.39	2.22		
Blue Collar Occupation	89	35.3	12.34	2.40		
Others	81	32.1	12.60	2.05		
Unemployed	69	27.4	12.7	2.12		

*Note: M=Mean; *p<0.05*

that the majority (35.3%) had blue-collar occupations or jobs typically involving manual labor while few (5.2%) had white-collar occupations or jobs usually involving intellectual or analytical work and which may require formal education and specialized skills. Table 1 also shows that the t-Test revealed that, when classified according to sex, the results showed a significant difference (t = 2.92; p = 0.004) in knowledge about cholera and its prevention among household heads. On the other hand, the t-Test revealed no significant differences in knowledge about cholera and its prevention among household heads according to marital status (t = 1.27; p = 0.207) and income level (t = -1.302; p = 0.194). Table 1 also displays the ANOVA result revealing no significant differences in knowledge about cholera and its prevention among household heads according to age (F = .466; p = 0.628), educational level (F = 1.532; p = 0.218), and occupation (F = .405; p = 0.749).

Table 2 shows that most (58.3%) household heads in a highly urbanized city had a high level of knowledge, while some (31.7%) had a moderate level, and the least number (9.9%) had a low level of knowledge about cholera and its prevention. The mean score was 12.52 out of 16, with a standard deviation of 2.20.

Table 3 shows the percentage of knowledge items about cholera and its prevention that were answered correctly by the household heads. The top items the participants answered correctly were: "You should go to the nearest medical or health facility if cholera cannot be managed at home" (96.4%); "Cholera can be transmitted by drinking unsafe water" (95.6%); "Storing of cooking utensils in a dry and clean place can help prevent cholera" (95.6%); "Cholera vaccine can be utilized to avoid acquiring cholera" (93.3%); and "Cholera can spread by poor sanitation" (92.5%).

Table 2. Level of Knowledge about Cholera and its Prevention (N=252)

Level of Knowledge (M= 12.52, SD= 2.20)	n	%
High	147	58.3
Moderate	80	31.7
Low	25	9.9

On the other hand, less than 70% of the household heads were not able to correctly answer the following six items: "Boiling water for 1-3 minutes cannot help prevent acquiring cholera" (68.7%); "Cleaning and washing of fruits and vegetables after buying them from markets cannot prevent cholera" (64.7%); "Cholera cannot spread by flies" (64.3%); "The bacterium that causes cholera can be found in coastal water" (63.1%); "Washing your hands before and after eating cannot prevent cholera" (59.5%); and "A homemade solution composed of water, sugar, and salt or Oral Rehydrating Solution (ORS) is ineffective in managing cholera and its symptoms" (51.2%).

Discussions

This study was conducted among household head residents in a highly urban community in the Philippines. Given that household heads are the family members responsible for the organization and care of the household, the bulk population of household heads was in their adult years. This can be particularly helpful in spreading awareness about cholera and its prevention, as young and middle-aged adults have a more sophisticated understanding of the workings of the

Table 3. Percentage of Participants Who Answered the Knowledge Items Correctly (N=252)

Item	f	%
You should go to the nearest medical or health facility if cholera cannot be managed at home.	243	96.4
Cholera can be transmitted by drinking unsafe water.	241	95.6
Storing cooking utensils in a dry and clean place can help prevent Cholera.	241	95.6
Cholera vaccine can be utilized to avoid acquiring cholera.	235	93.3
Cholera can be spread by poor sanitation.	233	92.5
The practice of defecating in open spaces instead of in a toilet could help cholera spread.	218	86.5
Profuse watery stool or diarrhea is a symptom associated with cholera.	213	84.5
Proper disposal of human waste will prevent cholera.	204	81.0
Correct treatment of water with chlorine solution can help prevent cholera.	197	78.2
Unsafe drinking water will not cause cholera.	190	75.4
Boiling water for 1-3 minutes cannot help prevent acquiring cholera.	173	68.7
Cleaning and washing fruits and vegetables after buying them from markets cannot prevent cholera.	163	64.7
Cholera cannot spread by flies.	162	64.3
The bacterium that causes cholera can be found in coastal water.	159	63.1
Washing your hands before and after eating cannot prevent cholera.	150	59.5
A homemade solution composed of water, sugar, and salt or ORS (Oral Rehydrating Solution) is ineffective in managing cholera and its symptoms.	129	51.2

world around them (Lally and Valentine-French, 2019). Meanwhile, the majority of the household heads were dominated by women. Mothers are typically tasked with caring for the household, maintaining a clean and tidy household, and preparing nutritious and sanitary meals (Anetor and Abraham, 2020). Since women naturally fill this function, it is essential to have a sufficient number of them to assess their cholera knowledge and preventative actions. Also, health education can be delivered if they lack information regarding cholera— its cause, transmission, and preventative countermeasures (Anetor and Abraham, 2020). In addition, the majority of the household heads in the *barangay* had the highest educational attainment of high school due to the evident influence of poverty and the substantial demand for a hand-to-mouth way of living. According to Carlson and McChesney (2015), higher levels of education correlate with higher salaries. Consequently, the income disparity between individuals with varying educational levels has consistently expanded, favoring those with more educational achievement. In the absence of a college diploma as a prerequisite for a job, most chose to work in blue-collar jobs where manual labor is the primary source of investment. In blue-collar jobs, income amounts to approximately less than PHP 25,000, which, in reality, is not enough for a Filipino household to live comfortably (Ladrido, 2018).

Meanwhile, most household heads in this study had a moderate to high level of knowledge. During the survey with household heads and *barangay kagawad* on health, there were claims of prior informal information dissemination in the *barangay* regarding cholera education. Upon the declaration of the cholera outbreak last August 2022, the City Health Officer inspected the *barangays,* specifically the drinking water sources like deep wells and water refilling stations. Informal health teachings were provided, as claimed by the barangay officials and health workers, to the residents. However, there was no formal information dissemination among the residents. Based on an informal interview of the researchers with the household heads, some claimed they had known about cholera through reports from radio and television. The media is crucial in disseminating information about health issues (Anwar *et al.*, 2020). The accessibility of information through newspapers, television, radio, and the internet can significantly impact cholera knowledge. This may also have provided the household heads in the *barangay* with knowledge about cholera and its prevention. Notably, while there are also studies in other countries reporting low levels of knowledge about cholera infection and its prevention among household members and residents at high risk for cholera (Wahed *et al.*, 2013; Dureab *et al.*, 2021), the majority of our study samples showed a high level of knowledge. The result of the present investigation is similar to studies conducted by Orimbo et al. (2020) in Kenya and Nauja, Bugoye and Rongo. (2020) in Tanzania, which revealed a high level of knowledge about cholera infection and its prevention.

Analysis of each item in the questionnaire showed that household heads knew cholera's causes and related factors. They considered the cause of cholera not only as stemming from drinking unsafe water but also attributed it to various environmental factors, such as open defecation and inadequate food hygiene practices. Hence, they associate cholera with an illness that can be acquired from a dirty or contaminated environment. According to Orimbo et al. (2020), additional factors that make individuals more susceptible to cholera comprise inadequate hygiene practices, the practice of open defecation, consumption of untreated water, exposure to flies, consumption of unwashed fruits and vegetables, and living in unclean environments. Similar to the study of Wahed et al. (2013) in Bangladesh, 83% of their respondents stated that drinking unsafe water was one of the main causes of cholera. They also stated that food safety (87%), maintaining good hygiene practices (85%), and using safe drinking water (74%) will prevent cholera. These findings are similar to those of Tutu, Gupta and Busingye (2019) in Ghana, where more than 50% of household heads agreed that the germs that cause cholera can be found in coastal waters. Surprisingly, many household heads in this study knew of the cholera vaccine. Perhaps the household heads became aware that vaccines are effective in preventing specific diseases, possibly due to vaccination programs in the *barangay*, such as the recent mass COVID-19 vaccination (Cleofas and Oducado, 2022).

Moreover, it is also evident in our study that a number of household heads remained unaware or were only moderately aware of cholera prevention, especially in managing the symptoms. Nearly half of the participants were unaware that an ORS could be used to manage the symptoms. Similar to the study by Nauja, Bugoye and Rongo (2020) in Tanzania, the majority of the household heads would send the cholera patient to the nearest treatment center rather than giving an ORS to a person who acquired cholera. In contrast to the study by Wahed et al. (2013), about 92% of the respondents were aware of ORS. The use of ORS may not have been introduced among household heads. They may also focus more on daily survival, financial challenges, and other urgent issues that take precedence over learning about diseases. Some residents may not have the time or money to commit to learning about certain diseases or health conditions when they are trying to meet their basic requirements. Prioritization of immediate concerns due to the hand-to-mouth way of living may also have influenced the acquisition of knowledge of some household heads.

In this study, female household heads had significantly higher levels of knowledge than male household heads. Based on the results of the study, sex was found to be associated with the household heads' knowledge about cholera and its prevention. Female household heads displayed higher knowledge about cholera and its prevention in comparison to male household heads. This could be attributed to the variations in traditional roles, responsibilities, and access to healthcare and health information between males and females. Women may be more engaged in caregiving roles or may attend healthcare-related events more, leading to increased exposure to cholera information. A study by Akel et al. (2023) on the general population's knowledge of cholera outbreaks in developing countries disclosed that higher knowledge about cholera was related to the female gender. Similarly, the study by Tutu, Gupta and Busingye (2019) revealed that females had a higher score on basic knowledge of cholera risk factors in Ghana. The finding of the present investigation is also congruent with those of Samuel Amoo et al. (2021) in Nigeria, Akabanda, Hlortsi and Owusu-Kwarteng (2017) in Ghana, and Baluka, Miller and Kaneene (2015) in Uganda, where more female food handlers or service workers participated in the study than males because females were more involved in food handling and primary health. Additionally, the study by Serrem et al. (2021) in Kenya showed that female food handlers had more knowledge of food safety and sanitation than males. In addition, the review paper of Tong, Raynor and Aslani (2014) noted that more women than men tend to search for health information. Overall, women exhibit more active health information-seeking behaviors to protect their health and the well-being of their families. This may be reflected in the higher number of female household head participants in the study, who scored generally higher than men in terms of knowledge about cholera, its prevention, and management.

Meanwhile, this study has important implications for public health practice and nurses working in the community setting. Despite the majority of the participants being knowledgeable of cholera and its preventive practices, there were still some household heads having low to moderate knowledge, underscoring the need for targeted and gender-responsive public health interventions aimed at bolstering cholera education and awareness at the community level. Public health workers and nurses may design and implement educational programs tailored to the specific needs of male household heads. These programs should acknowledge and address potential barriers to knowledge acquisition and health-seeking behaviors among males, such as traditional gender roles. Moreover, this study also highlights the need to educate household heads about a simple and easy-to-use ORS preparation in managing symptoms of cholera. By implementing these intervention recommendations, public health workers and nurses can empower household heads with the knowledge and resources necessary to prevent cholera transmission, protect their families, and contribute to the overall control of cholera outbreaks within their communities.

This study has limitations. The study was only focused on the knowledge of cholera and its prevention among household heads in one urban *barangay* in Iloilo, Philippines. The conclusions drawn from the survey do not extend to other residents not included in the sample. Since the study is cross-sectional, the researchers recorded the information observed from the variables without manipulating them. A conclusion about the causality between variables cannot be drawn. Moreover, the study only focused on the following socio-demographic profiles of the household heads in terms of age, sex, marital status, educational level, family income level, occupation, and their association with knowledge of cholera and its prevention. Other factors influencing knowledge about cholera may be considered in future research. Understanding these factors can help public health policymakers design targeted interventions to improve knowledge of cholera in at-risk populations.

Conclusion

This study highlighted that the household heads understood well and were informed of cholera and its prevention. However, some misconceptions and disparities still exist concerning the disease's cause, transmission, and prevention. Furthermore, female heads of households exhibited a greater knowledge level than their male counterparts. The provision of continuous and consistent knowledge assessment, public health campaigns, and health education to the household heads may be undertaken to raise awareness further and ensure the correct and timely information regarding cholera, its prevention, and, more importantly, its appropriate and proper management. Designing targeted interventions to enhance awareness of cholera in at-risk populations, such as male heads of households, may warrant increased focus and consideration.

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Conflict of interest

Authors declare no conflict of interests.

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References

Acevedo, C. G. (2021) 'Propaganda, folk beliefs, and health information: Insights from the cholera outbreaks in the Philippines', *Philippine Journal of Librarianship and Information Studies*, 41(2), pp. 17–22.

Aerts, C. *et al.* (2020) 'Understanding the role of disease knowledge and risk perception in shaping preventive behavior for selected vector-borne diseases in Guyana', *PLOS Neglected Tropical Diseases*, 14(4), p. e0008149. doi: 10.1371/journal.pntd.0008149.

Akabanda, F., Hlortsi, E. H. and Owusu-Kwarteng, J. (2017) 'Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana', *BMC Public Health*, 17(1), pp. 1–9. doi: 10.1186/s12889-016-3986-9.

Akel, M. *et al.* (2023) 'Knowledge, Attitude, and Practices of the General Population toward the Old-New Outbreak of Cholera in a Developing Country', *Tropical Medicine and Infectious Disease*, 8(236), pp. 1–24. doi: 10.3390/tropicalmed8040236.

Ali, E., Mohamed, M. and Tawhari, M. (2021) 'Knowledge, attitude, and practice study regarding cholera among the people in Jazan city, KSA', *Journal of Family Medicine and Primary Care*, 10(2), pp. 712–712. doi: 10.4103/jfmpc.jfmpc_965_20.

Ali, M. *et al.* (2015) 'Updated Global Burden of Cholera in Endemic Countries', *PLOS Neglected Tropical Diseases*, 9(6), p. e0003832. doi: 10.1371/journal.pntd.0003832.

Alkhaledi, F. A. (2016) 'Knowledge, attitude and Practice on cholera epidemic in AL-Diwaniya Province', *Al-Qadisiyah Medical Journal*, 12(22), pp. 98–105.

Anetor, G. O. and Abraham, F. (2020) 'Knowledge of cholera and its prevention amongst urban residents of a district in Abuja: The pivotal role of health education', *Research Journal of Health Sciences*, 8(2), pp. 102–112. doi: 10.4314/rejhs.v8i2.6.

Anwar, Ayesha *et al.* (2020) 'Role of Mass Media and Public Health Communications in the COVID-19 Pandemic', *Cureus*, 12(9), p. e10453. doi: 10.7759/cureus.10453.

Baluka, S. A., Miller, R. and Kaneene, J. B. (2015) 'Hygiene practices and food contamination in managed food service facilities in Uganda', *African Journal of Food Science*, 9(1), pp. 31–42. doi: 10.5897/AJFS2014.1170.

Carlson, R. H. and McChesney, C. S. (2015) 'Income Sustainability through Educational Attainment', *Journal of Education and Training Studies*, 3(1), pp. 108–115. doi: 10.11114/jets.v3i1.508.

Center for Disease Prevention and Control (2020) *Cholera CDC I illness and symptoms*. Available at: https://www.cdc.gov/cholera/illness.html.

Cleofas, J. V. and Oducado, R. M. F. (2022) 'Demographic, Health and Pandemic-Related Determinants of COVID-19 Vaccination Intention Among Filipino Emerging Adults', *Emerging Adulthood*, 10(3), pp. 815–820. doi: 10.1177/21676968221084876.

Dureab, F. *et al.* (2021) 'Knowledge on and preventive practices of cholera in Al-Mahweet – Yemen, 2018: a cross-sectional study', *Journal of Water and Health*, 19(6), pp. 1002–1013. doi: 10.2166/wh.2021.139.

Feleke, B. T., Wale, M. Z. and Yirsaw, M. T. (2021) 'Knowledge, attitude and preventive practice towards COVID-19 and associated factors among outpatient service visitors at Debre Markos compressive specialized hospital, north-west Ethiopia, 2020', *PLOS ONE*, 16(7), p. e0251708. doi: 10.1371/journal.pone.0251708.

Fooladi, M. M. (2017) 'The role of nurses in community awareness and preventive health', *International Journal of Community Based Nursing and Midwifery*, 3(4), pp. 328–329.

Joseph, P. R. *et al.* (1965) 'Studies of cholera El Tor in the Philippines. 2. A retrospective investigation of an explosive outbreak in Bacolod City and Talisay, November 1961', *Bulletin of the World Health Organization*, 33(4), pp. 637–643.

Ladrido, P. (2018) *For these families earning below ₱25,000 a month, daily living is a struggle. CNN*. Available at: http://www.cnnphilippines.com/life/culture/2018/06/12/filipino-families-poverty-line.html.

Lally, M. and Valentine-French, S. (2019) *Lifespan development: A psychological perspective.* . 2nd edn. Creative Commons.

Lopez, A. L. *et al.* (2015) 'Epidemiology of Cholera in the Philippines', *PLoS Neglected Tropical Diseases*, 9(1), p. e3440. doi: 10.1371/journal.pntd.0003440.

Nauja, R. H., Bugoye, F. C. and L. M. B., R. (2020) 'Knowledge, Perceptions and practices on cholera transmission and prevention measures among heads of household members in Kigamboni Municipality, Dar Es Salaam, Tanzania', *International Journal of*

Research -GRANTHAALAYAH, 7(11), pp. 28–48. doi: 10.29121/granthaalayah.v7.i11.2020.331.

Orimbo, E. O. *et al.* (2020) 'Knowledge, attitude and practices on cholera in an arid county, Kenya, 2018: A mixed-methods approach', *PLOS ONE*, 15(2), p. e0229437. doi: 10.1371/journal.pone.0229437.

Philippine Daily Inquirer (2022) *Iloilo City in state of calamity amid surge in cholera, gastro cases*. Available at: https://newsinfo.inquirer.net/1658437/iloilo-city-declares-state-of-calamity-amid-surge-in-cholera-gastro-cases.

Philippine Genome Center (2018) *Genomic epidemiology on infectious diseases in the Philippines 2.0*. Available at: https://pgc.up.edu.ph/international-workshop-in-omics-in-infectious-diseases/.

Philippine Statistics Authority (2021) *Compendium of Philippine environment statistics component 5: Human settlements and environmental health*. Available at: https://psa.gov.ph/press-releases/id/165164.

Ratnayake, R. *et al.* (2021) 'Highly targeted spatiotemporal interventions against cholera epidemics, 2000–19: a scoping review', *The Lancet Infectious Diseases*, 21(3), pp. e37–e48. doi: 10.1016/S1473-3099(20)30479-5.

Rincón Uribe, F. A. *et al.* (2021) 'Health knowledge, health behaviors and attitudes during pandemic emergencies: A systematic review', *PLOS ONE*, 16(9), p. e0256731. doi: 10.1371/journal.pone.0256731.

Samuel Amoo, O. *et al.* (2021) 'Assessment of potential factors that support the endemicity of cholera in Nigeria from food handlers, health workers and the environment', *Microbiologia Medica*, 36(3), pp. 1–8. doi: 10.4081/mm.2021.10058.

Serrem, K. *et al.* (2021) 'Food safety and sanitation challenges of public university students in a developing country', *Food Science & Nutrition*, 9(8), pp. 4287–4297. doi: 10.1002/fsn3.2399.

Tong, V., Raynor, D. K. and Aslani, P. (2014) 'Gender differences in health and medicine information seeking behaviour- A review', *Journal of the Malta College of Pharmacy Practice*, 1(20), pp. 14–16.

Tutu, R. A., Gupta, S. and Busingye, J. D. (2019) 'Examining health literacy on cholera in an endemic community in Accra, Ghana: a cross-sectional study', *Tropical Medicine and Health*, 47(1), pp. 1–10. doi: 10.1186/s41182-019-0157-6.

Wahed, T. *et al.* (2013) 'Knowledge of, attitudes toward, and preventive practices relating to cholera and oral cholera vaccine among urban high-risk groups: findings of a cross-sectional study in Dhaka, Bangladesh', *BMC Public Health*, 13(242), pp. 1–12. doi: 10.1186/1471-2458-13-242.

World Health Organization (2022) *Cholera*. Available at: https://www.who.int/news-room/fact-sheets/detail/cholera.

Yamane, T. (1967) *Statistics, An introductory analysis*. 2nd edn. New York: Harper and Row.

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ORIGINAL ARTICLE

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Students' perceptions of the relevance of instructors' assessment items in online community-based interprofessional education

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ABSTRACT

Introduction: This study aimed to acquire students' perceptions of the assessment items used by instructors implemented in the community-based Interprofessional Education (IPE) program during the COVID-19 pandemic. The study also compared the students' perceptions of the instructors' assessment items regarding student characteristics. Motivation for joining the IPE program and a comparison between motivation and gender and disciplines were also identified in this study.

Methods: The research method is observational with a cross-sectional approach. Sixth-semester medical, nursing, and nutrition students who had completed the community-based IPE program were involved. Students' perception was measured using a questionnaire on the instructors' assessment items developed based on the IPE competencies. Motivation was measured using a Motivated Strategies for Learning Questionnaire (MSLQ).

Results: A majority of students across the three programs agreed or strongly agreed with the assessment items, and there were no significant differences in student perceptions from the variables of gender ($p = 0.23$) and disciplines ($p = 0.68$). The correlation between students' motivation and their perception of the instructors' assessment items was significant ($r_s = 0.61$ with $p < 0.01$). However, there was a weak and not significant correlation between students' grade point average (GPA) with the perception of assessment items ($r_s = 0.1$ with $p = 0.07$).

Conclusions: All instructors' assessment items were still perceived as relevant and can be used to assess the students during IPE online learning. Thus, the result of this study can be considered to be used in another setting with a similar situation.

Keywords: assessment, community-based, interprofessional education (ipe), online learning, perception

Introduction

An interprofessional education (IPE) program is a learning activity in which two or more health students learn with, from, and about each other as professionals to collaborate and improve health services (World Health Organization, 2010). It can be implemented in several learning methods, namely: seminars, problem-based learning (PBL), skills laboratories, clinical practice, and community-based education (CBE). However, since IPE learning with formations in the classroom primarily develops some of the skills needed to provide health services, CBE is suggested as a model for collaborative IPE learning (Lestari, Scherpbier and Stalmeijer, 2020). Lewis and Clark Community College's School of Nursing has been implementing IPE on the CBE since 2006, and

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the program continues to grow in scope and has received good feedback (Cuff, 2015).

In the Indonesian context, IPE has been implemented in various settings in the hospital and the community. Randita, Widyandana and Claramita, (2019) reported that community-based IPE is effective in improving collaborative competencies among medical and midwifery students. Moreover, a community-based IPE program encourages collaboration among medical, nursing, and midwifery students, especially when the students help families and communities solve their identified health problems (Lestari, Scherpbier and Stalmeijer, 2020).

Along with IPE development, there is an expectation to show student learning outcomes and competencies through assessment. Assessment is assigning or determining value based on certain specific criteria. The objectives include assessing educational goals' achievement and finding out what students have obtained in learning activities (Anderson and Kinnair, 2016). The success in revealing the learning outcomes and processes is highly dependent on the quality of the assessment method and its implementation (Asmara *et al.*, 2021). The benchmark for successful learning in the IPE program is the achievement of the expected competencies. An Interprofessional Education Collaborative Expert Panel identified four core competencies expected from IPE: interprofessional ethical values, responsibility, communication, and teamwork (Schmitt *et al.*, 2011).

The Faculty of Medicine, Universitas Diponegoro, has implemented an IPE program in the community setting since 2016. A small group of students consisting of 4-5 students from three disciplines (medicine, nursing, and nutrition) is attached to a family in three stages. The students visit the family to measure and identify the health problems of all family members. They discuss the issues identified and plan the intervention with the team members and the instructor (stage 1). Students who have implemented an integrated health intervention, monitored (stage 2), evaluate their intervention outcome (stage 3), and present it in the seminar of nine small groups with three instructors. At the end of the program, the students visit the family to give feedback and express their gratitude. The IPE program in this institution conducts four student assessment methods, i.e., self and peer assessment, instructors' assessment, and assessment from the family. All items of the IPE assessment were developed based on learning objectives. Before joining the program, the students are given an explanation about the program, including the assessment process (Asmara *et al.*, 2019).

The increasing number of COVID-19 cases is affecting all systems, including education. Fortunately, responding to the guidelines for social distancing, learning from home is still an option for delivering the learning process, including the IPE program, which must change from face-to-face to online learning methods (Khalili, 2020). It has consequences in all aspects of education, including implementation of IPE in a community setting. Therefore, during the COVID-19 pandemic, this implementation was conducted online and virtually, such as visiting the family, discussing with a team, supervision, and assessment from the instructors. Several online platforms were used depending on the students' and family's resources.

The research team understands that this situation will undoubtedly affect the learning and assessment program. Therefore, it is necessary to evaluate whether the assessment method is still relevant during the pandemic. Involving the students in designing the curriculum, including assessment, will increase the applicability and usefulness of the curriculum (McKenney and Reeves, 2021). It is necessary to evaluate whether the online community-based IPE program, including the assessment, can be implemented smoothly and valued by the students. Students' perceptions of learning can be influenced by intrinsic and extrinsic factors, including gender, disciplines, grade point average (GPA), and motivation (Yune *et al.*, 2020). Furthermore, assessment drives learning, meaning that the assessment must be designed for a meaningful learning process for students, including methods and instruments used (Dolmans and Tigelaar, 2012). Therefore, the authors identify students' perceptions on the instructors' assessment items and compare these perceptions in terms of student characteristics factors (gender and disciplines), then analyze the correlation between motivation and GPA with perceptions.

Materials and Methods

Design and Settings

The authors conducted a cross-sectional observational study to gather and compare students' perceptions across various independent variables. The reason for using this method was to collect students' perceptions of assessment items from the instructors, including several independent variables that would be done using a one-time data collection. Thus, a cross-sectional approach is appropriate for the study design. The authors collected the data on students' gender, disciplines of the study program, students' motivation, GPA, and perceptions of assessment items using a Google Forms questionnaire. Furthermore, the authors compared students' perceptions of assessment items based on GPA and the disciplines of the study program.

Samples

The sample collection was obtained from participants who met inclusion criteria, namely students in the 6th semester (3rd year) of the medical, nursing, and nutrition program; completed the IPE program; and agreed to be involved in the study. The target population was 470 health professional students consisting of 234 medical students, 130 nursing students, and 106 nutrition students. Using the formula of minimal sample size for a questionnaire study, with a 5% margin error, 95% confidence interval, and population variance (P=50%), we should have a minimum of 285 respondents (Taherdoost, 2017). Therefore, to anticipate a low response rate, the authors sent the questionnaire to all students who met the inclusion criteria.

Research Instruments

The questionnaires included students' motivation for the IPE program and instructor assessment. A Likert scale from 1 to 4, ranging from Strongly Agree to Strongly Disagree, was used to answer both questionnaires The students' motivation was measured by using the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintricht. It was reported that 77 statements in the MSLQ in Indonesian version were valid and reliable. Internal consistency of motivation and learning strategies was 0.89 and 0.88, respectively (Ningrum, 2021). The questions included the motivation of the students in joining IPE program including the benefits that will be gained.

The IPE team developed the instructors' assessment items based on the IPE competencies, followed by an expert panel to do content validity and apply the validity and reliability test. Fifteen statements resulted from content validity. Exploratory factor analysis (EFA) was employed to determine the validity, which resulted in a range of loading factors 0.633-0.817 (> 0.3). Furthermore, the statements were reliable, with Cronbach's alpha of 0.925 (Asmara *et al.*, 2021). The assessment items covered individual and group assessment items. Questions 1-10 were for a group assessment, while questions 11-15 were for the individual student's evaluation. The authors obtained data from students' GPAs up to semester six from the faculty administration.

Data Collection

To collect the data, the first author distributed questionnaires to all 470 students who had just finished their community-based IPE program. The Google Forms application was used to avoid luring meetings. Before filling out the questionnaire, all participants were given an explanation of the data collection process using Zoom methods.

Ethical Consideration

This research has obtained approval and ethical feasibility in the form of ethical clearance from the Health Research Ethics Commission Faculty of Medicine Diponegoro University No: 204/EC/KEPK/FK-UNDIP/VI/2021. The explanation of confidentiality of their identity and a guarantee that their perceptions would not affect their scores were written in the preface of the Google Forms questionnaire. Obtaining the students' signed informed consent was a prerequisite for participating in the questionnaire.

Data analysis

The Kolmogorov-Smirnov test identified that the data were not normally distributed. Therefore, we used the Mann-Whitney test to compare student perceptions by gender, the Kruskal Wallis test to compare student perceptions from three study programs, and the Spearman-rho correlation test to determine the relationship between GPA and motivation with their perception toward item assessment.

Results

Students' characteristics

Three hundred and thirty-seven (337) students completed the questionnaires (Response rate 71.7%). The student's gender, the study program, and the respondents' GPA distribution are detailed in Table 1. More than half of the respondents were medical students, and a majority were female students—furthermore, only four students had a GPA of less than 3.00.

Student perception on assessment items

Table 2. Students' perception on assessment items (n = 337)

No	Item of assessment	Strongly Agree	Agree	Disagree	Strongly disagree	Mean ± SD	Median
1	Ability to identify family health problems and determine possible causes	132	198	6	1	3.37 ± 0.5	3
2	Ability to formulate rationalization or justification of intervention	118	212	6	1	3.33 ± 0.5	3
3	Presentation (appearance, timing, clarity)	112	213	12	0	3.30 ± 0.5	3
4	Discussion (fluency, presentation material mastery)	125	200	10	2	3.33 ± 0.5	3
5	Communication skills	154	174	7	2	3.42 ± 0.6	3
6	Professionalism (mutual respect, not dominant, giving opportunities to other members)	178	154	4	1	3.51 ± 0.5	4
7	Comprehensive and collaborative interventions (media, delivery methods, creativity)	149	174	12	2	3.39 ± 0.6	3
8	Results of intervention monitoring & evaluation	128	199	9	1	3.35 ± 0.5	3
9	Follow-up plan (for family)	113	210	14	0	3.29 ± 0.5	3
10	Final report quality	104	223	9	1	3.28 ± 0.5	3
11	Discipline	140	193	4	0	3.40 ± 0.5	3
12	Responsibility	162	172	3	0	3.47 ± 0.5	3
13	Communication skills	141	186	9	1	3.39 ± 0.6	3
14	Cooperation ability	154	179	4	0	3.45 ± 0.5	3
15	Politeness & respect for others	170	160	6	1	3.48 ± 0.5	4

Table 2 shows that most respondents agreed and strongly agreed with all assessment items. The item Professionalism (mutual respect, not dominant, giving opportunities to other members) received the highest score, averaging 3.51 ± 0.5 on a scale of 1 (Strongly Disagree) to 4 (Strongly Agree). Politeness and respect for others also received a high score, averaging 3.48 + 0.5 with a median of 4. Meanwhile, item "final report quality" had the lowest score, averaging 3.28 ± 0.5 on the same scale. Thus, even though most students perceived that assessment items were good, the "final report quality" item should receive proper attention.

Students' motivation

Overall, most students have a good motivation to participate in the community-based IPE program. Table 3 presents items related to student motivation. Most students selected 'Strongly Agree' or 'Agree,' some indicated 'Disagree,' and a few chose 'Strongly Disagree.' The item with the highest score was "I feel IPE learning is helpful for me," with an average value of 3.31± 0.5, while the lowest score was "I like IPE learning," with an average value of 2.91± 0.7. The result shows that even though the number of students who like IPE learning was small, they thought that IPE is a helpful learning for them.

Comparison of students' perceptions on item assessment

Table 4 shows no significant difference in student perceptions toward the sum perception of instructors' assessment items based on gender and disciplines with p-value 0.23 and 0.68, respectively. However, this study showed that male students perceived more positively than female students and nursing students' perceptions were lower than those of other students in different disciplines.

Table 3. Item of student motivation in participating in the IPE program (n = 337)

No	Statement Item	Students' Motivation				Mean ± SD	Median
		Strongly Agree	Agree	Disagree	Strongly Disagree		
1	I can learn and do everything well in this IPE program.	103	228	5	1	3.28 ± 0.5	3
2	I can understand the material presented in IPE learning.	92	229	15	1	3.22 ± 0.5	3
3	I can solve problems well while studying IPE.	93	231	13	0	3.24 ± 0.5	3
4	I prefer challenging assignments so that I can learn new things.	65	206	63	3	2.99 ± 0.6	3
5	I like IPE learning	57	199	75	6	2.91 ± 0.7	3
6	I feel I can relate IPE material to other courses.	116	205	14	2	3.29 ± 0.6	3
7	I often look for readings that provide additional knowledge, even though it takes extra time.	66	223	48	0	3.05 ± 0.6	3
8	I feel IPE learning is helpful for me.	121	202	13	1	3.31 ± 0.5	3
9	I find the IPE learning process enjoyable.	68	189	74	6	2.95 ± 0.7	3

Table 4. Comparison of the sum perception on the assessment items based on gender and disciplines (n = 337)

Variables	The sum perception on the assessment items (Median ± Interquartile Range)	*Min*	*Max*	*p value*
Gender				
Male	52 ± 15	30	60	0.23*
Female	49 ± 11	39	60	
Disciplines				
Medical	50 ± 13	30	60	0.68**
Nursing	47.5 ± 13	35	60	
Nutrition	50 ± 12	38	60	

**Mann-Whitney test (p-value <0.05)*
***Kruskall Wallis test (p-value <0.05)*

The correlation between students' motivation and GPA with the perception of the assessment items

The Spearman-rho correlation test indicated a strong and significant correlation between students' motivation and their perception of the instructors' assessment items (r_s = 0.61 with p < 0.01). However, there was a weak and not significant correlation between students' GPA with the perception of assessment items (r_s= 0.1 with p = 0.07). The Spearman-rho correlation test indicated a strong and significant correlation between students' motivation and their perception of the instructors' assessment items (r_s = 0.61 with p < 0.01). However, there was a weak and not significant correlation between students' GPA with the perception of assessment items (r_s= 0.1 with p = 0.07).

Discussions

The study shows that students positively perceive the assessment items during online learning in a community-based IPE program. However, there are no differences in perception among students based on gender and discipline. Meanwhile, there is a strong and significant correlation between students' motivation and their perception, and there is a weak and not significant correlation between students' GPA and the perception of assessment items.

Student perception on assessment items

Student assessment in community settings has several problems due to varying field conditions. However, this study revealed that students have a positive perception of the assessment items, and the highest average value of the assessment item was "Professionalism." Professionalism, as defined by the Interprofessional Education Collaborative Expert Panel, is the specific competencies of the IPE program (Schmitt *et al.*, 2011). Students must develop their professional attitude during the educational process, even from the beginning of education. Students' attitudes during the educational process can inform their behavior during later practice (Arif *et al.*, 2014). Thus, the result of this item suggests that the students understand the relevance of assessment professionalism as an essential aspect of their future collaboration practice.

The assessment item with the lowest average is "quality of the final report." The final report is one of the assessment criteria used by supervisors to determine students' abilities. Before reaching the final report, a team of students composed a report of each stage that needed instructors' feedback to improve the report's quality. However, implementing IPE in a community setting lacks supervision and feedback because the instructors are not on the students' side (Kristina *et al.*, 2023). It is worsened by online learning where feedback is also served online (Khalili, 2020). Therefore, the supervisor's feedback on the final report might need to be improved, affecting the report's quality.

Students' motivation

Students participating in a community-based IPE program are well-motivated. Most students agree and strongly agree on statements of motivation. High motivation results in high engagement in an IPE team to reach the goals (Oyserman and Destin, 2010; Khalili *et al.*, 2013; Reinders and Krijnen, 2023). Therefore, having good motivation is a good step for students to participate in the program.

Comparison of students' perceptions on item assessment

This study showed no significant differences in perceptions between male and female students, in

Table 5. Correlation between students' motivation and GPA with the sum perception on the assessment items (n = 337)

Variables	The sum perception on the assessment items (Median ± Interquartile Range)	*Min-Max*	*r_s*	*p value*
Students' motivation	3.22 ± 0.53	2 - 4	0.61	< 0.01***
GPA	3.53 ± 0.22	2.81 – 4.00	0.1	0.07***

*** Spearman-rho test (p-value <0.05)

which males were slightly more positive than female students. Meanwhile, gender, age, and experience in IPE affect students' perception of the IPE program including the assessment process (Hammick *et al.*, 2007; Cant, Leech and Hood, 2015;). A possible explanation could be that the male students involved in this study were limited to only 20% of the participants. In contrast, the number of participants influences the result of the study (Taherdoost, 2017).

The results also showed no significant difference in students' perceptions of the instructors' assessment items regarding disciplines. However, nursing students' perceptions were lower than those of other students in different disciplines. Most previous research reported significantly different student perceptions toward IPE from various study programs. Nursing students are mostly the highest, whereas medical students are the lowest (Lestari *et al.*, 2018; Yune *et al.*, 2020) Medical students' perceptions are lower than other students in different disciplines because medical students were more skeptical about IPE than other health students. They think IPE is less critical and a waste of time because their curriculum is already tight. The academic burden is excessive, so they are less interested and enthusiastic about the IPE program (Yune *et al.*, 2020). Furthermore, different perceptions of patients' needs and unequal participation in decision-making are other reasons why the perceptions of IPE programs among students differ (Thistlethwaite, 2012; Sunguya *et al.*, 2014; Lestari *et al.*, 2018). This study showed different results because the students might receive information from their seniors about how the program is. They were also involved in the preparation program in which the program was introduced, and they were trained to do case studies in a team (Asmara *et al.*, 2019). Experiences with IPE are one of the factors affecting students' perceptions of the program (Hammick *et al.*, 2007; Cant, Leech and Hood, 2015).

The correlation between students' motivation and GPA with the perception of the assessment items

This study indicated a strong and significant positive relationship between motivation and student perceptions of instructors' assessment items, which is in line with previous research that reported high motivation and level of engagement resulted in good student perceptions of the IPE program where the assessment process is included (Soemantri *et al.*, 2020). Thus, the excellent result of the student's perceptions of the assessment items could be caused by a high motivation to participate in this program. In addition, assessment drives learning, which means that the objectivity of the assessments process and instruments increases students' learning stimulation (Wiliam, 2011). The results showed that almost all students had satisfied GPAs even though there was a weak and not significant correlation between students' GPAs with the perception of instructors' assessment items. It's similar to other study, which also reported that academic achievement was significantly related to higher scores for teaching perception, atmosphere, and social self-perception (Ahmed *et al.*, 2018; Sarmita, 2018).

A limitation of this study is that the differences in the supervision styles, learning experiences, and learning environment, which might influence the differences in students' motivation and perception of the assessment items, need to be investigated. Another limitation is that we should have compared the students' perception of the assessment items with the previous IPE program to see the reliability or consistency of the results. Further research should identify other factors, such as supervision styles, learning experiences, and learning environment, that affect students' perception of assessment in the IPE program.

Conclusion

In conclusion, students have perfect perceptions of items of instructors' assessment during IPE online learning during the COVID-19 pandemic. The study showed no significant difference in students' perceptions of gender and disciplines. Moreover, a significant and strong relationship existed between motivation and student perceptions of assessment items. However, a weak and insignificant correlation existed between students' GPAs and their perceptions of the assessment items.

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Conflict of Interest

The authors do not have any conflict of interest to be declared. All authors give permission to publish the manuscript.

References

Ahmed, Y. *et al.* (2018) 'Students' perception of the learning environment and its relation to their study year and performance in Sudan', *International journal of medical education*, 9, pp. 145–150. doi: 10.5116/ijme.5af0.1fee.

Anderson, E. S. and Kinnair, D. (2016) 'Integrating the assessment of interprofessional education into the health care curriculum', *Journal of Taibah University Medical Sciences*, 11(6), pp. 552–558. doi: 10.1016/j.jtumed.2016.10.005.

Arif, S. A. *et al.* (2014) 'Impact of an interprofessional international experience abroad on the attitudes of health care professional students', *Currents in Pharmacy Teaching and Learning*, 6(5), pp. 639–645. doi: 10.1016/j.cptl.2014.05.010.

Asmara, F. Y. *et al.* (2019) 'Implementation of interprofessional education in community setting', *Journal of Community Empowerment for Health*, 2(2), pp. 222–228. doi: 10.22146/jcoemph.47513.

Asmara, F. Y. *et al.* (2021) 'Assessment of Interprofessional Education (IPE) in Community Settings: A Systematic Review', *Nurse Media Journal of Nursing*, 11(3), pp. 318–335. doi: 10.14710/nmjn.v11i3.34155.

Cant, R., Leech, M. and Hood, K. (2015) 'Factors affecting Australian medical students' attitudes to interprofessional education; validity of the Readiness for Inter-professional Learning Scale-Med', *Journal of Interprofessional Education and Practice*, 1(3–4), pp. 90–96. doi: 10.1016/j.xjep.2015.10.002.

Cuff, P. A. (Ed.). (2015). Building health workforce capacity through community-based health professional education: workshop summary. National Academies Press.

Dolmans, D. H. J. M. and Tigelaar, D. (2012) 'Building bridges between theory and practice in medical education using a design-based research approach: AMEE Guide No. 60', *Medical Teacher*, 34(1), pp. 1–10. doi: 10.3109/0142159X.2011.595437.

Hammick, M. *et al.* (2007) 'A best evidence systematic review of interprofessional education: BEME Guide no. 9', *Medical Teacher*, 29(8), pp. 735–751. doi: 10.1080/01421590701682576.

Khalili, H. *et al.* (2013) 'An interprofessional socialization framework for developing an interprofessional identity among health professions students', *Journal of Interprofessional Care*, 27(6), pp. 448–453. doi: 10.3109/13561820.2013.804042.

Khalili, H. (2020) 'Online interprofessional education during and post the COVID-19 pandemic: a commentary', *Journal of Interprofessional Care*, 34(5), pp. 687–690. doi: 10.1080/13561820.2020.1792424.

Kristina, T. N. *et al.* (2023) 'Increasing the value of Community-Based Education through Interprofessional Education', *The Asia Pacific Scholar*, 8(2), pp. 4–13. doi: 10.29060/taps.2023-8-2/oa2755.

Lestari, E. *et al.* (2018) 'Understanding attitude of health care professional teachers toward interprofessional health care collaboration and education in a Southeast Asian country', *Journal of Multidisciplinary Healthcare*, 11, pp. 557–571. doi: 10.2147/JMDH.S178566.

Lestari, E., Scherpbier, A. and Stalmeijer, R. (2020) 'Stimulating students' interprofessional teamwork skills through community-based education: A mixed methods evaluation', *Journal of Multidisciplinary Healthcare*, 13, pp. 1143–1155. doi: 10.2147/JMDH.S267732.

McKenney, S. and Reeves, T. C. (2021) 'Educational design research: Portraying, conducting, and enhancing productive scholarship', *Medical Education*, 55(1), pp. 82–92. doi: 10.1111/medu.14280.

Ningrum, R. K. (2021) 'Validitas dan Reliabilitas Motivated Strategies for Learning Questionaire (MSLQ) pada Mahasiswa Kedokteran', *PENDIPA Journal of Science Education*, 5(3), pp. 421–425. doi: 10.33369/pendipa.5.3.421-425.

Oyserman, D. and Destin, M. (2010) 'Identity-Based Motivation: Implications for Intervention', *The Counseling Psychologist*, 38(7), pp. 1001–1043. doi: 10.1177/0011000010374775.

Randita, A. B. T., Widyandana, W. and Claramita, M. (2019) 'IPE-COM: A pilot study on interprofessional learning design for medical and midwifery students', *Journal of Multidisciplinary Healthcare*, 12, pp. 767–775. doi: 10.2147/JMDH.S202522.

Reinders, J. J. and Krijnen, W. (2023) 'Interprofessional identity and motivation towards interprofessional collaboration', *Medical Education*, (October 2022), pp. 1–11. doi: 10.1111/medu.15096.

Sarmita, R. N. (2018) 'Contributing Factors To the Low Grade Point Average (Gpa) of Undergraduate Students', 2(03), pp. 1–27.

Schmitt, M. *et al.* (2011) 'Core competencies for interprofessional collaborative practice: Reforming health care by transforming health professionals' education', *Academic Medicine*, 86(11), p. 1351. doi: 10.1097/ACM.0b013e3182308e39.

Soemantri, D. *et al.* (2020) 'Measuring the interprofessional collaborative competencies of health-care students using a validated Indonesian version of the CICS29', *Journal of Interprofessional Care*, 34(6), pp. 763–771. doi: 10.1080/13561820.2019.1697215.

Sunguya, B. F. *et al.* (2014) 'Interprofessional education for whom? - Challenges and lessons learned from its implementation in developed countries and their application to developing countries: A systematic review', *PLoS ONE*, 9(5). doi: 10.1371/journal.pone.0096724.

Taherdoost, H. (2017) 'Determining sample size; How to calculate survey sample size', *International Journal of Economics and Management Systems*, 2(2), pp. 237–239.

Thistlethwaite, J. (2012) 'Interprofessional education: A review of context, learning and the research agenda', *Medical Education*, pp. 58–70. doi: 10.1111/j.1365-2923.2011.04143.x.

Wiliam, D. (2011) 'What is assessment for learning?', *Studies in Educational Evaluation*, 37(1), pp. 3–14. doi: 10.1016/j.stueduc.2011.03.001.

World Health Organization, W. (2013) 'Transforming and Scaling up health professionals' education and training', *WHO publication*, p. 124.

Yune, S. J. *et al.* (2020) 'Perception of interprofessional education and educational needs of students in South Korea: A comparative study', *PLoS ONE*, 15(12 December), pp. 1–13. doi: 10.1371/journal.pone.0243378.

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ORIGINAL ARTICLE

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Developing a parental empowerment model to prevent health risk behaviors among adolescents in East Java, Indonesia

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ABSTRACT

Introduction: Parental empowerment in monitoring adolescents plays a crucial role in preventing health-risk behaviors. This research aimed to develop a model of parental empowerment against the prevention of health risk behavior (PE-HRB) in adolescents based on the theory of health promotion model.

Methods: The research design used was an explanative survey method. The research population was parents who have adolescent children in East Java and able to access online questionnaires. Consecutive sampling obtained a large sample of 704 respondents from July - September 2020. Questionnaires were distributed using the online Zoho platform and distributed to parents. The data analysis used a smart PLS (Partial Least Squares) statistical test with significance level T>1.96.

Results: Personal factors positively and significantly influenced cognition and affect (T=2.82;p=0.005). Cognition and affection variables influence on parental empowerment (T=5.19; p=<.001). Cognition and affection have no effect on preventive behavior (T=1.49; p=.135). Parental empowerment is an important point in shaping preventive behavior.

Conclusions: Empowerment is a factor that significantly affects the formation of parental behavior without going through commitment variables. Parental involvement in adolescents' academic and personal lives is an important aspect to prevent health-risk behavior in adolescents. Cognition and affection variables cannot directly form preventive behavior but must go through parental empowerment pathways to form preventive behavior. Parental empowerment has no effect on commitment, but commitment affects prevention behavior. Empowering parents is a topic that can be used as material in health education in primary health services.

Keywords: adolescents, family, health risk, parental empowerment, sexual risk behavior

Introduction

Adolescence is a critical period in child development (Newman et al., 2008). Data from WHO in 2018 stated that the world's adolescent population is estimated at 1.2 million or 1 in 6 in the world's population (WHO, 2018). Most adolescents are in good health, but some aspects of adolescents' health require preventive efforts such as traffic accidents, premarital sex, drug abuse, cigarette use, etc. Parental monitoring is an effort that can be made to prevent health-risk behavior in adolescents (Arria et al., 2008). Parental involvement in monitoring children's activities is an important factor; the higher the parental involvement, the lower the appearance of health risk behavior in adolescents (Pengpid & Peltzer, 2018). Empowerment of parents entails four aspects, including: knowledge,

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participation, skills, and support from various parties to implement preventive behavior. One of the most widely used models of health behavior formation in improving health states is the health promotion model by Nola J. Pender (Karen & Nola, 2011; Pender et al., 1995; Susan et al., 1995). There have been many studies using the basis of behavioral theory to explain health promotion behavior (Azadi et al., 2021). However, the formation of behavior by combining parental empowerment and Nola J. Pender's health promotion behavior remains largely unexplained. Parental empowerment as the primary caregiver to the child is a major necessity because the family's function, according to Friedman, is to prevent health problems and take care of sick families (Paramita & Harmanto, 2014). Adolescents who have harmonious families will have a lower risk of performing risky behavior due to good interaction and communication between parents and children (Kurnia et al., 2019; Lenciauskiene & Zaborskis, 2008). Parents can open interactions through discussion and engage in youth activities and monitor teenagers' activities. This can prevent adolescents from intending to perform risky behavior such as consuming drugs, premarital sex, and alcohol consumption (Kaynak et al., 2013). Parents need enough preparations to carry out good interactions with adolescents including knowledge, self-efficacy, and commitment. Based on research on adolescents in Indonesia, it shows that parenting style is closely related to risky behavior in adolescents (Krisnana et al., 2019).

Empowerment is a process of better control of the individual to give decisions and responsibilities for himself related to his health viewed as individual and in the community process (WHO, 2009). Parental empowerment can result in self-management skills, improved abilities, and responsibilities (Ni et al., 2016). Through empowerment, parental knowledge and self-efficacy can increase (WHO, 2009). Self-efficacy will determine parental commitment so that the behavior displayed can last for a long time (Abidin et al., 2016). Through high commitment, parents have a sense of being responsible for adolescent behavior, so that even if the parents are in depressed conditions, they keep going and do not hinder efforts to prevent health-risk behavior in adolescents (Pender, 2011). The Pender health promotion model theory explains that, to build health promotion behavior, it begins with commitment. Commitment is formed through cognition and affect, interpersonal factors and situational factors. According to the WHO (2008), four aspects are needed to form empowerment consisting of knowledge, participation, skills and environment. These two theories are combined because they have the same goals and components that are in line. This study aims to develop a model of parental empowerment against the prevention of health-risk behavior in adolescents based on the theory of health promotion model by Pender. HPM theory becomes the main framework in the conceptual development of research. Components of the HPM theory, consisting of previous experience factors, cognition and affect, social support, commitment and preventive behavior, are the variables measured in this research.

Materials and Methods

Study Design

The research design used a cross-sectional study using an explanative survey method. This type of research was used because the researchers aimed to find an explanation of a phenomenon or event that occurred so that it would produce an overview of the causal relationship between the independent and the dependent variables. This research aims to describe the behavioral phenomenon of preventing health risk behavior in adolescents based on the health promotion model theory, so it is very appropriate to use an explanatory research design.

Population

The population in this study was parents who have teenage children in the Surabaya area and East Java. Part of the results of this study has been published in other journals with the title "Factors Related to Parental Involvement in the Prevention of Health Risk Behaviors among Adolescents: A Cross-sectional Study in East Java Indonesia" (Krisnana et al., 2022).

Samples, sampling

Respondents were parents who met inclusion criteria, including; 1) parents who had adolescents aged 15-19 years, 2) parents whose children attend Senior High School or Vocational High School or Islamic Senior High School in East Java, 3) parents who could fill out online questionnaires via smartphone or personal computer, and 4) parents who were willing to participate in the research. This study used convenience sampling. The large sample obtained during the distribution of online questionnaires from July until September 2020 was 706 and 704 sample parents who met the inclusion criteria.

Variables

Independent variables in this study were personal factors (X1) consisting of education (X1.1), employment (X1.2), cognition and affection (X2) consisting of benefits and barriers (X2.1) and self-efficacy (X2.2), empowerment (X3) consisting of knowledge (X3.1), participation (X3.2), and environment (X3.3). The dependent variables in this study were commitment (Y1) and health -risk behavior prevention in adolescents containing parental monitoring (Y2).

Instruments

Personal factor questionnaire

The personal factor questionnaire consisted of questions containing a checklist about the respondents' highest education and an occupation questionnaire which contained a checklist of the respondents' professions. The Cronbach's alpha for personal factors was 0.73.

Questionnaire about benefits and barriers

Instruments to measure benefits were developed based on the concept of Pender's theory in the health promotion model (HPM). The perceived benefits instrument was adopted from the Exercise Benefits Questionnaire (Lovell et al., 2010; Pender, Garcia et al., 1995). Instruments used to measure the benefits of prevention of risky behavior in adolescents consisted of four subscales, namely: i) physical appearance (question number 1), ii) psychological aspects (question no. 3), iii) social interaction (question number 5), and iv) preventive healthcare (question number 7). The questionnaire about obstacles consisted of four questions consisting of four subscales, namely: i) environmental conditions (question number 2), ii) spending time (question number 4), iii) draining energy (question number 6), iv) family disappointment (question number 8). The respondents' answers were on a 4-point Likert scale ranging from strongly agree to disagree. The higher the score, the higher the perceived benefits of preventing risky behavior. The Cronbach's alpha for the benefits and barriers questionnaires was 0.79.

Self-efficacy Questionnaire

The instrument for measuring self-efficacy was derived from the Self-Efficacy for Exercise (SEE) scale questionnaire (Estrada, 2016; Resnick & Jenkins, 2000). The change or modification of the original sentence is about exercise changed to prevent risky behavior. The questionnaire to measure self-efficacy levels consisted of nine questions about the parent's confidence in carrying out activities to prevent health risk behavior. The answer responses were in the range of 0-10 to describe situations ranging from 0 (not confident) to 10 (very confident). The higher the score, the higher the self-efficacy of the mother. The Cronbach's alpha for the self-efficacy questionnaire was 0.94.

Knowledge questionnaire

Knowledge questionnaires were compiled by researchers. The knowledge questionnaire consisted of five questions with answer responses of right and wrong. The parameters for compiling a knowledge questionnaire consisted of; 1) definition of health-risk behavior in adolescents, 2) etiology, 3) prevention, 4) causes of risky behavior in family, 5) complications of health-risk behavior in adolescents. The correct answer was given a score of 1, while the wrong answer was 0, hence the maximum obtainable score was 5. Higher scores reflect better levels of parental knowledge about health risk behavior in adolescents. The Cronbach's alpha for the knowledge questionnaire was 1.00.

Participation questionnaire

The participation questionnaire was adopted from research in six African countries (Pengpid & Peltzer, 2018). This questionnaire consisted of four questions that showed parents' participation in knowing the teenagers' activities in the last 30 days. The four contents of the question were 1) checking children's homework, 2) checking their children's belongings surreptitiously, 3) understanding children's problems and worrying about them, and 4) knowing about children's activities at leisure. The answer responses consisted of five options, including, always with a score of 5, often with a score of 4, rarely with a score of 3, once with a score of 2, and never with a score of 1. Obtainable score ranged from 4 to 20, with higher scores reflecting better the parental participation. The Cronbach's alpha for the participation questionnaire was 0.70.

Environmental questionnaires

The environmental questionnaire was developed by researchers referring to nonphysical environments i.e., information came from health workers, families, and people nearby. The answer responses consisted of always with a score of 3, sometimes with a score of 2, and never with a score of 1. obtainable score ranged from 3 to 9. The higher the score, the greater the information obtained from the environment. The Cronbach's alpha for the environment questionnaire was 0.698.

Commitment questionnaire

The commitment questionnaire was adapted from the shortened Committed Action Questionnaire (CAQ-8) (McCracken et al., 2015). The questionnaire was adapted and modified according to the topic of prevention of health-risk behavior in adolescents. The commitment questionnaire consisted of eight questions with responses ranging from never true (0) to always true (6). Higher scores reflect higher level of parental commitment in preventing health-risk behavior. The Cronbach's alpha for the commitment questionnaire was 0.84.

Parental monitoring questionnaires

A questionnaire on parental monitoring was adopted from a proprietary questionnaire (Li et al., 2000). The questionnaire consisted of 27 questions about parents' behavior in monitoring adolescents over the past four months. This questionnaire was compiled on seven factors, namely 1) indirect monitoring for seven questions, 2) live monitoring for three questions, 3) school monitoring for four questions, 4) health monitoring for four questions, 5) computer monitoring for four questions, 6) telephone monitoring for two questions, and 7) restrictions monitoring. Answer responses included; 0 times; 1-2 times; 3-4 times; 5 and up; do not know and refuse. The Cronbach's alpha for the parental monitoring questionnaire was 0.87.

Data collection

Concerning the COVID-19 pandemic situation, the respondents' data collection was done through the spread of online questionnaires using Zoho.form (Zhou et al., 2022). The dissemination of questionnaires used social media through various means including 1) sending questionnaire links to high school teachers in Surabaya and East Java to be distributed to parents; 2) sending links to colleagues or association of professional child nurses in East Java region through group messages; 3) publishing questionnaire links on the status features of researchers' social media. Before filling out the questionnaire, prospective respondents were informed about the details of the study such as study title and objectives, benefits, risks, and compensation, for the respondent's willingness to fill out the questionnaire. If agreed, then the respondents gave the signature directly through the online media form as proof of approval. Respondents who agreed then continued on to fill out the questionnaire until it was completed. To validate that the questionnaire filler was a parent, then the parent must fill in the school's name and the area or the location of the child's school. To avoid double filling by parents, a screening was carried out to check across respondent's name, school name, and phone number.

Table 1. Demographic characteristics of respondents n=704

Characteristic	n	%
Child's Gender		
Male	303	43
Female	401	57
Respondents		
Father	322	45.7
Mother	382	54.3
Type of Children's Education		
Vocational High School (SMK)	365	51.8
Senior High School (SMA)	247	35.1
Islamic Senior High School (MA)	92	13.1
Father's Level of Education		
Elementary School (SD)	71	10.1
Junior High School (SMP)	357	50.7
Senior High School (SMA)	151	21.4
College	125	17.8
Mother's Level of Education		
Elementary School (SD)	140	19.9
Junior High School (SMP)	176	25
Senior High School (SMA)	219	31.1
College	169	24
Type of Transportation		
Escorted by parents	213	30.3
Riding a motorcycle	421	59.8
Taking public transport	55	7.8
Other	15	2.1
Number of Children		
One	48	6.8
Two	305	43.3
Three	225	32
>3	126	17.9

Data analysis

The collected data were analyzed using a SmartPLS software for statistical test with T>1.96. SmartPLS allows testing a series of relationships between variables that are relatively complicated simultaneously. The path analysis model for all variables in the PLS consists of three sets of relationships, namely: 1) the inner model specializes in the relationship between latent variables (structural model), 2) the outer model specializes in the relationship between latent variables and indicators. Indicators were considered valid if they had an outer loading value above 0.5 and a T-Statistic value above 1.96. Hypothetical testing was done using t-test.

Ethical clearance

This research was conducted with respect for human rights and applied ethical principles to human subjects. The researcher provided an explanation of the objectives, benefits, risks, right to withdraw and rewards and compensation given to respondents via gform at the earliest position before filling out the questionnaire. If respondents agreed, they could click the agree button and continue with the questionnaire questions. For respondents who did not agree, there was no need to continue filling in the questions. This research has obtained ethics eligibility from the Health Research Ethics Commission

(KEPK), Faculty of Nursing, University of Airlangga with certificate number 2057-KEPK. All participants

Table 2. The parental empowerment variable (n=704)

Variables					
Knowledge	**True (%)**	**False (%)**			
Definition	94	6			
Etiology	67	33			
Prevention	94	6			
Family causes	33.1	66.9			
Complications	96.4	3.6			
Participation	**Always (%)**	**Often (%)**	**Rarely (%)**	**Once (%)**	**Never (%)**
Checking a child's homework	26.4	37.2	31.1	2.1	3.1
Checking a child's belongings	18.2	37.6	34.4	4.3	5.5
Understanding a teenager's problems and worried about it	41.3	42.0	12.8	2.4	1.4
Knowing the teenagers' activities in spare time	39.5	38.9	17.6	2.4	1.6
Resources of Health Information	**Always (%)**	**Sometimes (%)**	**Never (%)**		
Health workers	22.7	56.5	20.7		
Friends	28.3	58.1	13.6		
Relatives	43.8	47.7	8.5		

received explanations via the zoho.form and gave online signatures as proof of willingness to become respondents.

Results

The results showed that the students' gender attending high school is almost comparable among males (43%) and females (57%). Questionnaire respondents between fathers (45.7%) and mothers (54.3%) have an almost comparable amount. More than half of teenagers (51.8%) attend Vocational High Schools (SMK), and others attend Senior High School and Islamic Senior High School. Table 2 shows that parents possessed a good knowledge of definition, etiology, prevention, and complications. However, knowledge of family as the cause of health-risk behavior in adolescents is still relatively poor. This is proven with only 33.1% of parents answering correctly, and most of them answered incorrectly. Parental participation in monitoring children varies. The highest percentage of parents were constantly worried about the problems experienced by teenagers (41.3%), but there were still parents who never worried about problems experienced by teenagers (1.4%). The percentage of parents who have never checked a child's belongings in the last 30 days was 5.5%. The most information sources obtained by parents come from relatives (43.8%). Precisely the information coming from health workers has the least percentage compared to other sources of information (22.7%). There are even parents who claim that they have never been informed by health officials about the prevention of health-risk behavior in adolescents (20.7%). The PLS statistical test states that, if the value of T>1.96, then it is stated that there is an influence between dependent variables on independent variables. Besides, the influence is meaningful or significant if p≤0.05). The results of the hypothesis testing using PLS shows that personal factors (X1) consisting of father's education level and mother's education level influence the cognition and affection variables (X2) consisting of self-efficacy, benefits and obstacles (t=2,823; p=0.005). Cognition and affection variables affect parental empowerment (X3) consisting of knowledge, participation and environment (t=5,198; p=0.000).

Table 3. The final model of hypothesis testing results of the development of parental empowerment model for health risk behavior (PE-HRB) prevention among adolescents in East Java Indonesia

Variable	Path coefficients	Mean	SD	t	p
Effect of Personal Factors (X1) on Cognition and Affection (X2)	0.108	0.111	0.038	2.823	0.005
Effect of Cognition and Affection (X2) on Parental Empowerment (X3)	0.250	0.253	0.048	5.198	0.000
Effect of Cognition and Affection (X2) on Parental Prevention Behavior (Y2)	-0.063	-0.064	0.042	1.495	0.135
Effect of Commitment (Y1) on Parental Prevention of Behavior (Y2)	-0.229	-0.232	0.038	6.009	0.000
Effect of Parental Empowerment (X3) on Commitment (Y1)	-0.085	-0.087	0.046	1.849	0.065
Effect of Parental Empowerment (X3) on Parental Prevention Behavior (Y2)	0.169	0.171	0.046	3.636	0.000

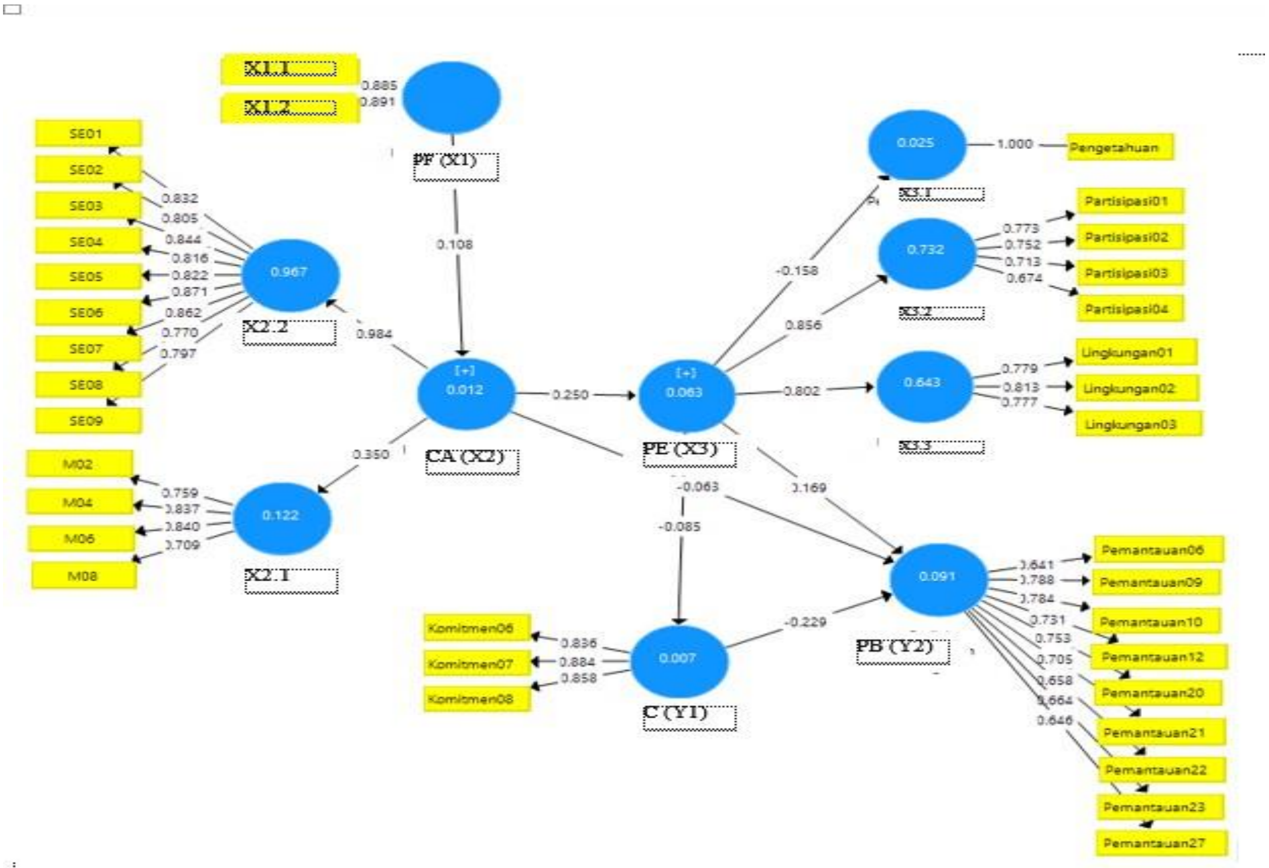
X1.1
X1.2
0.885
0.891
PF (X1)
0.108
SE01
SE02
SE03
SE04
SE05
SE06
SE07
SE08
SE09
0.832
0.805
0.844
0.816
0.822
0.871
0.862
0.770
0.797
0.967
X2.2
0.984
[+]
0.012
CA (X2)
0.350
M02
M04
M06
M08
0.759
0.837
0.840
0.709
0.122
X2.1
0.250
[+]
0.063
PE (X3)
-0.158
0.856
0.802
0.025
1.000
Pengetahuan
X3.1
0.732
0.773
0.752
0.713
0.674
Partisipasi01
Partisipasi02
Partisipasi03
Partisipasi04
X3.2
0.643
0.779
0.813
0.777
Lingkungan01
Lingkungan02
Lingkungan03
X3.3
-0.063
0.169
-0.085
Komitmen06
Komitmen07
Komitmen08
0.836
0.884
0.858
0.007
C (Y1)
-0.229
0.091
PB (Y2)
0.641
0.788
0.784
0.731
0.753
0.705
0.658
0.664
0.646
Pemantauan06
Pemantauan09
Pemantauan10
Pemantauan12
Pemantauan20
Pemantauan21
Pemantauan22
Pemantauan23
Pemantauan27

Figure 1. The Development of Parental Empowerment Model for Health Risk Behavior PE-HRB) Prevention among Adolescents in East Java, Indonesia

Note :
X1 : Personal Factors (PF)
X1.1 : Father's Level of Education
X1.2 : Mother's Level of Education
X2 : Cognition and Affection (CA)
X2.1 : Benefits and Barriers
X2.2 : Self-Efficacy
X3 : Parental Empowerment (PE)
X3.1 : Knowledge
X3.2 : Participation
X3.3 : Environments
Y1 : Commitment (C)
Y2 : Preventive Behavior (PB)

Cognition and affection had no effect on preventive behavior (Y2) (t=1,495; p=0.135). Parent empowerment (X3) affects preventive behavior (Y2). These results suggest that cognition and affection variables cannot directly form preventive behavior but must go through parental empowerment pathways to form preventive behavior. Parental empowerment had no effect on commitment (Y1), but commitment affects prevention behavior. These results suggest that to form preventive behavior this can be through parental empowerment pathways, which influence directly without a commitment pathway (Table 3 and Figure 1). Figure 2 shows the results of a model formed to create preventive behavior in parents. Personal factors affect the cognition and affection, then the cognition and affection will affect the parental empowerment. Then, the parental empowerment affects the preventive behavior that parents have to prevent health-risk

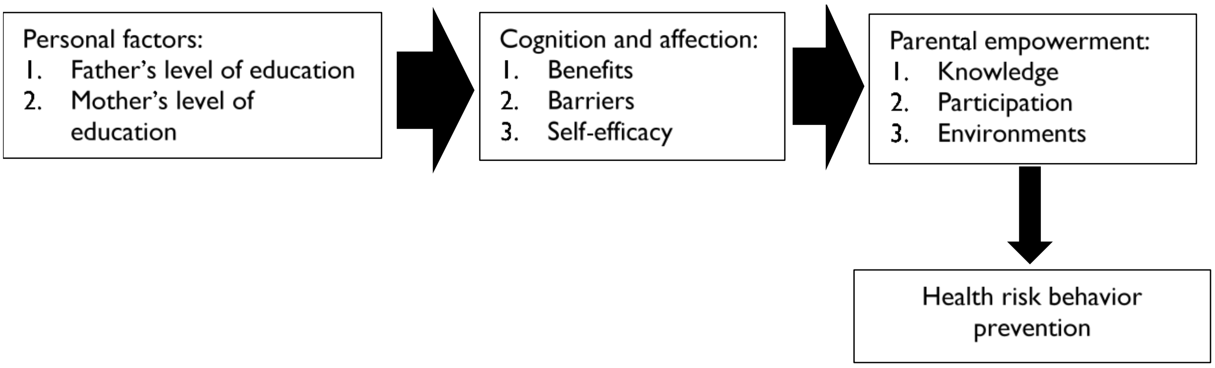
Personal factors:
1. Father's level of education
2. Mother's level of education
Cognition and affection:
1. Benefits
2. Barriers
3. Self-efficacy
Parental empowerment:
1. Knowledge
2. Participation
3. Environments
Health risk behavior prevention

Figure 2. Results of findings on the development of the Parental Empowerment Model for Health Risk Behavior (PE-HRB) Prevention among Adolescent in East Java Indonesia.

behavior in adolescents. Although commitment variables have an effect on preventive behavior, commitment variables are not included in the model because they do not have a path connected between the independent variables and dependent variables.

Discussions

Parental supervision is vital to preventing health-risk behavior in adolescents. The higher the parental monitoring in adolescents, the lower the level of health-risk behavior adolescents engaged in (Li et al., 2000). Parental monitoring and the closeness of relationships between adolescents and parents in whole families play an important role in preventing health-risk behavior such as pre-marital sex (Lenciauskiene & Zaborskis, 2008). Parental monitoring to adolescents consists of seven sub-scales, namely, indirect monitoring, direct monitoring, school monitoring, health monitoring, computer monitoring, phone monitoring, and restrictive monitoring (Cottrell et al., 2007). The results of this study showed that parental monitoring is an important aspect for preventing risky behavior in adolescents. The question item that has the highest percentage is communication among parents. Communication among parents has an essential role because fellow parents can provide support, i.e., emotional support, informational support, appraisal support, and instrumental support (Nelson et al., 2018).

Parental empowerment is indispensable for shaping parental behavior in the prevention of health-risk behavior in adolescents. Parental empowerment includes knowledge, participation, and the environment (WHO, 2009). The results of this study show that parental empowerment has a positive influence on the preventive formation of parents' behavior. This means that the higher the element of empowerment that parents have, the higher the behavior of parents in preventing health-risk behavior in adolescents. The health promotion model theory stated by Pender states that behavior is influenced by commitment factors (Pender, 1996). However, this study found that behavior is not formed through commitment but can be formed through parental empowerment. An interesting finding in this study was that health promotion behavior can be formed not only through commitment but also through parental empowerment. Through empowerment, namely with good knowledge, high participation, and a supportive environment, it can form good prevention behavior in parents.

Knowledge is an important element of empowerment. The lowest percentage of parental knowledge of health-risk behavior in adolescents is on the aspect of behavioral causes that come from less harmonious families. Results reveal that parents are not yet fully aware that family harmony is important to prevent health-risk behavior in adolescents. Some of the research results show that family harmony plays an important role in adolescents' behavior, including politeness (Ermawati, 2016), aggressive behavior (Arintina & Fauziah, 2015), drug and alcohol abuse (Zhou et al., 2006) and can even cause stress and depression. Self-efficacy is also important thing for parents to prevent health risk behavior on adolescents. Parents need to have a self-efficacy to prevent risky health-behavior of adolescents; self-efficacy possessed by parents can maintain preventive behavior for a long time. With a high level of self-efficacy owned by parents, boredom does not prevent them from taking preventive action (Krisnana et al., 2022).

Parental empowerment with regard to participation or involvement in adolescents' lives shows that parents who regularly check their teenage children's belongings are very few compared to other participation components. Parental involvement in both academic and the adolescent's personal life is important to prevent health-risk behavior in adolescents (Hill et al., 2004; Raboteg-Šarić et al., 2001). The source of information obtained by parents about the prevention of health-risk behavior in adolescents comes from three sources, namely health workers, friends, and relatives. Information from relatives about the prevention of health-risk behavior in adolescents was more frequent. This means that health information is provided not only by doctors, nurses, and other health workers, but also by other people such as social workers. They can become meaningful informants for healthy behavior. This is due to technological advances, such as social media that people can use widely (NeJhaddadgar et al., 2022; Prasanti, 2017). The results of this research can be applied to activities to change parental behavior through the process of increasing parental empowerment. The empowerment process begins with increasing knowledge, and is realized in the form of health education. The limitation of this study is that the sample is only based on people who had the questionnaire link. The study did not take samples based on representatives of each region in East Java with equal number.

Conclusion

Empowerment efforts can strengthen the formation of behavior in parents without commitment. Parental empowerment is an essential aspect of shaping preventive behavior in parents about health-risk behavior in adolescents. It needs family harmony and parental involvement in adolescent life, both academically and personally. Sources of information about health-risk behavior in adolescents come from health workers and friends or relatives. This condition can be caused by the widespread source of health information that people can access people through digital media. The model of empowering parents in preventing health risk behavior in adolescents is formed through increased knowledge, participation and a supportive environment. Empowering parents can increase the prevention of health risk behavior in adolescents not only in the non-academic sphere, but also in the adolescent academic sphere.

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Conflict of interest

Authors declare there is no potential conflict of interest.

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References

Abidin, M. I. Z., Pangtuluran, Y. and Maria, S. (2016) ‘Pengaruh Kepuasan Kerja, Lingkungan Kerja Dan Efikasi Diri Terhdap Komitmen Organisasi Di Rumah Sakit Smc Samarinda’, *Jurnal Ekonomi dan keuangan*, 13(1), pp. 1–10.

Arintina, Y. C. and Fauziah, N. (2015) ‘Keharmonisan Keluarga dan Kecenderugan Berperilaku Agresif Pada Siswa SMK’, *Empati: jurnal Karya Ilmiah S1 Undip*, 4(1), pp. 208–212.

Arria, A. M. *et al.* (2008) ‘High school drinking mediates the relationship between parental monitoring and college drinking: a longitudinal analysis’, *Subst Abuse Treat Prev Policy*, 3(6). doi: https://doi.org/10.1186/1747-597x-3-6.

Azadi, N. A. *et al.* (2021) ‘The effect of education based on health belief model on promoting preventive behaviors of hypertensive disease in staff of the Iran University of Medical Sciences’, *Archives of Public Health*, 79(1), pp. 1–8. doi: 10.1186/s13690-021-00594-4.

Cottrell, S. A. *et al.* (2007) ‘Development and Validation of a Parental Monitoring Instrument : Measuring How Parents Monitor Adolescents ’ Activities and Risk Behaviors’, *The Family Journal: Conseling and Theraphy for Couples and Families*, 15(4), pp. 328–335. doi: 10.1177/1066480707303748.

Ermawati (2016) ‘Hubungan Antara Keharmonisan Keluarga dengan Perilaku Siswa Sekolah Dasar’, *Ilmu Pendidikan Sosial, sains, dan Humaniora Vol.*, 2(3), pp. 183–187. Available at: http://ejournal.uin-suska.ac.id/index.php/suaraguru/article/view/2654.

Estrada, M. (2016) *University Students ’ Involvement in a Health Promoting Lifestyle : Influencing Factors of the Health Promotion Model*.

Hill, N. . *et al.* (2004) ‘Parent Academic Involvement as Related to School Behavior, Achievement, and Aspirations: Demographic Variations Across Adolescence’, *Child Dev*, 75(5), pp. 1491–1509. doi: 10.1111/j.1467-8624.2004.00753.x.

Karen, R. and Nola, J. (2011) ‘Health Promotion Model - Translation Procedures for HPM Instruments’.

Kaynak, Ö. *et al.* (2013) ‘Addictive Behaviors Relationships among parental monitoring and sensation seeking on the development of substance use disorder among college students’, *Addictive Behaviors*, 38(1), pp. 1457–1463. doi: 10.1016/j.addbeh.2012.08.003.

Krisnana, I. *et al.* (2019) ‘Adolescent characteristics and parenting style as the determinant factors of bullying in Indonesia : a cross-sectional study’, *International Journal of Adolesecent Medicine and Health*, pp. 1–9. doi: 10.1515/ijamh-2019-0019.

Krisnana, I. *et al.* (2022) ‘Factors Related to Parental Involvement in the Prevention of Health Risk Behaviors among Adolescents: A Cross-sectional Study in East Java Indonesia’, *Open Access Macedonian Journal of Medical Sciences*, 9(G), pp. 371–374. doi: 10.3889/oamjms.2021.8517.

Kurnia, I. D. *et al.* (2019) ‘The Increased Interaction of Parents can Prevent Smoking Behavior and Alcohol Consumption of Adolescents in Indonesia’, in *Proceedings ofthe 9th International Nursing Conference (INC 2018)*. SCITEPRESS – Science and Technology Publications, pp. 274–279. doi: 10.5220/0008323802740279.

Lenciauskiene, I. and Zaborskis, A. (2008) ‘The effects of family structure , parent – child relationship and parental monitoring on early sexual behaviour among adolescents in nine European countries’, *Scandinavian Journal of Public Health*, 36, pp. 607–618. doi: 10.1177/1403494807088460.

Li, X. *et al.* (2000) ‘Perceived Parental Monitoring and Health Risk Behaviors Among Urban Low-Income African- American Children and Adolescents’, *Journal of Adolescent Health*, 27(1), pp. 43–48.

Lovell, G. P., Ansari, W. El and Parker, J. K. (2010) ‘Perceived Exercise Benefits and Barriers of Non-Exercising Female University Students in the United Kingdom’, *International Journal of Environmental Research and Public Health*, 7(3), pp. 784–798. doi: 10.3390/ijerph7030784.

Mccracken, L. M., Chilcot, J. and Norton, S. (2014) ‘Further development in the assessment of psychological flexibility : A shortened Committed Action Questionnaire (CAQ-8)’, *European Journal of Pain*, 19(5), pp. 1–9. doi: 10.1002/ejp.589.

NeJhaddadgar, N. *et al.* (2022) ‘Effectiveness of telephone-based screening and triage during COVID-19 outbreak in the promoted primary healthcare system: a case study in Ardabil province, Iran’, *Journal of Public Health (Germany)*, 30(5), pp. 1301–1306. doi: 10.1007/s10389-020-01407-8.

Nelson, M. B., Riley, K. and Arellano, K. (2018) ‘Adding a Parent to the Brain Tumor Team : Evaluating a Peer Support Intervention for Parents of Children With Brain Tumors’, *Journal of Pediatric Oncology Nursing*, 35(3), pp. 218–228. doi: 10.1177/1043454218762797.

Newman, K. *et al.* (2008) ‘Relationships between parenting styles and risk behaviors in adolescent health: an integrative literature review’, *Revista Latino-Americana de Enfermagem*, 16(1), pp. 142–150. doi: 10.1590/S0104-11692008000100022.

Ni, Z., Chao, Y. and Xue, X. (2016) ‘An empowerment health education program for children undergoing surgery for congenital heart diseases’, *Journal of Child Health Care*, 20(3), pp. 354–364. doi: 10.1177/1367493515587057.

Paramita, C. V. O. and Harmanto, H. (2014) ‘Implementasi Program Save Our Student dalam Upaya Menekan Jumlah Pelanggaran Lalu Lintas Pada Pelajar Kota Surabaya’, *Kajian Moral dan*

Kewarganegaraan, 3(2), pp. 880–896. Available at: http://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-pendidikan-kewarganegaraa/article/view/9273/4030 (Accessed: 4 July 2018).

Pender, N. J. (1996) *Health promotion in nursing practice*. 3rd edn. Stamford: Appleton & Lange.

Pender, N. J. (2011) *Health Promotion Model Manual*, *deepblue.lib.umich.edu*. Available at: http://deepblue.lib.umich.edu/bitstream/handle/2027.42/85350/?sequence=1.

Pender, N. J., Anne, W. and David, L. (1995) *Health Promotion Model - Instruments to Measure HPM Behavioral Determinants : Planning for Exercise [Commitment] (Adolescent Version)*. University of Michigan. Available at: deepblue.lib.umich.edu 1995.

Pender, N. J., Garcia, A. W. and Ronis, D. L. (1995) 'Health Promotion Model - Instruments to Measure HPM Behavioral Determinants : Exercise Social Support Scale (Adolescent Version)'. Available at: http://deepblue.lib.umich.edu/handle/2027.42/85345.

Pengpid, S. and Peltzer, K. (2018) 'Parental involvement and health risk behaviours among school-going adolescents in six African countries', *Journal of Psychology in Africa*, 28(3), pp. 212–217. doi: 10.1080/14330237.2017.1409481.

Prasanti, D. (2017) 'Potret Media Informasi Kesehatan Bagi Masyarakat Urban di Era Digital The Portrait of Media Health Information For Urban Community in The Digital Era', *Iptek-Kom*, 19(2), pp. 149–162. Available at: https://media.neliti.com/media/publications/228091-potret-media-informasi-kesehatan-bagi-ma-2319a661.pdf.

Raboteg-Šarić, Z., Rijavec, M. and Brajša-Žganec, A. (2001) 'The relation of parental practices and self-conceptions to young adolescent problem behaviors and substance use', *Nordic Journal of Psychiatry*, 55(3), pp. 203–209. doi: 10.1080/08039480152036092.

Resnick, B. and Jenkins, L. S. (2000) 'Testing the reliability and validity of the Self-Efficacy for Exercise scale.', *Nursing research*, 49(3), pp. 154–9. doi: doi: 10.1097/00006199-200005000-00007.

Susan, N., Karen, R. and Nola, J. (1995) 'Health Promotion Model - Instruments to Measure Health Promoting Lifestyle : Health-Promoting Lifestyle Profile [HPLP II] (Adult Version)'.

WHO (2009) *WHO Guidelines on Hand Hygiene in Health Care*. Geneva. Available at: http://www.who.int/gpsc/5may/tools/9789241597906/en/ (Accessed: 4 July 2018).

WHO (2018) *Adolescents: health risks and solutions*. Available at: http://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions (Accessed: 21 March 2020).

Zhou, Q., King, K. M. and Chassin, L. (2006) 'The roles of familial alcoholism and adolescent family harmony in young adults' substance dependence disorders: Mediated and moderated relations', *Journal of Abnormal Psychology*, 115(2), pp. 320–331. doi: 10.1037/0021-843X.115.2.320.

Zhou, Y. *et al.* (2022) 'Social Media Efficacy in Crisis Management: Effectiveness of Non-pharmaceutical Interventions to Manage COVID-19 Challenges', *Frontiers in Psychiatry*, 12(February), pp. 1–16. doi: 10.3389/fpsyt.2021.626134.

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ORIGINAL ARTICLE

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Self-efficacy, intention, and attitude toward human papillomavirus vaccination among urban females in indonesia: a cross-sectional study

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ABSTRACT

Introduction: Women's choice to undergo vaccination against the Human Papillomavirus (HPV) is shaped by a multitude of factors. This study seeks to investigate the differences of intentions and attitudes toward the HPV vaccine and its effect size among women categorized into three groups based on their level of self-efficacy.

Methods: As many as 441 respondents were selected using the consecutive sampling method. The samples were divided into three groups based on their level of self-efficacy (low, medium, and high). The research employed a cross-sectional design from 13 May to 15 June 2023 in the working area of Public Health Centers located in Jakarta by implementing individual home visits. The research instruments comprised the Self-Efficacy Scale for HPV vaccination, the Intentions to Receive the HPV Vaccine Questionnaire, and the Attitude of HPV, Cervical Cancer, and Vaccine HPV Questionnaire; all were declared valid and reliable. The Kruskal-Wallis Test, the Tukey HSD Post Hoc Test, and the Epsilon Squared Test were performed to examine intention and attitude based on the type of self-efficacy and the effect size found.

Results: Significant differences were observed in intention ($p<0.001$) and attitude ($p<0.001$) among the three self-efficacy groups, demonstrating relatively robust effect sizes (attitude: $\varepsilon^2=0.109$, $p<0.001$; intention: $\varepsilon^2=0.159$, $p<0.001$).

Conclusions: The research demonstrated discernible discrepancies in intention and attitude across the three sample groups distinguished by their self-efficacy levels. It is advisable to design interventions focusing on health promotion that highlight the diverse needs and characteristics of different groups of women.

keywords: attitude, cervical cancer vaccine, intention, self-efficacy, women

Introduction

Cervical cancer stands as the fourth most prevalent malignancy among women worldwide, recording an estimated 660,000 new diagnoses in the year 2022 (World Health Organization, 2024). Concurrently, an overwhelming 94% of the 350,000 cervical cancer-related fatalities are concentrated in low- and middle-income countries (World Health Organization, 2024). Disparities in cervical cancer burden across these regions are intricately linked to inequities in accessing vaccination, screening, and treatment services, alongside various risk factors such as HIV prevalence and socioeconomic determinants encompassing gender biases and poverty (Stelzle *et al.*, 2021). Cervical cancer remains a significant cause of mortality among Indonesian women, with projections indicating an annual increase of 15,000 cases and a mortality rate of 50% (Ministry of Health of Republic of Indonesia, 2022)

Numerous individuals affected by cervical cancer include young and less educated women residing in the world's most impoverished nations, where access to pre-screening and treatment services is restricted

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(Arbyn *et al.*, 2020; Okunade, 2020). Patients typically seek medical attention only after complications have progressed to an advanced stage, and the majority lack access to prevention programs or services (Vu *et al.*, 2018). The expenditures of therapy and care for cervical cancer patients are high, whether by the government or third-party insurance, especially if the patient is self-funding (Pangribowo, 2019). Sufferers' prognosis and survival rates vary significantly. As a result, several parties recommend and campaign for early prevention of this disease (Samaria, 2022; Samaria *et al.*, 2023). Conversely, cervical cancer can be avoided by avoiding human papillomavirus (HPV) infection (Bruni *et al.*, 2021). This problem can be remedied with a highly successful and cost-efficient HPV vaccine-based preventative method that prevents the most frequent kinds of high-risk and low-risk human papillomavirus infection.

HPV is one of the leading causes of cervical cancer, a significant public health concern worldwide. HPV vaccine is beneficial in preventing HPV-related illnesses and malignancies and is recommended internationally for preventing cervical cancer and other HPV-related disorders is the HPV vaccine. However, the level of acceptance and usage of the HPV vaccine continues to vary amongst individuals and populations and can be influenced by a variety of factors, including psychological characteristics such as self-efficacy (Lee, 2022; Lismidiati *et al.*, 2022; Osaghae *et al.*, 2022).

One of the factors that play an essential role in achieving the target of vaccination coverage is self-efficacy, namely, confidence that a person will receive a type of vaccine up to a complete dose (Christy, Winger and Mosher, 2019; Myhre *et al.*, 2020; Stout *et al.*, 2020). In the context of HPV infection transmission, self-efficacy can also be defined as the belief in one's ability to prevent disease, trust in vaccines that are safe for oneself, and reflects people's confidence in their ability to carry out health behaviors in the face of various people and obstacles (Myhre *et al.*, 2020). In the context of the HPV vaccine, self-efficacy includes an individual's beliefs regarding their ability to obtain, access, and receive the HPV vaccine. Self-efficacy can play an essential role in shaping intentions and individual attitudes related to receiving the vaccine.

Self-efficacy holds particular significance when contemplating a young woman's intention to receive the HPV vaccine. Several steps are required to complete the vaccination, including getting three injections over six months (Christy, Winger and Mosher, 2019). Enhanced self-efficacy concerning HPV vaccination has been linked to heightened vaccine acceptance and intention among college students and young adults. Insights gleaned from qualitative research suggest that self-efficacy may serve as a mechanism through which social norms influence the inclination to be vaccinated (Thompson *et al.*, 2018). Consequently, self-efficacy emerges as a pivotal factor warranting further exploration concerning women's intentions and attitudes toward receiving the HPV vaccine, extending to completion of the vaccination regimen. Additionally, intentions and attitudes toward the HPV vaccine play crucial roles in determining acceptance and adherence to the vaccine (Stout *et al.*, 2020; Elgzar *et al.*, 2022). Intention pertains to an individual's readiness to receive the HPV vaccine, while attitude reflects an individual's favorable or unfavorable appraisal of the HPV vaccine.

A prior investigation revealed that a significant majority (72.3%) of the nursing students under examination exhibited favorable attitudes toward Pap smear, HPV, and vaccination (Mohammed *et al.*, 2022). Specifically, the findings indicated that slightly over two-thirds of the surveyed nursing students (68.2%) expressed agreement with Pap smear, while slightly less than two-thirds (62.6%) were uncertain about HPV, and approximately half (52.8%) concurred with vaccination, thereby reflecting their intentions and self-efficacy concerning young adult women's health. These outcomes are consistent with another study involving young adult female university students from Korea and China, both of whom demonstrated a positive attitude toward HPV vaccination and expressed a strong intention to receive the vaccine (Kim *et al.*, 2022).

On the other hand, parental attitudes and intentions regarding HPV vaccination for their children were found to be influenced by parental gender, HPV vaccination status, and having at least one daughter (López *et al.*, 2022). Mothers in Ethiopia demonstrated a strong inclination and intention to vaccinate their daughters despite having limited knowledge about HPV vaccination (Sinshaw, Berhe and Ayele, 2022). Similarly, parents in Nigeria exhibited a positive attitude toward and high intention to uptake the HPV vaccine for their adolescents (Balogun and Omotade, 2022). In contrast, a notable proportion of parents aged over 65 years indicated a lack of intention to vaccinate their adolescents with the HPV vaccine.

Among adolescents, a study conducted in Uganda revealed that only 43.3% of girls achieved timely completion for both doses of the HPV vaccination, which reflected their lack of self-efficacy (Patrick *et al.*, 2022). Conversely, a study in Indonesia examined self-efficacy in adolescents regarding HPV vaccine uptake (Lismidiati *et al.*, 2022). The results indicated that 50.1% of adolescent girls exhibited high self-efficacy in acquiring the HPV vaccine, while 57.9% demonstrated a robust understanding of HPV and the corresponding vaccine. Notably, parental support emerged as a significant factor, with adolescents being almost 18 times more inclined to possess high self-efficacy when backed by their parents. Additionally, social persuasion enhanced the likelihood by nearly nine times for adolescents to develop self-efficacy in obtaining the HPV vaccination. Therefore, parental support and social persuasion emerged as significant predictors of self-efficacy in obtaining HPV vaccination, with parental support being the primary factor influencing adolescents' decisions to obtain the HPV vaccine (Lismidiati *et al.*, 2022).

Previous studies also have highlighted the relationship between self-efficacy with attitude, intention, and other factors regarding HPV vaccination in women (Christy et al., 2019; Elgzar et al., 2022; Lismidiati et al., 2022; Stout et al., 2020. However, there is a lacuna that demonstrates limited studies investigating intention and attitude toward HPV vaccination based on the type of self-efficacy and its effect size found, explicitly examining its impact on three groups of women, involving unmarried women aged 18-26, female adolescents aged 9-17 years, and mothers with adolescents who were eligible for the HPV vaccine simultaneously. Each group of women reflects diverse decision-making characteristics which have different implications for self-efficacy, intention and attitude to the HPV vaccine (Polonijo, Mahapatra and Brown, 2022; Lam *et al.*, 2023; Zhang *et al.*, 2023). Young adult women represent autonomous decision-makers, while female adolescents rely on parental guidance, and mothers play a supportive role in their daughters' vaccination decisions. All cohorts require comprehensive assessment and categorization based on their self-efficacy levels.

To the best of the authors' knowledge, there is currently limited research exploring variances in intention and attitude among respondent groups with varying levels of self-efficacy. Existing studies have primarily focused on assessing the correlation between self-efficacy and intention as well as attitude, overlooking the nuanced spectrum of self-efficacy levels among women (Christy, Winger and Mosher, 2019; Stout *et al.*, 2020; Elgzar *et al.*, 2022; Lismidiati *et al.*, 2022). Indeed, through acquiring more granular insights, interventions can be tailored more precisely to align with the unique needs and attributes of women.

The purpose of this study was to examine the different types of HPV vaccine self-efficacy (low, medium, and high self-efficacy) on the intentions and attitudes of women, especially young women who are eligible to receive HPV vaccination (age 18-26 years old), adolescents aged 9-17 years, and mothers with adolescent children who are eligible for the HPV vaccine in the working area of the Jakarta Public Health Center.

This study can provide better insight into the role of self-efficacy in HPV vaccine acceptance and help design appropriate interventions to increase vaccination adherence rates. In addition, this research can provide valuable information for health professionals, policymakers, and nursing practitioners in developing effective strategies to increase acceptance and adherence to the HPV vaccine by enhancing self-efficacy. More effective intervention strategies can be designed to increase the adoption of the HPV vaccine in the female population of reproductive age. In addition, this research can also provide new insights into psychological factors that influence individual decisions regarding HPV vaccination.

Materials and Methods

Design and Settings

A cross-sectional design was utilized to observe the variations in intentions and attitudes toward the HPV vaccine, as well as its effect size concurrently among women who were divided in three groups level of self-efficacy (low, medium, and high). The study ran from 13 May to 15 June 2023 in the working area of the Health Center located in Jakarta.

Samples

The study included 147 young adult women who were eligible to receive the HPV vaccination (18-26 years old), 147 female adolescents aged 9-17 years, and 147 mothers with female adolescents who live in Jakarta. The sample size was calculated using the G*Power 3.1 by setting the effect size of 0.25, a power value of 95%, and an alpha level of 5%, resulting in 400 candidates as participants. Considering a 10% for anticipated dropout, the total number of respondents was 441; they were split into three groups regarding their level of self-efficacy. Prospective respondents were recruited using the consecutive sampling method. Respondents were selected sequentially until the predetermined sample size was attained (Setia, 2016). The data collection was conducted simultaneously across all working areas of Health Public Centers in Jakarta. Data meeting the specified criteria were sequentially sorted until the desired sample size was achieved. The data collection process was completed within approximately one month.

Research Instruments

This study employed a sociodemographic survey and three other questionnaires to analyze self-efficacy, intention, and attitude toward HPV vaccination. The sociodemographic questionnaire explored the frequency distribution of age, total family income, level of education, and respondents' work type.

Self-efficacy was measured by the Self-Efficacy Scale for the HPV vaccination questionnaire (Christy, Winger and Mosher, 2019). This questionnaire consists of three favorable statements, with seven answer choices, including 1=strongly disagree, 2=quite disagree, 3=slightly disagree, 4=neutral, 5=slightly agree, 6=quite agree, and 7=very much agree. In this questionnaire, participants rated their confidence in their ability to obtain the HPV vaccine even though (1) it is expensive, (2) getting the injection is slightly painful, and (3) it means finding the time to go to the doctor three times. Total self-efficacy scores are in the range of 7-21. Self-efficacy scores were categorized into three groups, namely, low self-efficacy (score: 0-10), moderate self-efficacy (score: 11-14), and high self-efficacy (score: 15-21). The scale underwent translation into Bahasa Indonesia with the assistance of experts in the field of health. Subsequently, two faculty members reviewed the questionnaire for clarity prior to validity and reliability testing. Thereafter, the tests for validity and reliability were conducted on 30 women. The questionnaire had excellent validity (r item 0.786-0.886) and reliability (Cronbach's α = 0.801).

A questionnaire measured intention, namely the Intentions to Receive the HPV Vaccine Questionnaire. Five items measured intention to receive the HPV vaccine. Participants rated on a 7-point scale how likely they were to (1) get more information about the HPV vaccine, (2) consider getting the vaccine, (3) try to get the vaccine, (4) get the vaccine, and (5) get the vaccine if the doctor offers it (1=very unlikely to 7=very likely). This subscale exhibits good reliability in the current sample (α = 0.95) (Stout *et al.*, 2020). This questionnaire was also translated to Bahasa Indonesia and was tested for validity and reliability on 30 people with a value of r count (0.836-0.962) and Cronbach's α = 0.950.

The attitude variable was measured using the Attitude HPV, Cervical Cancer, and Vaccine HPV questionnaire (Winarto *et al.*, 2022), which contains 12 questions with five questions about HPV infection and cervical cancer and seven questions about HPV vaccine on the Guttman scale. Each answer choice has a specific value. Questions with two and three-answer options get a score of 0 for a negative answer and a score of 2 for a confirming answer. Questions with four answer options received a score of 0 for a negative response, a score of 1 for a confirming answer, and a score of 2 for a very confirming answer. This questionnaire was already in Bahasa Indonesia (Winarto *et al.*, 2022) and tested for the validity and reliability of 30 people with an r value between 0.365-0.697 and α = 0.772.

Data Collection

The data were collected offline by conducting home visits individually to all respondents. Respondents willing to participate in this study after the protocol explanation were asked to sign an informed consent form and manually fill out a paper-based questionnaire. Respondents completed filling out the questionnaire in about 20 minutes.

Ethical Consideration

This research prioritized the principle of anonymity and volunteerism to respondents. The study protocol was explained to respondents before they agreed to participate and signed the informed consent. The study protocol has passed a research ethics review from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Pembangunan Nasional "Veteran" Jakarta, with letter number 205/V/2023/KEPK.

Data analysis

Univariate analysis was used in this study to identify the characteristics of the respondents, including the frequency distribution of age, total family income, level of education, and type of work. Additionally, bivariate analysis was conducted using the Kruskal-Wallis test due to abnormal data values detected in the normality test. Given that the Kruskal-Wallis test yielded a p-value of <0.05 for both attitude and intention, a Post Hoc test was subsequently employed using the Tukey HSD method to identify significant correlations between different levels of self-efficacy and attitudes and intentions. Furthermore, the Epsilon Squared test was employed to quantify the effect size of the observed differences.

Results

Most respondents in this survey attended high school, followed by higher education, junior high schools, and elementary schools (Table 1). The respondents' employment status is almost balanced;

Table 1. Characteristics of Respondents (n=441)

Variable	Group Classification			Total (%)	Mean±SD	P-value*
	Female Adolescents	Young Adults	Mothers			
	n(%)	n(%)	n(%)			
Age					21.10±2.099	0.000
9-17 years old	147(100)	0(0)	0(0)	147(33.3)		
18-26 years old	0(0)	147(100)	0(0)	147(33.3)		
>26 years old	0(0)	0(0)	147(100)	147(33.4)		
Educational background						0.000
Elementary school	4(0.9)	1(0.2)	3(0.7)	8(1.8)		
Junior high school	142(32.2)	2(0.5)	51(11.6)	195(44.2)		
Senior High School	1(0.2)	81(18.04)	77(17.5)	159(36.1)		
Higher education	0(0)	63(14.3)	16(3.6)	79(17.9)		
Working Status						0.000
Unemployed	147(33.3)	10(2.3)	60(13.6)	217(49.2)		
Employed	0(0)	137(31.1)	87(19.7)	224(50.8)		
Socioeconomic status						0.085
Low (<(Minimum regional wage of Jakarta: Rp. 4,901,798)	79(17.9)	75(17)	93(21.1)	247(56)		
High (≥Minimum regional wage of Jakarta: Rp. 4,901,798)	68(15.4)	72(16.3)	54(12.2)	194(44)		
Self-efficacy					12.61±3.756	0.001
Low	37(8.4)	18(4.1)	63(14.3)	118(26.8)		
Medium	81(18.4)	45(10.2)	64(14.5)	190(43.1)		
High	29(16.6)	84(19.00)	20(4.5)	133(30.2)		
Attitudes toward the HPV Vaccine					17.02±3.27	0.000
Low	62(14.1)	0(0)	14(3.2)	76(17.2)		
Medium	4911.1)	26(5.9)	33(7.5)	108(24.5)		
High	36(8.2)	121(27.4)	100(22.7)	257(58.3)		
Intention to receive HPV vaccine					26.33±5.65	0.000
Low	6(1.4)	0(0)	3(0.7)	9(2)		
Medium	8719.7)	21(4.8)	71(16.1)	179(40.6)		
High	54(12.2)	126(28.6)	73(16.6)	253(57.4)		

*Levene test for assessing variances in three groups of women

however, most hold jobs (50.8%). An almost equal distribution is anticipated due to the balanced representation of respondents from two nearly equivalent employment status categories. The non-working cohort may consist of adolescent females who are not yet employed and approximately half of the unemployed mothers. On the other hand, the employed group consists of employed young unmarried women alongside some working mothers. This balanced representation ensures near parity between the two categories. Nonetheless, the respondents' socioeconomic level was unequal. Respondents from low socioeconomic status (56%) outnumbered those from high socioeconomic status (44%) based on the minimum regional wage of Jakarta in 2023.

The HPV vaccine had never been administered to any of the participants in this study. Table 1 also shows that 147 respondents came from the category of female adolescents, 147 young adult women (aged 18-26 years and not married yet) and 147 mothers (>26 years old) who had adolescent daughters. Most sociodemographic variables depict a non-homogeneous variance, so they cannot meet the requirements for parametric statistical tests. Therefore, we chose a non-parametric statistical analysis, Kruskal-Wallis test, to process the data (see Table 2).

The results of the investigation into intentions and attitudes based on the three self-efficacy categories are presented in Table 2. Respondents with high self-efficacy exhibited the highest value for attitudes toward the HPV vaccine (mean=19.226; median= 24). Conversely, respondents with low self-efficacy demonstrated the lowest value attitude score regarding the HPV vaccine (mean=14.839; median=18). Regarding the intention variable in obtaining the HPV vaccine, individuals with high self-efficacy recorded the highest

Table 2. Attitude and Intention to Receive HPV Vaccine Regarding Type of Self-Efficacy (n=441)

Dependent Variable	Self-Efficacy Type	Median	Interquartile Range	Mean±SD	95% CI	P-value*
Attitudes toward the HPV Vaccine	Low (n= 118)	18.00	17	14.839±3.274	14.274 to 15.404	<0.001
	Medium (n= 190)	17.00	16	17.016±2.818	16.571 to 17.461	
	High (n= 133)	24.00	13	19.226±3.384	18.694 to 19.757	
Intention to receive HPV vaccine	Low (n= 118)	22.50	8	21.610±6.879	20.689 to 22.531	<0.001
	Medium (n= 190)	27.00	7	26.237±4.635	25.511 to 26.963	
	High (n= 133)	30.00	5	29.180±3.651	28.313 to 30.048	

*Kruskal-Wallis test

Table 3. Post Hoc Test Results: Tukey HSD (n=441)

Dependent Variable	Self-Efficacy Type	Pairwise	P Value	95% CI
Attitude	Low	Medium	<0.001	-3.04 to -1.32
		High	<0.001	-5.31 to -3.46
	Medium	Low	<0.001	1.32 to 3.04
		High	<0.001	-3.04 to -1.38
	High	Low	<0.001	3.46 to 5.31
		Medium	<0.001	1.38 to 3.04
Intention	Low	Medium	<0.001	-6.03 to -3.22
		High	<0.001	-9.08 to -6.06
	Medium	Low	<0.001	3.22 to 6.03
		High	<0.001	-4.30 to -1.59
	High	Low	<0.001	6.06 to 9.08
		Medium	<0.001	1.59 to 4.30

SE: Standard error

score (mean=29.180; median=30.00) while those with low self-efficacy exhibited the lowest intention score (mean=21.610; median=22.50). Notably, both respondents' attitudes toward the HPV vaccine and their intention to receive it were found to exhibit an equal or directly proportional relationship.

Table 2 presents the results of the attitude and intention variables regarding the receipt of the HPV vaccine across different levels of self-efficacy. The analysis revealed a significant p-value of <0.001 for the relationship between attitudes toward the HPV vaccine and self-efficacy. This indicates a substantial association between attitudes toward the HPV vaccine and self-efficacy levels. Furthermore, the findings regarding the intention variable, as shown in Table 2, indicate a significant p-value of <0.001, signifying a notable difference in intention among respondents with high, medium, and low levels of self-efficacy. Thus, it can be inferred that self-efficacy also plays a role in influencing a woman's intention to receive the HPV vaccine.

Table 3 illustrates the results of the correlation between different types of self-efficacy and attitudes and intentions. The table indicates that all pairs of self-efficacy groups, when correlated with attitudes and intentions, yielded significant values (p<0.001). This implies that each category of self-efficacy group is significantly associated with attitudes and intentions regarding the HPV vaccine. Table 4 displays effect sizes of self-efficacy on attitude and intention. The effect size (ε^2) for attitude is 0.200 (p<0.001), and intention is 0.223 (p<0.001), both indicating a relatively strong effect size.

Discussions

This study discloses most respondents have a high school education, work, and come from families of low economic status. Socioeconomic status can affect the ability and intention of respondents to get vaccines. These results are similar to the findings from previous study (Dereje *et al.*, 2021). Socioeconomic position can influence a person's motivation to obtain the vaccine. A person from a lower-income family is less likely to desire to vaccinate their children than someone from a higher-income family (Dereje *et al.*, 2021).

This study offers detailed findings from intention and attitude assessments conducted among groups of women categorized by varying levels of self-efficacy: low, medium, or high. The research demonstrates discernible discrepancies in intention and attitude across the three sample groups distinguished by their self-efficacy levels. These findings can serve as a basis for recommending more tailored interventions that align closely with the individual needs and characteristics of women in each group.

Groups characterized by low, medium, and high levels of self-efficacy all exhibited significant correlations with attitudes and intentions. Upon closer examination, it becomes evident that as the level of self-efficacy increases, so does the mean attitude score, as well as the mean intention score in all categories of ages of women—female adolescents, young adults women, and mothers. Conversely, the group with low self-efficacy demonstrated the lowest intention score, whereas the group with the highest self-efficacy exhibited the highest intention score. This pattern suggests a linear relationship between self-efficacy

Table 4. Results of the Epsilon Squared Kruskal-Wallis Test for Measuring Effect Size

Independent Variable	Dependent Variable	N	ε	ε^2	P Value
Self-Efficacy Type	Attitude	441	0.447	0.200	<0.001
	Intention	441	0.472	0.223	<0.001

ε^2: Epsilon Squared

levels and both attitude and intention scores, as reported in previous study (Alene *et al.*, 2020). This result indicates that self-efficacy can be a predictor variable in determining the mean scores of attitudes and intentions (Christy, Winger and Mosher, 2019).

This study's effect size was relatively strong, indicating that self-efficacy is a good predictor of the variable intentions and attitudes. Thus, the effect size of self-efficacy is clinically essential to evaluate how efficiently health professionals can predict the expected outcomes of attitudes and intentions to receive the HPV vaccine. However, the clinical significance of the impact must be examined by HPV vaccine experts.

The novel contribution of this research lies in the conclusion that individuals with higher levels of self-efficacy tend to exhibit stronger attitudes and intentions toward receiving the HPV vaccine. However, it is noteworthy that the high self-efficacy group is predominantly female adolescents, whereas the medium self-efficacy group consists mostly of young adults, and the low self-efficacy group primarily includes mothers. This observation indicates that female adolescents with the highest self-efficacy levels also harbor the most favorable attitudes and intentions. Consequently, it implies that individuals in the youngest age bracket exhibit the highest inclination and readiness to receive the vaccine, despite potentially possessing less experience and knowledge compared to young adults or parents. Given the characteristics of young adolescents, it becomes imperative to provide them with support in the critical thinking process to effectively absorb and discern information pertaining to cervical cancer and the HPV vaccine (Lismidiati *et al.*, 2022; Patrick *et al.*, 2022). By doing so, their understanding and self-efficacy can be further refined, subsequently enhancing their attitudes and intentions regarding vaccine acceptance.

Among the three categories of responders, an adolescent's average mother or guardian appears to have the lowest self-efficacy. This problem can be due to lower parental literacy. This issue could be attributed to their low exposure to digital mass media messages, low levels of health literacy, and low exposure to the effects of globalization and urbanization (Alene *et al.*, 2020; Dereje *et al.*, 2021). Since 2021, as the government declared that the HPV vaccine was free and mandatory for schoolchildren in the fifth and sixth grades, myths and false information about the HPV vaccine have increased in Indonesia (Sitaresmi *et al.*, 2020; Frianto *et al.*, 2022). The problems have multiplied and are easily accessible through online media. Parents' digital literacy abilities were regarded as less equivalent to those of teenagers and adults, consequently impacting their self-efficacy.

On the other hand, young adult women who made their own vaccine decisions had the highest level of self-efficacy. Someone concerned about determining whether or not to vaccinate themself has greater self-efficacy than teenagers or parents (Chanprasertpinyo and Rerkswattavorn, 2020; Rabiu *et al.*, 2020; Stout *et al.*, 2020). Health education is suggested to be given based on the three main points of the statement in the self-efficacy questionnaire, namely being confident in getting the HPV vaccine despite the cost, being confident in receiving the HPV vaccine despite the injection being a little painful, and feeling able to take the time to go to a healthcare facility as many as three times, according to the provisions of the total dose of the HPV vaccine (Christy et al., 2020). It will be a stronger attraction to have a positive attitude toward vaccination and raise the intention to receive the HPV vaccine if women believe that the cost of vaccines is cheaper considering prospective benefits to avoid cervical cancer rather than having to pay more if they develop cervical cancer (Rabiu *et al.*, 2020; Elgzar *et al.*, 2022).

This study employs non-probability sampling, specifically consecutive sampling, which warrants cautious generalization. Another limitation pertains to the exclusive emphasis on three levels of self-efficacy groups, overlooking sociodemographic variances in each group which could be a confounding factor. Nonetheless, this research marks the inaugural endeavor in Indonesia to investigate self-efficacy, intentions, and attitudes toward the HPV vaccine across adolescent girls, young adult women, and parents concurrently. These insights lay the groundwork for future research endeavors, particularly in designing intervention programs that account for these sociodemographic nuances.

Conclusion

The study reveals noticeable variations in intention and attitude among the three sample cohorts categorized by their levels of self-efficacy. Across all levels of self-efficacy—low, medium, or high—a consistent positive correlation is observed with women's mean attitude and intention scores regarding vaccination acceptance. Moreover, our investigation reveals a notable effect size associated with the self-efficacy variable in predicting women's attitudes and intentions, indicating its practical relevance in clinical contexts. Drawing from these findings, it is advisable to design interventions focusing on health promotion that highlight the diverse needs and characteristics of different groups of women. Such tailored interventions can effectively address individual differences and enhance vaccine acceptance among women. We also recommend for subsequent studies to incorporate demographic variables into statistical analysis to mitigate potential confounding effects and ensure the accuracy of the findings.

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Conflict of Interest

None declared.

References

Alene, T. *et al.* (2020) ‘Acceptance of human papillomavirus vaccination and associated factors among parents of daughters in gondar town, northwest Ethiopia’, *Cancer Management and Research*, 12, pp. 8519–8526. doi: 10.2147/CMAR.S275038.

Arbyn, M. *et al.* (2020) ‘Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis’, *The Lancet Global Health*, 8(2), pp. e191–e203. doi: 10.1016/S2214-109X(19)30482-6.

Balogun, F. M. and Omotade, O. O. (2022) ‘Parental intention to vaccinate adolescents with HPV vaccine in selected communities in Ibadan, Southwest Nigeria: an application of Integrated Behavioral Model’, *Human Vaccines and Immunotherapeutics*, 18(5). doi: 10.1080/21645515.2022.2069959.

Bruni, L. *et al.* (2021) ‘HPV vaccination introduction worldwide and WHO and UNICEF estimates of national HPV immunization coverage 2010–2019’, *Preventive Medicine*, 144. doi: 10.1016/j.ypmed.2020.106399.

Chanprasertpinyo, W. and Rerkswattavorn, C. (2020) ‘Human papillomavirus (HPV) vaccine status and knowledge of students at a university in rural Thailand’, *Heliyon*, 6(8). doi: 10.1016/j.heliyon.2020.e04625.

Christy, S. M., Winger, J. G. and Mosher, C. E. (2019) ‘Does Self-Efficacy Mediate the Relationships Between Social-Cognitive Factors and Intentions to Receive HPV Vaccination Among Young Women?’, *Clinical Nursing Research*, 28(6), pp. 708–725. doi: 10.1177/1054773817741590.

Dereje, N. *et al.* (2021) ‘Knowledge and acceptance of HPV vaccination and its associated factors among parents of daughters in Addis Ababa, Ethiopia: a community-based cross-sectional study’, *Infectious Agents and Cancer*, 16(1). doi: 10.1186/s13027-021-00399-8.

Elgzar, W. T. *et al.* (2022) ‘Intention and self-efficacy for pap smear screening and Human Papilloma Virus vaccination among Saudi women at Najran city, KSA’, *African Journal of Reproductive Health*, 26(7s), pp. 61–73. doi: 10.29063/ajrh2022/v26i7s.7.

Frianto, D. *et al.* (2022) ‘Parental Acceptance of Human Papillomavirus (HPV) Vaccination in Districts with High Prevalence of Cervical Cancer in West Java, Indonesia’, *Patient Preference and Adherence*, 16, pp. 2709–2720. doi: 10.2147/PPA.S365901.

Kim, H. W. *et al.* (2022) ‘Knowledge, attitudes, and perceptions associated with HPV vaccination among female Korean and Chinese university students’, *BMC Women’s Health*, 22(1). doi: 10.1186/s12905-022-01624-1.

Lam, E. W. H. *et al.* (2023) ‘Awareness, perceptions, and acceptance of human papillomavirus vaccination among parents in Hong Kong.’, *Hong Kong medical journal = Xianggang yi xue za zhi*. doi: 10.12809/hkmj2210470.

Lee, M. (2022) ‘The Role of Knowledge and Self-Efficacy in Behavioral Intention to Prevent Cervical Cancer among Female College Students’, *International Journal of Advanced Culture Technology*, 10(1), pp. 144–153. doi: 10.17703/IJACT.2022.10.1.144.

Lismidiati, W. *et al.* (2022) ‘Self-Efficacy to Obtain Human Papillomavirus Vaccination among Indonesian Adolescent Girls’, *Asian Pacific Journal of Cancer Prevention*, 23(3), pp. 789–794. doi: 10.31557/APJCP.2022.23.3.789.

López, N. *et al.* (2022) ‘Factors influencing HPV knowledge and vaccine acceptability in parents of adolescent children: results from a survey-based study (KAPPAS study)’, *Human Vaccines and Immunotherapeutics*, 18(1). doi: 10.1080/21645515.2021.2024065.

Ministry of Health of Republic of Indonesia (2022) *National Cervical Cancer Elimination Plan for Indonesia 2023-2030*. Available at: https://www.kemkes.go.id/eng/national-cervical-cancer-elimination-plan-for-indonesia-2023-2030 (Accessed: 9 March 2024).

Mohammed, H. M. E. *et al.* (2022) ‘Knowledge and Attitudes of Nursing Students toward Human Papilloma Virus Vaccination’, *Journal of Nursing Science-Benha University*, 3(1), pp. 51–63. doi: 10.21608/JNSBU.2022.212751.

Myhre, A. *et al.* (2020) ‘Associations between risk-perception, self-efficacy and vaccine response-efficacy and parent/guardian decision-making regarding adolescent HPV vaccination’, *Papillomavirus Research*, 10(100204), pp. 1–6. doi: 10.1016/j.pvr.2020.100204.

Okunade, K. S. (2020) ‘Human papillomavirus and cervical cancer’, *Journal of Obstetrics and Gynaecology*, 40(5), pp. 602–608. doi: 10.1080/01443615.2019.1634030.

Osaghae, I. *et al.* (2022) ‘HPV Vaccination Training of Healthcare Providers and Perceived Self-Efficacy in HPV Vaccine-Hesitancy Counseling’, *Vaccines*, 10(12). doi: 10.3390/vaccines10122025.

Pangribowo, S. (2019) ‘Beban Kanker di Indonesia’, *Pusat Data Dan Informasi Kesehatan Kementerian Kesehatan RI*, pp. 1–16.

Patrick, L. *et al.* (2022) ‘Encouraging improvement in HPV vaccination coverage among adolescent girls in Kampala, Uganda’, *PLoS ONE*, 17(6 June). doi: 10.1371/journal.pone.0269655.

Polonijo, A. N., Mahapatra, D. and Brown, B. (2022) ‘“I Thought It Was Just For Teenagers”: Knowledge, Attitudes, and Beliefs about HPV Vaccination Among Women Aged 27 to 45’, *Women’s Health Issues*, 32(3), pp. 301–308. doi: 10.1016/j.whi.2022.01.007.

Rabiu, K. *et al.* (2020) ‘Parental acceptance of human papillomavirus vaccination for adolescent girls in Lagos, Nigeria’, *Journal of Family Medicine and Primary Care*, 9(6), p. 2950. doi: 10.4103/jfmpc.jfmpc_102_20.

Samaria, D. (2022) ‘Edukasi kesehatan tentang deteksi dini kanker serviks di Desa Cibadung, Gunung Sindur, Bogor’, *Jurnal*

Kreativitas Pengabdian Kepada Masyarakat, 5(7), pp. 2243–2258. doi: 10.33024/jkpm.v5i7.6318.

Samaria, D. *et al.* (2023) 'Edukasi Kesehatan Vaksinasi Human Papilloma Virus untuk Mencegah Kanker Serviks pada Siswi di Jakarta Timur', *Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM)*, 6(7), pp. 2916–2930. doi: 10.33024/jkpm.v6i7.10105.

Setia, M. S. (2016) 'Methodology Series Module 5: Sampling Strategies', *Indian Journal of Dermatology*, 61(5), pp. 505–509. doi: 10.4103/0019-5154.190118.

Sinshaw, M. T., Berhe, S. and Ayele, S. G. (2022) 'Knowledge and Attitude Towards Human Papillomavirus Vaccine and Associated Factors Among Mothers Who Have Eligible Daughters in Debre Markos Town, Northwest Ethiopia', *Infection and Drug Resistance*, 15, pp. 781–793. doi: 10.2147/IDR.S352440.

Sitaresmi, M. N. *et al.* (2020) 'Improvement of Parent's awareness, knowledge, perception, and acceptability of human papillomavirus vaccination after a structured-educational intervention', *BMC Public Health*, 20(1). doi: 10.1186/s12889-020-09962-1.

Stelzle, D. *et al.* (2021) 'Estimates of the global burden of cervical cancer associated with HIV', *The Lancet Global Health*, 9(2), pp. e161–e169. doi: 10.1016/S2214-109X(20)30459-9.

Stout, M. E. *et al.* (2020) 'Self-efficacy and HPV Vaccine Attitudes Mediate the Relationship Between Social Norms and Intentions to Receive the HPV Vaccine Among College Students', *Journal of Community Health*, 45(6), pp. 1187–1195. doi: 10.1007/s10900-020-00837-5.

Thompson, E. L. *et al.* (2018) 'Human papillomavirus vaccine information, motivation, and behavioral skills among young adult US women', *Journal of Health Psychology*, 23(14), pp. 1832–1841. doi: 10.1177/1359105316672924.

Vu, M. *et al.* (2018) 'Cervical cancer worldwide', *Current Problems in Cancer*, 42(5), pp. 457–465. doi: 10.1016/j.currproblcancer.2018.06.003.

Winarto, H. *et al.* (2022) 'Knowledge, attitudes, and practices among Indonesian urban communities regarding HPV infection, cervical cancer, and HPV vaccination', *PLoS ONE*, 17(5 May), pp. 1–29. doi: 10.1371/journal.pone.0266139.

World Health Organization (2024) *Cervical cancer*. Available at: https://www.who.int/news-room/fact-sheets/detail/cervical-cancer (Accessed: 9 March 2024).

Zhang, L. *et al.* (2023) 'Sociocultural–psychological predictors influencing parents' decision-making regarding HPV vaccination for their adolescent daughters in mainland China: An extended TPB model', *Frontiers in Public Health*, 10(1035658), pp. 1–14.

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ORIGINAL ARTICLE

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Individual and organizational factors associated with disaster preparedness and resilience among Indonesian hospital nurses: a cross-sectional study

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ABSTRACT

Introduction: The significance of nurses' disaster preparedness and resilience in diverse settings has become increasingly apparent due to the rise in global crises. This study aimed to investigate nurses' perspectives on these two factors and to examine their intricate relationships and nuances.

Methods: A cross-sectional framework was used to evaluate 390 nurses using the Disaster Preparedness Evaluation Tool (DPET) and the Connor-Davidson Resilience Scale (CD-RISC). Descriptive statistics, Mann-Whitney U-test, Kruskal-Wallis H test, Spearman's correlation analysis, and the generalized linear model were employed to determine the relationships between nurses' characteristics, self-regulation, work culture perception, and their DPET and CD-RISC scores.

Results: The results revealed that 79.7% of the participants were female, but male nurses consistently scored higher on both the assessments. The average DPET score was 172.29, and the average CD-RISC score was 27.34. Self-regulation and work culture perception were the most influential factors in raising DPET and CD-RISC scores by 4.032 and 1.454 units (p=0.000), and 1.112 and 0.34 units (p=0.000).

Conclusions: This study emphasizes the need for ongoing training of nurses in disaster preparedness and resilience to promote introspective learning and collaborative best practices. It also highlights the role of hospitals in optimizing resources and creating a supportive environment for enhanced disaster preparedness and resilience, given the impact of organizational work culture. The study findings suggest a nuanced understanding of gender dynamics in disaster preparedness and resilience, emphasizing the importance of further exploration of these disparities for effective nursing practices.

Keywords: disaster, preparedness, resilience, self-regulation, work culture

Introduction

Disaster preparedness and resilience have gained significant importance because of the surge in global disasters. Indonesia, located in the unstable Pacific Ring of Fire and comprising numerous islands, faces heightened susceptibility to various natural disasters, such as earthquakes, tsunamis, volcanic eruptions, and floods (Mercy Corps, 2020). These disasters pose considerable challenges to healthcare delivery and disaster response, necessitating tailored approaches to accommodate the country's diverse landscape. Indonesia's large population requires greater medical assistance, which can exacerbate concerns regarding disease outbreaks, as demonstrated by the COVID-19 pandemic. Although disaster incidents declined by

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33.5% in 2021, fatalities have surged by 76.9% (The National Agency for Disaster Countermeasure, 2021), emphasizing the need for comprehensive strategies to fortify the healthcare sector against potential threats (Alameddine et al., 2021; Mohtady Ali et al., 2023). Indonesia's vulnerability highlights the critical need for proactive disaster preparedness measures and resilience-building efforts in the healthcare system. These efforts can provide valuable insights for enhancing global disaster response and mitigating future crises.

Nurses play a crucial role in healthcare and have a multifaceted role in disaster preparedness and emergency response. Their duties extend beyond standard clinical care and are critical in shaping disaster preparedness and ensuring effective responses to crises (Baskin and Bartlett, 2021; Songwathana and Timalsina, 2021). Therefore, it is important to enhance nurses' disaster preparedness competencies and integrate vital skills, knowledge, and attitudes to ensure effective crisis management (Said & Chiang, 2020).

Several studies have investigated disaster preparedness among nurses worldwide, revealing moderate levels of preparedness. King et al. (2019) and Wang et al. (2023) found this in high-income countries, though Almukhlifi et al. (2021) highlighted exceptions. Indonesian studies by Rizqillah and Suna (2018), Martono et al. (2019), and Setyawati et al. (2020) also reported moderate preparedness levels. Reports by Said and Chiang (2020) and Almukhlifi et al. (2021) raised concerns about bioterrorism and biological threats. To ensure effective crisis management, it is crucial to enhance nurses' disaster-related skills and knowledge, given their vital role in healthcare response. Research reveals a gap between nurses' perceptions and reality of preparedness, as demonstrated by Winarti and Gracya (2023). Nurses in susceptible regions, such as Indonesia, may overestimate their competencies despite individual experiences, prior disaster interactions, and institutional dynamics impacting their perceptions, as shown by Al-Hunaishi et al. (2019) and Ghavami et al. (2022).

Resilience, a topic of significant interest in nursing, has been extensively studied. It refers to an individual's ability to cope with stress, adversity, and challenges. According to Abualruz and Hayajneh (2019), resilience enables nurses to adapt effectively to difficult situations regardless of their source. Mao et al. (2019) highlight its role in promoting positive outcomes and reducing negative psychological impacts during traumatic events. Lin et al. (2020) view resilience as a psychosocial asset that helps nurses navigate potential threats and maintain well-being. Resilience is influenced by both individual characteristics and organizational support, making it critical for nurses to handle complex healthcare situations effectively and maintain their overall health and effectiveness (Arbon et al., 2013; Luo et al., 2021).

Research on resilience among nurses has yielded mixed results. Lin et al. (2020) found that nurses generally exhibit high resilience, with lower levels of anxiety and depression and higher levels of active coping mechanisms. However, the study also showed that nurses had lower resilience than other medical professionals, likely due to their heavy work commitments and direct patient engagement. In contrast, Alameddine et al. (2021) reported that most participants exhibited moderate resilience, with a smaller group showing low resilience and a smaller group showing high resilience. Kılınç and Çelik (2021) also observed a moderate prevalence of resilience. In the context of the COVID-19 pandemic, Afshari, Nourollahi-Darabad, and Chinisaz (2021) noted a trend toward decreased resilience.

Nurses' preparedness and resilience are essential in healthcare during crises, and understanding these factors is crucial. Training in emergency care techniques and triage procedures (Almukhlifi et al., 2021; King et al., 2019), as well as promoting resilience, enable nurses to effectively respond to disasters and maintain their well-being (Alameddine et al., 2021; Yu et al., 2019). Strong teamwork skills are fostered through preparedness efforts and resilience, which also allows nurses to effectively navigate difficulties within multidisciplinary teams (Alameddine et al., 2021). Additionally, preparedness measures strengthen the adaptive capacity of healthcare systems, while resilience empowers nurses to remain flexible, resourceful, and innovative in delivering care amid changing circumstances.

This study, conducted across two naval hospitals in Jakarta, aimed to explore nurses' perceptions of disaster preparedness and resilience, and investigate the individual and organizational factors that influence them. This study used a cross-sectional paper-based survey with instruments such as the Disaster Preparedness Evaluation Tool (DPET) and the Connor-Davidson Resilience Scale (CD-RISC) to gather insights. Research questions focused on nurses' perceptions of their level of disaster preparedness and resilience and the factors that contribute to or hinder their preparedness and resilience. The study provided insights into the influencing factors and aimed to inform policy frameworks and refine clinical practice. Understanding these factors can lead to targeted interventions, training modules, and policy changes that enhance nurses’ disaster preparedness and resilience.

Materials and Methods

Study Design

This study used a cross-sectional paper-based survey to determine nurses’ perceptions of disaster preparedness and resilience along with the factors that influence these perceptions. This approach was selected because of its ability to capture data at a specific point in time, thereby providing a snapshot of the views of the nursing community.

Population Sample and Sampling

The participants in this study were nurses from two naval hospitals in Jakarta who were recruited using total sampling. The study included 464 registered nurses and permanent staff members with at least one year of professional experience. The sampling approach aimed to ensure comprehensive coverage of the target population and to maximize the representativeness of the findings. The response rate was 84.1%, with 390 nurses responding and 74 choosing not to participate.

Measurements

Participants completed an information sheet to provide sociodemographic details, including gender, age, educational level, length of employment, prior disaster training, and previous disaster duty experience. The Disaster Preparedness Evaluation Tool (DPET) (Tichy et al., 2009) was used to assess nurses' perceptions of disaster preparedness. The DPET comprises 47 items across seven dimensions: disaster knowledge, disaster skills, family preparedness, knowledge-specific response, patient management during response, recovery knowledge, and recovery management. Each item uses a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree.’

We used the Connor-Davidson Resilience Scale (CD-RISC) (Campbell-Sills and Stein, 2007) to evaluate nurses' perceptions of disaster resilience, which contains ten items rated on a 5-point scale from 'not true at all' to 'true nearly all of the time.' A score of up to 40 points indicates heightened resilience. Additionally, we explored nurses' self-regulation of community disaster engagement using the Baack and Alfred Self-Regulation Scale (Baack and Alfred, 2013), which has three items rated on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree.’

The questionnaire for evaluating organizational culture was created by integrating the Short Version of the Practice Environment Scale-Nursing Work Index (PES-NWI) (Caballero et al., 2019) with the Nurse Leadership and Organizational Culture (N-LOC) Questionnaire (Lui and Johnston, 2019) to form an initial set of 23 questions. However, after validity testing, five questions were removed because they had an r-value below the predetermined threshold of 3.339. The revised questionnaire, consisting of 18 questions, was designed to reflect the specific culture of the participant population, and included aspects such as leadership perceptions, nursing care quality, interpersonal relationships, and nurse participation levels. To gather participants' perspectives, a 5-point Likert scale ranging from ‘very likely’ to ‘very unlikely’ was used.

This study used rigorously validated standardized assessment tools to ensure accurate data collection. Validity was assessed by comparing the r values to a predetermined threshold of 3.339 for 34 participants, whereas reliability was determined using Cronbach's alpha. The reliability coefficients for the DPET, CD-RISC, self-regulation, and organizational work culture questionnaires were high with values of 0.96, 0.97, 0.91, and 0.79, respectively. These findings were derived from a pilot study of 34 nurses from a military hospital in Jakarta, which closely resembled the main study's demographics and demonstrated the strength of the research instruments.

Data Collection

Data collection involved the distribution of paper-based questionnaires using a total sampling approach across multiple wards in two naval hospitals in Jakarta. After obtaining approval from the hospital directors, the process began with the heads of the nursing departments, facilitating communication with ward-specific heads of nurses. Introductory meetings were held with the heads of the nurses to explain the study's objectives and methodology, followed by detailed briefings and written informed consent acquisition from the participants. Participants completed the questionnaires over five days, with follow-up reminders sent to the heads of the nurses on days 3 and 5. The questionnaires provided contact information for the investigator team, allowing respondents to seek clarification on any questions that they might have had.

Data Analysis

Statistical methods were carefully selected based on the study objectives and data characteristics. Given the skewness of the data, indicative of deviation from a normal distribution, non-parametric tests, such as the Mann-Whitney U-test and Kruskal-Wallis H-test, were employed to analyze continuous variables. These tests are suitable for skewed datasets and provide reliable inferential statistics without assuming normality. Spearman's correlation coefficient was utilized to explore relationships between nurses' perceptions of self-regulation, work culture, DPET, and CD-RISC scores. Additionally, a generalized linear model was employed to investigate the factors influencing nurses' perceptions of DPET and CD-RISC scores, facilitating a comprehensive assessment of the factors involved.

Ethical Approval

This study was approved by the hospital's Health Research Ethics Committee (HREC), which ensures adherence to ethical protocols. Approval was confirmed through two letters: one dated June 22, 2023, with number 17, and the other dated July 14, 2023, with reference number B/19/EC/LKS/VII. All participants provided written informed consent before participating in the study, confirming their willingness to participate. To maintain the ethical integrity and confidentiality of the participants, the questionnaires administered were anonymous and free of any personally identifiable information.

Results

Characteristics of the Respondents

We conducted a survey of 390 nurses, resulting in an 84.1% response rate. The respondent demographics, presented in Tables 1 and 2, varied. Notably, 79.7% of the participants were female and 88.2% held nursing diplomas. The most common workplace was the ward (60.5%). Regarding emergency training, a significant number of participants had Basic Life Support (BLS) or Basic Trauma and Cardiac Life Support (BTCLS) certification. However, only 49.7% had received disaster training and 15.9% had been deployed in disaster settings.

Respondents' ages ranged from 22 to 50 years, with a median of 40 years. Their average professional experience was 14.31 years, with a median employment duration of 15 years. The average tenure in their current unit was 7.81 years, and the median duration was four years. The respondents scored an average of 11.02 on self-regulation, with a median of 12. Their perception of work culture averaged 64.75, with a standard deviation of 9.13 and a median score of 66, as shown in Table 2.

Table 3 presents an analysis of the DPET and CD-RISC cores. The average DPET score was 172.29, with a standard deviation of 23.683; the median was calculated

Table 1. Differences in DPET and CD-RISC based on nurses' characteristics (N=390).

Characteristics		**DPET**			**CDRISC**		
	n (%)	**Mean (SD)**	**Median (P25,P75)**	**P-Value**	**Mean (SD)**	**Median (P25,P75)**	**P-Value**
Sex							
Male	79 (20.3)	178.97 (24.143)	179 (166,188)	**0,005** **^{a}	28.92 (5.844)	30 (27,30)	**0.003** **^{a}
Female	311 (79.7)	170.59 (23.299)	174 (152,186)		26.93 (5.536)	28 (22,30)	
Education							
Ners	46 (11.8)	169.91 (21.966)	176 (157, 186)	0.776^{a}	27.37 (5.519)	28 (24,30)	0.984^{a}
Diploma	344 (88.2)	172.60 (23.915)	174.50 (155,187)		27.33 (5.674)	28.50 (23,30)	
Unit of Work							
ED	42 (10.8)	178.50 (20.182)	183.50 (171,188)	**0.000** ***^{b}	29.26 (4.478)	30 (28,30)	**0.000** ***^{b}
OR	16 (4.1)	169.81 (27.530)	159.50 (154,180)		27.38 (7.117)	27 (23,32)	
ICU	32 (8.2)	158.56 (27.451)	153.50 (141,171)		25.34 (6.964)	22.50 (20,30)	
Wards	236 (60.5)	173.02 (23.810)	173 (156,188)		27.14 (5.911)	28 (22,30)	
OPD	58 (14.9)	174.83 (19.692)	180 (168,187)		28.26 (3.187)	30 (27,30)	
Hemodialysis	6 (1.5)	155.33 (17.072)	151.5 (141,174)		23.33 (4.457)	21 (20,29)	
Emergency Training							
ACLS/ATCLS	10 (2.6)	172.80 (33.911)	177 (159,194)	0.820^{b}	27.70 (6.684)	29 (26,31)	0.210^{b}
BLS/BTCLS	318 (81.5)	172.85 (24.046)	174 (155,188)		27.24 (5.863)	28 (22,30)	
Basic Surgery	2 (0.5)	155.50 (0.707)	155.50 (155,-)		24.50 (3.536)	24.50 (22,-)	
ICU	4 (1.0)	168.75 (20.419)	168.50 (150,188)		23.75 (3.304)	23.50 (21,27)	
Other	4 (1.0)	167.75 (16.879)	174.50 (150,179)		26 (6.164)	28.5 (20,30)	
Never	52 (13.3)	170 (20.462)	178 (155,186)		28.35 (4.014)	28.35 (27,30)	
Disaster Training							
Yes	194 (49.7)	173.06 (23.621)	175 (156,187)	0.558^{a}	27.23 (5.872)	28 (22,30)	0.576^{a}
Never	196 (50.3)	171.52 (23.779)	174 (155,188)		27.44 (5.432)	28 (24,30)	
Duty in Disaster							
Yes	62 (15.9)	175.81 (22.737)	177.5 (162,188)	0.104^{a}	27.90 (4.661)	29 (26,30)	0.275^{a}
Never	328 (84.1)	171.62 (23.833)	174 (153,187)		27.23 (5.817)	28 (22,30)	

ED, Emergency Department; OR, Operating Room; ICU, Intensive Care Unit, OPD, Outpatient Department

P25 and P75 are the lower and upper quartiles, respectively.

a Mann–Whitney U test.

b Kruskal–Wallis H test.

SD, standard deviation.

* p<0.05; ** p<0.01; *** p<0.001

Table 3. Score of the Disaster Preparedness Evaluation Tool (DPET) and the Connor-Davidson Resilience Scale (CD-RISC)

Variable	Number of Question	Mean (SD)	Median (P25,P75)	Min-Max
DPET	47	172.29 (23.683)	175 (156,187)	94-235
Disaster knowledge	16	60.11 (8.017)	61 (55, 64)	33-80
Disaster skills	7	25.79 (3.869)	27 (23, 28)	13-35
Family preparedness for a disaster	2	7.41 (1.267)	8 (6, 8)	2-10
Knowledge-specific response	4	14.80 (2.190)	15 (13, 16)	8-20
Patient management during response	12	42.86 (7.055)	44 (36, 48)	24-60
Recovery knowledge	1	3.75 (0.712)	4 (3, 4)	1-5
Recovery management	5	17.57 (3.185)	17 (25, 20)	10-25
CD-RISC	10	27.34 (5.649)	28 (23, 30)	10-40

as 175. Additionally, the study assessed seven dimensions of DPET, including disaster knowledge, disaster skills, family preparedness, knowledge-specific response, patient management, recovery knowledge, and recovery management, with their respective mean scores. The mean CD-RISC score was 27.34, with a standard deviation of 5.649. The median scores were 28.

Bivariate Analyses of Factors Related to Total DPET and CD-RISC Scores

The results of the bivariate analyses for DPET and CDRISC scores are presented in Tables 1 and 2. The data showed variations in scores based on sex, with male nurses having a higher mean DPET score of 178.97 with a standard deviation of 24.143, and ED nurses having a noteworthy mean score of 178.50 with a standard deviation of 20.182. Spearman's correlation analysis revealed a positive correlation between self-regulation and perception of work culture scores and the DPET total score. Additionally, significant differences in CD-RISC scores were observed based on sex and working units, with male nurses achieving a higher mean score of 28.92 and ED nurses having the highest mean score of 29.26. Similar to the DPET scores, Spearman's correlation analysis confirmed a positive association between self-regulation and the perception of work culture scores and the CD-RISC total score.

Generalized Linear Models of DPET and CD-RISC

The study analyzed the DPET and CD-RISC scores using generalized linear models. Table 4 presents the factors affecting nurses' scores, including the regression coefficients (B), standard errors (SE), and significance levels (Sig.). The analysis showed that, although male nurses had higher DPET scores than female nurses, the difference was not statistically significant (p=0.097). Nurses with a diploma degree had lower DPET scores than those with a nursing degree, and this difference was statistically significant (B=-4.74, p=0.024). The study also found that, while differences in DPET scores were observed across various working units, most were not statistically significant. However, nurses who underwent ICU training demonstrated higher DPET scores than those who did not (B=15.92, p=0.026). Furthermore, disaster training experience positively correlated with higher DPET scores (B=3.866, p=0.009). Notably, the perception of self-regulation and work culture significantly increased the DPET scores (SRC: p<0.001; work culture: p<0.001).

A generalized linear model of nurses' perceptions of resilience, measured using the CD-RISC score, revealed that male nurses had slightly higher scores than female nurses; however, the difference was not statistically significant (B=0.632, p=0.116). The analysis showed that educational background and working units did not significantly impact the scores, but nurses with emergency training in all groups had lower scores. CD-RISC scores decreased across all emergency training categories, with statistical significance only in the BLS/BTCLS (p=0.009) and other non-specific emergency training (p=0.025) groups. Experience in the current unit significantly affected the perceived resilience (B=0.048, p=0.032). Self-regulation and work culture were the most influential factors shaping nurses' CD-RISC scores, indicating their critical role in shaping perceptions of

Table 2. Differences in DPET and CD-RISC based on nurses' age, working experience, self-regulation and work cultures perception scores (N=390).

Characteristics			DPET		CDRISC	
	Mean (SD)	Median (P25, P75)	r	P-Value	r	P-Value
Age	37.41 (9.518)	40 (28, 45)	0.001	0.983c	-0.029	0.570c
Working Experience (years)	14.31 (9.578)	15 (5, 22)	-0.015	0.775c	-0.006	0.911c
Current Unit Work Experience (Years)	7.81 (7.925)	4 (2, 13)	0.028	0.582c	0.039	0.439c
Self-Regulation	11.02 (2.020)	12 (9, 12)	0.725	**0.000***c**	0.763	**0.000***c**
Work Culture	64.75 (9.311)	66 (62, 72)	0.741	**0.000***c**	0.775	**0.000***c**

P25 and P75 were the lower and upper quartiles, respectively.
c Spearman Correlation test
SD, standard deviation.
* p<0.05; ** p<0.01; *** p<0.001

Table 4. Generalized linear model for factors associated with nurses' DPET and CDRISC score (N=390).

Variable	DPET			CDRISC		
	B	SE	P-Value	B	SE	P-Value
Intercept	21.040	88.465	0.017	-6.654	19.423	0.001
Sex						
Male	3.040	18.311	0.097	0.632	0.4020	0.116
Female	0a	.	.	0a	.	.
Education						
Ners	-4.740	20.977	**0.024***	-0.133	0.4606	0.772
Diploma	0a	.	.	0a	.	.
Working Unit						
ED	5.342	58.029	0.357	1.184	12.741	0.353
Operating Room	2.865	65.096	0.660	0.557	14.292	0.697
ICU	-1.282	59.387	0.829	1.098	13.039	0.400
Wards	6.810	54.830	0.214	0.806	12.038	0.503
OPD	6.546	57.526	0.255	0.991	12.630	0.433
Hemodialysis	0a	.	.	0a	.	.
Emergency Training Experience						
ACLS/ATCLS	1.457	46.238	0.753	-1.080	10.152	0.287
BLS/BTCLS	2.328	21.227	0.273	-1.214	0.4660	**0.009****
Basic Surgery	-5.336	100.173	0.594	-2.403	21.993	0.274
ICU	15.921	71.737	**0.026***	-2.471	15.750	0.117
Other	-7.102	67.601	0.293	-3.320	14.842	**0.025***
Never	0a	.	.	0a	.	.
Disaster Training Experience						
Yes	3.866	14.734	**0.009****	0.480	0.3235	0.138
Never	0a	.	.	0a	.	.
Disaster Duty Experience						
Yes	-1.845	20.878	0.377	-0.534	0.4584	0.244
Never	0a	.	.	0a	.	.
Age	0.049	0.1709	0.776	-0.035	0.0375	0.346
Total Working Experience	-0.133	0.1711	0.438	-0.001	0.0376	0.971
Total Working Experience in the current Unit	0.072	0.1014	0.476	0.048	0.0223	**0.032***
Self-Regulation	4.032	0.4338	**0.000*****	1.112	0.0952	**0.000*****
Work Culture	1.454	0.0970	**0.000*****	0.340	0.0213	**0.000*****

a Reference; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

disaster readiness and resilience, with both showing significant results ($p < 0.001$).

Discussions

This study investigated nurses' disaster preparedness and resilience by focusing on individual and organizational dynamics. Variations in scores revealed by the generalized linear models were observed. Key determinants of these scores include education, disaster- and emergency-related training, self-regulation, and work culture, highlighting the intricate balance between personal attributes and organizational context, which can provide valuable insights for enhancing disaster readiness in the nursing profession.

Factors which Influenced DPET Scores

Demographic Factors: Gender and Education Levels on DPET Score

Although the difference in disaster preparedness scores between male and female nurses was not statistically significant, male nurses achieved higher scores on the DPET than their female counterparts did. This aligns with previous research that reported mixed results on gender disparities in disaster preparedness (Almukhlifi et al., 2021). Previous studies have found that males generally have higher levels of preparedness (Almukhlifi et al., 2021; Chegini et al., 2022; Farajzadeh et al., 2017; King et al., 2019; Younos et al., 2021), but the reasons for this are complex and may involve sociocultural, professional, or training-related factors. Gender roles can impact male nurses' perceptions of their abilities and empowerment during disasters, affecting their preparedness. Gender differences in education can also affect disaster preparedness. These findings emphasize the need for thorough examination of gender roles and their potential influence on disaster preparedness in the nursing profession.

This study found an association between education level and DPET scores. Unexpectedly, nurses with bachelor's degrees had lower DPET scores than those with a diploma. The reasons for this difference are unclear but may be due to differences in curriculum focus or practical training. Previous research by Farajzadeh et al. (2017) and Martono et al. (2019) suggests that higher qualifications do not always lead to better disaster preparedness, while Setyawati et al. (2020) and Chegini et al. (2022) showed that nurses with bachelor's or PhD degrees are better prepared. This highlights the complexity of the relationship between education and disaster preparedness, and emphasizes the importance of uniform and effective disaster training at all academic levels.

Training and Experience: Emergency Preparedness Training and Disaster Duty Experience on DPET Score

Similar to previous research (Almukhlifi et al., 2021; Rizqillah & Suna, 2018), this study revealed a strong relationship between disaster training and improved disaster preparedness scores. Trained individuals, such as nurses, consistently outperformed untrained individuals in DPET assessments. King et al. (2019) and Martono et al. (2019) emphasize the importance of specialized bioterrorism training, while Setyawati et al. (2020) and Younos et al. (2021) suggest that general training may not always lead to actual preparedness. Tailored training in disaster management generally enhances the perceived readiness of professionals (Kimin et al., 2022). Disaster training equips nurses with the necessary knowledge, skills, and resources to handle emergencies effectively, including protocols, triage procedures, and emergency care procedures (Almukhlifi et al., 2021; King et al., 2019).

The relationship between disaster experience and preparedness was not statistically significant; however, those who experienced disasters scored higher on preparedness measures. This knowledge suggests that first-hand exposure to disasters can lead to valuable experiential knowledge and reduce fear and anxiety. For instance, nurses with more disaster experiences feel more prepared than their peers in other professions, as demonstrated in studies by Rizqillah and Suna (2018), King et al. (2019), and Abuadas and Albikawi (2022). However, discordant literature like Farajzadeh et al. (2017) may offer a different perspective on the relationship between disaster experience and preparedness. Both training and first-hand experience play important roles in enhancing disaster preparedness, but their impact may vary based on various factors.

The primary data showed a nonsignificant negative correlation between work experience and disaster preparedness. In other words, as work experience increases, DPET scores decrease. Although more experience often provides opportunities for training, simulations, and real-world disaster scenarios (Almukhlifi 2021), it does not necessarily enhance disaster preparedness. Martono et al. (2019) and Setyawati et al. (2020) found no correlation between work experience and disaster preparedness. These studies suggest that experienced nurses may be more prepared for disaster management. However, there may be a gap between the perceived and actual preparedness. This discrepancy may be due to seasoned nurses becoming complacent or overly confident, or being less receptive to new methods and technologies than less experienced individuals.

As experience in a specific area or unit increased, so did perceived disaster preparedness. However, the correlation was not statistically significant. Specialized knowledge and skills honed through intensive training in a particular field contributed to this perception. However, this expertise may not extend to broader disaster scenarios, emphasizing the need for comprehensive training that encompasses both specialized and general situations. Rizqillah and Suna (2018) and King et al. (2019) found that tenure as an emergency nurse or specialist did not necessarily lead to higher disaster readiness. These studies indicate that specialization plays a role in disaster preparedness, but it is not the sole determinant. Continuous learning, versatility, and adaptability are essential to effective disaster management.

Self-Regulation and Workplace Culture on DPET Score

Our research revealed a connection between nurses' self-regulation scores and elevated DPET scores, highlighting the importance of self-regulation in disaster preparedness. According to Ryan and Deci's Self-Determination Theory (SDT), individuals with higher self-regulation levels exhibit intrinsic motivation during disasters (Ryan & Deci, 2022). Our findings align with those of Abuadas and Albikawi (2022), who demonstrated a strong correlation between self-regulation and disaster preparedness among nurses. Baker et al.(2019) discovered that more self-regulated nurses were proactive in disaster situations. These outcomes align with Wang and Tsai (2022) and Cai et al. (2023), who propose that strong intentions for disaster risk reduction lead to proactive behavior.

Our study revealed that a positive work culture characterized by supportive leadership, good interpersonal relationships, and active participation significantly enhanced disaster preparedness scores. This finding aligns with the observations of Lim et al. (2020) and Abuadas and Albikawi (2022), who emphasized the importance of leadership in fostering a conducive environment for commitment and social interaction and in boosting nurses' preparedness. Cai et al. (2023) also highlighted the role of trust in disaster risk reduction, stating that it thrives in a positive work environment. Abenir et al. (2022) further stressed the importance of leadership in communication, networking, and engagement in the relationship between resilience factors and preparedness. These findings underscore the crucial role of active work culture, particularly leadership, in disaster preparedness.

Factors which Influenced CD-RISC Score

Demographic Factors: Gender and Education Levels on CD-RISC Score

Our study revealed that males exhibited higher resilience scores than females, which aligns with previous research on disaster preparedness showing that male nurses have higher resilience and lower psychological distress (Alameddine et al., 2021; Sierra-García et al., 2022). However, Kılınç and Çelik (2021) found no gender disparities in resilience. The factors contributing to higher resilience scores in males are not entirely clear, but sociocultural influences and innate gender-based characteristics may play a role. These findings emphasize the complex interplay between sociocultural and intrinsic factors in nursing that should be considered in broader professional contexts.

Our study found no relationship between educational level and resilience. Surprisingly, individuals with 'Ners' degrees, which surpassed diplomas, scored lower. This warrants an examination of the curricula and personal development components of educational frameworks. Our findings align with those of Alameddine et al. (2021) and Kılınç and Sis Çelik (2021), who reported no significant variation in resilience among nurses from different educational backgrounds. Conversely, Afshari, Nourollahi-Darabad, and Chinisaz (2021) found that education significantly affected resilience, with more highly educated nurses displaying greater resilience. Further research is needed to understand how educational programs, especially in emergencies, influence resilience in nurses and equip them with the knowledge and skills necessary to handle challenging situations.

Training and Experience: Emergency Preparedness Training and Disaster Duty Experience on CD-RISC Score

This study emphasizes the importance of disaster training in building resilience, despite the surprising finding that those without training had slightly higher CD-RISC scores. Further investigation is needed to understand this unexpected observation, which contradicts the results of previous studies. Previous research has demonstrated the significance of disaster preparedness, including training, in fostering resilience, for example,), Mao et al. (2020), Sierra-García et al. (2022) and Zhang et al. (2022). Adequate preparation and training are crucial for fostering resilience among rescue workers, as emphasized by Mao et al. (2019). However, the relationship between training and resilience may be influenced by factors such as quality of training, inherent resilience, or external support.

Our research showed that nurses' work experiences did not have a direct impact on their resilience. However, the duration of service in their current units positively affected their perceived resilience. This finding aligns with resilience theory, which suggests that facing challenges can enhance resilience over time. The results of our study are consistent with those of Alameddine et al. (2021), who found that merely accumulating years in a profession does not necessarily lead to increased resilience. Additionally, Afshari et al. (2021) supported the positive effect of experience in the current unit on resilience. Our study highlighted the significance of a supportive work environment in promoting resilience among nurses.

Self-Regulation and Workplace Culture on CD-RISC Score

Our research identified a connection between nurses' self-regulation and resilience as indicated by their CD-RISC scores. Theoretically, self-regulation enables individuals to regulate their emotions, thoughts, and actions during high stress events. This is especially important for nurses whose professions are demanding. Studies by Abualruz and Hayajneh (2019), Kim and Chang (2022), Sierra-García et al. (2022), and Lu et al. (2023) have also found that self-regulation is essential for nursing resilience. Our findings and a significant body of literature support the importance of self-regulation in fostering resilience among nurses.

Our research underscores the importance of a positive work environment in bolstering nurses' resilience in challenging situations. A supportive work climate, characterized by mutual respect and reciprocal trust, plays a crucial role in fostering posttraumatic growth and enhancing nurses' adaptability to disasters. According to Abualruz and Hayajneh (2019) and Mao, Hu, and Loke (2021), a positive work environment with social support and resources is vital. Scrymgeour et al. (2020) also emphasize the significance of professional duty as an intrinsic motivator, with peer and team cohesion amplifying its impact. However, our findings are in contrast with the literature on workplace bullying, which can negatively affect supportive work environments (Yu et al., 2019). To ensure nurses' resilience during crises, organizations must prioritize factors such as leadership, peer support, and engagement.

This study on naval hospital preparedness and resilience in Jakarta provides valuable insights, emphasizing the need for continuous training and self-assessment among nurses in disaster preparedness. Collaboration and standardized protocols can lead to coordinated responses and optimal resource utilization. Healthcare systems can create environments that foster a sense of belonging and mutual support by aligning organizational values with preparedness goals and providing resources for nurses' training. However, acknowledging the study's constraints is essential, as the cross-sectional design limits the comprehensive examination of temporal changes, necessitating longitudinal studies. The generalizability of the findings is also limited due to the concentration of naval hospitals in Jakarta; therefore, future research should adopt qualitative methodologies in diverse settings. Furthermore, additional research is needed to explore gender dynamics in disaster preparedness and resilience and to address disparities through targeted interventions.

Conclusion

This study offers vital information on the factors affecting nurses' disaster preparedness and resilience in naval hospitals in Jakarta. This study emphasizes the intricate role of demographic factors, such as gender and education, in shaping nurses' perceptions. Disaster-specific training and real-world experiences play key roles in preparedness and resilience. Additionally, self-regulation and supportive work environments are crucial for an effective disaster response. However, this study's focus on Jakarta's naval hospitals may limit its applicability to other healthcare settings. Future research should use qualitative methodologies to gain a more comprehensive understanding of disaster preparedness and resilience. Improving the impact of future research on nurses' disaster preparedness requires addressing the study's limitations, such as its cross-sectional design and limited generalizability. Exploring gender dynamics in disaster preparedness is necessary to promote equitable outcomes in nursing practice.

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Conflict of interest

The authors confirm that there is no conflict of interest regarding the submission of this article.

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References

Abenir, M. A. D., Manzanero, L. I. O. and Bollettino, V. (2022) 'Community-based leadership in disaster resilience: The case of small island community in Hagonoy, Bulacan, Philippines', *International Journal of Disaster Risk Reduction*, 71. doi: 10.1016/j.ijdrr.2022.102797.

Abuadas, M. H. and Albikawi, Z. F. (2022) 'Predictors of disaster preparedness among registered nurses in Saudi Arabia: A structural equation modelling analysis', *Australasian Emergency Care*, 25(2), pp. 132–139. doi: 10.1016/j.auec.2021.07.004.

Abualruz, H. M. and Hayajneh, F. (2019) 'The Contrary Impact of Resilience on the Complicated Nursing Work Environment: A Literature Review', *Open Journal of Nursing*, 09(11), pp. 1188–1201. doi: 10.4236/ojn.2019.911087.

Afshari, D., Nourollahi-Darabad, M. and Chinisaz, N. (2021) 'Demographic predictors of resilience among nurses during the COVID-19 pandemic', *Work*, 68(2), pp. 297–303. doi: 10.3233/WOR-203376.

Alameddine, M. *et al.* (2021a) 'Resilience of nurses at the epicenter of the COVID-19 pandemic in Lebanon', *International Journal of Nursing Sciences*, 8(4), pp. 432–438. doi: 10.1016/j.ijnss.2021.08.002.

Alameddine, M. *et al.* (2021b) 'Resilience of nurses at the epicenter of the COVID-19 pandemic in Lebanon', *International Journal of Nursing Sciences*, 8(4), pp. 432–438. doi: 10.1016/j.ijnss.2021.08.002.

Al-Hunaishi, W., Hoe, V. C. W. and Chinna, K. (2019) 'Factors associated with healthcare workers willingness to participate in disasters: A cross-sectional study in Sana'a, Yemen', *BMJ Open*, 9(10). doi: 10.1136/bmjopen-2019-030547.

Almukhlifi, Y. *et al.* (2021) 'Emergency healthcare workers' preparedness for disaster management: An integrative review', *Journal of Clinical Nursing*. Blackwell Publishing Ltd. doi: 10.1111/jocn.15965.

Arbon, P. *et al.* (2013) 'Australasian emergency nurses' willingness to attend work in a disaster: A survey', *Australasian Emergency Nursing Journal*, 16(2), pp. 52–57. doi: 10.1016/j.aenj.2013.05.003.

Baack, S. and Alfred, D. (2013) 'Nurses' preparedness and perceived competence in managing disasters', *Journal of Nursing Scholarship*, 45(3), pp. 281–287. doi: 10.1111/jnu.12029.

Baker, O. G., Alamri, A. A. and ... (2019) 'A descriptive study to analyse the disaster preparedness among Saudi nurses through self-regulation survey', *Journal of nursing ….* doi: 10.1111/jonm.12833.

Baskin, R. G. and Bartlett, R. (2021) 'Healthcare worker resilience during the COVID-19 pandemic: An integrative review', *Journal of Nursing Management*, 29(8), pp. 2329–2342. doi: 10.1111/jonm.13395.

Cai, J. *et al.* (2023) 'Influences of social environment and psychological cognition on individuals' behavioral intentions to reduce disaster risk in geological hazard-prone areas: An application of social cognitive theory', *International Journal of Disaster Risk Reduction*, 86. doi: 10.1016/j.ijdrr.2023.103546.

Campbell-Sills, L. and Stein, M. B. (2007) 'Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10-item measure of resilience', *Journal of Traumatic Stress*, 20(6), pp. 1019–1028. doi: 10.1002/jts.20271.

Chegini, Z. *et al.* (2022) 'Disaster preparedness and core competencies among emergency nurses: A cross-sectional study', *Nursing Open*, 9(2), pp. 1294–1302. doi: 10.1002/nop2.1172.

Farajzadeh, M. *et al.* (2017) 'Research Paper: Preparedness of Nurses for Crises and Disasters in Imam Khomeini and Social Security Hospitals of Saqqez', *Health in Emergencies and Disasters Quarterly*, 3(1), pp. 57–63. doi: 10.29252/nrip.hdq.3.1.57.

Gea-Caballero, V. *et al.* (2019) 'Development of a short questionnaire based on the Practice Environment Scale-Nursing Work Index in primary health care', *PeerJ*, 2019(7). doi: 10.7717/peerj.7369.

Ghavami, V. *et al.* (2022) 'Predictors of nurses' reporting for work at the time of epidemics and natural disasters; solutions for hospital surge capacity', *Journal of Nursing Scholarship*, 54(4), pp. 470–476. doi: 10.1111/jnu.12746.

Kim, E. Y. and Chang, S. O. (2022) 'Exploring nurse perceptions and experiences of resilience: a meta-synthesis study', *BMC Nursing*, 21(1). doi: 10.1186/s12912-021-00803-z.

Kimin, A. *et al.* (2022) *Factors affecting nurses' ability to provide effective care in a disaster response: A review*, *Journal of Public Health Research*.

King, H. C., Spritzer, N. and Al-Azzeh, N. (2019) 'Perceived Knowledge, Skills, and Preparedness for Disaster Management among Military Health Care Personnel', *Military Medicine*, 184(9–10), pp. E545–E551. doi: 10.1093/milmed/usz038.

Kılınç, T. and Sis Çelik, A. (2021) 'Relationship between the social support and psychological resilience levels perceived by nurses during the COVID-19 pandemic: A study from Turkey', *Perspectives in Psychiatric Care*, 57(3), pp. 1000–1008. doi: 10.1111/ppc.12648.

Lim, H. W., Li, Z. and Fang, D. (2020) 'Impact of management, leadership, and group integration on the hospital response readiness for earthquakes', *International Journal of Disaster Risk Reduction*, 48. doi: 10.1016/j.ijdrr.2020.101586.

Lin, J. *et al.* (2020) 'Factors Inuencing Resilience of Medical Workers from Other Provinces to Wuhan Fighting Against 2019 Novel Coronavirus Pneumonia'. doi: 10.21203/rs.3.rs-17931/v1.

Lu, J. *et al.* (2023) 'Analysis of Factors Affecting Psychological Resilience of Emergency Room Nurses Under Public Health Emergencies', *Inquiry (United States)*, 60. doi: 10.1177/00469580231155296.

Lui, J. N. M. and Johnston, J. M. (2019) 'Validation of the nurse leadership and organizational culture (N-LOC) questionnaire', *BMC Health Services Research*, 19(1). doi: 10.1186/s12913-019-4290-z.

Luo, Y. *et al.* (2021) 'Willingness to participate in front-line work during the COVID-19 pandemic: A cross-sectional study of nurses from a province in South-West China', *Journal of Nursing Management*, 29(6), pp. 1356–1365. doi: 10.1111/jonm.13309.

Mao, X. *et al.* (2019) 'What it takes to be resilient: The views of disaster healthcare rescuers', *International Journal of Disaster Risk Reduction*, 36. doi: 10.1016/j.ijdrr.2019.101112.

Mao, X., Hu, X. and Loke, A. Y. (2021) 'A Concept Analysis on Disaster Resilience in Rescue Workers: The Psychological Perspective', *Disaster Medicine and Public Health Preparedness*. Cambridge University Press. doi: 10.1017/dmp.2021.157.

Martono, M. *et al.* (2019) 'Indonesian nurses' perception of disaster management preparedness', *Chinese Journal of Traumatology - English Edition*, 22(1), pp. 41–46. doi: 10.1016/j.cjtee.2018.09.002.

Mercy Corps (2020) *Indonesia Tsunamis Facts - What To Know | Mercy Corps*. Available at: https://www.mercycorps.org/blog/facts-indonesia-disasters (Accessed: 26 August 2023).

Mohtady Ali, H. M. *et al.* (2023) 'Enabling Transformational Leadership to Foster Disaster-Resilient Hospitals', *International Journal of Environmental Research and Public Health*, 20(3), p. 2022. doi: 10.3390/ijerph20032022.

Rizqillah, A. F. and Suna, J. (2018) 'Indonesian emergency nurses' preparedness to respond to disaster: A descriptive survey', *Australasian Emergency Care*, 21(2), pp. 64–68. doi: 10.1016/j.auec.2018.04.001.

Ryan, R. M., & Deci, E. L. (2022). Self-Determination Theory. In Encyclopedia of quality of life and well-being research (pp. 1–7).

Said, N. B. and Chiang, V. C. L. (2020) 'The knowledge, skill competencies, and psychological preparedness of nurses for disasters: A systematic review', *International Emergency Nursing*. Elsevier Ltd. doi: 10.1016/j.ienj.2019.100806.

Scrymgeour, G. C. *et al.* (2020) *Nurses working in healthcare facilities during natural disasters: a qualitative enquiry*.

Setyawati, A. D. *et al.* (2020) 'Disaster Knowledge, Skills, and Preparedness Among Nurses in Bengkulu, Indonesia: A Descriptive Correlational Survey Study', *Journal of Emergency Nursing*, 46(5), pp. 633–641. doi: 10.1016/j.jen.2020.04.004.

Sierra-García, E. *et al.* (2022) 'Modulating Elements of Nurse Resilience in Population Care during the COVID-19 Pandemic', *International Journal of Environmental Research and Public Health*. MDPI. doi: 10.3390/ijerph19084452.

Songwathana, P. and Timalsina, R. (2021) 'Disaster preparedness among nurses of developing countries: An integrative review', *International Emergency Nursing*, 55, p. 100955. doi: 10.1016/J.IENJ.2020.100955.

The National Agency for Disaster Countermeasure. (2021, July 17). Indonesian disaster information data. https://www.bnpb.go.id/

Tichy, M. et al. (2009). Nurse practitioners' perception of Disaster Preparedness Education. The American Journal for Nurse Practitioners, 13(1), 10–22. https://scholarsarchive.byu.edu/facpubhttps://scholarsarchive.byu.edu/facpub/5306

Wang, J. J. and Tsai, N. Y. (2022) 'Factors affecting elementary and junior high school teachers' behavioral intentions to school disaster preparedness based on the theory of planned behavior', *International Journal of Disaster Risk Reduction*, 69. doi: 10.1016/j.ijdrr.2021.102757.

Wang, Y. *et al.* (2023) 'Disaster Preparedness among Nurses in China: A Cross-Sectional Study', *Journal of Nursing Research*, 31(1), p. E255. doi: 10.1097/JNR.0000000000000537.

Winarti, W. and Gracya, N. (2023) 'Exploring Nurses' Perceptions of Disaster Preparedness Competencies', *Nurse Media Journal of Nursing*, 13(2), pp. 236–245. doi: 10.14710/NMJN.V13I2.51936.

Younos, T. B., Hasan, M. K. and Nasreen, M. (2021) 'Are nurses ready? Bangladeshi nurses' perceived preparedness for disasters: A mixed-methods approach', *International Journal of Disaster Risk Reduction*, 58. doi: 10.1016/j.ijdrr.2021.102195.

Yu, F. *et al.* (2019) 'Personal and work-related factors associated with nurse resilience: A systematic review', *International Journal of Nursing Studies*. Elsevier Ltd, pp. 129–140. doi: 10.1016/j.ijnurstu.2019.02.014.

Zhang, J. *et al.* (2022) 'Exploring effect of psychological first aid education on vocational nursing students: A quasi-experimental study', *Nurse Education Today*, 119, p. 105576. doi: 10.1016/J.NEDT.2022.105576.

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ORIGINAL ARTICLE

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Analysis of factors self-harm behaviour among adolescents undergoing drug rehabilitation in Indonesia

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ABSTRACT

Introduction: Self-harm is one of the mental health problems experienced by adolescents. In Indonesia, the behaviour of self-harm in adolescents has increased. However, no research analyses the factors related to self-harm behaviour in adolescents. The study aimed to analyse the factors associated with self-harm behaviour in adolescents in drug rehabilitation.

Methods: This study used a descriptive-correlative design with a cross-sectional approach. The sample in this study was 241 adolescents who were in drug rehabilitation using the purposive sampling technique. This research was conducted in the Lido Centre for the Rehabilitation of the National Narcotics Agency, the Lampung Centre for Rehabilitation of the National Narcotics Agency, the Cipinang Besar Utara Narcotics Penitentiary, the Special Prison for Children of Jakarta, Lampung Narcotics Penitentiary, and the Al Islamy Foundation. This study used five questionnaires, namely the Internalized Stigma of Mental Illness, Self-Identity Questionnaire, UCLA Loneliness Scale Version 3, and the Deliberate Self-Harm Inventory. This research was conducted in May-October 2020. The data of this study were analysed using a logistic regression test.

Results: The results of the logistic regression analysis showed that, from several factors related to self-harm, namely loneliness, self-identity, and stigma, two factors that are most related to self-harm behaviour are self-identity and stigma, with a p-value of 0.000 ($p<0.05$).

Conclusions: Self-harm behaviour can occur due to factors such as self-identity and stigma. This research can be a basis for providing nursing interventions to adolescents undergoing drug rehabilitation. Appropriate nursing interventions can help adolescents undergoing drug rehabilitation control the self-harm behaviour they want to engage in. Researchers recommend the importance of interventions aimed at strengthening self-identity and reducing stigma in efforts to prevent and treat self-harm behaviour. Additionally, future research is recommended to consider other variables that may also contribute to this behaviour.

Keywords: adolescents, drug rehabilitation, factors analysis, self-harm behaviour

Introduction

One of the mental health problems for adolescents around the world is having self-harm behaviour. The prevalence of self-harm behaviour reaches 4.3% (men) and 3.4% (women) at the age of 13-17 years (WHO, 2017). Studies in 41 countries, including Southeast Asia,

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show that 16.9% of people have self-harm behaviour with an average age of 13 years (Gillies et al., 2018). The high prevalence of self-harm requires special attention in health. A study by King et al. (2019) shows that 30% of adolescents with self-harm behaviour are drug abusers. The prevalence of adolescent drug abuse in Indonesia reached 24-28% in 2019 (BNN, 2019). Drug abuse *contributes to the burden of disease and self-harm behaviour in adolescents (*Moran *et al.,* 2015*).*

Self-harm behaviour is deliberate self-harm through injuring or poisoning oneself (King, Cabarkapa and Leow, 2019). This is related to various factors that influence adolescent behaviour. Adolescents have unique characteristics with the task of finding self-identity. Self-identity that is not positive has the risk of causing psychosocial problems such as self-harm (Azizah et al., 2018). Also, the existence of self-stigma increases risky behaviour. Individuals experience self-stigma as a negative feeling due to their condition (Eaton et al., 2020). The inability to accept self-condition can lead to adolescent maladaptive responses. Self-harm behaviour is a response to adolescents' emotional and psychological distress (Brown, Elkins and Parker, 2016). The level of self-resilience affects individual behaviour in the face of any pressure received (Ibrahim, 2017).

Previous research results suggest that self-harm behaviour varies throughout the life cycle. The proportion of adolescents who have self-harm behaviour and who attempt suicide ranges from 30:1 in adolescents to 3:1 in the elderly (Muehlenkamp et al., 2012). Based on these data, it can be seen that adolescents have a large proportion of self-harm. Teens usually do things that can injure themselves because of something complex and varied. The reasons that are often associated with self-harm in adolescents include: (a) adjusting to shifts in one's physical or psychological development; (b) managing pressures from peers or academic demands in daily life; (c) experiencing mental health issues like depression or inquisitiveness; (d) battling familial issues like parental divorce or domestic abuse; or (e) navigating social factors like social media's influence (Chen., 2007' Dimmock et al., 2008).

According to previous research, the trigger event for adolescents who show self-harm behaviour is conflicts with peers and parents. In addition, adolescents are typically perfectionists, feel dissatisfied with physical appearance, and have difficulty controlling and expressing feelings. Adolescents also have distorted self-perceptions and low self-esteem (Oktan, 2017). Usually, individuals perform self-harm behaviour to get relief, describe feelings of unacceptability, or as an effort to make individuals connect with other individuals (Stänicke, Haavind and Gullestad, 2018). Lonely adolescents often experience this condition to meet their social needs.

Self-harm behaviour is often a manifestation of feelings of loneliness, self-identity conflict, and social stigma (Stänicke, Haavind and Gullestad, 2018). According to Cacioppo et al. (2015), loneliness can trigger intense emotional pain, which a person may cope with by self-harm as a form of distraction or relief from the pain. Meanwhile, unstable or negative self-identity can influence individuals' perceptions of themselves and the surrounding environment, thus encouraging destructive behaviour such as self-harm (Serafini and Adams, 2009; Arslan, 2019). Lastly, stigma or shame and fear of being rejected by society can exacerbate negative feelings and increase the emotional burden, which in the end can trigger self-harm behaviour (Ardani and Handayani, 2017; Eaton et al., 2020). Therefore, it is important to understand and address these factors in efforts to prevent and treat self-harm behaviour.

Based on the background, the researcher wanted to conduct a study to identify what factors were associated with self-harm behaviour in adolescents in drug rehabilitation in Indonesia.

Materials and Methods

Research design and samples

This study employed a cross-sectional methodology and a descriptive-correlative design. This study's population consisted of adolescents residing in five rehabilitation facilities: the Cipinang Besar Utara Narcotics Penitentiary (153 respondents), the Lampung Narcotics Penitentiary (7 participants), the Lido Centre for the Rehabilitation of the National Narcotics Agency (BNN) (28 respondents), the Centre for Rehabilitation of the National Narcotics Agency (BNN) Lampung (3 respondents), and Al Islamy Foundation (50 participants). In this study, the determination of the sample was through purposive sampling with the inclusion criteria: 1. Adolescent (10-25 years); 2. Underwent rehabilitation; 3. Do not have verbal communication barriers and physical illnesses that interfere with research participation; 4. Able to read and write. The sample used in this study was 241 respondents.

Variable and Instruments

The independent variables in this study are loneliness, self-identity and stigma, while the dependent variable is self-harm behaviour.

Data collection in this study was carried out using four instruments, namely: the Internalized Stigma of Mental Illness (ISMI) scale, Self-Identity Questionnaire, UCLA Loneliness Scale Version 3, and Deliberate Self-Harm Inventory questionnaire. These instruments were adopted and used to collect data related to the factors of self-harm behaviour among Indonesian adolescents.

The Internalized Stigma of Mental Illness (ISMI) scale is a questionnaire consisting of 29 statement items with subdomains: Alienation, Experience of Discrimination, Social Withdrawal, Stereotype Support, and Stigma Resistance (Boyd, Otilingam and DeForge, 2014). The self-identity questionnaire in this study was adopted from Serafini and Adams (2009), which consisted of 15 questions with an ordinal measurement scale (Likert). In this questionnaire, self-identity is divided into general categories, namely rather passive, active, quite active.

Developed by Russell (1996), the UCLA Loneliness Scale Version 3 is an instrument used to measure the level of loneliness. In this study, the researcher will use the UCLA Loneliness Scale Version 3 questionnaire which has been modified by Setyo, Razak and Zainuddin (2018), due to the equation of the place setting, namely the correctional institution and the research population, namely the inmates. This instrument has three dimensions of loneliness, namely personality, social desirability, and depression, and consists of 18 items with an ordinal measurement scale.

The Deliberate Self-harm Inventory (DSHI) instrument was first developed in the United States by Sansone, Wiederman and Sansone (1998). The Self-harm Inventory (SHI) questionnaire has five dimensions, namely direct self-harm behaviour, indirect self-harm behaviour, risk behaviour, and cognition. This instrument consists of 22 items with an ordinal measurement scale. The number of instruments is short enough so that it is suitable for capturing large populations.

The questionnaire used in this study has been tested for validity and reliability with the following details: Internalized Stigma: Substance Abuse Version (r> 0.361 and Cronbach's alpha 0.910). There are 14 valid questions on the self-identity questionnaire with a calculated r-value greater than the r table. The researcher did not delete the invalid questions because the questionnaire was standardised and avoided the tendency for one of the dimensions of self-identity due to the inequality of the number of question items. The results of the validity test of the self-identity questionnaire were 0.440-0.859. The results of the parenting questionnaire reliability test showed that Cronbach's alpha value was 0.886. The Cronbach's alpha value is above 0.6, so that the self-identity questionnaire is stated to be reliable and well-used.

The UCLA Loneliness Scale Version questionnaire has been tested on 100 assisted residents in the Class IIA Sungguminasa Penitentiary, Gowa. In the discriminatory power trial results, two questions were dropped out of 20 questions because the total correlation coefficient was <0.30, while the valid value coefficient must be in the range from 0.301 to 0.608. Then the validity test was carried out using Aiken's V formula to calculate the content validity coefficient. The v-value for the loneliness scale moved from a value of 0.50 to 0.75, sp that the scale validation results were good. A reliability test was also carried out in a trial with 20 questions with an alpha value of 0.748 and a reliability test with 18 questions resulting in an alpha value of 0.780. It was stated that the questionnaire had a reliability level that was classified as reliable. For the Deliberate Self-Harm Inventory questionnaire, the validity test results on the DSHI questionnaire obtained 7 out of 11 valid questions with a calculated r-value of 0.391-0.599 (r table> 0.361). The DSHI questionnaire reliability test results showed that Cronbach's alpha value was 0.710 (> 0.7). So it is stated that the DSHI questionnaire is reliable and well-used. Researchers did not delete invalid questions in the questionnaire due to the inequality of the number of question items.

Data Collection and Data Analysis

Data were collected from May to October 2020. The samples used met the requirements for being willing to be respondents in this research and were currently undergoing rehabilitation at a drug rehabilitation institution. Adolescents filled out informed consent if they were willing to complete the questionnaire in around 15-20 minutes. In filling out the questionnaire, the researcher was assisted by a research assistant who was a drug rehabilitation staff member and who had previously explained this research. When conducting the research, researchers explained the activities, procedures, objectives, benefits, risks of loss, rights and obligations of participants. Participants' participation was voluntary, proven by signing an Informed Consent. After that, the researcher examined all questionnaires, and if any were found to be incomplete, the respondents were asked to complete them. In conducting the research, if the respondent was unwilling to participate, he could resign at any time, and there was no coercion.

Data analysis was performed using SPSS 21.0. To analyse the data in this study, univariate and multivariate analyses were used. The univariate analysis

Table 1. Distribution of Respondents based on Characteristics of Age and Duration of Rehabilitation in Drug Rehabilitation (n= 241)

Variables	Mean	SD	Min-Max	95% CI
Age	21.16	2.16	15-25	20.88-21.43
Duration of Rehabilitation	38.35	56.95	1-396	31.12-45.57

aims to describe the characteristics of each research variable. The results obtained will be presented in frequency, percentage, average, minimum-maximum value and standard deviation. Multivariate analysis was performed using logistic regression statistical tests (p<0.05) (Hosmer Jr, Lemeshow and Sturdivant, 2013).

Ethical considerations

The researcher conducted an ethical test first in the Faculty of Nursing ethics committee, University of Indonesia, as evidenced by the Ethics Review Pass Certificate Number: SK-90 / N2.F12.DI.2.1 / ETIK 2020.

Results

Participants' characteristics

This study's respondents' characteristics were age, gender, the latest education, rehabilitation agency, and rehabilitation duration. An overview of the distribution of age and duration of rehabilitation is shown in Table 1. An overview of the distribution of the latest education, gender, and institution where rehabilitation is shown in Table 2. The description of the distribution of self-harm, loneliness, self-identity, suicidal ideation, and stigma is shown in Table 3.

Based on Table 1, it is known that the average age of the respondents is 21.16 years, with the youngest being 15 years and the oldest being 25 years old, and a standard deviation of 2.16 years (95% CI: 20.88 - 21.43). The average length of respondents' rehabilitation in this study was 38.35 weeks, with the shortest rehabilitation time of 1 week and the most extended rehabilitation length of 396 weeks, and a standard deviation of 56.94 weeks (95% CI: 31.12 - 45.57).

Based on Table 2, most of the respondents in this study had the senior high school education level (44%) and were male (99.6%). The majority of respondents in this study underwent rehabilitation at a correctional institution (LAPAS) (53.5%).

Table 2. Frequency Distribution of Educational Characteristics, Gender, and Rehabilitation Institutions for Adolescents in Drug Rehabilitation (n=241)

Variable	Total (n)	%
Education		
Primary School	36	14.9
Junior High school	92	38.2
Senior High school	106	44.0
College	7	2.9
Gender		
Male	240	99.6
Women	1	0.4
Rehabilitation Place Agency		
Rehabilitation Centre	88	36.5
Correctional Institution (LAPAS)	153	53.5
Total	241	100.0

Based on Table 3, it is known that as many as 124 adolescents (51.5%) have low self-harm behaviour, 189 adolescents high loneliness (78%), and 91 adolescents (38%) delay self-identity. There is a high self-stigma of as many as 122 adolescents (50.6%).

Analysis of Factors Affecting Self-Harm Behaviour

Based on the results of the analysis that has been carried out, the information presented in Table 4 is obtained.

Based on Table 4, relationships were presented through odds ratio (OR) alongside 95% confidence interval (CI). The Loneliness's OR value is 1.004, which means that for each unit increase in loneliness, the odds of self-harm behaviour are multiplied by 1.004. The self-identify's OR value is 1.033, suggesting that for each unit increase in self-identity, the odds of self-harm behaviour increase by about 3.3%, assuming all other variables are held constant. Then, the stigma's OR value is 0.335, meaning that for each unit increase in stigma, the odds of the self-harm behaviour are multiplied by 0.335, or decrease by about 66.5%. Moreover, Table 4 shows that self-identity and stigma have a statistically significant relationship with self-harm behaviour with a p-value 0.000 (p <0.05). From the logistic regression test results, it was found that the variables in this study influenced the behaviour of self-harm in adolescents by 95%. Thus. It can be concluded that other variables have not been included in this study, which can also influence as much as 5%.

Table 3. Frequency Distribution of Self-Harm Behaviour, Loneliness, Self-Identity, and Adolescent Stigma in Drug Rehabilitation (n=241)

Variables	Total (n)	%
Self-Harm Behaviour		
Clean	66	27.4
Low	124	51.5
Moderate	48	19.9
High	3	1.2
Loneliness		
Moderate	52	22.0
High	189	78.0
Self-Identity		
Diffusion	3	1.0
Closed	24	10.0
Delay	91	38.0
Reached	123	51.0
Stigma		
No High Self Stigma	119	49.4
There is a High Self Stigma	122	50.6
Total	241	100.0

Table 4. Results of Logistic Regression on Variables Related to Self-harm Behaviour in Adolescents in Drug Rehabilitation (n= 241)

Variable	OR (exp.B)	95% CI (exp.B)	p-value
Loneliness	1.004	0.774 – 1.332	0.550
Self-Identity	1.033	0.815 – 1.304	0.000
Stigma	0.335	0.010 – 7.261	0.000

Discussions

Based on the results of the general effect test that has been carried out, it is found that three independent variables were analysed in this study. However, after a partial test, the results showed that, from the three independent variables, information was obtained that two independent variables had a more significant effect on self-harm behaviour, namely self-identity and stigma. This is in line with Ardani and Handayani (2017) who found that drug abuse individuals often get stigma, which develops to form self-stigma. Based on the analysis results carried out, information is obtained that the three independent variables in this study can explain 25.4% of personal harm behaviour; 74.6% of the rest are influenced by other factors that are outside this study. Many factors influence a person to injure themselves (Azizah et al., 2018).

The stigma variable coefficient (Exp B) results tend to increase along with the increase in a person's suicidal behaviour category. This indicates that the higher the stigma experienced by a person, the higher the tendency to injure themselves. Moreover, the coefficient value is positive, which indicates that increased stigma will increase a person's tendency to injure themselves. From the results of the analysis, stigma is one of the factors related to self-harm behaviour. This is in line with the findings by Evans-Polce et al, (2015), which reveal that stigma is closely related to self-harm behaviour and is caused by various things, first, the emergence of shame, anxiety, low self-esteem, stress, and failing treatment-seeking. Second, people choose not to defend themselves against stigma, which can lead to emotional issues including rage, failure-related feelings, or the development of self-confidence to carry on with the maladaptive behaviour.

Based on the results, information was obtained that the coefficient value of the self-identity variable decreased along with the increase in the category of self-harm behaviour. This indicates that the greater a person's ability to identify his or her own identity, the smaller the behaviour to injure themselves. The results of this study are supported by previous research conducted by Arslan (2019). The same thing happened to the coefficient value of the loneliness variable which indicates the same as the self-identity variable (Cacioppo et al., 2015). These two variables have a significant effect on self-harm behaviour.

Self-harm behaviour is often an outward sign of social shame, self-identity struggle and loneliness (Stänicke, Haavind and Gullestad, 2018). Cacioppo et al. (2015) state that loneliness can cause severe emotional distress, which an individual may use as an escape or diversion from their suffering via self-harming. Furthermore, unstable or unfavourable self-identity can affect how people see themselves and their surroundings, which can lead to harmful behaviours like self-harm (Serafini and Adams, 2009; Arslan, 2019). Self-harm behaviour can be sparked by unpleasant emotions and an increased emotional burden brought on by shame or stigma and the fear of social rejection (Ardani and Handayani, 2017; Eaton et al., 2020).

This study has several obstacles that were experienced when conducting research, namely the effect of the Covid-19 pandemic conditions requiring researchers to carry out various procedures for mutual safety and also causing a longer implementation of the research to because, at the beginning of the pandemic period, no one was allowed to visit the drug rehabilitation. However, this study has the advantage that it is the first research of its kind in Indonesia. Furthermore, this study also provides the results of which factors are most associated with self-harm behaviour so that these can be used as a reference in providing nursing interventions to adolescents in drug rehabilitation who have self-harm behaviour. This study can also become basic data used by drug rehabilitation institutions, especially nurses or health workers in the rehabilitation environment, to develop promotional or preventive actions for adolescents. In addition, this research can also serve as basic data for further research and can serve as a reference for research that provides treatment in nursing actions.

Conclusion

Self-harm behaviour in adolescents is something that needs attention and should also receive a nursing intervention. The results of this study indicate that the loneliness variable did not have a statistically significant relationship with self-harm behaviour, while the self-identity and stigma variables had a statistically significant relationship with self-harm behaviour of 95% confidence interval. Based on the results of this study, future research could consider further investigation by adding other variables such as depression, anxiety, peer pressure, or trauma experiences. Additionally, given the significant influence of these variables on self-harm behaviour, future research could focus on developing and evaluating interventions aimed at reducing loneliness, strengthening self-identity, and reducing stigma. The implication of this study can be used as a reference in developing nursing interventions that are more focused on improving self-identity in adolescents and preventing self-stigma given to adolescents with self-harm behaviour and self-stigma in adolescents. These interventions include behavioural cognitive therapy, cognitive therapy, acceptance, and commitment therapy.

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Conflict of interest

The authors declare they have no conflicts of interest.

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References

(BNN), N. N. A. of the R. of I. (2019) *The use of narcotics among adolescents is increasing*, *National Narcotics Agency of the Republic of Indonesia (BNN)*.

Ardani, I. and Handayani, S. (2017) 'Hiv/aids related stigma as a barrier for health seeking behavior: a case study of injecting drug users in jakarta', *Buletin Penelitian Kesehatan*, 45(2), pp. 81–88.

Arslan, G. (2019) 'Mediating role of the self–esteem and resilience in the association between social exclusion and life satisfaction among adolescents', *Personality and Individual Differences*, 151, p. 109514.

Azizah, U. *et al.* (2018) 'Faktor-faktor yang berhubungan dengan masalah psikososial remaja di wilayah bantaran Kali Code Kota Yogyakarta', *Berita Kedokteran Masyarakat*, 34(10), pp. 281–290.

d, J. E., Otilingam, P. G. and DeForge, B. R. (2014) 'Brief version of the Internalized Stigma of Mental Illness (ISMI) scale: psychometric properties and relationship to depression, self esteem, recovery orientation, empowerment, and perceived devaluation and discrimination.', *Psychiatric rehabilitation journal*, 37(1), p. 17.

Brown, V., Elkins, K. and Parker, A. (2016) 'Self-harm and young people', *Research Bulletin*, 5(1), p. 42.

Cacioppo, S. *et al.* (2015) 'Loneliness: Clinical import and interventions', *Perspectives on Psychological Science*, 10(2), pp. 238–249.

ChenT.C (2007) 'Development and adaptation of adolescents: Theory and practice.', in *Development and adaptation of adolescents: Theory and practice.* Taiwan: Psychological.

Dimmock, M., Grieves, S. and Place, M. (2008) 'Research Section : Young people who cut themselves–a growing challenge for educational settings', *British journal of special education*, 35(1), pp. 42–48.

Eaton, K. *et al.* (2020) 'Pathways to self-stigma in parents of children with a mental health disorder', *Journal of Child and Family Studies*, 29, pp. 1732–1744.

Evans-Polce, R. J. *et al.* (2015) 'The downside of tobacco control? Smoking and self-stigma: A systematic review', *Social science & medicine*, 145, pp. 26–34.

Gillies, D. *et al.* (2018) 'Prevalence and characteristics of self-harm in adolescents: meta-analyses of community-based studies 1990–2015', *Journal of the American Academy of Child & Adolescent Psychiatry*, 57(10), pp. 733–741.

Hosmer Jr, D. W., Lemeshow, S. and Sturdivant, R. X. (2013) *Applied logistic regression*. New York: John Wiley & Sons.

Ibrahim, N. (2017) 'Gender differences and psychological factors associated with suicidal ideation among youth in Malaysia', *Psychology Research and Behavior Management*, 10, pp. 129–135. doi: 10.2147/PRBM.S125176.

King, J., Cabarkapa, S. and Leow, F. (2019) 'Adolescent self-harm: think before prescribing', *Australian prescriber*, 42(3), p. 90.

Moran, P. *et al.* (2015) 'Substance use in adulthood following adolescent self-harm: a population-based cohort study', *Acta Psychiatrica Scandinavica*, 131(1), pp. 61–68.

Muehlenkamp, J. J. *et al.* (2012) 'International prevalence of adolescent non-suicidal self-injury and deliberate self-harm', *Child and adolescent psychiatry and mental health*, 6(1), pp. 1–9.

Oktan, V. (2017) 'Self-harm behaviour in adolescents: body image and self-esteem', *Journal of psychologists and counsellors in schools*, 27(2), pp. 177–189.

Russell, D. W. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. Journal of personality assessment, 66(1), 20-40.

Sansone, R. A., Wiederman, M. W. and Sansone, L. A. (1998) 'The self-harm inventory (SHI): Development of a scale for identifying self-destructive behaviors and borderline personality disorder', *Journal of clinical psychology*, 54(7), pp. 973–983.

Serafini, T. E. and Adams, G. R. (2009) 'Functions of identity: Scale construction and validation', *Identity: an international journal of theory and research*, 2(4), pp. 361–389.

Setyo, F. G., Razak, A. And Zainuddin, K. (2018) 'Hubungan Antara Dukungan Sosialdengan Kesepian Pada Narapidana Kasus Narkotika Lapas Kelas Iia Sungguminasa, Gowa'. Universitas Negeri Makassar.

Stänicke, L. I., Haavind, H. and Gullestad, S. E. (2018) 'How do young people understand their own self-harm? A meta-synthesis of adolescents' subjective experience of self-harm', *Adolescent Research Review*, 3(2), pp. 173–191.

WHO (2017) *Mental Health Status of Adolescents in South-East Asia : Evidence for Action*.

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Initiation of self-care practices in heart failure patients: a phenomenological study

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ABSTRACT

Introduction: The incidence of heart failure continues to rise with advancing age, unabated by advancements in healthcare technology. Patients with heart failure are required to manage their care independently at home for the remainder of their lives. This study aimed to delve into the experiences of heart failure patients regarding self-care management at home.

Methods: Nineteen patients with heart failure were chosen through purposive sampling and thorough interviews were conducted to collect their self-care treatment experiences. Content analysis was carried out to scrutinize the acquired data.

Results: The analysis revealed four themes: patients' perception of heart failure diagnosis, efforts in self-care, readiness for self-care, and adoption of new healthy behaviors in heart failure. Eight categories were formulated within these themes, including "transitioning into a heart failure patient;" "recognizing the need for self-care;" "seeking information and heart failure therapy;" "facilitators and barriers in seeking information regarding self-care;" "social support and belief in engaging in self-care at home;" "self-confidence in engaging in self-care at home;" "efforts to develop self-care strategies;" and "engaging in new healthy behaviors as heart failure patients independently."

Conclusions: Patients become aware of the necessity for self-care upon experiencing discomfort due to symptoms resulting from their heart failure. Family support and the patient's belief system play pivotal roles in initiating self-care practices at home. Nurses should provide support to patients in fostering self-care practices within their homes.

Keywords: heart failure, phenomenological study, self-care

Introduction

Heart failure represents a global health concern characterized by high mortality rates, morbidity, poor quality of life, and diminished functional capacity. Globally, the population afflicted by heart failure stands at approximately 64 million individuals. Mortality rates among heart failure patients range between 2-3% within 30 days post-treatment, with only 50% surviving beyond five years(Savarese *et al.*, 2023). In the United States and Europe, the prevalence varies between 1-3% among the adult population, escalating to over 10% among those aged over 70 years(Agarwal, Fonarow and Ziaeian, 2021a). Southeast Asia, as indicated by Lam et al. (2016) and MacDonald et al. (2020) reflects similar trends, where the mortality rate due to heart failure stands at 13.6% within the first year. In Indonesia, according to Reyes et al. (2016), the prevalence of heart failure incidents amounts to 5%. The mortality rate among heart failure patients within the initial year is 11.3%,

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accompanied by a 17% readmission rate. The rates of readmission and mortality within the first year due to heart failure in Indonesia remain notably high.

Heart failure necessitates lifelong self-management behavior to maintain stability, including adherence to medication, lifestyle modifications, symptom monitoring, and decision-making in response to symptom changes (Riegel *et al.*, 2019; Agarwal, Fonarow and Ziaeian, 2021b; Jiang and Wang, 2021). Self-care is integral to sustaining patients' stability post-hospital discharge (White, Kirschner and Hamilton, 2014) and this encompasses complex activities aimed at preserving health, symptom monitoring, and appropriate response to emerging symptoms. Emphasizing symptom monitoring and seeking assistance is crucial within self-care (Attaallah, Klymko and Hopp, 2016; Riegel, Dickson and Faulkner, 2016). Nurses play a pivotal role in assisting heart failure patients in effectively conducting self-care.; therefore, understanding how patients develop self-care strategies enables nurses to provide tailored approaches to the heart failure patients under their care. Currently, there's limited research depicting how patients develop self-care practices; however, some studies emphasize the importance of heart failure self-care (Chamberlain, 2017; Kessing *et al.*, 2017) and identify factors associated with heart failure patient self-care (Jaarsma *et al.*, 2017; Chae *et al.*, 2022; Patrick *et al.*, 2022).

Self-care in heart failure is crucial and positively impacts patient outcomes, yet many patients have not fully embraced it (Jaarsma *et al.*, 2013; Jiang *et al.*, 2023). Self-care consists of three components: maintenance, monitoring, and management, yet most patients only engage in self-care maintenance, including in Indonesia. Several qualitative studies have explored the implications of living with heart failure (Fry *et al.*, 2016a), disease management (Farmer *et al.*, 2016), and the experiences of living with heart failure (Su et al., 2023),yet they do not provide insights into how patients develop self-care practices to cope with their heart failure. Limited knowledge (Jaarsma et al., 2020; Riegel et al., 2021; Kim and Cho, 2021; Hashimoto et al., 2023) exists regarding the decision-making process and stages involved in heart failure patient self-care. Heart failure is marked by a fluctuating disease course, characterized by stable periods interspersed with occasional progressive deteriorations. Given these conditions, the researcher aims to elucidate patients' experiences during episodes of heart failure progression, particularly concerning self-care practices.

This study aims to explore how heart failure patients adhere to self-care practices and the stages they undergo following a heart failure diagnosis based on their experienced journey.

Materials and Methods

Research Design and Sampling Technique

This study employed a descriptive phenomenological (Speziale and Carpenter, 2011) approach to explore the meaning behind heart failure patients' experiences in conducting self-care practices at home. Ethical clearance for this research was obtained from the Research Ethics Commission of the Faculty of Medicine, Universitas Brawijaya, under protocol number 84/EC/KEPK/04/2022. Participants involved in this study were provided with explanations and signed written consent forms indicating their willingness to participate in the research. A total of 19 participants were selected using purposive sampling techniques for inclusion in this study. The inclusion criteria for participant recruitment encompassed heart failure patients in stage C, with New York Heart Association (NYHA) functional status of 2-3, diagnosed by a physician within the last year, and in stable condition (systolic blood pressure 100-140 mmHg, heart rate 60-100 beats per minute, absence of shortness of breath and chest pain, and no major arrhythmias). Participants were excluded from the study if they developed dementia or experienced deteriorating conditions requiring supportive or palliative therapy. Participant selection was carried out one by one, and analyzed until data saturation was achieved.

Data Collection

Participants were provided with informed consent to engage in the research during their visit to the cardiac outpatient clinic. In-depth interviews were conducted face-to-face at agreed-upon locations, as arranged with each patient. These interviews with the participants were recorded using audio recorders and lasted between 18 to 66 minutes. Demographic data of the participants were also collected as per the research requirements through the use of a questionnaire. The primary researcher conducted the interviews after practicing with three heart failure patients beforehand. The researcher followed a guideline during the in-depth interviews, initiating with the question “After being diagnosed with heart failure, how do you manage to stay healthy at home?" This question was then followed by more specific inquiries regarding how they monitor symptoms, make decisions, and take action concerning the symptoms of heart failure they experience.

The trustworthiness of qualitative studies relates to credibility, dependability, transferability, and confirmability(Graneheim, Lindgren and Lundman, 2017). Purposive sampling was employed to obtain a broad sample and fulfill the credibility aspect in describing patients' experiences of self-care at home. This sampling technique was chosen to seek heart failure patients who had relevant experiences for the study being conducted. To obtain valid data in this study, the researchers extended the time spent with participants. Interviews were conducted by the researchers on the second or third meeting with the participants. Additionally, detailed notes were taken by the researchers during the interview process with the participants. Furthermore, to prevent analysis from being influenced by prior understandings and to achieve reliability and confirmability, the authors (TS, SY) collectively discussed and reflected upon the codes and categories. Quotes are presented to enhance authenticity and achieve confirmability. Furthermore, readers can evaluate the quotes to follow the structured description and perceive the results written by researchers as an interconnected sequence.

Data Analysis

All interview outcomes with the participants were repeatedly listened to and transcribed verbatim. The content analysis approach (Miles and Huberman, 1994; Lindgren, Lundman and Graneheim, 2020) was employed by the researchers (TS, SY) to identify sub-categories, categories, and themes within this study. The researchers (TS, SY) meticulously read and reviewed the verbatim transcripts to pinpoint keywords reflecting efforts to maintain, monitor symptoms, and make decisions or take actions in response to perceived symptoms. These keywords were marked, analyzed, and interpreted by the researchers (TS, SY). They were then scrutinized, and coded, eventually forming categories. The researchers (TS, SY) proceeded to select and group the identified categories, thus forming themes. These themes, once identified, were aligned according to the predetermined research objectives. Subsequently, the researchers (TS, SY) organized these themes within a coherent framework to elucidate the relationships among themes and establish the sequence of discovered themes.

Results

A total of 19 heart failure patients were enrolled in the study. Their age ranged from 46 to 70 years old (mean=60.4 years), more than half of the participants were male (n=10), and most participants were married (n=14). Educational backgrounds varied among participants: over half of the participants were high school graduates (n=11) and college graduates (n=7). A significant portion of the participants (n=15) were either unemployed or retired. These participants had experienced heart failure within the last year, with the condition persisting for up to six years. The primary cause of heart failure among most participants (n=17) was coronary artery disease (CAD), while the remainder was due to heart valve abnormalities. More than half of the participants (n=11) experienced symptoms of shortness of breath during mild activity or NYHA III (table 1). The analysis revealed four major themes. The

Table 1. Participant Characteristics (N=19)

ID	Sex	Age	Education	Marital status	Employment	Length of HF	Etiology & FC of HF
P1	F	47	BD	Married	Lecturer	3	CAD/NYHA III
P2	M	52	BD	Married	Lecturer	8	CAD/NYHA II
P3	M	54	HS	Married	Unemployment	3	CAD/NYHA III
P4	F	64	HS	Widow	Unemployment	6	CAD/NYHA III
P5	M	68	BD	Widower	Retiree	2	CAD/NYHA II
P6	M	52	HS	Married	Unemployment	3	CAD/NYHA III
P7	M	62	HS	Married	Retiree	6	CAD/NYHA II
P8	M	64	BD	Married	Retiree	1	CAD&HT/ NYHA II
P9	M	70	BD	Married	Retiree	6	CAD/NYHA II
P10	M	70	HS	Married	Retiree	1	CAD/NYHA II
P11	M	61	HS	Married	Retiree	1	CAD&HT/ NYHA III
P12	F	70	HS	Widow	Retiree	4	CAD/NYHA II
P13	F	53	HS	Married	Unemployment	2	Valve abnormality/ NHYA III
P14	F	70	MS	Married	Unemployment	6	HT/NYHA III
P15	M	65	BD	Married	Shopkeeper	4	HT/NYHA II
P16	M	46	HS	Married	Shopkeeper	3	Valve abnormality/ NHYA III
P17	F	65	BD	Widow	Retiree	4	CAD/NYHA III
P18	M	54	HS	Married	Unemployment	2	CAD/NYHA III
P19	F	62	HS	Widow	Unemployment	3	CAD/NYHA III

ID (Identity); P1 (Participant 1); M (Male); F(Female); BD (Bachelor degree); HS (High school); MS (Middle school); PS (Primary School); HF (Heart Failure); FC of HF (Functional class of Heart Failure); CAD (coronary artery disease); HT (Hypertension): NYHA (New York Heart Association).

Table 2. Self-care practice in heart failure

Theme	Category	Subcategory
Patients' perception of heart failure diagnosis	Transitioning into a heart failure patient	1. Denying and attempting to cope with 2. Non-adherence to heart failure medication 3. Attempt to interpret the self-care practice
	Recognizing the need for self-care	1. The symptoms prompt participants to engage 2. Compare their condition to others
Efforts in self-care	Seeking information and heart failure therapy	1. Symptoms drive participants to seek treatment 2. Seek valid information 3. Disbelief in alternative therapy
	Facilitators and barriers in seeking information regarding self-care	1. Utilize the internet to gather information 2. Limited interaction between doctors and participants
Readiness for self-care	Social support and belief in engaging in self-care at home	1. Require reinforcement and support 2. Faith in the treatment program
	Self-confidence in engaging in self-care at home	1. Can manage their heart failure symptoms 2. Confident in the self-care actions
Adoption of new healthy behaviors as heart failure patients	Efforts to develop self-care strategies	1. Strive to develop individual strategies 2. Devise methods to conduct self-care
	Engaging in new healthy behaviors as heart failure patients independently	1. Actively take on the role 2. Self-care becomes the daily lifestyle pattern

content within these themes was formulated into eight categories and eighteen subcategories (Table 2).

Theme 1: Patients' perception of heart failure diagnosis

The journey of self-care treatment for heart failure patients began with how the patients perceived their heart failure diagnosis. This theme was supported by two subcategories transitioning into a heart failure patient and recognizing the need of self-care.

Category 1: Transitioning into a heart failure patient (subcategories; denying and attempting to cope with, non-adherence to heart failure medication and attempt to interpret the self-care practice)

The initial reaction of participants upon experiencing heart failure is denial and attempting to cope with life while grappling with the condition. Participants also frequently exhibited non-compliance with the programmed therapy, especially when their condition was stable. Participants attempted to make sense of the heart failure condition they experienced.

"I'm still young, only 46 years old, and yet I have heart failure? But what can I do? I must keep living and stay healthy for the sake of my child. I have to endure for my child." (P16, HF NYHA III, Valve Abnormality).

"When I feel good, I tend to neglect taking my medication. I even want to eliminate them one by one without consulting the doctor. But the illness turns out to be stronger." (P2, HF NYHA II, CAD)

"To be healthy, first, you have to seek treatment when ill, second, you must adhere to the doctor's instructions, and third, you have to strive for your health." (P8, HF NYHA II, CAD)

Category 2: Recognizing the need for self-care (subcategories; the symptoms prompt participants to engage and compare their condition to others).

Participants realized the necessity of engaging in self-care due to the cardiac symptoms they experienced. The presence of perceived symptoms triggered participants to engage in self-care, particularly medication use. Additionally, participants attempted to compare the outcomes of their self-care with those of other cardiac patients.

"Previously, even a little activity made me tired, but now, not if I take my medication regularly. My heart used to beat rapidly all the time... But after taking the medication regularly, it doesn't happen anymore." (P16, HF NYHA III, Valve Abnormality)

"I compare myself to others who have the same illness as mine. My neighbor, for instance, has a stent. The difference when walking... It is remarkably different. The proof is, they still struggle with shortness of breath while walking, but I don't anymore." (P18, HF NYHA III, CAD)

Theme 2: Efforts in self-care

Participants endeavored to conduct self-care by seeking information about their heart failure condition and its treatment. Throughout this process, factors supporting and hindering it were identified. The categories that support this theme were seeking information and heart failure therapy and facilitators and barriers in seeking information regarding self-care.

Category 3: Seeking information and heart failure therapy (subcategories; symptoms drive participants to seek *treatment, seek valid information, and disbelief in alternative therapy).*

The presence of heart failure symptoms drives participants to seek treatment from healthcare facilities and place trust in healthcare providers. Participants also sought valid information from healthcare professionals to regain health despite having experienced heart failure. Additionally, participants did not believe in alternative treatment practices conducted by non-healthcare professionals.

"Whoever handles me here, the important thing is I ask for healing, not to stay ill, so that I won't swell again." (P18, HF NYHA III, CAD)

"Doctor, besides taking medication, what else can speed up recovery? I want to return to normal, to be able to be active and work again." (P18, HF NYHA III, CAD)

"After I followed my desire for alternative treatments, instead of getting better, it worsened, to the point where I wished for death. Up until now, I don't listen to everything people say, it's all lies." (P18, HF NYHA III, CAD)

"I started from my first examination until now, I believe in the doctor. Because the doctor has the knowledge and the data." (P8, HF NYHA II, CAD)

Category 4: Facilitators and barriers in seeking information regarding self-care (subcategories; utilize the internet to gather information and limited interaction between doctors and participants).

Participants utilized technological advancements, such as the presence of the internet, to guide them in self-care at home. The obstacles encountered by participants in searching for information related to self-care were the limited interaction time between doctors and patients.

"Nowadays, we just have to open Google, right? Moreover, there are people far away that we can call, email, ask them. From there, we can learn, inquire about information, about how my illness is." (P9, HF NYHA II, CAD).

"At check-ups, they don't say anything, just ask if I feel better. Then they check my blood pressure, give me medication, and send me home." (P10, HF NYHA II, CAD & HT).

"I met the doctor twice during check-ups, never talked, just wrote a prescription, checked, and then sent me home. I tried to consult once, but the doctor seemed too busy, in a rush." (P11, HF NYHA III, CAD & HT).

Theme 3: Readiness for self-care

The readiness of participants to engage in self-care can be realized through social support from the patient's surroundings and belief in the outcomes of self-care practices. Patients needed to consistently carry out self-care routines and experience positive benefits, which reinforced their confidence in maintaining stable bodily conditions through self-care. This theme is supported by two categories, namely social support and belief in engaging in self-care at home and self-confidence in engaging in self-care at home.

Category 5: Social support and belief in engaging in self-care at home (subcategories; require reinforcement and support, and faith in the treatment program).

Participants needed reinforcement and support to continue engaging in self-care. Moreover, participants had to believe that the self-care program they were undertaking would yield positive effects on their congestive heart failure condition.

"When my mother is around, she's the one who usually reminds me to take my medication. She's diligent in reminding me to take my medication." (P16, HF NYHA III, Valve Abnormality).

"I don't feel anything, sir, just normal. No shortness of breath or swelling. I'm much better now. I believe that by regularly taking medication, monthly check-ups, and continuous monitoring by the doctor, I become healthier." (P4, HF NYHA III, CAD).

"My condition has greatly improved, no shortness of breath, no swelling. If it is checked again later, God willing, my heart will not even be swollen anymore, maybe just some scars. God willing, it will be like that." (P8, HF NYHA II, CAD).

Category 6: Self-confidence in engaging in self-care at home (subcategories; can manage their heart failure symptoms and confident in the self-care actions).

Participants' self-confidence was acquired after gaining experience in performing self-care that effectively controlled symptoms of heart failure. The outcomes and experiences of self-care formed confidence within the patient to continue practicing self-care.

"Before, I used to carry my grandchild, but now I limit myself. If I feel tired, I just rest." (P4, HF NYHA III, CAD).

"Now, I'm just normal, like a regular person. But I am reminded by the doctor not to do heavy work, when working, if I am tired, just stop. Leave it, continue tomorrow. Until now, I've been doing that consciously." (P18, HF NYHA III, CAD)

Theme 4: Adoption of New Healthy Behaviors as Heart Failure Patients

Participants endeavored to develop individualized self-care strategies according to their respective needs and conditions. Upon finding them suitable and experiencing their benefits, participants would adopt them as new healthy behaviors as heart failure patients. The adoption of new healthy behaviors was supported by two categories, namely; efforts to develop self-care strategies and engaging in new healthy behaviors as heart failure patients independently.

Category 7: Efforts to develop self-care strategies (subcategories; strive to develop individual strategies and devise methods to conduct self-care)

Participants developed individual strategies according to the conditions and abilities they possessed to support the success of self-care implementation at home. Participants also utilized available equipment and technology to support more effective implementation of self-care. Participants used the alarm on their mobile phones as reminders for hospital appointments and scheduling medication intake.

"I never take the medication that makes me urinate on Fridays; otherwise, I might not be able to go to the mosque. I only take it after returning from the mosque." (P11, HF NYHA III, CAD & HT).

"I use an alarm clock, so my phone must always be near me. I carry my phone everywhere I go, even while working at home. I always have it with me so. I will not forget to take the medication. I write down my check-up schedule on the calendar at home, so I won't forget about it." (P16, HF NYHA III, Valve Abnormality).

Category 8: Engaging in new healthy behaviors as heart failure patients independently (subcategories; actively take on the role and self-care becomes the daily lifestyle pattern).

Participants actively assumed the role to continuously maintain their condition stable despite experiencing heart failure. This new role gradually formed a new healthy behavior as heart failure patients. This condition became the goal of self-care to adapt to their new role as heart failure patients.

"If I go somewhere, I always bring my medication. My bag always contains medicine. So, if it's time to take medication, I can do it." (P10, HF NYHA II, CAD).

"Now, I consistently take my medication, it's part of my effort. I also participate in neighborhood exercise sessions. So, I have a routine agenda every day, a set routine agenda. Do not dwell on it, do not let the disease consume your thoughts. They say a second attack could be fatal. This is the best for me right now." (P17, HF NYHA III, CAD)

Discussions

Theme 1: Patients' perception of heart failure diagnosis

Being diagnosed with heart failure is a severe and challenging condition for patients. The first theme identified in this qualitative study is "Patients' perception of heart failure diagnosis," which includes "Transitioning into a heart failure patient" and "Recognizing the need for self-care." The interview results depicted the condition of patients newly diagnosed with heart failure, where they often denied and disregarded the self-care recommendations provided. Previous studies (Fry *et al.*, 2016b; Son, Lee and Kim, 2019; Nordfonn, Morken and Lunde Husebø, 2020)have shown similar results where participants denied their heart failure condition as a form of coping mechanism. The presence of severe, disruptive, and fluctuating symptoms of heart failure made participants realize the need for adjustment and self-care. The presence of these heart failure symptoms could serve as motivation for patients to feel compelled to engage in self-care (Riegel et al., 2019; Riegel et al., 2021).

As one of the healthcare professionals responsible for preparing patients for self-care at home, nurses need to conduct assessments to evaluate patients' perspectives on their experienced heart failure condition. This point is crucial as it forms the basis for patients to continue the self-care process at home. Misconceptions about their heart failure condition would result in the failure of self-care implementation at home and trigger readmission for patients. Nurses are responsible for shaping patients' accurate perceptions of their experienced heart failure.

Theme 2: Efforts in self-care

The second theme identified in this qualitative study was "Efforts in self-care," which comprised two categories: "Seeking information and heart failure therapy" and "Facilitators and barriers in seeking information regarding self-care." This theme depicted the efforts made by heart failure patients to seek valid information about their condition. It also discussed the conditions that supported and hindered patients' information-seeking activities. Previous studies (Koirala *et al.*, 2018) have shown that the presence of perceived heart failure symptoms in patients is a strong predictor of patients engaging in self-care. A good understanding of the condition through increased literacy about heart failure medication has been proven effective in improving medication adherence. The qualitative study conducted by Sedlar, Lainscak and Farkas (2020) showed similar findings to this study regarding the lack of collaboration between healthcare professionals and patients.

The involvement of professional healthcare personnel is crucial in facilitating patients' efforts toward self-care. Nurses are obligated to provide valid information sources that can serve as a guide for patients to carry out self-care at home. Therefore, nurses need to assess patients' knowledge and understanding of their heart failure condition before they are discharged from the hospital. A good understanding and knowledge from patients should ideally be one of the indicators for discharging patients from the hospital.

Theme 3: Readiness for self-care

The third theme, "readiness for self-care," comprised of two categories: "social support and belief in engaging in self-care at home" and "self-confidence in engaging in self-care at home," demonstrates one's confidence in initiating self-care at home. Achieving patient readiness for self-care necessitates support from individuals surrounding the patient, such as family members who will play a role as family caregivers. Support from family, professional healthcare personnel, and friends is crucial in shaping the patient's self-confidence in commencing self-care at home. The confidence of heart failure patients acts as a mediating factor in the formation of self-care maintenance and management (Jiang *et al.*, 2023). Social support exhibits a significant association with self-care confidence in heart failure patients (Fivecoat, Sayers and Riegel, 2018) and positively correlates with self-care confidence and self-care behaviors, as demonstrated consistently in the research (Graven and Grant, 2014; Vellone et al., 2015;2016; Koirala et al., 2020; Massouh et al., 2020).

Fatigue and shortness of breath resulting from symptoms of heart failure makes patients have difficulty performing self-care efforts without assistance from caregivers. Nurses need to identify the presence of caregivers around the patient to help continue self-care after returning home. Moreover, nurses also need to assess the patients' self-confidence in continuing the care program at home. The self-care program for heart failure patients should not only involve the patients themselves but also their families as caregivers. This needs to be done to ensure the continuation of the patient care program after returning home.

Theme 4: Adoption of new healthy behaviors as heart failure patients

The fourth theme identified from this interview is the “adoption of new healthy behaviors as heart failure patients,” which was formed from two categories: "efforts to develop self-care strategies" and "engaging in new healthy behaviors as heart failure patients independently" as the expected output from patients engaging in self-care for heart failure. The patients began to develop independent strategies according to their needs to continue their self-care in line with their condition. Heart failure patients exhibited better self-management when they were activated, regardless of their literacy or knowledge about their condition (Jacobson et al., 2018).

Heart failure patients require adaptation and formation of new healthy behaviors to maintain stability. They must take medication for the rest of their lives and change behaviors to stay healthy. Nurses need to assist patients in identifying individual strategies and reinforcing new healthy behaviors as heart failure patients. This is necessary to ensure the formation of new healthy behaviors as heart failure patients

The findings of this research offer practical insights into understanding the process of developing self-care behaviors as part of the transition toward new healthy behaviors among heart failure patients. The phenomenon depicted in this research enriches nurses’ understanding in supporting the implementation of self-care at home. One limitation of this research is that the data may not encompass all aspects of the experiences related to self-care among heart failure patients. The participants were drawn from a single hospital in Malang City, which could be a limitation due to variations in the availability of educational resources across different hospitals.

Conclusion

The findings of this research emphasize the crucial role of patient acceptance regarding their heart failure condition to initiate the self-care process. Based on these findings, patients should obtain information from healthcare professionals or other reliable sources. The themes highlighted in this study underscore the significance of support for patients, particularly from professional healthcare providers, in facilitating self-care. These research findings can contribute to the development of tailored self-care programs to improve outcomes for heart failure patients, especially in Indonesia.

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Conflict of interest

The authors declare no conflict of interest.

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References

Agarwal, M. A., Fonarow, G. C. and Ziaeian, B. (2021a) 'National Trends in Heart Failure Hospitalizations and Readmissions from 2010 to 2017', *JAMA Cardiology*, 6(8), pp. 952–956. doi: 10.1001/jamacardio.2020.7472.

Agarwal, M. A., Fonarow, G. C. and Ziaeian, B. (2021b) 'National Trends in Heart Failure Hospitalizations and Readmissions from 2010 to 2017', *JAMA Cardiology*, 6(8), pp. 952–956. doi: 10.1001/jamacardio.2020.7472.

Attaallah, S., Klymko, K. and Hopp, F. P. (2016) 'Self-Care Among Older Adults With Heart Failure', *Gerontology and Geriatric Medicine*, 2, p. 233372141668401. doi: 10.1177/2333721416684013.

Chae, S. *et al.* (2022) 'Factors associated with poor self-management documented in home health care narrative notes for patients with heart failure', *Heart and Lung*, 55, pp. 148–154. doi: 10.1016/j.hrtlng.2022.05.004.

Chamberlain, L. (2017) 'Perceived social support and self-care in patients hospitalized with heart failure', *European Journal of Cardiovascular Nursing*, 16(8), pp. 753–761. doi: 10.1177/1474515117715842.

Farmer, S. A. *et al.* (2016) 'Patient, Caregiver, and Physician Work in Heart Failure Disease Management: A Qualitative Study of Issues That Undermine Wellness', *Mayo Clinic Proceedings*, 91(8), pp. 1056–1065. doi: 10.1016/j.mayocp.2016.05.016.

Fivecoat, H. C., Sayers, S. L. and Riegel, B. (2018) 'Social support predicts self-care confidence in patients with heart failure', *European Journal of Cardiovascular Nursing*, 17(7), pp. 598–604. doi: 10.1177/1474515118762800.

Fry, M. *et al.* (2016a) 'The implications of living with heart failure; The impact on everyday life, family support, co-morbidities and access to healthcare: A secondary qualitative analysis', *BMC Family Practice*, 17(1). doi: 10.1186/s12875-016-0537-5.

Fry, M. *et al.* (2016b) 'The implications of living with heart failure; The impact on everyday life, family support, co-morbidities and access to healthcare: A secondary qualitative analysis', *BMC Family Practice*, 17(1). doi: 10.1186/s12875-016-0537-5.

Graneheim, U. H., Lindgren, B.-M. and Lundman, B. (2017) 'Methodological challenges in qualitative content analysis: A discussion paper', *Nurse Education Today*, 56, pp. 29–34. doi: 10.1016/j.nedt.2017.06.002.

Graven, L. J. and Grant, J. S. (2014) 'Social support and self-care behaviors in individuals with heart failure: An integrative review', *International Journal of Nursing Studies*, pp. 320–333. doi: 10.1016/j.ijnurstu.2013.06.013.

Hashimoto, S. *et al.* (2023) 'Confidence in self-care after heart failure hospitalization', *Journal of Cardiology*, 81(1), pp. 42–48. doi: 10.1016/j.jjcc.2022.10.001.

Jaarsma, T. *et al.* (2013) 'Comparison of self-care behaviors of heart failure patients in 15 countries worldwide', *Patient Education and Counseling*, 92(1), pp. 114–120. doi: 10.1016/j.pec.2013.02.017.

Jaarsma, T. *et al.* (2017) 'Factors Related to Self-Care in Heart Failure Patients According to the Middle-Range Theory of Self-Care of Chronic Illness: a Literature Update', *Current Heart Failure Reports*. Current Science Inc., pp. 71–77. doi: 10.1007/s11897-017-0324-1.

Jaarsma, T. *et al.* (2020) 'Status of theory use in self-care research', *International Journal of Environmental Research and Public Health*. MDPI AG, pp. 1–13. doi: 10.3390/ijerph17249480.

Jacobson, A. F. *et al.* (2018) 'Patient activation, knowledge, and health literacy association with self-management behaviors in persons with heart failure', *Heart and Lung*, 47(5), pp. 447–451. doi: 10.1016/j.hrtlng.2018.05.021.

Jiang, Y. *et al.* (2023) 'Relationships of person-related, problem-related, and environment-related factors to self-care behaviours and the mediating role of self-confidence among patients with heart failure: Cross-sectional analysis of structural equation modelling', *International Journal of Nursing Studies*, 147. doi: 10.1016/j.ijnurstu.2023.104590.

Jiang, Y. and Wang, W. (2021) 'Health promotion and self-management among patients with chronic heart failure', in *Health Promotion in Health Care - Vital Theories and Research*. Springer International Publishing, pp. 269–285. doi: 10.1007/978-3-030-63135-2_19.

Kessing, D. *et al.* (2017) 'Self-care and health-related quality of life in chronic heart failure: A longitudinal analysis', *European Journal of Cardiovascular Nursing*, 16(7), pp. 605–613. doi: 10.1177/1474515117702021.

Kim, H. and Cho, M. K. (2021) 'Factors influencing self-care behavior and treatment adherence in hemodialysis patients', *International Journal of Environmental Research and Public Health*, 18(24). doi: 10.3390/ijerph182412934.

Koirala, B. *et al.* (2018) 'Factors affecting heart failure self-care: An integrative review', *Heart and Lung*. Mosby Inc., pp. 539–545. doi: 10.1016/j.hrtlng.2018.09.004.

Koirala, B. *et al.* (2020) 'Heart failure self-care, factors influencing self-care and the relationship with health-related quality of life: A cross-sectional observational study', *Heliyon*, 6(2). doi: 10.1016/j.heliyon.2020.e03412.

Lam, C. S. P. *et al.* (2016) 'Regional and ethnic differences among patients with heart failure in Asia: The Asian sudden cardiac death in heart failure registry', *European Heart Journal*, 37(41), pp. 3141–3153. doi: 10.1093/eurheartj/ehw331.

Lindgren, B. M., Lundman, B. and Graneheim, U. H. (2020) 'Abstraction and interpretation during the qualitative content analysis process', *International Journal of Nursing Studies*. Elsevier Ltd. doi: 10.1016/j.ijnurstu.2020.103632.

MacDonald, M. R. *et al.* (2020) 'Regional Variation of Mortality in Heart Failure With Reduced and Preserved Ejection Fraction Across Asia: Outcomes in the ASIAN-HF Registry', *Journal of the American Heart Association*, 9(1). doi: 10.1161/JAHA.119.012199.

Massouh, A. *et al.* (2020) 'Self-care confidence mediates self-care maintenance and management in patients with heart failure', *Heart and Lung*, 49(1), pp. 30–35. doi: 10.1016/j.hrtlng.2019.07.008.

Miles, M. and Huberman, A. (1994) *Qualitative Data Analysis: An Expanded Sourcebook*. 2nd Ed. Thousand Oaks, CA, USA: Sage Publications.

Nordfonn, O. K., Morken, I. M. and Lunde Husebø, A. M. (2020) 'A qualitative study of living with the burden from heart failure treatment: Exploring the patient capacity for self-care', *Nursing Open*, 7(3), pp. 804–813. doi: 10.1002/nop2.455.

Patrick, M. *et al.* (2022) 'Anxiety and depression moderate the relationship between quality of life and self-care in patients with heart failure', *Geriatric Nursing*, 44, pp. 54–59. doi: 10.1016/j.gerinurse.2021.12.020.

Reyes, E. B. *et al.* (2016) 'Heart failure across Asia: Same healthcare burden but differences in organization of care', *International Journal of Cardiology*. Elsevier Ireland Ltd, pp. 163–167. doi: 10.1016/j.ijcard.2016.07.256.

Riegel, B. *et al.* (2019) 'Integrating symptoms into the middle-range theory of self-care of chronic illness', *Advances in Nursing Science*. Lippincott Williams and Wilkins, pp. 206–215. doi: 10.1097/ANS.0000000000000237.

Riegel, B *et al.* (2021) *Integrating Symptoms Into the Middle-Range Theory of Self-Care of Chronic Illness*, *Editorial / International Journal of Nursing Studies*.

Riegel, Barbara *et al.* (2021) 'Self-care research: Where are we now? Where are we going?', *International Journal of Nursing Studies*, 116. doi: 10.1016/j.ijnurstu.2019.103402.

Riegel, B., Dickson, V. V. and Faulkner, K. M. (2016) 'The situation-specific theory of heart failure self-care revised and updated', *Journal of Cardiovascular Nursing*, 31(3), pp. 226–235. doi: 10.1097/JCN.0000000000000244.

Savarese, G. *et al.* (2023) 'Global burden of heart failure: a comprehensive and updated review of epidemiology', *Cardiovascular research*. NLM (Medline), pp. 3272–3287. doi: 10.1093/cvr/cvac013.

Sedlar, N., Lainscak, M. and Farkas, J. (2020) 'Living with chronic heart failure: Exploring patient, informal caregiver, and healthcare professional perceptions', *International Journal of Environmental Research and Public Health*, 17(8). doi: 10.3390/ijerph17082666.

Son, Y. J., Lee, Y. M. and Kim, E. Y. (2019) 'How do patients develop self-care behaviors to live well with heart failure?: A focus group interview study', *Collegian*, 26(4), pp. 448–456. doi: 10.1016/j.colegn.2018.12.004.

Speziale, H. Streubert. and Carpenter, D. Rinaldi. (2011) *Qualitative research in nursing : advancing the humanistic imperative*. Wolters Kluwer Health/Lippincott Williams & Wilkins.

Su, H. *et al.* (2023) 'The Lived Experience of Frailty in Patients Aged 60 Years and Older with Heart Failure: A Qualitative Study', *Asian Nursing Research*, 17(4), pp. 191–199. doi: 10.1016/j.anr.2023.07.002.

Vellone, E. *et al.* (2015) 'Self-care confidence may be the key: A cross-sectional study on the association between cognition and self-care behaviors in adults with heart failure', *International Journal of Nursing Studies*, 52(11), pp. 1705–1713. doi: 10.1016/j.ijnurstu.2015.06.013.

Vellone, E. *et al.* (2016) 'Self-care confidence may be more important than cognition to influence self-care behaviors in adults with heart failure: Testing a mediation model', *International Journal of Nursing Studies*, 60, pp. 191–199. doi: 10.1016/j.ijnurstu.2016.04.016.

White, M. F., Kirschner, J. and Hamilton, M. A. (2014) 'Self-care guide for the heart failure patient', *Circulation*, 129(3). doi: 10.1161/CIRCULATIONAHA.113.003991.

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ORIGINAL ARTICLE

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Perceived implementation of patient safety compliance among nursing supervisors in military hospitals: a descriptive qualitative study

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ABSTRACT

Introduction: Patient safety incidents remain high in Indonesia and are a significant responsibility of nursing supervisors working in military hospitals. The purpose of this study was to explore the understanding and perception of nursing supervisors in implementing patient safety compliance in military hospitals.

Methods: A descriptive qualitative approach was conducted with nursing supervisors at a military hospital through in-depth interviews. A total of 25 nursing supervisors from military hospitals participated in the interviews. The content analysis was employed to analyze the interview data.

Results: Five themes were identified in this study: patient safety as our responsibility, implementation in practice, support in safety initiatives, barriers to safety goals, and tech-driven safety efficiency.

Conclusions: The findings underscore that an in-depth understanding by nursing supervisors is critical to fostering appropriate behavior, particularly in achieving patient safety goals. Nursing supervisors articulated expectations for improvements in healthcare quality. As healthcare professionals, nursing supervisors must grasp the significance of a patient safety approach and be adept at executing it to enhance the quality of care, which will, in turn, lead to better healthcare outcomes.

Keywords: compliance, military hospital, nursing supervisor, patient safety.

Introduction

Patient safety incidents in Indonesia remain high (Larasati and Dhamanti, 2021). Although there are 2,877 accredited hospitals in Indonesia, the incidence of patient safety incidents is still 12 %, totaling 7,465 reports (Dhamanti *et al.*, 2021). This figure comprises 38% near-missed events (NMEs), 31% no-harm events (NHEs), and 31% adverse events (AEs) (Tuck et al., 2014; Wau and Purba, 2019; Toyo *et al.*, 2022). One of the primary causes of the high incidence of patient safety incidents is the lack of awareness among nursing supervisors regarding Standard Operating Procedures (SOPs) for patient safety. This issue is compounded by their motivation (both internal and external) and the lack of adequate rewards or recognition by nursing supervisors (Pramesona *et al.*, 2023). Implementing the nursing services of SOP is essentially part of individual performance and workplace behavior. According to Meinarno and Sarwono (2018), compliance means adhering to applicable orders or regulations and is the

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starting point for changing individual attitudes and behavior.

Military nursing supervisors have different responsibilities than civilian nursing supervisors because they are essential in crisis situations. Often called upon to respond to natural disasters or epidemics to save lives (Michaud *et al.*, 2019), they play a dual role as military officers and nursing supervisors (Butler, 2017) The scope of practice for military Nursing supervisors working in general hospitals encompasses not only routine nursing duties but also military missions. Military nursing is characterized by trauma-centered care for patients of all ages, as well as challenging conditions, including potential physical and psychological dangers (Goodman *et al.*, 2013; Elliott, 2015; Butler, 2017; Conlon et al., 2019). This unstable healthcare environment and demanding operational requirements increase the burden on military nursing supervisors (Heideveld-Chevalking *et al.*, 2018). Even when working in general hospitals, military nursing supervisors require competencies to thrive in this environment. Military nursing competencies include clinical nursing competencies, operational nursing competencies, soldier or survival skills, personal, physical, or psychosocial stress, leadership and administrative support, and group integration and identification (Reineck *et al.*, 2018).

Patient safety incidents can lead to adverse outcomes, including death, bodily function impairment, financial loss, and decreased public trust in hospitals (Lazar, Fleischut and Regan, 2013). The World Health Organization (WHO) reported that patient safety incidents (PSI) in the United States cause the deaths of 1.5 million people each year due to unsafe injections alone (World Health Organization, 2019). The same publication noted that approximately one in every patient was harmed while receiving hospital care. The Joint Commission International (JCI) and the WHO reported that some countries have up to a 70% error rate in drug administration (The Joint Commission, 2024).

In Indonesia, according to the Report of the Ministry of Health of Indonesia there were 189 incidents were found in 289 reports in 2015, the incidents have increased from 2020 (Kemenkes, 2020). Indonesian studies on Standard Operational Procedure (SOP) compliance regarding nursing supervisors' performance or work outcomes in providing nursing care have been conducted by Lestari (2016) and Fikri et al. (2022). They stated that a nursing manager can provide external motivation through rewards to nursing staffs for implementing SOP, in this case, patient safety SOP (Fikri, Rizany and Setiawan, 2022). Additionally, internalization processes need to be reinforced to produce work motivation and a high commitment to safety-based care, as reported in the research where compliance pressure, motivation, and commitment are determinants of nursing supervisors' compliance in implementing patient safety SOP (Lestari, 2016).

In the preliminary observation by researcher at a military hospital it was identified that the implementation of patient’s safety standards has not been implemented optimally. However, there were no research that explore the experiences of military nursing supervisors in patient safety compliance. The purpose of this study was to explore the understanding and perception of nursing supervisor in implementing patient safety compliance at the military hospital.

Materials and Methods

Research Design

The research design is a descriptive qualitative study (Creswell and Creswell, 2018) using one to one interviews. The study design adhered to the guidelines outlined in the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong, Sainsbury and Craig, 2007).

Settings

This study was carried out at the military hospital in Jakarta, Indonesia. Participants in this study were nurses who serving as a head nurse in a military hospital, having at least five years of experience as a head nurse, and having completed certified patient safety training.

Participants selection

In total, based on data saturation, it was found that 25 participants satisfied the requirements for inclusion. The purposive sampling method was used in the recruitment of the participants. The inclusion criteria of the participants consisted of: (1) serving as a head nurse in a military hospital, (2) having at least five years of experience as a head nurse, and (3) having completed certified patient safety training.

Data Collection

Data collection involved one-on-one interviews with the nursing supervisors, lasting approximately 30 to 45 minutes each between August and September 2023. The interviews concluded when no new topics emerged that were relevant to the research purpose (Saunders *et al.*, 2018).

Eligible nursing supervisors were contacted to determine their willingness to participate in this study. Those willing were then provided with an explanation of the study's purpose, signed informed consent after receiving this explanation, and were assured of the study's confidentiality. They were informed that they could withdraw at any time. Participant observations were taken during and after each interview and discussion, describing the circumstances under which the interviews were conducted, as well as immediate impressions of the interactions and the overall dynamics between the interviewer and the nursing supervisors. The interview guidelines were utilized to explore the nursing supervisors' roles and experiences in implementing patient safety compliance. These guidelines were strategically structured, drawing insights from a predefined framework centered around the domains of perception, experience, and expectations.

The interview protocol encompassed a series of questions were asked about patient safety goals in military hospital to the nursing supervisor, these questions were followed by guidelines questions: (1) background information including age, gender, education levels, work experience and patient safety certificate training; (2) understanding and feeling of nursing supervisor (3) actions undertaken; (4) support received; (5) barrier faced; and, (6) expectations in implementing patient safety goals in military hospitals.

Ethical Consideration

The Ethics Committee of the Faculty of Nursing, University of Indonesia gave its clearance for this study (reference numbers: Ket-0192/UN2.F12.D1.2.1/ PPM.00.02/2023). The hospital where the study was conducted also granted clearance for the research. Participants who completed the requirements received an explanation of the research's goals, methods, drawbacks, risks, advantages, confidentiality, and voluntary involvement. In order to participate in this study, participants were then required to sign a written consent form. All information was kept private and published anonymously using a code that only the researchers knew (eg, P1 for participants number 1).

Data analysis

Wording and questions were changed based on the nursing supervisors' answers to maintain continuity and flow and to encourage interviewees to speak openly. Data saturation was discussed with the research team after each transcription and translation was completed. The interviews and discussions were anonymized and transferred to specialized software for the organization and management of qualitative data (Neringa Kalpokas, 2023). The analysis was conducted by the researcher (DS, SS), using the content analysis method by Graneheim and Lundman (2004).

The transcript of the interview results was carried out by the interviewing author into Microsoft Word and appraised by other authors who were interviewed to ensure the accuracy of the transcript. Based on transcripts, data coding and analysis were conducted by two authors. The data were analyzed using Colaizzi's seven-step method approach was used as a step to analyzed the data (Creswell and Creswell, 2018), This included the following steps: 1) reading and re-reading transcripts from participants recordings; 2) looking into noteworthy remarks that were relevant to the phenomenon; and 3) characterizing and classifying each meaning, 4) compiling all the essential ideas that were repeated, 5) developing and articulating the meaning of the words received, 6) incorporating and categorizing the same meaning into the topics, and 7) giving the results back to the participants for validation. In the verification phase, all authors verified the data to get the true meaning of this study's results and agree with the data analysis results. All textual data, including themes, were translated into English from the Indonesian.

This strategy consisted of listening, transcribing of each interview and discussion, and identifying keywords. The next stage of analysis was discussed by identifying categories of related keywords and followed by formulating the themes from the appropriate categories related to perceived barriers among nursing supervisors in implementing patient safety compliance in military hospital.

Trustworthiness

The trustworthiness and credibility of the results were enhanced through a member-checking process, the completion of an audit trail, and an investigator triangulation strategy (Carter *et al.*, 2014). The member-checking process involved an in-person group meeting discussion to confirm the results and interpretations generated during the first analytic stage with some of the study's nursing supervisors. All our analytic decisions can be traced back through an audit trail, composed of a series of Word, Excel, and PowerPoint documents. This process was repeated to ensure the accuracy and validity of our findings. Furthermore, our analytic strategy incorporated perspectives from different researchers in an effort to ensure the convergence of final interpretations.

Table 1. Demographics Characteristics of Nursing supervisors (n=25)

Code	Gender	Age (years)	Education Levels	Work Experience (years)	Certified Patient Safety Training (year)
P1	Female	41	Bachelor	10	First
P2	Female	53	Bachelor	17	First
P3	Female	51	Bachelor	16	First
P4	Female	50	Bachelor	15	First
P5	Female	50	Bachelor	16	First
P6	Female	45	Bachelor	12	Second
P7	Female	49	Bachelor	14	First
P8	Male	47	Bachelor	15	First
P9	Female	35	Bachelor	5	First
P10	Female	32	D3 in Nursing	5	First
P11	Female	44	Bachelor	10	First
P12	Female	52	D3 in Nursing	15	Third
P13	Female	49	Bachelor	15	First
P14	Female	44	Bachelor	10	First
P15	Female	45	Bachelor	10	First
P16	Female	45	Bachelor	10	First
P17	Female	50	Bachelor	15	First
P18	Female	45	D3 in Nursing	10	First
P19	Male	39	Bachelor	9	First
P20	Male	45	Bachelor	13	First
P21	Female	53	D3 in Nursing	10	First
P22	Female	43	Bachelor	12	First
P23	Female	45	Bachelor	13	First
P24	Female	40	Bachelor	10	First
P25	Female	51	D3 in Nursing	16	Third

Results

Demographics and Characteristics of Nursing supervisors

The findings were extracted from the analysis of 25 in-depth individual interviews. The obtained data, as illustrated in Table 1, provide a comprehensive overview of the nursing supervisors' demographics and their certified patient safety training. The age range is from 32 to 55 years, reflecting diversity in age distribution. The gender representation included both males and females, offering an unequal representation (21 female and 4 male). The duration of work experience among the nursing supervisors varied from 4 to 20 years. The duration of certified patient safety training was diverse, with one and two years being the most common lengths of certified training.

The Qualitative data analysis identified themes and sub-themes from thematic content, with keywords generated from one-on-one interviews, forming 15 categories. These sub-themes were grouped into five main themes. A comprehensive illustration of these themes and sub-themes is presented in Table 2 for reference. This categorization provides a coherent framework for understanding the multifaceted aspects of perceived patient safety implementation among nursing supervisors in a military hospital.

Theme 1 Patient safety as our responsibility.

This theme is supported by four categories. Nursing supervisors expressed that patient safety was a nursing supervisor’s behavior to prevent injuries and accidents to patients. Theme One emphasizes that nursing supervisors view patient safety as a fundamental responsibility, focusing on proactive behaviors and

Table 2: Themes and categories

Themes	Categories
Patient safety as our responsibility	Prevention of injuries and accidents
	The nursing care system is safe and prevents infection
	Reduce patient requiring hospitalization
	Nurse’s Responsibility
Implementation in practice	Nursing supervisors implemented six patient safety goals
	Nursing supervisors implemented five patient safety goals
	Nursing supervisors implemented four patient safety goals or less
Support in safety initiatives	Infrastructure support
	Health material, medical equipment support and emergency medicine support
	Training and education support
Barriers to safety goals	Limited of sterile gloves
	Delayed in emergency medication
	Limited of medical device resources
Tech-driven safety efficiency	Expectation that patient safety goals are achieved; patient satisfaction is high and increasing, the quality of health services is getting better
	Patient safety will become easier, more effective and more efficient by using technology applications.

adherence to protocols to prevent injuries and ensure safe patient care. The example of statements below explained this.

"Patient safety is the behavior of nursing supervisors aimed at preventing anything that could injure or harm patient accidents to patients." (P1).

"Patient safety is the behavior of nursing supervisors to prevent injuries and accidents to patients, by always washing their hands before and after carrying out nursing actions and following hospital standards operational procedures." (P19).

"The behavior of nursing supervisors or health workers in hospitals is to prevent something or that could harm patients and accidents to the patient in implementing the six patient safety goals." (P24).

"Patient safety is the behavior of nursing supervisors aimed at preventing anything that could injure or harm patient accidents to patients." (P6)

"Patient safety is a system that makes nursing care safer and reduces the risk of hazards." (P15).

"I feel responsible for implementing patient safety." (P25).

Theme 2 Implementation in practice.

Theme two, "Implementation in Practice," explores how nursing supervisors at the military hospital apply patient safety standards based on their understanding and training. It highlights their adherence to the six established patient safety goals, showcasing their practical approaches and commitment to enhancing patient safety in their daily duties. The example of their statements as follow:

"...We cannot be separated from the six patient safety goals. Identification is in the form of name, date of birth and medical record number. Then, to prevent misunderstandings in communication, we increase effective communication between the head of the room and its members, between fellow nursing supervisors, between nursing supervisors and doctors, and between Nursing supervisors and other health workers. then we carry out anamnesis vigilance again with good effective communication with the patient and, we check again what it's called, on the patient's status as well, on the patient itself, there is already a marking of the operation area, then we check again, and check again on the patient." (P2).

"...In our room there are many geriatric patients who have had strokes, the patient's most frequent actions are in bed, by looking at the patient's bracelet and communicating by calling the patient's name or asking the patient's name. family, if the patient cannot speak, give the injection by double checking with another nurse. Patients were treated for a long time and had a lot of bed rest, so many experienced decubitus. Actions taken before visiting patients include washing hands according to SOP by providing education to patients and families, preventing the risk of falls, installing bed rails, observing decubitus wounds, if the wound is little you can apply moisturizer or rub olive oil around the wound after carrying out wound care. Family tilt to the right, tilt to the left every 2 hours, and put a ring in a prominent place that has the potential to cause pressure sores, give a pressure sore or an air mattress, after the procedure we wash our hands again...." (P25).

"...For endoscopic procedures, the first is to identify the patient, make an appointment to perform the endoscopic procedure, signature informed consent, carry out effective communication by explaining and ensuring the patient fasts to prevent aspiration during the procedure. Second, before the procedure we wash our hands, then wear PPE (Personal Protective Equipment) such as masks, aprons, gloves for nursing supervisors to avoid infections obtained from patients before the procedure, and during the procedure. Third, the nurse removes the PPE, throws it in the infectious waste bin, then washes her hands. Next, raise the bed rails so that the patient does not fall after the procedure because the patient is sedated. Finally, we wash our hands again after taking steps to prevent infection..." (P13).

"...Last time I called the patient's name with a diagnosis of diabetes mellitus, high blood sugar, date of birth and I wash my hand first, checked the patient's blood pressure, and I wash my hand again then the patient visited the doctor, the patient got an insulin injection. I explained to the patient and the patient's family according to the SOP how to inject insulin." (P12).

Theme 3 Support in safety initiatives.

Nursing supervisors expressed that support from hospital management and nursing management would greatly impact on the success implementing of patient safety goals. The statements below are the example of their statements:

"If the management has prepared a running water sink, hand soap for washing hands, gloves and clothes in the hemodialysis ward, the nursing supervisors will typically use them." (P2).

"The psychiatric ward, The nursing supervisor suggested installing hazard signs and safety measures in the care room. provides suggestions for installing danger signs and safety measures in the nursing ward." (P7).

"The nursing supervisor initiated discussions with other healthcare workers and families to ensure patient safety." (P12).

Theme 4 Barriers to safety goals.

"This theme explores the significant obstacles that nursing supervisors face in implementing patient safety protocols, focusing on the scarcity of essential resources like sterile gloves and medical devices, and the impact of these shortages on timely and effective healthcare delivery. The example of nursing supervisors' statements below confirmed this situation:

"…If sterile gloves were empty in our ward, we would typically borrow to another ward…" (P8).

" I was reluctant to change the infusion because the supply of abbocath number 24 ran out ". (P11).

However, participants also voices barriers in making nursing supervisors depressed when emergency medicine stocked run out. As they stated:

"I was depressed because I had to wait until the emergency medication (dopamine and sulfas atropine) arrived from the pharmacy before I could help the patient overcome bradycardia and hypotension." (P8, P19).

Theme 5 Tech-driven safety efficiency.

Theme five explores how integrating technology into healthcare practices can enhance patient safety outcomes, increase patient satisfaction, and improve the overall efficiency and quality of health services in military hospitals. As the example of their statement:

"…We hope that patient safety goals can be achieved and patient satisfaction will be high and increase so that the quality of health services in our hospital will be better…" (P25).

This theme embodies the nursing supervisors' desire to increase accessibility, simplify procedures, and reduce waiting times in the healthcare ecosystem, reducing the workload of nursing supervisors more effectively and efficiently, reinforcing the profound impact of technology on healthcare expectations.

"My family and me can now easily register for hospitals because I'm a member of a WhatsApp group."(P21)

"Since our patients previously received accurate information from the service, we are optimistic that the information system will progress." (P131)

"In order to reduce waiting times, we believe that all hospitals will eventually employ online registration systems." (P2)

"To reduce the workload of nursing supervisors to make nursing supervisors' work more effectively and more efficiently, we believe all hospitals will eventually implement Management Information Systems." (P22)

Discussions

The first theme identified is 'Patient Safety as Our Responsibility. The nursing supervisors expressed that patient safety is their responsibility. Our findings highlight the important influence of understanding patient safety principles as the main basis for forming good behavior, especially in the implementation of patient safety goals. Research by Pelzang et al. (2020) confirms that inadequate understanding of the concept of patient safety has the potential to hinder the improvement of patient safety processes and practices in the Bhutanese healthcare system. Our findings are in line with aspects of patient safety highlighted by Chatzi & Malliarou (2023) and Zolot (2017). They stated that aspects of patient safety are routinely given to nursing supervisors so that they can increase nursing supervisors' understanding and perception of patient safety. The influence of understanding patient safety principles as the main basis for forming good behavior can increase nursing supervisors' understanding and perception of patient safety.

The second theme was about implementation in practice. The study found that most nursing supervisors implemented the patient's safety standards based on their understanding. This result aligns with research by Rizany et. al. (2019) which states that nursing supervisors in military hospitals have a strong organization, clearer responsibilities, and clear lines of command. Other research also states that patient safety is the responsibility of nursing supervisors which is divided into two, including civil responsibility and criminal responsibility (Sukendar *et al.*, 2021). In military hospitals, the responsibility of military nursing supervisors has a strong organization, clearer responsibilities, and clear lines of command, because it is based on the values of life in the military which consist of discipline (carrying out service orders with a full sense of responsibility, fostering the relationship between superiors and subordinates in harmony and mutual trust, and upholding goals in carrying out tasks), hierarchy (carrying out orders and being accountable for them and implementing them based on the chain of command), and military honor (avoiding actions that embarrass oneself, the family, the corps and the state , as well as positioning yourself as a role model for the environment) (Bramasta and Firdaus, 2023).

This study's third theme describes support in safety initiatives. The result of research found that support from leadership is important in optimizing patient safety in services. Research by Al Sawafi (2021) confirms that health service leaders must be responsible and accountable for strengthening the health service system by improving infrastructure, providing adequate support and resources, carrying out comprehensive monitoring and evaluation of patient safety. This result research is in line with study by Parand et al., (2014). They stated that managers and policies made by managers are one of the factors that influence patient safety. Other results of this study also found that support from management including providing opportunities for hand hygiene training and higher education can also increase understanding of infection prevention which will impact patient safety. Management support in providing training opportunities, such as hand hygiene and advanced education, significantly bolsters staff understanding of infection prevention—a key component in ensuring patient safety. leadership effectiveness in healthcare is not solely about policy-making or resource allocation but also involves fostering a culture of continuous learning and adherence to best practices in safety. enhancing patient safety requires a multifaceted approach by leadership. By prioritizing both structural and educational improvements within healthcare settings, leaders can create an environment that not only supports but actively promotes patient safety. This approach is integral to cultivating a healthcare system where safety protocols are not just implemented but are ingrained in the everyday practices of all healthcare professionals, thereby driving substantial improvements in patient care quality and safety standards.

This study's fourth theme describes barriers to safety goals. The main barrier in implementation of the patient's safety strategies was varied including limited facilities. This results in line with another studies by Md Vera Susiladewi et. al (2023), Guanche-Sicilia et al (2021), and Eka Safitri et. al (2023), they found that only 11.4% of nursing supervisors monitor peripheral vein cannulation using the VIP score which can cause patient safety problems. They stated that the condition of the infusion being installed for a long time due to nursing supervisors not changing it causes an increase in phlebitis. Incorrect use of medical gloves or gloves also has an impact on patient safety. Research by Lindberg & Skytt (2020) states that the continuous use of gloves during activities with patients carries the risk of transmission with ideally one gloves for each patient. Medical gloves also have a direct influence on the safety of clinical staff and patients as well as optimal performance (Zare *et al.*, 2021). Limited facilities have an impact on patient safety. The facilities used directly by nurses in providing medical care have a direct influence on optimal safety. So, the responsibility of the supervisor is very important to maintain and fulfill the facilities that will be used to provide nursing services and care.

The final theme of this study describes tech-driven safety efficiency. Research found that nursing supervisors hope to make the implementation of patient safety strategies easier, more effective, and more efficient through technology applications, which requires support and engagement from hospital management. Research by Wahyuni et al. (2023) confirms the importance of health information technology and system infrastructure components supporting digital transformation in hospitals. This result research is in line with study by Mokoagow et al. (2024). They stated that Hospital Information Systems can Minimize the complexity of health services by improving organizational efficiency through innovation-based information system development business process management, service flow automation, cost reduction, improving hospital performance, which aims to develop human resources, organizational development, and quality improvement technology to achieve hospital service efficiency. Integrating digital systems streamlines complex health services and improves organizational efficiency through innovations in business process management and service flow automation. Such technological advances not only reduce costs but also bolster hospital performance by facilitating human resource development, organizational growth, and quality improvements. This underscores the importance of hospital management's active support for technology adoption to drive significant improvements in service delivery and operational efficiency.

This study faces a limitation concerning the diversity of participants. Although the participants varied in terms of education, age, work experience, and backgrounds, this diversity may not fully represent the broader range of experiences necessary to comprehensively understand patient safety compliance implementation.

Conclusion

This study highlights the significant role of hospital and nursing management support in shaping the understanding, experiences, responsibilities, barriers, and expectations of nursing supervisors in military hospitals, emphasizing the profound effects of implementing patient safety compliance. It reveals that a deep comprehension of patient safety protocols by nursing staff is fundamental to fostering positive behaviors essential for achieving safety goals. Furthermore, the research points to the high expectations that nursing supervisors have regarding the enhancement of healthcare quality. As healthcare professionals, nursing supervisors must not only grasp but also effectively implement these patient safety approaches, thereby improving the quality of care and ultimately raising overall healthcare standards.

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Conflict of Interest

There are no potential conflicts of interest to declare.

References

Bramasta, D. bayu and Firdaus, F. (2023) *Mengenal Arti Penting Trisila TNI AL: Disiplin, Hierarki, dan Kehormatan Militer [Get to know the importance of the TNI AL Trisila: Discipline, Hierarchy and Military Honor]*, *Kompas.com tren*.

Butler, F.K. (2017) 'Tactical Combat Casualty Care: Beginnings', *Wilderness and Environmental Medicine*, 28(2), pp. S12–S17. Available at: https://doi.org/10.1016/j.wem.2016.12.004.

Carter, N. *et al.* (2014) 'The use of triangulation in qualitative research', *Oncology Nursing Forum*, 41(5), pp. 545–547. Available at: https://doi.org/10.1188/14.ONF.545-547.

Chatzi, A. V. and Malliarou, M. (2023) 'The need for a nursing specific patient safety definition, a viewpoint paper', *International Journal of Health Governance*, 28(2), pp. 108–116. Available at: https://doi.org/10.1108/IJHG-12-2022-0110.

Conlon, L., Wiechula, R. and Garlick, A. (2019) 'Hermeneutic Phenomenological Study of Military Nursing Officers', *Nursing Research*, 68(4), pp. 267–274. Available at: https://doi.org/10.1097/NNR.0000000000000342.

Creswell, J.W. and Creswell, J.D. (2018) *Research Design: Qualitative, quantitative, and mixed methods approaches*. 5th edn. Los Angeles: SAGE Publications Inc.

Dhamanti, I. *et al.* (2021) 'Factors contributing to under-reporting of patient safety incidents in Indonesia: leaders' perspectives', *F1000Research*, 10, p. 367. Available at: https://doi.org/10.12688/f1000research.51912.1.

Eka Safitri, J., Qodir, A. and Ari Kurniyanti, M. (2023) 'Hubungan Tingkat Kepatuhan Perawat Dalam Pelaksanaan Spo Pemasangan Infus Terhadap Kejadian Phlebitis Di Rs', *Media Husada Journal Of Nursing Science*, 4(1), pp. 25–35. Available at: https://doi.org/10.33475/mhjns.v4i1.118.

Elliott, B. (2015) 'Military nurses' experiences returning from war', *Journal of Advanced Nursing*, 71(5), pp. 1066–1075. Available at: https://doi.org/10.1111/jan.12588.

Fikri, M.K., Rizany, I. and Setiawan, H. (2022) 'Hubungan Motivasi Kerja dengan Kepuasan Kerja Perawat pada Masa Pandemi COVID-19 di Rawat Inap', *Jurnal Kepemimpinan dan Manajemen Keperawatan*, 5(1), pp. 38–46. Available at: https://doi.org/10.32584/jkmk.v5i1.1362.

Goodman, P. *et al.* (2013) 'Military nursing care of Iraqi patients', *Military Medicine*, 178(9), pp. 1010–1015. Available at: https://doi.org/10.7205/MILMED-D-13-00055.

Graneheim, U.H. and Lundman, B. (2004) 'Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness', *Nurse Education Today*, 24(2), pp. 105–112. Available at: https://doi.org/10.1016/j.nedt.2003.10.001.

Guanche-Sicilia, A. *et al.* (2021) 'Prevention and treatment of phlebitis secondary to the insertion of a peripheral venous catheter: A scoping review from a nursing perspective', *Healthcare (Switzerland)*, 9(5), pp. 1–24. Available at: https://doi.org/10.3390/healthcare9050611.

Heideveld-Chevalking, A.J. *et al.* (2018) 'Development and validation of a Self-assessment Instrument for Perioperative Patient Safety (SIPPS)', *BJS Open*, 2(6), pp. 381–391. Available at: https://doi.org/10.1002/bjs5.82.

Kemenkes, R. (2020) *Sistem pelaporan insiden keselamatan pasien*, *Perhimpunan Rumah Sakit Seluruh Indonesia*.

Larasati, A. and Dhamanti, I. (2021) 'Literature Review: Implementation of Patient Safety Goals in Hospitals in Indonesia', *Jurnal Media Gizi Kesehatan Masyarakat*, 10(1), pp. 138–148.

Lazar, E.J., Fleischut, P. and Regan, B.K. (2013) 'Quality measurement in healthcare', *Annual Review of Medicine*, 64, pp. 485–496. Available at: https://doi.org/10.1146/annurev-med-061511-135544.

Lestari, I. (2016) *Disertasi: Development Of Compliance Model for Nurse In Implementing Standard Procedure Operating Of Patient Safety Based On Compliance Pressure. Disertasi Thesis, Universitas Airlangga.*

Lindberg, M. and Skytt, B. (2020) 'Continued wearing of gloves: a risk behaviour in patient care', *Infection Prevention in Practice*, 2(4), p. 100091. Available at: https://doi.org/10.1016/j.infpip.2020.100091.

Md Vera Susiladewi, I.A. *et al.* (2023) 'Implementation of Intravenous Catheter Treatment to Prevent Phlebitis: A Cross-Sectional Study', *Nursing and Health Sciences Journal (NHSJ)*, 3(1), pp. 91–95. Available at: https://doi.org/10.53713/nhs.v3i1.179.

Meinarno, E.A. and Sarwono, S.W. (2018) *Psikologi Sosial*. 2nd edn. Jakarta: Salemba Humanika.

Michaud, J. *et al.* (2019) 'Militaries and global health: peace, conflict, and disaster response', *The Lancet*, 393(10168), pp. 276–286. Available at: https://doi.org/10.1016/S0140-6736(18)32838-1.

Neringa Kalpokas (2023) *Strategies for Handling Qualitative Data Management - ATLAS.ti*, *Guides*.

Pelzang, R. and Hutchinson, A.M. (2020) 'How is patient safety understood by healthcare professionals? the case of Bhutan', *Journal of Patient Safety*, 16(1), pp. 106–109. Available at: https://doi.org/10.1097/PTS.0000000000000450.

Pramesona, B.A. *et al.* (2023) 'A qualitative study of the reasons for low patient safety incident reporting among Indonesian nurses', *Revista Brasileira de Enfermagem*, 76(4), pp. 1–8. Available at: https://doi.org/10.1590/0034-7167-2022-0583.

Reineck, C. *et al.* (2018) 'Army nurse readiness instrument: psychometric evaluation and field administration.', *Military medicine*, 166(11), pp. 931–939.

Rizany, I. *et al.* (2019) 'The Impact of Nurse Scheduling Management on Nurses' Job Satisfaction in Army Hospital: A Cross-Sectional Research', *SAGE Open*, 9(2). Available at: https://doi.org/10.1177/2158244019856189.

Saputra Mokoagow, D. *et al.* (2024) 'Sistem Informasi Manajemen Rumah Sakit dalam Meningkatkan Efisiensi: Mini Literature Review', *COMSERVA : Jurnal Penelitian dan Pengabdian Masyarakat*, 3(10), pp. 4135–4144. Available at: https://doi.org/10.59141/comserva.v3i10.1223.

Saunders, B. *et al.* (2018) 'Saturation in qualitative research: exploring its conceptualization and operationalization', *Quality and Quantity*, 52(4), pp. 1893–1907. Available at: https://doi.org/10.1007/s11135-017-0574-8.

Sukendar, S. *et al.* (2021) 'Juridical Review of Nurse's Legal Responsibility for Patient Safety in Self Nursing Practice', *UNIFIKASI : Jurnal Ilmu Hukum*, 8(2), pp. 167–175. Available at: https://doi.org/10.25134/unifikasi.v8i2.2693.

The Joint Commission (2024) *National Patient Safety Goals | The Joint Commission*.

Tong, A., Sainsbury, P. and Craig, J. (2007) 'Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups', *International Journal for Quality in Health Care*, 19(6), pp. 349–357. Available at: https://doi.org/10.1093/intqhc/mzm042.

Toyo, E.M. *et al.* (2022) 'Evaluasi Sistem Pelaporan Insiden Keselamatan Pasien Dengan Metode HMN Di Rumah Sakit', *Majalah Farmasetika*, 8(1), p. 56. Available at: https://doi.org/10.24198/mfarmasetika.v8i1.41357.

Tuck, C.M., Haynie, K. and Davis, C. (2014) *Emergency Preparedness and Response in the School Setting - The Role of the School Nurse*.

Wahyuni, I. *et al.* (2023) 'Pentingnya Komponen Infrastruktur Sistem dan TIK Dalam Mendukung Transformasi Digital di Rumah Sakit', *Jurnal Sistem Informasi Kesehatan Masyarakat Journal of Information Sistems for Public Health*, VIII(3), pp. 8–17.

Wau, H. and Purba, D.I.G. (2019) 'Patient Satisfaction Reviewed from Dimension Reliability in Community Health Center', *Jurnal Medicoeticolegal dan Manajemen Rumah Sakit*, 8(3), pp. 151–157. Available at: https://doi.org/10.18196/jmmr.83101.

World Health Organization (2019) *Patient safety*.

Zare, A. *et al.* (2021) 'How do medical gloves affect manual performance? Evaluation of ergonomic indicators', *International Journal of Industrial Ergonomics*, 81(November 2020), p. 103062. Available at: https://doi.org/10.1016/j.ergon.2020.103062.

Zolot, J. (2017) 'Nurse Perception of Workplace Safety Affects Patient Care', *American Journal of Nursing*, 117(2), p. 14. Available at: https://doi.org/10.1097/01.NAJ.0000512286.71113.23.

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ORIGINAL ARTICLE

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Meta-analysis of the prevalence of restless leg syndrome and associated risk factors in chronic kidney disease patients

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ABSTRACT

Introduction: Restless legs syndrome (RLS) presents as a sleep-related issue in individuals with chronic kidney disease (CKD), contributing to heightened sleep disturbances and diminished quality of life. Consequently, this meta-analysis was conducted to assess the prevalence of RLS among CKD patients.

Methods: A comprehensive search for articles published between inception and September 2023 was conducted across CINAHL, Cochrane, Embase, Ovid-MEDLINE, PubMed, Scopus, and Web of Science databases. A Comprehensive Meta-Analysis (CMA) software version 3.0 with random effects models was used for pooled prevalence and prediction interval analysis. Heterogeneity was assessed using the I2 test and Cochran's Q-statistic. The quality of the studies was evaluated using Hoy's risk of bias. Additionally, moderator analyses were performed to investigate variations in the prevalence estimates among the included studies.

Results: A total of 97 studies were included in this meta-analysis with 315,875 participants. The pooled prevalence of RLS among CKD patients was 25% (95%CI: 20% to 32%). In terms of the demographic breakdown, the prevalence of RLS was nearly comparable in adults and children/adolescents at 25% and 21%, respectively. The prediction interval indicated a potential future RLS prevalence ranging from 1% to 88%. Notably, iron and phosphorus levels emerged as significant moderating factors influencing the prevalence of RLS.

Conclusions: Roughly 25% of individuals with chronic kidney disease (CKD) encounter restless legs syndrome (RLS). It is imperative to foster collaboration among healthcare professionals to facilitate proactive management and early assessment of RLS, thereby enhancing the overall quality of life for CKD patients.

Keywords: chronic kidney disease, meta-analysis, prevalence, renal disease, restless leg syndrome

Introduction

Patients diagnosed with chronic kidney disease (CKD) are susceptible to various sleep disorders, including conditions such as sleep apnea, insomnia, disturbed sleep, excessive daytime drowsiness, and restless leg syndrome (RLS) (Maung *et al.*, 2016, Tan *et al.*, 2022). Restless leg syndrome, also known as Willis-Ekbom Syndrome, is defined as a sensory-motor disorder marked by circadian rhythmicity. Patients frequently describe sensations of discomfort in their lower legs, such as achy, creeping, crawling, or itchy feelings, which are relieved by movement. Although symptoms of this disorder are typically heightened at night, they can occur at any time during periods of rest

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or inactivity (Novak *et al.*, 2015, Maung *et al.*, 2016). Previous meta-analyses conducted in Asian, American, and European countries revealed the prevalence of RLS in hemodialysis patients was 24% (Liu *et al.*, 2024), the prevalence of RLS in patients undergoing hemodialysis was 50% in Iranian and 30% in international databases (Ghanei Gheshlagh *et al.*, 2017), and the prevalence of RLS among CKD populations in East Mediterranean, Western Pacific, America, Europe, and Southeast Asia countries was 24.2% (Lin *et al.*, 2016). Although these prevalences are not too large, a systematic review found that RLS is two to three times more common in patients with CKD than in the general population (Safarpour *et al.*, 2023).

An imbalance in iron metabolism and dopamine neurotransmission among CKD patients is suspected as the cause of RLS (Novak *et al.,* 2015; (Maung *et al.*, 2016). Dopamine is a key neurotransmitter involved in the regulation of movement and motor control (Novak *et al.,* 2015). Additionally, electrolyte imbalances, for instance, potassium and calcium, can cause muscle cramps, restlessness, and discomfort, all of which can disrupt sleep. Furthermore, the accumulation of uremic toxins in the bloodstream can cause symptoms such as itching, restless legs, and general discomfort, making it difficult for people with CKD to get restful sleep (Maung *et al.*, 2016, Nigam *et al.*, 2018). RLS is linked to several risk factors, including female gender and alcohol users (Lin *et al.*, 2019). A meta-analysis by Lin *et al.* (2016) found that the prevalence of RLS increased with age, Kt/V or index of dialysis adequacy (dialyzer clearance of urea * dialysis time/volume of distribution of urea), and level of serum phosphate, and decreased with level of serum calcium, and hemoglobin, also associated with diabetes mellitus and hypertension. Other meta-analyses revealed no differences in gender, age, dialysis duration, body mass index (BMI), blood urea nitrogen (BUN), creatinine, albumin, phosphorus, parathyroid hormone, and calcium between dialysis patients with RLS and non-RLS (Liu *et al.*, 2024).

Previous research has confirmed that RLS in CKD is associated with increased cardiovascular risk (Chen *et al.*, 2022), increased risk of death, sleep disturbance (Novak *et al.,* 2015), and decreased health-related quality of life (HRQOL) among community-dwelling populations (Kubo *et al.*, 2016). Moreover, for hemodialysis patients grappling with RLS, the consequences are evident in elevated levels of fatigue, compromised sleep quality, heightened daily sleepiness, and symptoms of depression (Giannaki *et al.*, 2017). This emphasizes the complex implications of RLS in the context of CKD and underscores the need for comprehensive management strategies, commencing with addressing the prevalence of RLS.

Although several meta-analyses have been conducted on RLS, certain limitations were identified. These include: 1). limited moderator variables analyzed (Lin *et al.*, 2016, Ghanei Gheshlagh *et al.*, 2017, Liu *et al.*, 2024); 2). authors did not perform a moderator analysis (Kang *et al.*, 2022); 3). the search time was restricted and the meta-analysis study was not registered in the International Prospective Register of Systematic Reviews (Ghanei Gheshlagh *et al.*, 2017); 4). focused on adult CKD patients (Lin *et al.*, 2016); and 5). the inclusion of only hemodialysis patients in some analyses (Ghanei Gheshlagh *et al.*, 2017, Liu *et al.*, 2024). Therefore, our meta-analysis aims to address these gaps and build upon the existing evidence. This comprehensive examination evaluates the pooled prevalence of RLS in patients with chronic kidney disease, assesses the prevalence of RLS among children/adolescents and adults, and explores the associated risk factors for RLS.

Materials and Methods

Reporting standard

Our study adheres to the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) (Page *et al.*, 2021). This study has been registered on the international Prospective Registered Systematic Review (PROSPERO) database under the registration number (CRD42022385009) and was designed following the Cochrane collaborations.

Eligibility criteria

The criteria for inclusion of studies in this meta-analysis were as follows: (1) reporting of data derived from observational studies employing cohort, cross-sectional, and case-control designs; (2) presentation of outcomes related to RLS; and (3) inclusion of a prevalence rate. Conversely, studies were excluded if they: (1) addressed irrelevant topics; (2) utilized irrelevant study designs; (3) involved irrelevant populations; (4) were meta-analyses or reviews; (5) represented study protocols; (6) constituted non-research articles; (7) exhibited insufficient data, even after attempts to contact the study authors; and (8) included participants identical to those in another study.

Search strategy

Two researchers performed a comprehensive literature search without time and language restrictions from inception to September 2023 on the CINAHL, Cochrane, Embase, Ovid-MEDLINE, PubMed, Scopus, and Web of Science databases. Any differences were resolved through team discussion. A forward citation search was conducted to identify articles referenced in specific published studies and a backward citation search to review the reference lists of previously published systematic reviews and meta-analyses.

Furthermore, a manual search was conducted using Google Scholar to retrieve potential studies. Correspondingly, we reached out to the corresponding authors of eligible studies via email in case any information was absent from their published studies. A combination of Boolean and the following keywords were used to conduct a thorough search: Chronic Renal Insufficiency OR Chronic Kidney Disease OR kidney disease, Reltess Leg Syndrome OR Willis Ekbom Syndrome OR Wittmaack-Ekbom syndrome. The specific search terms used in each database are listed in Appendix 1.

Study selection

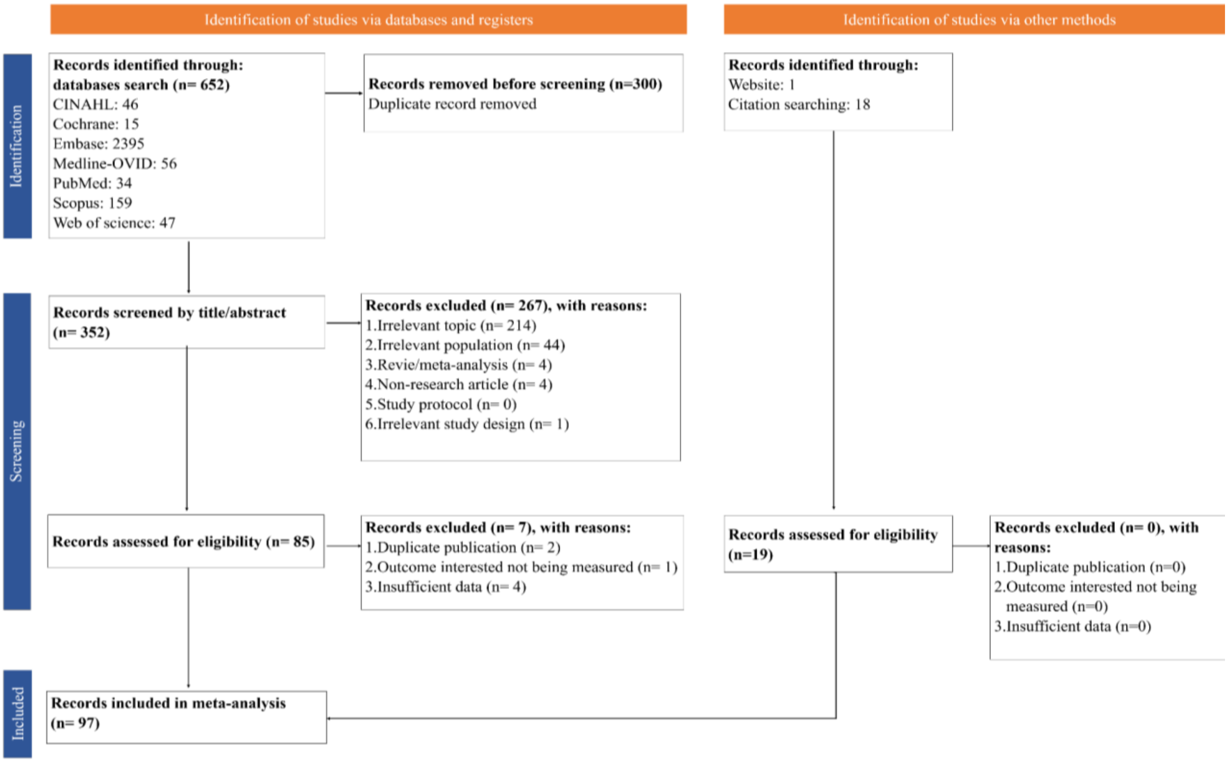
EndNote version 20.3 was employed for the comprehensive screening of studies based on inclusion and exclusion criteria through both database searches and manual searches. Manual and electronic methods were utilized to eliminate duplicate entries. Subsequently, two independent reviewers evaluated the titles and abstracts of each study to identify those eligible for full-text review. In cases where the full manuscript was not accessible, authors were contacted via email. Any inconsistencies identified during the screening process were addressed by consulting a third expert reviewer

Data extraction and risk of bias

To ensure the quality and validity of the data, two independent researchers conducted the data extraction, resolving disagreements through team discussions. The extracted data encompassed various categories, including authors, country, study design, population, sample size, RLS events, population characteristics, laboratory parameters, medical comorbidities, and other sleep problems. If data were missing from published studies, authors were contacted to ensure the incorporation of the majority of pertinent studies.

Two reviewers independently assessed the quality of all included studies using Hoy's risk of bias assessment, a tool that evaluates the internal and external validity of prevalence or incidence studies (Hoy *et al.*, 2012). This 10-item assessment tool features items 1-4, concentrating on the external validity of the study, and items 5-10, focusing on internal validity. Each item was rated with one for low risk and zero for high risk. The score was then classified as low (9-10), moderate (7-8), or high (0-6) risk of bias (Lundorff *et al.*, 2017). In the event of any data discrepancies, a third expert reviewer was consulted. Inter-rater agreement between the two reviewers was assessed using Cohen's Kappa test. Cohen proposed that the Kappa result be interpreted as

Figure 1. PRISMA flow diagram


Identification of studies via databases and registers
Identification of studies via other methods
Identification
Records identified through: databases search (n= 652)
CINAHL: 46
Cochrane: 15
Embase: 2395
Medline-OVID: 56
PubMed: 34
Scopus: 159
Web of science: 47
Records removed before screening (n=300)
Duplicate record removed
Records identified through:
Website: 1
Citation searching: 18
Screening
Records screened by title/abstract (n= 352)
Records excluded (n= 267), with reasons:
1.Irrelevant topic (n= 214)
2.Irrelevant population (n= 44)
3.Revie/meta-analysis (n= 4)
4.Non-research article (n= 4)
5.Study protocol (n= 0)
6.Irrelevant study design (n= 1)
Records assessed for eligibility (n= 85)
Records excluded (n= 7), with reasons:
1.Duplicate publication (n= 2)
2.Outcome interested not being measured (n= 1)
3.Insufficient data (n= 4)
Records assessed for eligibility (n=19)
Records excluded (n= 0), with reasons:
1.Duplicate publication (n=0)
2.Outcome interested not being measured (n=0)
3.Insufficient data (n=0)
Included
Records included in meta-analysis (n= 97)

follows: Values ≤ 0 indicate no agreement, 0.01-0.20 as none to slight, 0.21-0.40 as fair, 0.41-0.60 as moderate, 0.61-0.80 as substantial, and 0.81-1.00 as almost perfect agreement (McHugh, 2012).

Statistical analysis and assessment of publication bias

Data were analyzed using a random-effects model with Comprehensive Meta-Analysis (CMA) software version 3.0 to calculate the pooled prevalence rates. The primary results were reported in proportion format, accompanied by a 95% confidence interval (95% CI) and 95% prediction interval (95% PrI). The prediction interval signifies the range of prevalence in future studies akin to those included in the meta-analysis (IntHout *et al.*, 2016). Heterogeneity was evaluated using I^2 and Cochrane's Q-statistics, with p-values < 0.10 denoting significant statistical heterogeneity. I^2 values of 25%, 25%-75%, and 75% were categorized as minimal, moderate, and high heterogeneity, respectively (Higgins *et al.*, 2003).

When heterogeneity was present, subgroup and meta-regression analyses were employed to pinpoint moderator variables, with a p-value <0.05 indicating a significant moderator variable among groups. Additionally, sensitivity analysis was performed using sample sizes of less than 30 and a one-study-removal technique. To ensure the robustness of the study findings, the results of the sensitivity analysis were compared to those from the initial pooled prevalence analysis and scrutinized for consistency.

To evaluate the potential presence of publication bias, we depicted prevalence estimates on a funnel plot and employed Egger's regression intercept, Begg and Mazumdar rank correlation, and Kendall's tau without continuity correction. The presence of an asymmetric funnel plot with no points on one side would suggest the existence of publication bias (Ahn and Kang, 2018), while a p-value < 0.1 indicates publication bias (Peters *et al.*, 2006). In the event of detecting publication bias, the Duval and Tweedie trim and fill methods were applied for correction (Peters *et al.*, 2006).

Results

Characteristics of included studies

A thorough exploration of the literature was carried out across six electronic databases, resulting in the identification of 652 studies. Following the removal of duplicates, the remaining 352 studies underwent screening based on title and abstract, applying the previously outlined eligibility criteria. Subsequently, 85 studies met the criteria for full-text review, but seven were excluded due to reasons such as duplicate publication, absence of outcome interest measurement, or insufficient data. A manual search through the website and reference list of relevant studies revealed 18 studies from previous meta-analyses (Lin *et al.*, 2016) and one study from Google Scholar (Muzasti and Harahap, 2019) meeting the inclusion criteria and eligible for analysis. Figure 1 provides an overview of the literature identified at each stage of the procedure.

Finally, 97 studies were included in this meta-analysis with 315,875 participants in total. These studies were conducted in Asia (43 studies), Australia (1 study), Africa (5 studies), Europe (28 studies), North America (15 studies), and South America (5 studies) (Appendix 2). The percentage of females was higher than males (55.21% vs. 44.59%), the mean age was 53.22 (12.97) years, the mean BMI was 24.77 (4.61) kg/m^2, and the duration of dialysis was 51.82 (44.35) months. The study identified hyperparathyroidism (77.39%), peripheral neuropathy (69.63%), hypertension (50.09%), and diabetes mellitus (50.75%) as the most prevalent medical comorbidities. Additionally, psychological issues were observed, with anxiety and depression affecting 61.40% and 22.68% of the participants in the study, respectively. Moreover, other sleep problems experienced by CKD patients besides RLS in this study were poor sleep quality, sleepiness, insomnia, and obstructive sleep apnea (Table 1, Appendix 3).

Quality assessments and sensitivity analysis

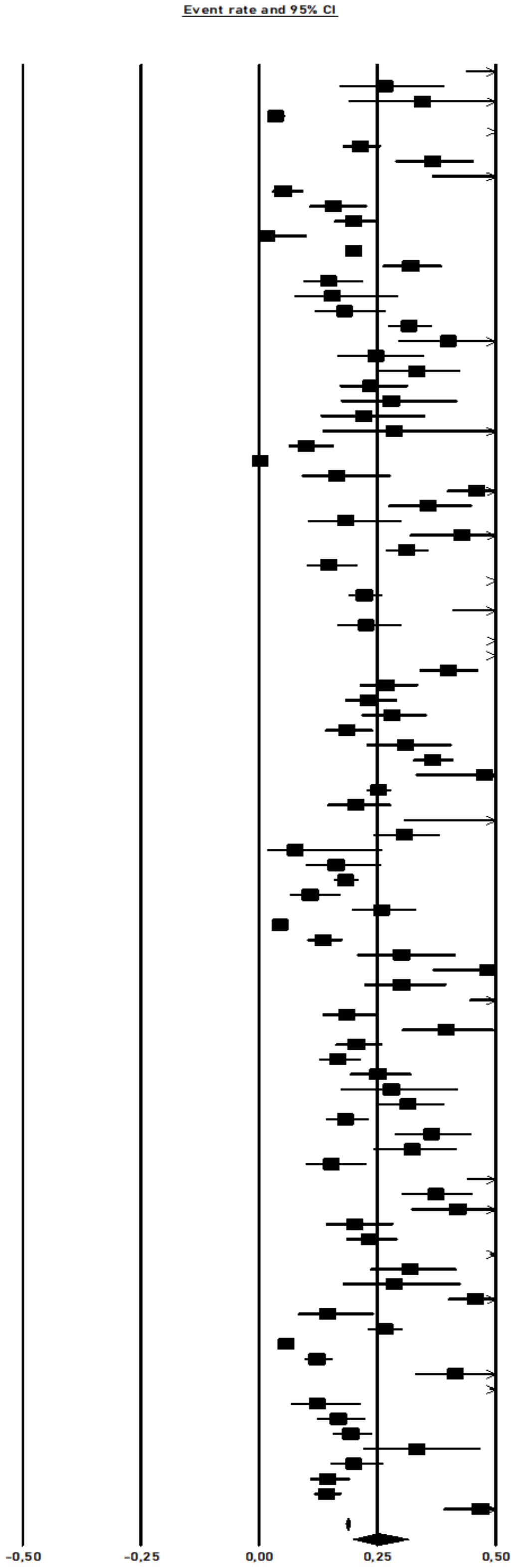
We assessed the study quality of all included studies using Hoy's risk of bias, and two raters performed the evaluation independently. We found 24 studies with low risk of bias and 73 studies with moderate risk. The Cohen's Kappa coefficient test showed almost perfect agreement between the two raters (κ = 0.85, p-value = <0.001) (Appendix 3).

Sensitivity analysis was performed based on the study sample size < 30 and the one-study removed technique. First, we independently analyzed studies with a sample size of <30. After excluding five studies with a sample size < 30, the RLS prevalence changed from 25% (95%CI: 20% to 32%) to 25% (95%CI: 19% to 31%), indicating a minor difference in the prevalence. Second, we performed a sensitivity analysis using the one-study-removed technique. Similarly, when one study was excluded, the RLS prevalence changed from 25% (95%CI: 20% to 32%) to 27% (95%CI: 24% to 29%), indicating a minor difference. Thus, the results of the current meta-analysis could be considered robust.

Meta-analysis prevalence of RLS

Figure 2. Forest plot of RLS prevalence among people with chronic kidney disease

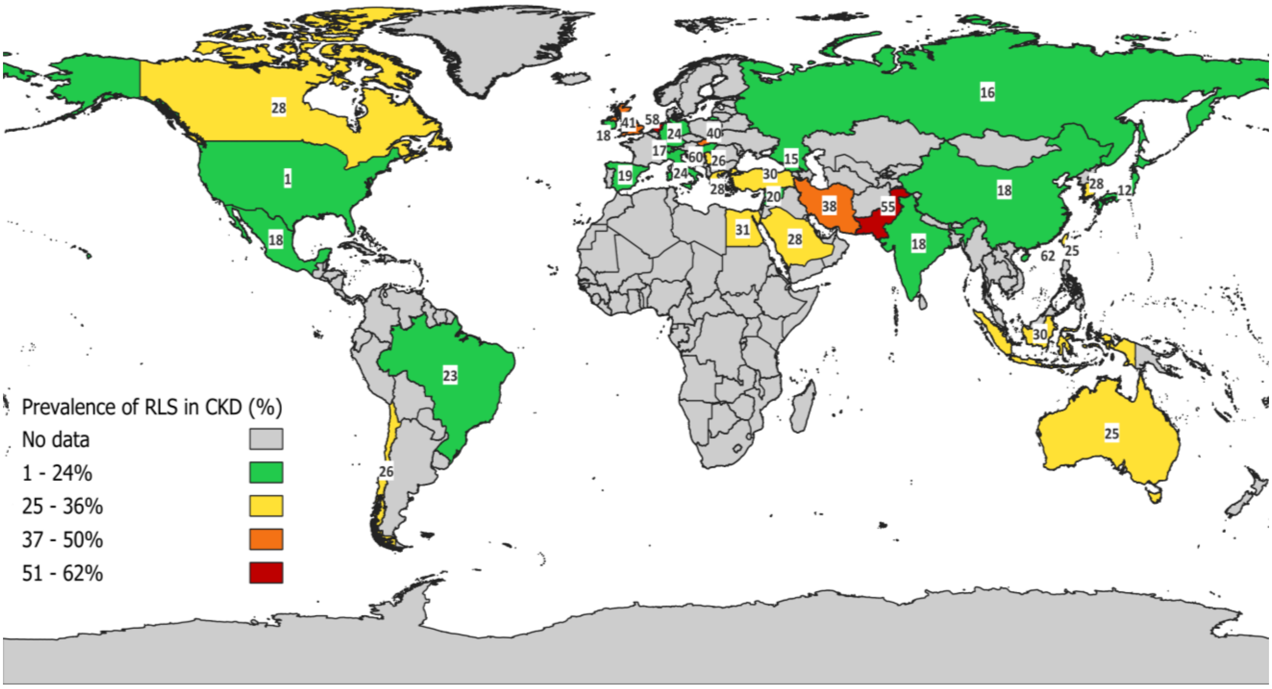
Model	Study name	Statistics for each study				
		Event rate	Lower limit	Upper limit	Z-Value	p-Value
	Al-Jahdali, H. H et al (2009)	0,50	0,44	0,57	0,07	0,95
	Alvarez-Ude et al (1999)	0,27	0,17	0,39	-3,47	0,00
	Applebee et al (2009)	0,35	0,19	0,54	-1,54	0,12
	Aritake-Okada et al (2011)	0,04	0,02	0,05	-13,82	0,00
	Amiri et al (2019)	0,67	0,58	0,75	3,64	0,00
	Araujo et al (2010)	0,22	0,18	0,26	-10,64	0,00
	Baiardi et al (2017)	0,37	0,29	0,45	-2,97	0,00
	Bambini et al (2019)	0,56	0,37	0,74	0,60	0,55
	Bathla et al (2016)	0,05	0,03	0,09	-8,97	0,00
	Beladi-Mousavi et al (2015)	0,16	0,11	0,23	-7,19	0,00
	Bhagawati et al (2019)	0,20	0,16	0,25	-9,60	0,00
	Bhowmik et al (2004)	0,02	0,00	0,10	-4,13	0,00
	Bliwise et al (2014)	0,20	0,19	0,21	-70,49	0,00
	Brzuszek et al (2022)	0,32	0,26	0,39	-5,10	0,00
	Calviño et al (2018)	0,15	0,10	0,22	-7,07	0,00
	Capelli et al (2021)	0,16	0,08	0,29	-4,11	0,00
	Castillo-Torres et al (2018)	0,18	0,12	0,27	-5,96	0,00
	Chavoshi et al (2015)	0,32	0,27	0,36	-7,10	0,00
	Chrastina et al (2015)	0,40	0,30	0,51	-1,72	0,09
	Chu et al (2014)	0,25	0,17	0,35	-4,43	0,00
	Cirignotta et al (2002)	0,33	0,25	0,42	-3,49	0,00
	Collado-Seidel et al (1998)	0,24	0,17	0,31	-5,83	0,00
	Collister et al (2019)	0,28	0,17	0,42	-3,00	0,00
	Darwish & Abdel-Nabi (2016)	0,22	0,13	0,35	-3,83	0,00
	Davis et al (2005)	0,29	0,13	0,51	-1,90	0,06
	Davis et al (2012)	0,10	0,06	0,16	-8,31	0,00
	Deferio et al (2017)	0,00	0,00	0,00	-127,64	0,00
	Deliyska et al (2011)	0,16	0,09	0,28	-4,71	0,00
	Dikici et al (2014)	0,46	0,40	0,52	-1,27	0,20
	Erdogan et al (2012),	0,36	0,27	0,45	-2,98	0,00
	Ezzat & Mohab (2015)	0,18	0,10	0,30	-4,48	0,00
	Giannaki et al (2011)	0,43	0,32	0,55	-1,19	0,23
	Gigli et al (2004)	0,31	0,27	0,36	-7,39	0,00
	Goffredo Filho et al (2003)	0,15	0,10	0,21	-8,25	0,00
	Haider & Anees (2014)	0,65	0,59	0,70	4,61	0,00
	Hamed et al (2023)	0,22	0,19	0,26	-11,85	0,00
	Hasheminasab Zaware et al (2016)	0,56	0,41	0,69	0,74	0,46
	Hsu et al (2008)	0,23	0,17	0,30	-6,29	0,00
	Hui et al (2000)	0,62	0,55	0,68	3,28	0,00
	Ibrahim & Wegdan (2011)	0,56	0,50	0,62	2,09	0,04
	Jaber et al (2011)	0,40	0,34	0,46	-3,05	0,00
	Kamal et al (2020)	0,27	0,21	0,34	-6,24	0,00
	Kawauchi et al (2006)	0,23	0,18	0,29	-7,62	0,00
	Kim et al (2008)	0,28	0,22	0,35	-5,42	0,00
	Kutlu et al (2018)	0,19	0,14	0,24	-8,85	0,00
	La Manna et al (2011)	0,31	0,23	0,41	-3,70	0,00
	Lee et al (2013)	0,37	0,33	0,41	-5,83	0,00
	Li et al (2014)	0,48	0,33	0,62	-0,31	0,76
	Lin et al (2013)	0,25	0,23	0,28	-15,82	0,00
	Lin et al (2019),	0,20	0,14	0,28	-6,42	0,00
	Loewen et al (2009)	0,58	0,31	0,82	0,57	0,57
	Losso et al (2015)	0,31	0,24	0,38	-4,83	0,00
	Malaki et al (2012)	0,08	0,02	0,26	-3,38	0,00
	Merlino et al (2012)	0,16	0,10	0,26	-5,61	0,00
	Merlino et al (2006)	0,18	0,16	0,21	-17,17	0,00
	Merlino et al (2010)	0,11	0,07	0,17	-7,69	0,00
	Miranda et al (2001)	0,26	0,20	0,33	-5,93	0,00
	Molnar et al (2007)	0,04	0,03	0,06	-17,72	0,00
	Muchsi et al (2005)	0,14	0,10	0,18	-11,58	0,00
	Mucsi et al (2004)	0,30	0,21	0,42	-3,30	0,00
	Murtagh et al (2007)	0,48	0,37	0,60	-0,25	0,81
	Muzasti & Harahap (2019)	0,30	0,22	0,40	-3,96	0,00
	Naini et al (2015)	0,52	0,45	0,58	0,42	0,67
	Nikic et al (2007)	0,19	0,13	0,25	-7,39	0,00
	Nikola et al (2012)	0,40	0,30	0,50	-2,03	0,04
	Noda et al (2006)	0,21	0,16	0,26	-8,65	0,00
	Ogna et al (2016)	0,17	0,13	0,21	-10,07	0,00
	Pan et al (2006)	0,25	0,19	0,32	-6,19	0,00
	Pavan et al (2014)	0,28	0,17	0,42	-3,00	0,00
	Pizza et al (2012)	0,31	0,25	0,39	-4,60	0,00
	Quinn et al (2011)	0,18	0,14	0,23	-10,04	0,00
	Rafie et al (2016	0,36	0,29	0,45	-3,12	0,00
	Razeghi et al (2012)	0,32	0,24	0,42	-3,58	0,00
	Riar et al (2019)	0,15	0,10	0,23	-6,86	0,00
	Rijsman et al (2004)	0,58	0,44	0,71	1,15	0,25
	Rohani et al (2015)	0,37	0,30	0,45	-3,18	0,00
	Sabry et al (2010)	0,42	0,32	0,53	-1,49	0,14
	Salman (2011)	0,20	0,14	0,28	-6,10	0,00
	Samavat et al (2017)	0,23	0,18	0,29	-7,70	0,00
	Saraji et al (2017)	0,55	0,49	0,61	1,61	0,11
	Shaikh et al (2014)	0,32	0,24	0,42	-3,52	0,00
	Sinha et al (2009)	0,29	0,18	0,43	-2,90	0,00
	Siddiqui et al (2005)	0,46	0,40	0,52	-1,38	0,17
	Soyoral et al (2010)	0,14	0,08	0,24	-5,45	0,00
	Stefanidis et al (2013)	0,27	0,23	0,30	-10,79	0,00
	Szentkiralyi et al (2009)	0,06	0,04	0,07	-20,07	0,00
	Takaki et al (2003)	0,12	0,10	0,15	-14,29	0,00
	Tekdös Demircioglu et al (2015	0,42	0,33	0,51	-1,83	0,07
	Telarovic et al (2007)	0,60	0,49	0,70	1,76	0,08
	Tuncel et al (2011)	0,12	0,07	0,21	-5,80	0,00
	Turk et al (2018)	0,17	0,12	0,22	-8,87	0,00
	Wali & Alkhouli (2015)	0,19	0,16	0,24	-10,60	0,00
	Walker et al (1995)	0,33	0,22	0,47	-2,40	0,02
	Winkelman et al (1996)	0,20	0,15	0,26	-7,90	0,00
	Xiao et al (2017)	0,14	0,11	0,19	-10,25	0,00
	Yang et al (2019)	0,14	0,12	0,17	-15,06	0,00
	Yildiz et al (2016)	0,47	0,39	0,55	-0,80	0,42
Fixed		0,19	0,18	0,19	-115,99	0,00
Random		0,25	0,20	0,32	-6,78	0,00



Total studies: k= 97 (315,875)
Heterogeneity: Q= 12605.35; p-value= < 0.001; I^2= 99.24%; Tau^2= 2.44
Overall effect (random effect, 95%CI)= 0.25 (0.20 to 0.32), p-value= < 0.001
Prediction Interval: 0.01 to 0.88

The pooled prevalence of RLS among CKD patients is shown in Figure 2, with a total prevalence rate of 25% (95% CI: 20% to 32%). According to the prediction interval, the future prevalence of RLS was expected to vary from 1% to 88%. Figure 3 depicts a global map of the prevalence of RLS among chronic kidney disease patients in various geographical regions. We detected statistical heterogeneity with a p-value of < 0.001 and a Q= 12605.35, I^2 = 99.24% and τ^2= 2.44. We assessed

Figure 3. The world map depicts the pooled prevalence of RLS among people with chronic kidney disease in various geographical regions. This map was created with QGIS 3.30



publication bias, and the result of Egger's regression intercept and Begg and Mazumdar rank correlation Kendall's tau without continuity correction was p-value < 0.1, which indicated a publication bias (p-value=0.03, 95% CI 0.28 to 7.14, t-value 2.15; and p-value= 0.002, Tau= - 0.21, respectively) (Appendix 4). After conducting the Duval trim and fill method, by adding 28 studies, the point estimate changed to 18.11% (95%CI 14.45% to 22.46%) (Appendix 4).

Sub-group and meta-regression analysis

Table 2 displays the results of a moderator analysis using subgroup and meta-regression analyses. Moderator analysis revealed that levels of serum iron and phosphorus were significant moderators, while other moderators were not significant. An increased iron level (-0.01, 95%CI: - 0.02 to -0.00) will decrease the prevalence of RLS, while an increasing phosphorus level (0.20, 95%CI: 0.06 to 0.34) will increase RLS (Table 2).

Discussions

We estimated the pooled prevalence of RLS to be 25% (95% CI: 20% to 32%) among patients with CKD. The current findings are consistent with the previous meta-analyses that found RLS prevalence in CKD was 24.2% (95%CI: 20.1–28.7) (Lin et al., 2016), and the pooled prevalence of RLS among patients undergoing hemodialysis was 24% (95 %CI: 21.0%–26.0 %). A systematic review by Saparfour et al. (2023) found that RLS prevalence is two to three times more common in patients with CKD compared to the general population, and a meta-analysis found that CKD patients have a sixfold increase in the likelihood of RLS when compared to the general population (Aini *et al.*, 2024). Regarding the population, RLS prevalence in adults and children-adolescents in this study was almost similar (25% vs. 21%, respectively). Previous meta-analyses also found that RLS prevalence in children and adolescents was 21% (Kang et al., 2022).

RLS is a neurological sensorimotor disorder characterized by distressing sensations in the limbs, particularly the legs, that appear or worsen during periods of inactivity. The sensations worsen during the evening and nighttime hours (Shi et al., 2015). The exact cause of RLS is unknown, and it is referred to as primary (idiopathic) RLS; however, secondary RLS is linked to various systemic disorders, particularly iron deficiency and chronic renal insufficiency (Saparfour et al., 2023). While the prevalence of RLS is generally low in CKD patients, it can exacerbate the burden and cause significant inconvenience in those undergoing dialysis. Notably, the presence of restless legs syndrome in dialysis patients may also suggest potential issues with the adequacy of the dialysis treatment (Mao et al., 2014).

Prior meta-analysis revealed that age, female gender, dialysis duration, Kt/V or index of dialysis adequacy (dialyzer clearance of urea * dialysis time/volume of distribution of urea), serum phosphate, serum calcium, hemoglobin, diabetes, and hypertension acted as significant moderators (Lin et al., 2016). However, in our meta-analysis, we only found iron and phosphorus as significant moderators. A higher iron level will decrease RLS prevalence or, vice versa, lower iron level will increase RLS prevalence. Previous meta-analyses found an association between phosphorus and RLS (Mansourian et al., 2020), and between iron and RLS (Mao et al., 2014). Iron deficiency in ESRD patients may cause RLS due to various underlying mechanisms, including anemia and changes in dopamine metabolism in the central nervous system (Beladi-Mousavi et al., 2015). Furthermore, brain iron deficiency and dopaminergic neurotransmission abnormalities play a central role in the pathogenesis of RLS, along with other nondopaminergic systems, though the exact mechanisms are still unknown (Safarpour et al., 2023).

High phosphorus levels, or hyperphosphatemia, in CKD patients, can often be asymptomatic. However, in some cases, it can lead to low calcium levels in the blood, causing symptoms such as muscle cramps or spasms (National Kidney Foundation, 2024). Because dopamine is involved in the regulation of phosphate excretion in the kidney, some situations that disrupt the functions of dopaminergic neurons may result in hyperphosphatemia, which plays an important role in diffuse vascular calcification in patients with end-stage renal failure. This condition may deteriorate vasculature functions, leading to the development of RLS (Mansourian et al., 2020). High phosphate levels are harmful to the cardiovascular system, and phosphate may be classified as a uremic toxin because of its effects on sleep disorders (Santos et al., 2016).

Our meta-analysis exhibits several strengths: (1) A thorough exploration was conducted using seven databases, complemented by manual searches of reference lists and Google Scholar, without restrictions on time and language; (2) In moderator analysis, a comprehensive examination of variables or risk factors was undertaken; (3) Stringent methodological procedures, including independent screening, meticulous data extraction, rigorous quality assessment, and adherence to PRISMA guidelines for reporting, were employed; and (4) Sensitivity analyses were performed to affirm the robustness of the study findings. However, the study has certain limitations: (1) Significant heterogeneity was observed in the results, prompting a subgroup analysis and meta-regression to identify potential sources of heterogeneity; (2) The outcomes of moderator analysis in both the current meta-analysis and previous studies remain debated, highlighting the need for larger longitudinal studies to establish causal relationships of restless legs syndrome (RLS) risk factors in CKD patients; and (3) Evidence of publication bias was detected, necessitating the implementation of the Duval and Tweedie trim and fill method for correction.

Conclusion

Approximately one-fourth of CKD patients experience RLS. Regarding the population, RLS prevalence in adults and children-adolescents was almost similar. The significant moderators in this meta-analysis were the level of serum iron and phosphorus. However, many studies' findings remain debatable. Further longitudinal research is needed to determine the associated risk factors of RLS in CKD patients, and future studies should focus on developing interventions to reduce RLS symptoms. Moreover, encouraging collaboration among healthcare professionals to develop a comprehensive approach and early assessment of RLS is crucial to improving the quality of life for CKD patients.

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Conflict of Interest

The authors declare that there is no known competing conflict of interest that could have influenced the work described in this paper.

Reference

Ahn, E. & Kang, H. (2018). Introduction to systematic review and meta-analysis. Korean J Anesthesiol, 71.2, 103-112.doi: 10.4097/kjae.2018.71.2.103

Aini, N., *et al.* (2024). *Association between chronic kidney disease and restless leg syndrome (RLS): A systematic review and meta-analysis*. *Sleep Biol Rhythms,* 22.2, 227-237.doi: 10.1007/s41105-024-00513-4

Beladi-Mousavi, S. S., *et al.* (2015). *Restless legs syndrome: Associated risk factors in hemodialysis patients*. *Nephro-Urology Monthly,* 7.6.doi: 10.5812/numonthly.31967

Chen, J.-J., *et al.* (2022). Pharmacological and non-pharmacological treatments for restless legs syndrome in end-stage kidney disease: a systematic review and component network meta-analysis. Nephrology Dialysis Transplantation, 37.10, 1982-1992.doi: 10.1093/ndt/gfab290

Ghanei Gheshlagh, R., *et al.* (2017). *The prevalence of restless legs syndrome in patients undergoing hemodialysis: A systematic review and meta-analysis study*. *Basic Clin Neurosci,* 8.2, 105-112.doi: 10.18869/nirp.bcn.8.2.105

Giannaki, C. D., *et al.* (2017). *Restless legs syndrome is contributing to fatigue and low quality of life levels in hemodialysis patients*. *World J Nephrol,* 6.5, 221-242.doi: 10.5527/wjn.v6.i5.236

Higgins, J. P., *et al.* (2003). *Measuring inconsistency in meta-analyses*. *Bmj,* 327.7414, 557-60.doi: 10.1136/bmj.327.7414.557

Hoy, D., *et al.* (2012). *Assessing risk of bias in prevalence studies: Modification of an existing tool and evidence of interrater agreement*. *J Clin Epidemiol,* 65.9, 934-9.doi: 10.1016/j.jclinepi.2011.11.014

Inthout, J., *et al.* (2016). *Plea for routinely presenting prediction intervals in meta-analysis*. *BMJ Open,* 6.7, e010247.doi: 10.1136/bmjopen-2015-010247

Kang, K.-T., *et al.* (2022). *Prevalence of sleep disorders in children with chronic kidney disease: a meta-analysis*. *Pediatric Nephrology,* 37.11, 2571-2582.doi: 10.1007/s00467-022-05536-y

Kubo, K., *et al.* (2016). *Relationship between quality of life and restless legs syndrome among a community-dwelling population in Japan*. *Neuropsychiatr Dis Treat,* 12. 809-15.doi: 10.2147/NDT.S102089

Lin, X. W., *et al.* (2019). *Restless legs syndrome in end stage renal disease patients undergoing hemodialysis*. *BMC Neurol,* 19.1, 47.doi: 10.1186/s12883-019-1265-y

Lin, Z., *et al.* (2016). *Prevalence of restless legs syndrome in chronic kidney disease: A systematic review and meta-analysis of observational studies*. *Renal Failure,* 38.9, 1335-1346.doi: 10.1080/0886022X.2016.1227564

Liu, Y., *et al.* (2024). *Prevalence of restless legs syndrome in maintenance hemodialysis patients: A systematic review and meta-analysis*. *Sleep Med,* 114. 15-23.doi: 10.1016/j.sleep.2023.11.1138

Lundorff, M., *et al.* (2017). *Prevalence of prolonged grief disorder in adult bereavement: A systematic review and meta-analysis*. *J Affect Disord,* 212. 138-149.doi: 10.1016/j.jad.2017.01.030

Mansourian, M., *et al.* (2020). *Are serum vitamin D, calcium and phosphorous associated with restless leg syndrome? A systematic review and meta-analysis*. *Sleep Med,* 75. 326-334.doi: 10.1016/j.sleep.2020.08.022

Mao, S., *et al.* (2014). *Restless legs syndrome in dialysis patients: A meta-analysis*. *Sleep Med,* 15.12, 1532-8.doi: 10.1016/j.sleep.2014.07.017

Maung, S. C., *et al.* (2016). *Sleep disorders and chronic kidney disease*. *World J Nephrol,* 5.3, 224-32.doi: 10.5527/wjn.v5.i3.224

Mchugh, M. L. (2012). *Interrater reliability: The kappa statistic*. *Biochem Med (Zagreb),* 22.3, 276-82.doi:

Muzasti, R. A. & Harahap, R. H. 2019. The role of anemia to restless legs syndrome in regular hemodialysis patients in Haji Adam Malik Medan general hospital. *Proceedings of the 2nd International Conference on Tropical Medicine and Infectious Disease.*

National Kidney Foundation. 2024. *Kidney failure risk factor: Serum phosphorus* [Online]. Available: https://www.kidney.org/content/kidney-failure-risk-factor-serum-phosphorus [Accessed January 14 2024].

Nigam, G., *et al.* (2018). *Exploring sleep disorders in patients with chronic kidney disease*. *Nat Sci Sleep,* 10. 35-43.doi: 10.2147/NSS.S125839

Novak, M., *et al.* (2015). *Restless legs syndrome in patients with chronic kidney disease*. *Semin Nephrol,* 35.4, 347-58.doi: 10.1016/j.semnephrol.2015.06.006

Page, M. J., *et al.* (2021). *The PRISMA 2020 statement: An updated guideline for reporting systematic reviews*. *BMJ,* 372. n71.doi: 10.1136/bmj.n71

Peters, J. L., *et al.* (2006). *Comparison of two methods to detect publication bias in meta-analysis*. *JAMA,* 295.6.doi:

Safarpour, Y., *et al.* (2023). *Restless Legs Syndrome in Chronic Kidney Disease- a Systematic Review*. *Tremor and other hyperkinetic movements (New York, N.Y.),* 13. 10.doi: https://dx.doi.org/10.5334/tohm.752

Santos, R. S., *et al.* (2016). *Parathyroidectomy improves restless leg syndrome in patients on hemodialysis*. *PLoS One,* 11.5, e0155835.doi: 10.1371/journal.pone.0155835

Saparfour, Y., *et al.* (2023). *Restless legs syndrome in chronic kidney disease: A systematic review*. *Tremor Other Hyperkinet Mov (N Y),* 13. 10.doi: 10.5334/tohm.752

Shi, Y., *et al.* (2015). *Prevalence and risk factors of restless legs syndrome among Chinese adults in a rural community of Shanghai in China*. *PLoS One,* 10.3, e0121215.doi: 10.1371/journal.pone.0121215

Tan, L. H., *et al.* (2022). *Insomnia and poor sleep in CKD: A systematic review and meta-analysis*. *Kidney Med,* 4.5, 100458.doi: 10.1016/j.xkme.2022.100458

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Table 1. Demographics of included studies

	Number of studies	Number of participants (%)	Mean	SD
Sample size	97	315,875		
Age (years)	82	313,570	53.22	12.97
Duration of dialysis (months)	49	11,579	51.82	44.35
BMI (kg/m^2)	32	286,887	24.77	4.61
Sex				
Male	82	140,327 (44.59%)		
Female	82	174,391 (55.21%)		
Population				
Children and Adolescent	6	433 (0.14%)		
Adult	91	315,442 (99.86%)		
Country geographical area				
Asia	43	9,256 (2.93%)		
Australia	1	85 (0.03%)		
Africa	5	1,098 (0.35%)		
Europe	28	6,568 (2.08%)		
North America	15	297,935 (94.32%)		
South America	5	933 (0.29%)		
Study design				
Cross-sectional	82	18,004 (5.69%)		
Cohort	5	1,036 (0.33%)		
Case-control	10	296,835 (93.98%)		
Laboratory parameters				
Albumin (g/dL)	29	287,797	3.76	0.48
Bilirubin (mg/dL)	1	65	0.69	0.21
BUN (mg/dL)	20	4,895	61.79	18.10
Calcium (mg/dL)	31	6,976	7.39	1.04
Creatinine (mg/dL)	31	285,587	43.12	12.18
Cholesterol (gr/dL)	2	170	175.94	46.85
Chloride (mmol/L)	2	243	103.40	34.15
Ferritin (ng/mL)	40	7,914	443.51	335.92
Folate (ng/mL)	1	129	7.0	2.44
GFR (ml/min/1.73 m2)	11	2,815	30.90	12.46
Hemoglobin (g/dL)	53	27,433	10.98	1.61
Hematocrit (%)	3	393	13.96	2.38
Iron (ng/dL)	21	4,284	63.37	32
Kt/V (index of dialysis adequacy)	20	4,078	1.37	0.27
Magnesium (mg/dL)	4	1,032	2.67	0.86
Phosphate (mg/dL)	14	3,416	3.86	1.13
Phosphorus (mg/dL)	20	3,846	4.22	1.83
Potassium (mmol/L)	9	2,006	5.04	0.71
PTH (pg/mL)	26	6,568	295.61	306.27
Sodium (mmol/L)	3	725	137.43	3.25
Transferrin (mg/dL)	6	1,205	218.94	47.19
Uric Acid (mg/dL)	2	504	6.80	3.67
Vitamin D (ng/mL)	3	389	189.4	62.47
Vitamin B12 (ng/mL)	1	129	25.0	8.60
Life style				
Alcohol use	4	38 (11.66%)		
Smoking	14	228 (15.77%)		
Medical comorbidities				
Anemia	5	230 (33.57%)		
Cancer	1	5 (15.63%)		
Cardiovascular disease	9	220 (26.99%)		
Cerebrovascular disease	5	76 (11.13%)		
Congestive heart failure	5	180 (24.86%)		
COPD	4	65 (18.47%)		
Diabetes Mellitus	43	2884 (44.88%)		
Hepatitis	1	2 (4.35%)		
Hypertension	28	1,267 (50.09%)		
Hyperparathyroidism	2	154 (77.39%)		
Hyperkalemia	1	40 (34.48%)		
Hyperuricemia	1	50 (43.11%)		
Osteoarthritis	1	11 (20%)		
Peripheral Neuropathy	2	94 (69.63%)		

Polyneuropathy	1	13 (27%)		
Peripheral vascular disease	5	58 (9.97%)		
Rheumatoid arthritis	1	2 (3.60%)		
Urologic disease	2	20 (27.28%)		
Psychological problem				
Anxiety	2	105 (61.40%)		
Depression	8	188 (22.68%)		
Other sleep problems				
ESS score	13	488	7.02	4.29
PSQI score	7	313	8.94	4.29
ISI score	2	189	15.29	1.82
Poor sleep quality	3	126 (75%)		
Daytime sleepiness	4	43 (25%)		
Insomnia	12	418 (61.20%)		
Obstructive sleep apnea	11	219 (21.14%)		

Note: ESS= Epworth Sleepiness Scale; ISI= Insomnia Severity Index, PSQI= The Pittsburgh Sleep Quality Index, COPD= Chronic obstructive pulmonary disease, Kt/V= dialyzer clearance of urea * dialysis time/volume of distribution of urea.

Table 2. Moderator analysis of RLS among people with chronic kidney disease

Variables	n	df	Prevalence % (95%CI)	p-value
Subgroup analysis				
Sex				
Male	82 (140,327)	81	0.13 (0.10 to 0.17)	0.13
Female	82 (174,391)	81	0.10 (0.07 to 0.13)	
Population				
Children and Adolescent	6 (433)	5	0.21 (0.14 to 0.30)	0.40
Adult	91 (315,442)	92	0.25 (0.20 to 0.32)	
County geographical area				
Asia	43 (9,256)	42	0.27 (0.23 to 0.32)	0.97
Africa	5 (1,098)	4	0.28 (0.16 to 0.45)	
Australia	1 (85)	0	0.25 (0.17 to 0.35)	
Europe	28 (6,568)	27	0.25 (0.20 to 0.30)	
North America	15 (297,935)	14	0.21 (0.06 to 0.52)	
South America	5 (933)	4	0.26 (0.19 to 0.35)	
Study design				
Cross-sectional	82 (18,004)	81	0.27 (0.24 to 0.30)	0.75
Cohort	5 (1,036)	4	0.26 (0.15 to 0.41)	
Case-control	10 (296,835)	9	0.14 (0.02 to 0.57)	

Meta-regression analysis	n		Scale	Coefficient (95%CI)	p-value
Age	82 (313,570)	81	Per 1-year increase	0.00 (-0.02 to 0.02)	0.87
Duration of dialysis (months)	49 (11,579)	48	Per 1-month increase	0.00 (-0.01 to 0.01)	0.43
BMI	32 (286,887)	31	Per 1 increase	-0.06 (-0.22 to 0.10)	0.44
Albumin (g/dL)	29 (287,797)	28	Per 1 increase	0.31 (-1.11 to 1.74)	0.67
BUN (mg/dL)	20 (4,895)	19	Per 1 increase	0.00 (-0.00 to 0.01)	0.41
Calcium (mg/dL)	31 (6,976)	30	Per 1 increase	-0.02 (-0.09 to 0.06)	0.68
Creatinine (mg/dL)	31 (285,111)	30	Per 1 increase	0.00 (-0.00 to 0.00)	0.85
Ferritin (ng/mL)	40 (7,914)	39	Per 1 increase	0.00 (-0.00 to 0.00)	0.20
GFR (ml/min/1.73 m2)	11 (2,815)	10	Per 1 increase	-0.01 (-0.04 to 0.01)	0.33
Hemoglobin (g/dL)	53 (27,433)	52	Per 1 increase	0.04 (-0.12 to 0.20)	0.61
Iron (ng/dL)	21 (4,284)	20	Per 1 increase	-0.01 (-0.02 to -0.00)	0.02
Kt/V (index of dialysis adequacy)	20 (4,078)	19	Per 1 increase	-0.21 (-1.77 to 1.35)	0.79
Magnesium (mg/dL)	4 (1,032)	3	Per 1 increase	-0.13 (-0.50 to 0.24)	0.50
Phosphate (mg/dL)	14 (3,416)	13	Per 1 increase	-0.09 (-0.25 to 0.08)	0.31
Phosphorus (mg/dL)	20 (3,846)	19	Per 1 increase	0.20 (0.06 to 0.34)	0.01
Potassium (mmol/L)	9 (2,006)	8	Per 1 increase	0.36 (-0.57 to 1.29)	0.44
PTH (pg ⁄mL)	26 (6,568)	25	Per 1 increase	0.00 (-0.00 to 0.00)	0.20
Transferrin (mg/dL)	6 (1,205)	6	Per 1 increase	-0.01 (-0.02 to 0.00)	0.09
ESS score	13 (488)	12	Per 1 increase	0.11 (-0.08 to 0.29)	0.25
Proportion of OSA	11 (219)	10	Per 1% increase	0.00 (-0.00 to 0.00)	0.29
Proportion of insomnia	12 (418)	11	Per 1% increase	-0.00 (-0.02 to 0.01)	0.76
Proportion of smoking	14 (228)	13	Per 1% increase	-0.02 (-0.04 to 0.00)	0.10
Proportion of alcohol use	4 (38)	3	Per 1% increase	0.05 (-0.07 to 0.02)	0.15
Proportion of anemia	5 (230)	4	Per 1% increase	0.07 (-0.02 to 0.16)	0.11
Proportion of cardiovascular disease	9 (220)	8	Per 1% increase	0.07 (-0.02 to 0.17)	0.12
Proportion of cerebrovascular disease	5 (76)	4	Per 1% increase	0.18 (-0.40 to 0.76)	0.54
Proportion of congestive heart failure	5 (180)	4	Per 1% increase	-0.08 (-0.40 to 0.24)	0.63
Proportion of COPD	4 (65)	3	Per 1% increase	-0.04 (-0.15 to 0.08)	0.52

Proportion of diabetes mellitus	43 (2,884)	42	Per 1% increase	0.00 (-0.02 to 0.02)	0.81
Proportion of hypertension	28 (1,267)	27	Per 1% increase	-0.02 (-0.03 to 0.00)	0.07
Proportion of peripheral vascular disease	5 (58)	4	Per 1% increase	0.00 (-0.83 to 0.83)	1.00
Proportion of depression	8 (188)	7	Per 1% increase	0.04 (-0.01 to 0.09)	0.09

Note: BMI= body mass index, BUN= blood urea nitrogen, GFR= glomerular filtration rate, PTH= Parathyroid hormone, Excessive daytime Sleepiness, PSQI= The Pittsburgh Sleep Quality Index, OSA= obstructive sleep apnea, COPD= Chronic obstructive pulmonary disease, Kt/V= dialyzer clearance of urea * dialysis time/volume of distribution of urea.

Appendix 1. Search String

Database	Result	String
CINAHL	46	S1= AB prevalence OR prevalence OR prevalence study OR incidence OR incidence OR incidence rate OR rate, incidence S2= AB restless legs syndrome OR ekbom syndrome OR ekbom`s syndrome OR rls/wed OR willis ekbom disease OR willis ekbom disorder OR willis-ekbom disease OR willis-ekbom`s disease OR wittmaack-ekbom syndrome OR anxietas tibiarum OR leg, restless OR restless arm OR restless arm syndrome OR restless arms OR restless arms syndrome OR restless leg OR restless leg syndrome OR restless legs OR restless legs syndrome OR syndrome of restless legs OR syndrome, restless legs S3= AB kidney disease OR disease, kidney OR kidney disease OR kidney diseases OR kidney disorder OR kidney pathology OR nephropathy OR perinephritis OR perirenal infection OR renal disease OR renal disorder OR unilateral kidney disease OR chronic kidney failure OR chronic kidney disease OR chronic kidney disorder OR chronic kidney failure OR chronic kidney insufficiency OR chronic nephropathy OR chronic renal disease OR chronic renal failure OR chronic renal insufficiency OR kidney chronic failure OR kidney disease, chronic OR kidney failure, chronic OR kidney function, chronic disease OR renal insufficiency, chronic S1 AND S2 AND S3 Augmented Words - apply equivalent theme Search Mode - find all search terms
Cochrane	15	#1 (Prevalence OR prevalence study OR incidence):ti,ab,kw #2 (restless legs syndrome OR ekbom syndrome willis OR willis-ekbom disease OR wittmaack-ekbom syndrome OR anxietas tibiarum):ti,ab,kw #3 (kidney diseases OR kidney disorder OR kidney pathology OR nephropathy OR perinephritis OR perirenal infection OR renal disease OR renal disorder OR chronic kidney failure OR chronic kidney disease OR chronic kidney disorder OR chronic kidney failure OR chronic kidney insufficiency OR chronic nephropathy OR chronic renal disease OR chronic renal failure OR chronic renal insufficiency OR kidney chronic failure OR kidney function, chronic disease OR renal insufficiency, chronic):ti,ab,kw #1 AND #2 AND #3
Embase	295	#1 'prevalence'/exp OR 'prevalence' OR 'prevalence study' OR 'incidence'/exp OR 'incidence' OR 'incidence rate' OR 'rate, incidence' #2 'restless legs syndrome'/exp OR 'ekbom syndrome' OR 'ekbom`s syndrome' OR 'rls/wed' OR 'willis ekbom disease' OR 'willis ekbom disorder' OR 'willis-ekbom disease' OR 'willis-ekbom`s disease' OR 'wittmaack-ekbom syndrome' OR 'anxietas tibiarum' OR 'leg, restless' OR 'restless arm' OR 'restless arm syndrome' OR 'restless arms' OR 'restless arms syndrome' OR 'restless leg' OR 'restless leg syndrome' OR 'restless legs' OR 'restless legs syndrome' OR 'syndrome of restless legs' OR 'syndrome, restless legs' #3 'kidney disease'/exp OR 'disease, kidney' OR 'kidney disease' OR 'kidney diseases' OR 'kidney disorder' OR 'kidney pathology' OR 'nephropathy' OR 'perinephritis' OR 'perirenal infection' OR 'renal disease' OR 'renal disorder' OR 'unilateral kidney disease' OR 'chronic kidney failure'/exp OR 'chronic kidney disease' OR 'chronic kidney disorder' OR 'chronic kidney failure' OR 'chronic kidney insufficiency' OR 'chronic nephropathy' OR 'chronic renal disease' OR 'chronic renal failure' OR 'chronic renal insufficiency' OR 'kidney chronic failure' OR 'kidney disease, chronic' OR 'kidney failure, chronic' OR 'kidney function, chronic disease' OR 'renal insufficiency, chronic' #4 #1 AND #2 AND #3 #5 #4 AND ('article'/it OR 'review'/it)
Pubmed	34	(("Prevalence"[Mesh]) AND "Restless Legs Syndrome"[Mesh]) AND "Kidney Failure, Chronic"[Mesh]
SCOPUS	159	(TITLE-ABS-KEY (prevalence OR "Point Prevalence" OR "period prevalence" OR incidence)) AND (TITLE-ABS-KEY ("Restless Legs" OR "Willis Ekbom Disease" OR "Disease, Willis Ekbom" OR "Wittmaack-Ekbom Syndrome" OR "Restless Leg Syndrome")) AND (TITLE-ABS-KEY ("End-Stage Kidney Disease" OR "Kidney Disease, End-Stage" OR "Chronic Kidney Failure" OR "End-Stage Renal Failure" OR "Renal Failure, Chronic" OR "Chronic Renal Failure" OR esrd))
WOS	47	AB=(prevalence OR Point Prevalence OR period prevalence OR incidence) AND AB=(Restless Legs OR Willis Ekbom Disease OR Disease, Willis Ekbom OR Wittmaack-Ekbom Syndrome OR Restless Leg Syndrome) AND AB=(End-Stage Kidney Disease OR Kidney Disease, End-Stage OR Chronic Kidney Failure OR End-Stage Renal Failure OR Renal Failure, Chronic OR Chronic Renal Failure OR ESRD)

MEDLINE-OVID		((period prevalence.mp OR period prevalences.mp OR point prevalence.mp OR point prevalences.mp OR prevalence.mp OR prevalence, period.mp OR prevalence, point.mp OR prevalences.mp) AND (disease, willis ekbom.mp OR restless leg syndrome.mp OR restless legs.mp OR restless legs syndrome.mp OR syndrome, restless leg.mp OR syndrome, willis ekbom.mp OR syndrome, wittmaack ekbom.mp OR willis ekbom disease.mp OR willis ekbom syndrome.mp OR wittmaack ekbom syndrome.mp)) AND (chronic kidney disease.mp OR chronic kidney diseases.mp OR chronic kidney insufficiencies.mp OR chronic kidney insufficiency.mp OR chronic renal disease.mp OR chronic renal diseases.mp OR chronic renal insufficiencies.mp OR disease, chronic kidney.mp OR disease, chronic renal.mp OR diseases, chronic kidney.mp OR diseases, chronic renal.mp OR kidney disease, chronic.mp OR kidney diseases, chronic.mp OR kidney insufficiencies, chronic.mp OR kidney insufficiency, chronic.mp OR renal disease, chronic.mp OR renal diseases, chronic.mp OR renal insufficiencies, chronic.mp OR renal insufficiency, chronic.mp)

Appendix 2. Reference of Included Studies

No.	Study	Reference
1	Al-Jahdali, H. H et al (2009)	Al-Jahdali, H. H., Al-Qadhi, W. A., Khogeer, H. A., Al-Hejaili, F. F., Al-Ghamdi, S. M., & Al Sayyari, A. A. (2009). Restless legs syndrome in patients on dialysis. *Saudi J Kidney Dis Transpl.* 20(3), 378-385.
2	Alvarez-Ude et al (1999)	Alvarez-Ude, F., Alamo, C., Fernandez-Reyes, M. J., Bravo, B., Vicente, E., Ferrer, M., Alonso, J., & Badia, X. (1999). Sleep complaints and perceived health status in patients in long-term hemodialysis. *Nefrologia.* 19(2), 168-176.
3	Applebee et al (2009)	Applebee, G. A., Guillot, A. P., Schuman, C. C., Teddy, S., & Attarian, H. P. (2009). Restless legs syndrome in pediatric patients with chronic kidney disease. *Pediatric Nephrology.* 24(3), 545-548. https://doi.org/https://dx.doi.org/10.1007/s00467-008-1057-x
4	Aritake-Okada et al (2011)	Aritake-Okada, S., Nakao, T., Komada, Y., Asaoka, S., Sakuta, K., Esaki, S., Nomura, T., Nakashima, K., Matsuura, M., & Inoue, Y. (2011). Prevalence and clinical characteristics of restless legs syndrome in chronic kidney disease patients. *Sleep Medicine.* 12(10), 1031-1033. https://doi.org/10.1016/j.sleep.2011.06.014
5	Amiri et al (2019)	Amiri, M., Bidaki, R., Avazbakhsh, M., Mirhosseini, H., & Yamola, M. (2019). Prevalence and correlates of restless legs syndrome in chronic renal failure patients undergoing hemodialysis. *Koomesh.* 21(3), 493-497
6	Araujo et al (2010)	Araujo, S. M., de Bruin, V. M., Nepomuceno, L. A., Maximo, M. L., Daher Ede, F., Correia Ferrer, D. P., & de Bruin, P. F. (2010). Restless legs syndrome in end-stage renal disease: Clinical characteristics and associated comorbidities. *Sleep Medicine.*11(8), 785-790. https://doi.org/10.1016/j.sleep.2010.02.011
7	Baiardi et al (2017)	Baiardi, S., Mondini, S., Baldi antognini, a., Santoro, a., & Cirignotta, F. (2017). Survival of Dialysis Patients with Restless Legs Syndrome: A 15-Year Follow-Up Study. *American Journal of Nephrology.* 46(3), 224-230. https://doi.org/10.1159/000479938
8	Bambini et al (2019)	Bambini, B. B. M., Moyses, R. M. A., Batista, L. C. D., Coelho, B., Tufik, S., Elias, R. M., & Coelho, F. M. (2019). Restless legs syndrome in patients on hemodialysis: Polysomnography findings. *Hemodialysis International.* 23(4), 445-448. https://doi.org/10.1111/hdi.12781
9	Bathla et al (2016)	Bathla, N., Ahmad, S., Gupta, R., & Ahmad, S. (2016). Prevalence and correlates of Willis-Ekbom's disease/restless legs syndrome in patients undergoing hemodialysis. *Saudi journal of kidney diseases and transplantation : An Official Publication of The Saudi Center for Organ Transplantation, Saudi Arabia.* 27(4), 685-691. https://doi.org/10.4103/1319-2442.185224
10	Beladi-Mousavi et al (2015)	Beladi-Mousavi, S. S., Jafarizade, M., Shayanpour, S., Bahadoram, M., Moosavian, S. M., & Houshmand, G. (2015). Restless legs syndrome: Associated risk factors in hemodialysis patients. *Nephro-Urology Monthly.* 7(6), Article e31967. https://doi.org/10.5812/numonthly.31967
11	Bhagawati et al (2019)	Bhagawati, J., Kumar, S., Agrawal, A. K., Acharya, S., Wanjari, A. K., & Kamble, T. K. (2019). Impact of different stages of chronic kidney disease on the severity of Willis-Ekbom disease. *Journal of Family Medicine and Primary Care.* 8(2), 432-436. https://doi.org/https://dx.doi.org/10.4103/jfmpc.jfmpc_418_18
12	Bhowmik et al (2004)	Bhowmik, D., Bhatia, M., Tiwari, S., Mahajan, S., Gupta, S., Agarwal, S. K., & Dash, S. C. (2004). Low prevalence of restless legs syndrome in patients with advanced chronic renal failure in the indian population: A case controlled study. *Renal Failure.* 26(1), 69-72. https://doi.org/10.1081/JDI-120028557
13	Bliwise et al (2014)	Bliwise, D. L., Zhang, R. H., & Kutner, N. G. (2014). Medications associated with restless legs syndrome: A case-control study in the US Renal Data System (USRDS). *Sleep Medicine.* 15(10), 1241-1245. https://doi.org/10.1016/j.sleep.2014.05.011
14	Brzuszek et al (2022)	Brzuszek, A., Hazara, A. M., & Bhandari, S. (2022). The prevalence and potential aetiological factors associated with restless legs syndrome in patients with chronic kidney disease: A cross-sectional study. *Int Urol Nephrol.* 54(10), 2599-2607. https://doi.org/10.1007/s11255-022-03166-9
15	Calviño et al (2018)	Calviño, J., Cigarrán, S., Gonzalez-Tabares, L., Guijarro, M., Millán, B., Cobelo, C., Cillero, S., & Sobrido, M. J. (2018). Restless legs syndrome: An unresolved uremic disorder after renal transplantation. *Nephron.* 139(1), 23-29. https://doi.org/10.1159/000486401
16	Capelli et al (2021)	Capelli, I., Pizza, F., Ruggeri, M., Gasperoni, L., Carretta, E., Donati, G., Cianciolo, G., Plazzi, G., & La Manna, G. (2021). Time evolution of restless legs syndrome in haemodialysis patients. *Clinical Kidney Journal.* 14(1), 341-347. https://doi.org/10.1093/ckj/sfz148
17	Castillo-Torres et al (2018)	Castillo-Torres, S. A., Ibarra-Sifuentes, H. R., Sánchez-Terán, H., Sánchez-Martínez, C., Chávez-Luévanos, B., & Estrada-Bellmann, I. (2018). Restless legs syndrome in end-stage renal disease patients undergoing hemodialysis. *Arq Neuropsiquiatr.* 76(12), 827-830. https://doi.org/10.1590/0004-282x20180133
18	Chavoshi et al (2015)	Chavoshi, F., Einollahi, B., Haghighi, K. S., Saraei, M., & Izadianmehr, N. (2015). Prevalence and sleep related disorders of restless leg syndrome in hemodialysis patients. *Nephro-Urology Monthly.* 7(2), Article e24611. https://doi.org/10.5812/numonthly.24611
19	Chrastina et al (2015)	Chrastina, M., Martinkova, J., Minar, M., Zilinska, Z., Valkovic, P., & Breza, J. (2015). Impact of kidney transplantation on restless legs syndrome. *Bratisl Lek Listy.* 116(7), 404-407. https://doi.org/10.4149/bll_2015_077

20	Chu et al (2014)	Chu, L., Chu, E., Dogra, G., & Chakera, A. (2014). Restless legs syndrome: An underappreciated and distressing problem for haemodialysis patients. *Internal Medicine Journal.* 44(10), 1030-1033. https://doi.org/10.1111/imj.12559
21	Cirignotta et al (2002)	Cirignotta, F., Mondini, S., Santoro, A., Ferrari, G., Gerardi, R., & Buzzi, G. (2002). Reliability of a questionnaire screening restless legs syndrome in patients on chronic dialysis. *Am J Kidney Dis.* 40(2), 302-306. https://doi.org/10.1053/ajkd.2002.34508
22	Collado-Seidel et al (1998)	Collado-Seidel, V., Kohnen, R., Samtleben, W., Hillebrand, G. F., Oertel, W. H., & Trenkwalder, C. (1998). Clinical and biochemical findings in uremic patients with and without restless legs syndrome. *American Journal of Kidney Diseases*, 31(2), 324-328.
23	Collister et al (2019)	Collister, D., Rodrigues, J. C., Mazzetti, A., Salisbury, K., Morosin, L., Rabbat, C., Brimble, K. S., & Walsh, M. (2019). Screening questions for the diagnosis of restless legs syndrome in hemodialysis. *Clinical Kidney Journal.* 12(4), 559-563. https://doi.org/10.1093/ckj/sfy129
24	Darwish & Abdel-Nabi (2016)	Darwish, A. H., & Abdel-Nabi, H. (2016). Sleep disorders in children with chronic kidney disease. *International Journal of Pediatrics and Adolescent Medicine.* 3(3), 112-118. https://doi.org/10.1016/j.ijpam.2016.06.001
25	Davis et al (2005)	Davis, I. D., Baron, J., O'Riordan, M. A., & Rosen, C. L. (2005). Sleep disturbances in pediatric dialysis patients. *Pediatric Nephrology.* 20(1), 69-75. https://doi.org/10.1007/s00467-004-1700-0
26	Davis et al (2012)	Davis, I. D., Greenbaum, L. A., Gipson, D., Wu, L. L., Sinha, R., Matsuda-Abedini, M., Emancipator, J. L., Lane, J. C., Hodgkins, K., Nailescu, C., Barletta, G. M., Arora, S., Mahan, J. D., & Rosen, C. L. (2012). Prevalence of sleep disturbances in children and adolescents with chronic kidney disease. *Pediatric nephrology.* 27(3), 451-459. https://doi.org/https://dx.doi.org/10.1007/s00467-011-2010-y
27	Deferio et al (2017)	Deferio, J. J., Govindarajulu, U., Brar, A., Cukor, D., Lee, K. G., & Salifu, M. O. (2017). Association of restless legs syndrome and mortality in end-stage renal disease: An analysis of the United States Renal Data System (USRDS). *BMC Nephrology.* 18(1), Article 258. https://doi.org/10.1186/s12882-017-0660-0
28	Deliyska et al (2011)	Deliyska, B., Shivarov, H., Nenchev, N., Shurliev, V., Vasilev, V., Kaludina, I., Lazarov, V., Trifonova, D., Sredkov, I., Milanova, M., & Spasova, S. (2011). Comparative study on restless legs syndrome in predialysis and dialysis patients. *Nephrology, Dialysis and Transplantation.* 17(1), 26-30.
29	Dikici et al (2014)	Dikici, S., Bahadir, A., Baltaci, D., Ankarali, H., Eroglu, M., Ercan, N., & Sav, T. (2014). Association of anxiety, sleepiness, and sexual dysfunction with restless legs syndrome in hemodialysis patients. *Hemodial Int.* 18(4), 809-818. https://doi.org/10.1111/hdi.12175
30	Erdogan et al (2012)	Erdogan, A., Dervisoglu, E., & Kutlu, A. (2012). Sleep quality and its correlates in patients on continuous ambulatory peritoneal dialysis. *Scand J Urol Nephrol.* 46(6), 441-447. https://doi.org/10.3109/00365599.2012.693134
31	Ezzat & Mohab (2015)	Ezzat, H., & Mohab, A. (2015). Prevelance of sleep disorders among ESRD patients. *Nephrology Dialysis Transplantation.* 30, iii621. https://doi.org/10.1093/ndt/gfv200.57
32	Giannaki et al (2011)	Giannaki, C. D., Sakkas, G. K., Karatzaferi, C., Hadjigeorgiou, G. M., Lavdas, E., Liakopoulos, V., Tsianas, N., Koukoulis, G. N., Koutedakis, Y., & Stefanidis, I. (2011). Evidence of increased muscle atrophy and impaired quality of life parameters in patients with uremic restless legs syndrome. *PLoS One. 6*(10), e25180. https://doi.org/10.1371/journal.pone.0025180
33	Gigli et al (2004)	Gigli, G. L., Adorati, M., Dolso, P., Piani, A., Valente, M., Brotini, S., & Budai, R. (2004). Restless legs syndrome in end-stage renal disease. *Sleep Medicine.* 5(3), 309-315. https://doi.org/10.1016/j.sleep.2004.01.014
34	Goffredo Filho et al (2003)	Goffredo Filho, G. S., Gorini, C. C., Purysko, A. S., Silva, H. C., & Elias, I. E. (2003). Restless legs syndrome in patients on chronic hemodialysis in a Brazilian city: Frequency, biochemical findings and comorbidities. *Arq Neuropsiquiatr.* 61(3b), 723-727. https://doi.org/10.1590/s0004-282x2003000500004
35	Haider & Anees (2014)	Haider, I., & Anees, M. (2014). Restless legs syndrome in end stage renal disease patients on haemodialysis. *Pakistan Journal of Medical Sciences.* 30(6). https://doi.org/10.12669/pjms.306.5691
36	Hamed et al (2023)	Hamed, S. A., Abdulhamid, S. K., El-Hadad, A. F., Fawzy, M., & Abd-Elhamed, M. A. (2023). Restless leg syndrome in patients with chronic kidney disease: A hospital-based study from Upper Egypt. *International Journal of Neuroscience.* 133(3), 257-268. https://doi.org/10.1080/00207454.2021.1910256
37	Hasheminasab Zaware et al (2016)	Hasheminasab Zaware, R., Mahmoodi Meymand, M. H., Rezaeian, M., Mohammadi Kamalabadi, N., Mostafavi, S. A., Abdolkarimi Dawarani, M. A., Jome Yazdian, R., & Bidaki, R. (2016). Insomnia and restless leg syndrome in patients undergoing chronic hemodialysis in Rafsanjan Ali Ibn Abitaleb Hospital. *Nephro-Urology Monthly.* 8(1), e29527. https://doi.org/10.5812/numonthly.29527
38	Hsu et al (2008)	Hsu, C. Y., Lee, C. T., Lee, Y. J., Huang, T. L., Yu, C. Y., Lee, L. C., Lam, K. K., Chien, Y. S., Chuang, F. R., & Hsu, K. T. (2008). Better sleep quality and less daytime symptoms in patients on evening hemodialysis: A questionnaire-based study. *Artificial Organs.* 32(9), 711-716. https://doi.org/10.1111/j.1525-1594.2008.00593.x
39	Hui et al (2000)	Hui, D. S. C., Wong, T. Y. H., Ko, F. W. S., Li, T. S. T., Choy, D. K. L., Wong, K. K., Szeto, C. C., Lui, S. F., & Li, P. K. T. (2000). Prevalence of sleep disturbances in Chinese patients with end-stage renal failure on continuous ambulatory peritoneal dialysis. *American Journal of Kidney Diseases.* 36(4), 783-788. https://doi.org/10.1053/ajkd.2000.17664
40	Ibrahim & Wegdan (2011)	Ibrahim, J. M., & Wegdan, O. M. (2011). Epidemiology of sleep disorders in patients with chronic renal disease in Cairo, Egypt. *J Egypt Public Health Assoc.* 86(3-4), 68-72. https://doi.org/10.1097/01.EPX.0000399136.00486.4e
41	Jaber et al (2011)	Jaber, B. L., Schiller, B., Burkart, J. M., Daoui, R., Kraus, M. A., Lee, Y., Miller, B. W., Teitelbaum, I., Williams, A. W., & Finkelstein, F. O. (2011). Impact of short daily hemodialysis on restless legs symptoms and sleep disturbances. *Clin J Am Soc Nephrol.* 6(5), 1049-1056. https://doi.org/10.2215/cjn.10451110
42	Kamal et al (2020)	Kamal, M., Zaki, N. F. W., Yousef, E. A., Eltoraby, E., Manzar, M. D., & Pandi-Perumal, S. R. (2020). An egyptian study of sleep disorders and its correlates in end-stage renal disease patients receiving hemodialysis. *Sleep and Vigilance.* 4(2), 213-220. https://doi.org/10.1007/s41782-020-00095-4
43	Kawauchi et al (2006)	Kawauchi, A., Inoue, Y., Hashimoto, T., Tachibana, N., Shirakawa, S., Mizutani, Y., Ono, T., & Miki, T. (2006). Restless legs syndrome in hemodialysis patients: Health-related quality of life and laboratory data analysis. *Clin Nephrol. 66*(6), 440-446. https://doi.org/10.5414/cnp66440

44	Kim et al (2008)	Kim, J.-M., Kwon, H.-M., Lim, C. S., Kim, Y. S., Lee, S.-J., & Nam, H. (2008). Restless legs syndrome in patients on hemodialysis: Symptom severity and risk factors. *J Clin Neurol.* 4, 153-157. https://doi.org/10.3988/jcn.2008.4.4.153
45	Kutlu et al (2018)	Kutlu, R., Selcuk, N. Y., Sayin, S., & Kal, O. (2018). Restless legs syndrome and quality of life in chronic hemodialysis patients. *Nigerian Journal of Clinical Practice.* 21(5), 573-577. https://doi.org/10.4103/njcp.njcp_84_17
46	La Manna et al (2011)	La Manna, G., Pizza, F., Persici, E., Baraldi, O., Comai, G., Cappuccilli, M. L., Centofanti, F., Carretta, E., Plazzi, G., Coli, L., Montagna, P., & Stefoni, S. (2011). Restless legs syndrome enhances cardiovascular risk and mortality in patients with end-stage kidney disease undergoing long-term haemodialysis treatment. *Nephrology Dialysis Transplantation.* 26(6), 1976-1983. https://doi.org/10.1093/ndt/gfq681
47	Lee et al (2013)	Lee, J., Nicholl, D. D. M., Ahmed, S. B., Loewen, A. H. S., Hemmelgarn, B. R., Beecroft, J. M., Turin, T. C., & Hanly, P. J. (2013). The prevalence of restless legs syndrome across the full spectrum of kidney disease. *Journal of clinical sleep medicine: JCSM: Official publication of the American Academy of Sleep Medicine.* 9(5), 455-459. https://doi.org/https://dx.doi.org/10.5664/jcsm.2664
48	Li et al (2014)	Li, H., Li, X. B., Feng, S. J., Zhang, G. Z., Wang, W., & Wang, S. X. (2014). Sleep disorders and its related risk factors in patients undergoing chronic peritoneal dialysis. *Chinese Medical Journal.* 127(7), 1289-1293. https://doi.org/10.3760/cma.j.issn.0366-6999.20132428
49	Lin et al (2013)	Lin, C. H., Wu, V. C., Li, W. Y., Sy, H. N., Wu, S. L., Chang, C. C., Chiu, P. F., Lion, H. H., Lin, C. Y., Chang, H. W., Lin, S. Y., Wu, K. D., Chen, Y. M., & Wu, R. M. (2013). Restless legs syndrome in end-stage renal disease: A multicenter study in Taiwan. *European Journal of Neurology.* 20(7), 1025-1031. https://doi.org/10.1111/ene.12095
50	Lin et al (2019)	Lin, X. W., Zhang, J. F., Qiu, M. Y., Ni, L. Y., Yu, H. L., Kuo, S. H., Ondo, W. G., Yu, Q., & Wu, Y. C. (2019). Restless legs syndrome in end stage renal disease patients undergoing hemodialysis. *BMC Neurol.* 19(1), 47. https://doi.org/10.1186/s12883-019-1265-y
51	Loewen et al (2009)	Loewen, A., Siemens, A., & Hanly, P. (2009). Sleep disruption in patients with sleep apnea and end-stage renal disease. *Journal of Clinical Sleep Medicine.* 5(4). 324-329.
52	Losso et al (2015)	Losso, R. L. M., Minhoto, G. R., & Riella, M. C. (2015). Sleep disorders in patients with end-stage renal disease undergoing dialysis: comparison between hemodialysis, continuous ambulatory peritoneal dialysis and automated peritoneal dialysis. *International Urology and Nephrology.* 47(2), 369-375. https://doi.org/10.1007/s11255-014-0860-5
53	Malaki et al (2012)	Malaki, M., Mortazavi, F. S., Moazemi, S., & Shoaran, M. (2012). Insomnia and limb pain in hemodialysis patients: what is the share of restless leg syndrome? *Saudi journal of kidney diseases and transplantation*: An official publication of the Saudi Center for Organ Transplantation, Saudi Arabia, 23(1), 15-20. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84857182480&partnerID=40&md5=0fb784b1be861f4d49f96698ab12a03f
54	Merlino et al (2012)	Merlino, G., Lorenzut, S., Romano, G., Sommaro, M., Fontana, A., Montanaro, D., Valente, M., Gigli, G. L., Merlino, G., Lorenzut, S., Romano, G., Sommaro, M., Fontana, A., Montanaro, D., Valente, M., & Gigli, G. L. (2012). Restless legs syndrome in dialysis patients: A comparison between hemodialysis and continuous ambulatory peritoneal dialysis. *Neurological Sciences*. 33(6), 1311-1318. https://doi.org/10.1007/s10072-012-0953-9
55	Merlino et al (2006)	Merlino, G., Piani, A., Dolso, P., Adorati, M., Cancelli, I., Valente, M., & Gigli, G. L. (2006). Sleep disorders in patients with end-stage renal disease undergoing dialysis therapy. *Nephrology Dialysis Transplantation.* 21(1), 184-190. https://doi.org/10.1093/ndt/gfi144
56	Merlino et al (2010)	Merlino, G., Lorenzut, S., Gigli, G. L., Romano, G., Montanaro, D., Moro, A., & Valente, M. (2010). A case-control study on restless legs syndrome in nondialyzed patients with chronic renal failure. *Mov Disord.* 25(8), 1019-1025. https://doi.org/10.1002/mds.23010
57	Miranda et al (2001)	Miranda, M., Araya, F., Castillo, J. L., Durán, C., González, F., & Arís, L. (2001). Restless legs syndrome: A clinical study in adult general population and in uremic patients. *Revista médica de Chile.* 129(2), 179-186.
58	Molnar et al (2007)	Molnar, M. Z., Novak, M., Szeifert, L., Ambrus, C., Keszei, A., Koczy, A., Lindner, A., Barotfi, S., Szentkiralyi, A., Remport, A., & Mucsi, I. (2007). Restless legs syndrome, insomnia, and quality of life after renal transplantation. *Journal of Psychosomatic Research.* 63(6), 591-597. https://doi.org/10.1016/j.jpsychores.2007.06.007
59	Mucsi et al (2005)	Mucsi, I., Molnar, M. Z., Ambrus, C., Szeifert, L., Kovacs, A. Z., Zoller, R., Barótfi, S., Remport, A., & Novak, M. (2005). Restless legs syndrome, insomnia and quality of life in patients on maintenance dialysis. *Nephrol Dial Transplant.* 20(3), 571-577. https://doi.org/10.1093/ndt/gfh654
60	Mucsi et al (2004)	Mucsi, I., Molnar, M. Z., Rethelyi, J., Vamos, E., Csepanyi, G., Tompa, G., Baroffi, S., Marton, A., & Novak, M. (2004). Sleep disorders and illness intrusiveness in patients on chronic dialysis. *Nephrology Dialysis Transplantation.* 19(7), 1815-1822. https://doi.org/10.1093/ndt/gfh130
61	Murtagh et al (2007)	Murtagh, F. E. M., Addington-Hall, J. M., Edmonds, P. M., Donohoe, P., Carey, I., Jenkins, K., & Higginson, I. J. (2007). Symptoms in advanced renal disease: A cross-sectional survey of symptom prevalence in stage 5 chronic kidney disease managed without dialysis . *Journal of Palliative Medicine.* 10(6), 1266-1276. https://doi.org/10.1089/jpm.2007.0017
62	Muzasti & Harahap (2019)	Muzasti, R. A., & Harahap, R. H. (2019). The role of anemia to restless legs syndrome in regular hemodialysis patients in Haji Adam Malik Medan general hospital Proceedings of the 2nd International Conference on Tropical Medicine and Infectious Disease.
63	Naini et al (2015)	Naini, A. E., Amra, B., Mahmoodnia, L., & Taheri, S. (2015). Sleep apnea syndrome and restless legs syndrome in kidney transplant recipients. *Advanced biomedical research.* 4, 206. https://doi.org/https://dx.doi.org/10.4103/2277-9175.166142
64	Nikić et al (2007)	Nikić, P. M., Andrić, B. R., Stojanović-Stanojević, M., Dordević, V., Petrović, D., & Stojimirović, B. B. (2007). Restless legs syndrome prevalence in patients on chronic hemodialysis in central Serbia. *Vojnosanitetski pregled. Military-medical and pharmaceutical review.* 64(2), 129-134. https://doi.org/10.2298/VSP0702129N

65	Nikola et al (2012)	Nikola, S., Marinela, K., Jelena, J., & Vidojko, D. (2012). Restless legs syndrome in patients on hemodialysis: Frequency, severity and risk factors. *Medicinski Casopis.* 46(3), 138-144. https://doi.org/10.5937/mckg46-2330
66	Noda et al (2006)	Noda, A., Nakai, S., Soga, T., Sugiura, T., Iwayama, N., Maeda, K., Atarashi, M., Yasuma, F., Ozaki, N., Yokota, M., & Koike, Y. (2006). Factors contributing to sleep disturbance and hypnotic drug use in hemodialysis patients. *Intern Med.* 45(22), 1273-1278. https://doi.org/10.2169/internalmedicine.45.1826
67	Ogna et al (2016)	Ogna, A., Forni Ogna, V., Haba Rubio, J., Tobback, N., Andries, D., Preisig, M., Tafti, M., Vollenweider, P., Waeber, G., Marques-Vidal, P., & Heinzer, R. (2016). Sleep Characteristics in Early Stages of Chronic Kidney Disease in the HypnoLaus Cohort. *Sleep.* 39(4), 945-953. https://doi.org/https://dx.doi.org/10.5665/sleep.5660
68	Pan et al (2006)	Pan, J. Y., Zhang, J. H., Ma, P., Liang, H. J., & Huang, Z. T. (2006). Effect of restless legs syndrome on the sleep quality of hemodialysis patients. *Chinese Journal of Clinical Rehabilitation.* 10(10), 19-21. https://www.scopus.com/inward/record.uri?eid=2-s2.0-33646036172&partnerID=40&md5=ccdf937a9bb10bf6c98f764d0c1ae8ad
69	Pavan et al (2014)	Pavan, M., & Sathish, J. (2014). Restless legs syndrome in patients on chronic hemodialysis. *Dial Traspl.* 35, 3-6. https://doi.org/http://dx.doi.org/10.1016/j.dialisis.2013.05.002
70	Pizza et al (2012)	Pizza, F., Persici, E., La Manna, G., Campieri, C., Plazzi, G., Carretta, E., Cappuccilli, M. L., Ferri, B., Stefoni, S., & Montagna, P. (2012). Family recurrence and oligo-anuria predict uremic restless legs syndrome. *Acta Neurol Scand.* 125(6), 403-409. https://doi.org/10.1111/j.1600-0404.2011.01581.x
71	Quinn et al (2011)	Quinn, C., Uzbeck, M., Saleem, I., Cotter, P., Ali, J., O'Malley, G., Gilmartin, J. J., & O'Keeffe, S. T. (2011). Iron status and chronic kidney disease predict restless legs syndrome in an older hospital population. *Sleep Medicine.* 12(3), 295-301. https://doi.org/10.1016/j.sleep.2010.08.014
72	Rafie et al (2016)	Rafie, S., Jafari, M., Azizi, M., Bahadoram, M., & Jafari, S. (2016). Restless legs syndrome in hemodialysis patients. *Saudi journal of kidney diseases and transplantation*: An official publication of the Saudi Center for Organ Transplantation, Saudi Arabia, 27(2), 326-330. https://doi.org/10.4103/1319-2442.178553
73	Razeghi et al (2012)	Razeghi, E., Sahraian, M. A., Heidari, R., & Bagherzadeh, M. (2012). Association of inflammatory biomarkers with sleep disorders in hemodialysis patients. *Acta Neurol Belg.* 112(1), 45-49. https://doi.org/10.1007/s13760-012-0003-7
74	Riar et al (2019)	Riar, S. K., Greenbaum, L. A., Bliwise, D. L., & Leu, R. M. (2019). Restless Legs Syndrome in Chronic Kidney Disease: Is Iron or Inflammatory Status To Blame? *Journal of clinical sleep medicine*: JCSM: Official publication of the American Academy of Sleep Medicine. 15(11), 1629-1634. https://doi.org/https://dx.doi.org/10.5664/jcsm.8028
75	Rijsman et al (2004)	Rijsman, R. M., Weerd, A. W. D., Stam, C., Kerkhof, G. A., & Rosman, J. B. (2004). Periodic limb movement disorder and restless legs syndrome in dialysis patients. *NEPHROLOGY. /9*, 353–361.
76	Rohani et al (2015)	Rohani, M., Aghaei, M., Jenabi, A., Yazdanfar, S., Mousavi, D., & Miri, S. (2015). Restless legs syndrome in hemodialysis patients in Iran. *Neurological Sciences.* 36(5), 723-727. https://doi.org/10.1007/s10072-014-2026-8
77	Sabry et al (2010)	Sabry, A. A., Abo-Zenah, H., Wafa, E., Mahmoud, K., El-Dahshan, K., Hassan, A., Abbas, T. M., Saleh, A. B., & Okasha, K. (2010). Sleep disorders in hemodialysis patients. *Saudi journal of kidney diseases and transplantation*: An official publication of the Saudi Center for Organ Transplantation, Saudi Arabia, 21(2), 300-305.
78	Salman (2011)	Salman, S. M. (2011). Restless legs syndrome in patients on hemodialysis. *Saudi journal of kidney diseases and transplantation*: An official publication of the Saudi Center for Organ Transplantation, Saudi Arabia, 22(2), 368-372.
79	Samavat et al (2017)	Samavat, S., Fatemizadeh, S., Fasihi, H., & Farrokhy, M. (2017). Restless leg syndrome, insomnia, and depression in hemodialysis patients: Three sides of a triangle? *Nephro-Urology Monthly.* 9(3), Article e45076. https://doi.org/10.5812/numonthly.45076
80	Saraji et al (2017)	Saraji, N. Z., Hami, M., Boostani, R., & Mojahedi, M. J. (2017). Restless leg syndrome in chronic hemodialysis patients in Mashhad hemodialysis centers. *Journal of Renal Injury Prevention.* 6(2), 137-141. https://doi.org/10.15171/jrip.2017.27
81	Shaikh et al (2014)	Shaikh, R. A., Solangi, S., Rathi, S. K., & Shaikh, Q. H. (2014). Prevalence of restless legs syndrome in Haemodialysis patients. *Journal of the Liaquat University of Medical and Health Sciences.* 13(1), 18-21. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84904560040&partnerID=40&md5=217b069534a3d800862f7d920789879b
82	Sinha et al (2009)	Sinha, R., Davis, I. D., & Matsuda-Abedini, M. (2009). Sleep disturbances in children and adolescents with non-dialysis-dependent chronic kidney disease. *Archives of Pediatrics and Adolescent Medicine.* 163(9), 850-855. https://doi.org/10.1001/archpediatrics.2009.149
83	Siddiqui et al (2005)	Siddiqui, S., Kavanagh, D., Traynor, J., Mak, M., Deighan, C., & Geddes, C. (2005). Risk factors for restless legs syndrome in dialysis patients. *Nephron Clin Pract.* 101(3), c155-160. https://doi.org/10.1159/000087073
84	Soyoral et al (2010)	Soyoral, Y., Sayarlioğlu, H., Tuncel, D., Şahin, M., Doğan, E., & Erkoç, R. (2010). Prevalence and risk factors of restless leg syndrome in a single hemodialysis unit. *Turkish Journal of Medical Sciences.* 40(3), 443-446. https://doi.org/10.3906/sag-0903-10
85	Stefanidis et al (2013)	Stefanidis, I., Vainas, A., Dardiotis, E., Giannaki, C. D., Gourli, P., Papadopoulou, D., Vakianis, P., Patsidis, E., Eleftheriadis, T., Liakopoulos, V., Pournaras, S., Sakkas, G. K., Zintzaras, E., & Hadjigeorgiou, G. M. (2013). Restless legs syndrome in hemodialysis patients: An epidemiologic survey in greece. *Sleep Medicine.* 14(12), 1381-1386. https://doi.org/10.1016/j.sleep.2013.05.022
86	Szentkiralyi et al (2009)	Szentkiralyi, A., Molnar, M. Z., Czira, M. E., Deak, G., Lindner, A. V., Szeifert, L., Torzsa, P., Vamos, E. P., Zoller, R., Mucsi, I., & Novak, M. (2009). Association between restless legs syndrome and depression in patients with chronic kidney disease. *Journal of Psychosomatic Research.* 67(2), 173-180. https://doi.org/10.1016/j.jpsychores.2009.05.004
87	Takaki et al (2003)	Takaki, J., Nishi, T., Nangaku, M., Shimoyama, H., Inada, T., Matsuyama, N., Kumano, H., & Kuboki, T. (2003). Clinical and psychological aspects of restless legs syndrome in uremic patients on hemodialysis. *American Journal ofKidney Diseases.* 41, 833-839.

88	Tekdöş Demircioğlu et al (2015)	Tekdöş Demircioğlu, D., Kavadar, G., Esen Öre, Ö., Emre, T. Y., & Yaka, U. (2015). Relationship between restless leg syndrome and quality of life in uremic patients. *Agri: Agri (Algoloji) Dernegi'nin Yayin organidir, The journal of the Turkish Society of Algology.* 27(2), 73-78. https://doi.org/10.5505/agri.2015.19327
89	Telarović et al (2007)	Telarović, S., Relja, M., & Trkulja, V. (2007). Restless legs syndrome in hemodialysis patients: Association with calcium antagonists - A preliminary report. *European Neurology.* 58(3), 166-169. https://doi.org/10.1159/000104718
90	Tuncel et al (2011)	Tuncel, D., Orhan, F. O., Sayarlioglu, H., Isik, I. O., Utku, U., & Dinc, A. (2011). Restless legs syndrome in hemodialysis patients: Association with depression and quality of life. *Sleep Breath.* 15(3), 311-315. https://doi.org/10.1007/s11325-010-0382-z
91	Turk et al (2018)	Turk, A. C., Ozkurt, S., Turgal, E., & Sahin, F. (2018). The association between the prevalence of restless leg syndrome, fatigue, and sleep quality in patients undergoing hemodialysis. *Saudi Med J.* 39(8), 792-798. https://doi.org/10.15537/smj.2018.8.22398
92	Wali & Alkhouli (2015)	Wali, S. O., & Alkhouli, A. F. (2015). Restless legs syndrome among Saudi end-stage renal disease patients on hemodialysis. *Saudi Medical Journal.* 36(2), 204-210. https://doi.org/10.15537/smj.2015.2.10036
93	Walker et al (1995)	Walker, S., Fine, A., & Kryger, M. H. (1995). Sleep complaints are common in a dialysis unit. *American Journal of Kidney Diseases.* 26(5), 751-756.
94	Winkelman et al (1996)	Winkelman, J. W., Chertow, G. M., & Lazarus, J. M. (1996). Restless legs syndrome in end-stage renal disease. *American Journal of Kidney Diseases.* 28(3), 372-378. https://doi.org/10.1016/S0272-6386(96)90494-1
95	Xiao et al (2017)	Xiao, J.-P., Zhang, G.-X., Chen, L., Sun, B.-G., Zhang, H.-X., Chen, L.-H., Yuan, L., Hao, L., & Wang, D.-G. (2017). Restless legs syndrome in maintenance hemodialysis patients: an epidemiologic survey in Hefei. *International Urology and Nephrology.* 49(7), 1267-1272. https://doi.org/https://dx.doi.org/10.1007/s11255-017-1573-3
96	Yang et al (2019)	Yang, Y., Ye, H., He, Q., Zhang, X., Yu, B., Yang, J., & Chen, J. (2019). Association between predialysis hypermagnesaemia and morbidity of uraemic restless legs syndrome in maintenance haemodialysis patients: A retrospective observational study in Zhejiang, China. *BMJ Open.* 9(7). https://doi.org/10.1136/bmjopen-2018-027970
97	Yildiz et al (2016)	Yildiz, D., Kahveciołlu, S., Buyukkoyuncu, N., Kilic, A. K., Yildiz, A., Gul, C. B., Seferoglu, M., & Tufan, F. (2016). Restless-legs syndrome and insomnia in hemodialysis patients. *Renal Failure.* 38(2), 194-197. https://doi.org/10.3109/0886022X.2015.1111118

Appendix 3. Characteristics Included Studies of the Prevalence of RLS Among Chronic Kidney Disease

No	Author (year), Country, Study design	Population characteristics (m + SD); (n, %)	RLS prevalence (n, %), Diagnostic tool	Comorbidities, Life style & other sleep problems (m ± SD); (n, %)	Laboratory parameters (m ± SD)	Risk of bias
1	Al-Jahdali, H. H et al (2009), Saudi Arabia, Cross-sectional	Sample size: 227 Population: Adult Mean Age (years): 55.70 + 17.02 Sex: NI Duration of dialysis (months): 40.40 + 37.80	Prevalence: 114 (50.22) Diagnostic tool: IRLSSG	NI	NI	8-M
2	Alvarez-Ude et al (1999), Spain, Cross-sectional	Sample size: 60 Population: Adult NI	Prevalence: 16 (26.67) Diagnostic tool: the Spanish versions of the Medical Outcome Study Sleep Scale	NI	NI	8-M
3	Applebee et al (2009), USA, Cross-sectional	Sample size: 26 Participants: Children and Adolescent Mean Age (years): 13.70 ± 0.50 Sex: M: 13 (50) F: 13 (50) BMI, kg/m2: 21.30 ± 6.70	Prevalence: 9 (34.62) Diagnostic tool: RLS for Children	NI	Creatinine (mg/dl): 1.50 ± 0.60 Ferritin (ng/mL): 151 ± 169 Hemoglobin (g/dL): 12.60 ± 1.40 Iron (ng/dL): 70.50 ± 45.80	9-L
4	Aritake-Okada et al (2011), Japan, Cross-sectional	Sample size: 514 Population: Adult Mean Age (years): 66.31 + 14.78 Sex: M: 353 (68.68) F: 151 (31.32)	Prevalence: 18 (3.50) Diagnostic tool: IRLSSG		BUN (mg/dL): 38.60 ± 21.50 Creatinine (mg/dL): 3.90 ± 3.80 GFR (ml/min/1.73 m2): 24.40 ± 17.30	9-L
5	Amiri et al (2019), Iran, Cross-sectional	Sample size: 116 Population: Adult Mean Age (years): 60.10 + 14.40 Sex: M: 68 (58.62) F: 48 (41.38)	Prevalence: 78 (67.24) Diagnostic tool: IRLSSG	NI	NI	8-M
6	Araujo et al (2010), Brazil, Cross-sectional	Sample size: 400 Population: Adult Mean Age (years): 51.52 ± 15.68 Sex: M: 236 (59) F: 164 (41) BMI, kg/m2: 23.19 ± 3.97 Dialysis duration (months): 70.92 ± 66.24	Prevalence: 86 (21.5) Diagnostic tool: IRLSSG	Diabetes mellitus: 12 (13.95) Hypertension: 16 (18.60) ESS score: 8.37 ± 4.67 Sleep quality: 10.07 ± 6.90	Albumin (g/dL): 4.03 ± 0.32 Calcium (mg/dL): 8.68 ± 0.75 Ferritin (ng/mL): 435.70 ± 342.07 Hemoglobin (g/dL): 11.28 ± 1.87 PTH (pg ⁄mL): 418.58 ± 507.72	9-L
7	Baiardi et al (2017), Italy, Cohort Prospective	Sample size: 128 Population: Adult Mean Age (years): 61.27 + 13.47 Sex: M: 80 (62.50) F: 48 (37.50) Duration of dialysis (months): 83.10 + 79.60	Prevalence: 47 (36.72) Diagnostic tool: IRLSSG	Diabetes mellitus: 6 (12.70) Peripheral vascular disease: 7 (14.90)	NI	8-M

8	Bambini et al (2019), Brazil, Case-control	Sample size: 25 Population: Adult Mean Age (years): 50 + 10 Sex: M: 7 (28) F: 18 (72) BMI, kg/m2: 25.70 + 4.80	Prevalence: 14 (56) Diagnostic tool: PSG	Hypertension: 14 (100) Smoking: 2 (14.30) ESS score: 7.70 ± 4.50	Albumin (g/dL): 4.0 ± 0.6 Calcium (mg/ dL): 9.80 ± 0.8 Creatinine (mg/dl): 8.40 ± 2.30 Hemoglobin (mg/dL): 11.20 ± 2.30 Iron (ng/dL): 57 ± 15 Vitamin D (ng/mL): 22.80 ± 7.80	9-L
9	Bathla et al (2016), Saudi Arabia, Cross-sectional	Sample size: 194 Population: Adult Mean Age (years): 54.40 ± 15 Sex: M: 113 (58.25) F: 81 (41.75) Duration of dialysis (months): 36.60 + 19.30	Prevalence: 10 (5.2) Diagnostic tool: IRLSSG	NI	NI	7-M
10	Beladi-Mousavi et al (2015), Iran, Cross-sectional	Sample size: 139 Population: Adult Mean Age (years): 51.82 ± 13.32 Sex: M: 60 (43.17) F: 79 (56.83) Duration of dialysis (months): 31.56 + 30.14	Prevalence: 22 (15.83) Diagnostic tool: IRLSSG	NI	Calcium (mg/dL): 8.54 ± 1.18 Ferritin (ng/mL): 713 ± 211.81 Hemoglobin (g/dL): 10.32 ± 1.59 Kt/V: 1.25 ± 0.03 Phosphate (mg/dL): 5.57 ± 1.59	8-M
11	Bhagawati et al (2019), India, Cross-sectional	Sample size: 300 Population: Adult Mean Age (years): 47.58 ± 15.04 Sex: M: 223 (74.33) F: 77 (25.67)	Prevalence: 60 (20) Diagnostic tool: IRLSSG	Diabetes mellitus: 14 (23.33) Hypertension: 29 (48.33) Smoking: 28 (46.67)	NI	8-M
12	Bhowmik et al (2004), India, Case-control	Sample size: 65 Population: Adult Mean Age (years): 42.40 ± 14.90 Sex: M: 50 (76.92) F: 15 (23.08) BMI, kg/m2: 21.50 ± 3.50	Prevalence: 1 (1.54) Diagnostic tool: IRLSSG	NI	Albumin (g/dL): 3.60 ± 0.7 Bilirubin (mg/dL): 0.69 ± 0.21 BUN (mg/dL): 134.80 ± 51.60 Calcium (mg/dL): 8.70 ± 1.08 Cholesterol (gr/dL): 179.20 ± 56.90 Creatinine (mg/dL): 6.60 ± 2.20 Ferritin (ng/mL): 157.60 ± 109.90 GFR (ml/min/1.73 m2): 10.40 ± 2.90 Hemoglobin (g/dL): 8.54 ± 2.17 Phosphate (mg/dL): 5.16 ± 1.05	7-M
13	Bliwise et al (2014), USA, Case-control	Sample size: 16,165 Population: Adult Mean Age (years): 61.40 ± 14.90 Sex: M: 7,856 (48.59) F: 8,309 (51.41) Medication: antidepressants, antiemetics with significant dopamine blockade, neuroleptic, antihistamines, erythropoietin.	Prevalence: 3,234 (20) Diagnostic tool: IRLSSG	Diabetes mellitus: 1,753 (54.20)	Hemoglobin (g/dL): 10.07 ± 1.58	9-L

14	Brzuszek et al (2022), United Kingdom, Cross-sectional	Sample size: 212 Population: Adult Mean Age (years): 64.30 ± 15.50 Sex: M: 124 (58.49) F: 88 (41.51)	Prevalence: 68 (32.08) Diagnostic tool: IRLSSG	Cardiovascular disease: 17 (25) Diabetes mellitus: 24 (35.29) Smoking: 6 (8.82)	Albumin (g/dL): 3.44 ± 0.48 Ferritin (ng/mL): 310 ± 218.5 Hemoglobin (g/dL): 11.27 ± 1.57 Phosphate (mmol/L): 1.40 ± 0.4 Potassium (mmol/L): 4.80 ± 0.6	9-L
15	Calviño et al (2018), Spain, Cross-sectional	Sample size: 129 Population: Adult Mean Age (years): 57 ± 12.80 Sex: M: 82 (63.57) F: 47 (36.43) BMI, kg/m2: 29.90 ± 7.72	Prevalence: 19 (14.73) Diagnostic tool: IRLSSG	COPD: 3 (15.80) Diabetes mellitus: 8 (42.10) Depression: 5 (26.30) Congestive heart failure: 10 (5.20)	Calcium (mg/dL): 9.4 ± 0.45 Creatinine (mg/dL): 1.6 ± 0.67 Ferritin (ng/mL): 222 ± 176.0 Folate (ng/mL): 7.0 ± 2.44 Hemoglobin (g/dL): 12.80 ± 1.69 Iron (ng/dL): 86 ± 28.40 Phosphate (mg/dL): 3.6 ± 0.76 Transferrin (mg/dL): 239 ± 38.5 Vitamin B12 (ng/mL): 515 ± 149.9 Vitamin D (ng/mL): 25 ± 8.6	8-M
16	Capelli et al (2021), Italy, Cohort Prospective	Sample size: 45 Population: Adult Mean Age (years): 59.76 + 13.38 Sex: M: 26 (44.58) F: 19 (55.42) BMI, kg/m2: 25.41 + 4.45	Prevalence: 7 (15.56) Diagnostic tool: IRLSSG	Diabetes mellitus: 1 (14) Cholesterol (mg/dL): 172.67 ± 36.80 ESS score: 10.71 ± 3.09 Insomnia: 6 (86)	Albumin (g/dL): 3.88 ± 0.42 BUN (mg/dl): 7.24 ± 1.68 Creatinine (mg/dL): 7.51 ± 3.72 Ferritin (ng/mL): 561.16 ± 820.88 Hemoglobin (g/dL): 10.28 ± 0.77 Iron (ng/dL): 41.3 ±18.80 PTH (pg/mL): 411.40 ± 220.24	8-M
17	Castillo-Torres et al (2018), Mexico, Cross-sectional	Sample size: 105 Population: Adult Mean Age (years): 49.35 + 16.31 Sex: M: 47 (44.76) F: 58 (55.24) Duration of dialysis (months): 47.52 + NI	Prevalence: 19 (18.09) Diagnostic tool: IRLSSG	Anemia: 12 (63.20) Cerebrovascular disease: 2 (10.50) Diabetes mellitus: 11 (57.90) Hypertension: 18 (97.40) Peripheral Neuropathy: 2 (10.50)	BUN (mg/dL): 53.60 ± 27.30 Calcium (mg/dL): 8.20 ± 0.9 Chloride (mmol/L): 101.90 ± 4.80 Creatinine (mg/dL): 9.70 ± 3.60 GFR (mL/min/1.73m2): 7.30 ± 3.20 Hemoglobin (g/dL): 7.91 ± 1.38 Hematocrit (%): 24.80 ± 4.30 Magnesium (mg/dL): 2.70 ± 0.4 Phosphorus (mg/dL): 5.10 ± 1.50 Potassium (mmol/L): 5.0 ± 0.9 Sodium (mmol/L): 137.10 ± 2.90	7-M
18	Chavoshi et al (2015), Iran, Cross-sectional	Sample size: 397 Population: Adult Mean Age (years): 57.60 ± 15.40 Sex: M: 209 (52.64) F: 188 (47.36) BMI, kg/m2: 24.21 + NI Medication: anti-hypertension, diabetes, corticosteroid.	Prevalence: 126 (31.70) Diagnostic tool: IRLSSG	Anemia: 16 (27.60) Cardiovascular disease: 26 (27.10) Diabetes mellitus: 50 (35.20) Hypertension: 45 (30) Smoking: 13 (18.80) Poor sleep quality: 96 (76.20)	NI	9-L
19	Chrastina et al (2015), Slovakia, Cross-sectional	Sample size: 75 Population: Adult Mean Age (years): 51.14 ± 11.12 Sex: M: 39 (52%) F: 36 (48%)	Prevalence: 30 (40.54) Diagnostic tool: IRLSSG	NI	Calcium (mg/dL): 2.53 ± 0.23 Creatinine (mg/dL): 119.81 ± 44.77 Ferritin (ng/mL): 551.23 ± 431.87 GFR (mL/min/1.73m2): 59.30 ± 18.75 Hemoglobin (g/dL): 12.82 ± 1.24 Iron (ng/dL): 13.38 ± 3.94	9-L

		Dialysis duration (months): 40.84 ± 30.74			Phosphorus (mg/dL): 4.45 ± 15.43	
20	Chu et al (2014), Australia, Cross-sectional	Sample size: 85 Population: Adult Mean Age (years): 63.68 ± 14.38 Sex: M: 54 (63.53) F: 31 (36.47) Duration of dialysis (months): 27.69 ± 32.55 Medication: Benzodiazepine	Prevalence: 21 (30.88) Diagnostic tool: IRLSSG	Diabetes mellitus: 8 (38.10)	BUN (mg/dL): 19.69 ± 4.89 Ferritin (ng/mL): 763.07± 570.78 Hemoglobin (g/dL): 10.54 ± 0.77 Kt/V: 1.55 ± 0.41	7-M
21	Cirignotta et al (2002), Italy, Cross-sectional	Sample size: 114 Population: Adult Mean Age (years): 63.60 ± 12.70 Sex: M: 70 (61.40) F: 40 (35.09) Dialysis duration (months): 74.10 ± 71.10	Prevalence: 38 (33.30) Diagnostic tool: RLSQ	NI	NI	8-M
22	Collado-Seidel et al (1998), Germany, Cross-sectional	Sample size: 136 Population: Adult Mean Age (years): 59 ± NI Sex: M: 84 (61.76) F: 52 (38.24) Dialysis duration (months): 54 ± NI	Prevalence: 32 (23) Diagnostic tool: IRLSSG	NI	Calcium (mg/dL): 10.0 ± 2.40 Creatinine (mg/dL): 10.90 ± 2.30 Ferritin (ng/mL): 278 ± 269 Hemoglobin (g/dL): 10.0 ± 1.0 Iron (ng/dL): 52 ± 26 Phosphate (mg/dL): 5.50 ± 1.70 PTH (pg ⁄mL): 75 ± 66 Transferrin (mg/dL): 228 ± 49	8-M
23	Collister et al (2019), Canada, Cohort	Sample size: 50 Population: Adult Mean Age (years): 64 ± 12.40 Sex: M: 26 (52) F: 24 (48) Medication: Dopamine	Prevalence: 14 (28) Diagnostic tool: IRLSSG	Diabetes mellitus: 7 (50) Cardiovascular disease: 2 (14.30) Cerebrovascular disease: 1 (7.10) Peripheral vascular disease: 1 (7.10) Obstructive sleep apnea: 3 (21.40)	Albumin (g/dL): 3.2 ± 0.23 Hemoglobin (g/dL): 10.4 ± 1.0 PTH (pg/mL): 72.1 ± 51.7	8-M
24	Darwish & Abdel-Nabi (2016), Egypt, Case-control	Sample size: 54 Participants: Children and Adolescent Mean Age (years): 9.88 ± 2.85 Sex: M: 31 (57.41) F: 23 (42.59) BMI, kg/m2: 17.93 ± 3.31 Dialysis duration (months): 26.77 ± 25.87	Prevalence: 12 (22.22) Diagnostic tool: RLSQ	ESS score: 9.07 ± 3.74	Calcium (mg/dL): 9.96 ± 0.76 Creatinine (mg/dL): 2.98 ± 2.55 GFR (mL/min/1.73m2): 10.69 ± 2.33 Hemoglobin (g/dL): 10.93 ± 1.20 Kt ⁄V: 1.13 ± 0.08 Phosphorus (mg/dL): 4.72 ± 0.79	8-M
25	Davis et al (2005), USA, Cross-sectional	Sample size: 21 Participants: Children and Adolescent Mean Age (years): 14.30 ± 4.50	Prevalence: 6 (28.57) Diagnostic tool: RLSQ	ESS score: 9.0 ± 3.10	Hemoglobin (g/dL): 11.0 ± 2.0	8-M

		Sex: M: 11 (52.38) F: 10 (47.62)				
26	Davis et al (2012), USA, Cross-sectional	Sample size: 159 Participants: Children and Adolescent Mean Age (years): 13.80 ± 3.60 Sex: M: 81 (50.94) F: 78 (49.06) Medication: Antihypertensives, Corticosteroids, Erythropoiesis-stimulating agents, CNS-stimulating agents, Antidepressants, Antihistamines	Prevalence: 16 (10.06) Diagnostic tool: Standard criteria for the diagnosis of RLS in children and adolescents	Daytime Sleepiness: 7 (43.75) ESS score: 6.30 ± 4.70 Obstructive sleep apnea: 4 (25%)	GFR (mL/min/1.73m2): 67.30 ± 42.30	9-L
27	Deferio et al (2017), USA, Case-control	Sample size: 279,956 Population: Adult Mean Age (years): 62.05 ± 15.39 Sex: M: 122,400 (43.72) F: 157,556 (56.28) BMI, kg/m2: 28.98 ± 7.57	Prevalence: 372 (0.13) Diagnostic tool: IRLSSG	Anemia: 44 (11.83) Cardiovascular disease: 64 (17.20) Congestive heart failure: 98 (26.34) Cerebrovascular disease: 30 (8.06) Diabetes mellitus: 145 (38.98) Depression: 15 (4.03) Hypertension: 311 (83.6) Peripheral vascular disease: 38 (10.22) Obstructive sleep apnea: 17 (4.57)	Albumin (g/dL): 3.32 ± 0.64 Creatinine: 6.64 ± 3.74	8-M
28	Deliyska et al (2011), Russia, Cross-sectional	Sample size: 61 Population: Adult Dialysis duration (months): 58.33 ± 14.06	Prevalence: 10 (16.39) Diagnostic tool: IRLSSG	NI	Creatinine (mg/dl): 3.21 ± 1.06 Hemoglobin (g/dL): 10.68 ± 1.69 Phosphate (mmol/L): 4.72 ± 1.29	8-M
29	Dikici et al (2014), Turkey, Cross-sectional	Sample size: 246 Population: Adult Mean Age (years): 59.70 ± 14.0 Sex: M: 124 (50.20) F: 122 (49.80) Dialysis duration (months): 58.80 ± 50.40	Prevalence: 113 (45.9) Diagnostic tool: IRLSSG	NI	Albumin (g/dL): 3.80 ± 0.4 Ferritin (ng/mL): 754.70 ± 440.5 Hemoglobin (g/dL): 11.10 ± 1.30 PTH (pg ⁄mL): 417.50 ± 391.20	8-M
30	Erdogan et al (2012), Turkey, Cross-sectional	Sample size: 112 Population: Adult Mean Age (years): 51 ± 15 Sex: M: 60 (53.57) F: 52 (46.43) Dialysis duration (months): 41 ± 29 BMI, kg/m2: 27.50 ± 5.70	Prevalence: 40 (35.71) Diagnostic tool: IRLSSG	NI	Albumin (g/dL): 3.40 ± 0.5 BUN (mg/dL): 108 ± 34 Calcium (mg/dL): 8.89 ± 0.98 Creatinine (mg/dL): 7.70 ± 2.80 Ferritin (ng/mL): 632.16 ± 710.54 GFR (mL/min/1.73m2): 5.0 ± 3.70 Hemoglobin (g/dL): 10.50 ± 1.90 Kt ⁄V: 1.61 ± 0.48 Phosphate (mg/dL): 4.45 ± 1.21	8-M

					PTH (pg ⁄mL): 299.58 ± 292.03	
31	Ezzat & Mohab (2015), Egypt, Case-control	Sample size: 60 Population: Adult	Prevalence: 11 (18.33) Diagnostic tool: PSG	NI	NI	7-M
32	Giannaki et al (2011), Greece, Cross-sectional	Sample size: 70 Population: Adult Mean Age (years): 54.10 ± 16.90 Sex: M: 51 (72.86%) F: 19 (27.14%) Dialysis duration (months): 36 ± 31.20 BMI, kg/m2: 25.50 ± 4.20	Prevalence: 30 (42.86%) Diagnostic tool: IRLSSG	ESS Score: 7.1 ± 4.4	Ferritin (ng/mL): 241.10 ± 206.60 Hemoglobin (g/dL): 12.20 ± 1.50 Kt ⁄V: 1.22 ± 0.4	9-L
33	Gigli et al (2004), Italy, Cross-sectional	Sample size: 407 Population: Adult Mean Age (years): 64.62 ± 13.17 Sex: M: 252 (61.92) F: 155 (38.08) BMI, kg/m2: 25 ± 5.50 Medication: antihypertensive, antidiabetics, benzodiazepines, clonidine, calcitriol, erythropoietin.	Prevalence: 127 (31.20) Diagnostic tool: IRLSSG	Alcohol use: 20 (15.50) Smoking: 15 (11.80) ESS score: 4.70 ± 3.70	NI	7-M
34	Goffredo Filho et al (2003), Brazil, Cross-sectional	Sample size: 176 Population: Adult Mean Age (years): 52 ± 13.90 Sex: M: 107 (60.80) F: 69 (39.20)	Prevalence: 26 (14.77) Diagnostic tool: IRLSSG	Diabetes mellitus: 6 (27.27) Hypertension: 22 (84.62)	Calcium (mg/dL): 2.19 ± 0.09 Creatinine (mg/dL): 8.39 ± 2.99 Hemoglobin (g/dL): 6.57 ± 0.93 Phosphorus (mg/dL): 1.51 ± 0.12 PTH (pg/mL): 181.90 ± 124.60	9-L
35	Haider & Anees (2014), Pakistan, Cross-sectional	Sample size: 250 Population: Adult Mean Age (years): 45.27 ± NI Sex: M: 153 (61.20) F: 97 (38.80) Duration of dialysis (months): 26.10 ± NI	Prevalence: 162 (64.80) Diagnostic tool: IRLSSG	NI	NI	8-M
36	Hamed et al (2023), Egypt, Cross-sectional	Sample size: 520 Population: Adult Mean Age (years): 50.45 ± 3.63 Sex: M: 200 (38.46) F: 320 (61.54) BMI, kg/m2: 30.46 ± 2.23	Prevalence: 116 (22.31) Diagnostic tool: IRLSSG	Anxiety: 100 (86.21) Diabetes mellitus: 56 (48.28) Depression: 92 (79.31) Hypertension: 36 (31.03) Hyperuricemia: 50 (43.10) Peripheral neuropathy: 92 (79.31) Hyperkalemia: 40 (34.48) Hyperparathyroidism: 84 (72.41) ESS score: 14.66 ± 1.08 Insomnia (ISI score): 18.66 ± 1.8	Albumin (g/dL): 2.60 ± 0.48 BUN (mg/dL): 15.36 ± 2.58 Calcium (mg/dL): 6.54 ± 0.30 Creatinine (mg/dL): 5.98 ± 1.17 Ferritin (ng/mL): 110.26 ± 6.35 Hemoglobin (g/dL): 8.82 ± 1.36 Iron (ng/dL): 88.29 ± 3.06 Magnesium (mg/dL): 2.35 ± 0.8 Phosphate (mg/dL): 5.42 ± 1.52 Potassium (mmol/L): 4.20 ± 0.6 Sodium (mmol/L): 136.0 ± 2.64	7-M

37	Hasheminasab Zaware et al (2016), Iran, Cross-sectional	Sample size: 45 Population: Adult Mean Age (years): NI Sex: M:21 (46.67) F: 23 (53.33)	Prevalence: 25 (55) Diagnostic tool: RLSQ	NI	NI	8-M
38	Hsu et al (2008), Taiwan, Cross-sectional	Sample size: 150 Population: Adult Mean Age (years): 55.28 + 11.09 Sex: M: 67 (44.67) F: 83 (55.33) BMI, kg/m2: 22.31 + 3.30 Duration of dialysis (months): 60.14 + 43.80	Prevalence:34 (22.7) Diagnostic tool: The sleep questionnaire	ESS score: 2.37 ± 2.77 Sleep quality: 5.92 ± 4.30	Albumin (g/dL): 3.92 ± 2.73 BUN (mg/dL): 68.60 ± 17.56 Creatinine (mg/dL): 11.89 ± 2.64 Hemoglobin (g/dL): 11.52 ± 8.54 Kt/V: 1.39 ± 0.24 PTH (pg/mL): 210.29 ± 295.07	7-M
39	Hui et al (2000), Hongkong, Cross-sectional	Sample size: 201 Population: Adult Mean Age (years): 56.70 + 12 Sex: M: 103 (51.24) F: 98 (48.76) BMI, kg/m2: 23.60 + 3.50 Duration of dialysis (months): 36 + 27.60	Prevalence: 124 (62) Diagnostic tool: the Sleep and Health Questionnaire (SHQ).	Alcohol use: 4 (3.23) Diabetes mellitus: 48 (23.90) Hypertension: 6 (4.84) Smoking: 9 (4.50)	NI	7-M
40	Ibrahim & Wegdan (2011), Egypt, Cross-sectional	Sample size: 264 Population: Adult Mean Age (years): 50.83 ± 14.48 Sex: M: 147 (55.68) F: 117 (44.32) Duration of dialysis (months): 25.41 + 16.21	Prevalence: 149 (56.44) Diagnostic tool: IRLSSG	Anemia: 145 (59.20) Diabetes mellitus: 107 (66.50) Hypertension: 74 (61.70) Insomnia: 86 (57.72) Obstructive sleep apnea: 56 (21.20)	NI	9-L
41	Jaber et al (2011), USA, Cohort Prospective	Sample size: 235 Population: Adult Mean Age (years): 52 ± 15 Sex: M: 150 (63.83) F: 85 (36.17) BMI, kg/m2: 29 + 7 Duration of dialysis (months): 43.20 + 49.20	Prevalence: 94 (40) Diagnostic tool: IRLSSG	COPD: 8 (8.51) Diabetes mellitus: 45 (47.87) Congestive heart failure: 24 (25.53) Cerebrovascular disease: 8 (8.51) Hypertension: 83 (88.29) Peripheral vascular disease: 9 (9.57) Smoking: 15 (15.96)	Albumin (g/dL): 3.80 ± 0.5 BUN (mg/dL): 60 ± 18 Calcium (mg/dL): 8.90 ± 0.8 Creatinine (mg/dL): 9.30 ± 3.40 Ferritin (ng/mL): 490 ± 253 Hemoglobin (g/dL): 11.60 ± 1.40 Phosphorus (mg/dL): 5.90 ± 1.50 Potassium (mmol/L): 4.90 ± 0.7	8-M
42	Kamal et al (2020), Egypt, Cross-sectional	Sample size: 200 Population: Adult Mean Age (years): 51.70 ± 6 Sex: M: 133 (66.50%) F: 67 (33.50%) BMI, kg/m2: 26.70 + 1.90	Prevalence: 54 (26.90) Diagnostic tool: IRLSSG	ESS score: 7.50 ± 3.40 Sleep quality: 6.10 ± 3.90	Albumin (g/dL): 4.0 ± 0.66 Calcium (mg/dL): 8.67 ± 0.35 Creatinine (mg/dL): 4.70 ± 0.7 Hemoglobin (g/dL): 10.30 ± 0.8 Iron (ng/dL): 77.20 ± 8.60 Kt/V: 1.12 ± 0.06 Phosphorus (mg/dL): 4.40 ± 0.6	7-M

		Duration of dialysis (months): 43.20 + 22.80				
43	Kawauchi et al (2006), Japan, Cross-sectional	Sample size: 228 Population: Adult	Prevalence: 53 (23) Diagnostic tool: IRLSSG	NI	NI	8-M
44	Kim et al (2008), South Korea, Cross-sectional	Sample size: 164 Population: Adult Mean Age (years): 62.20 ± 12.70 Population: Adult Sex: M: 92 (56.09) F: 72 (43.91) BMI, kg/m2: 22.50 ± 3.80 Dialysis duration (months): 61.32 ± 57.96	Prevalence: 46 (28.05) Diagnostic tool: IRLSSG	Diabetes mellitus: 33 (71.74) Hepatitis: 2 (4.35) ESS Score: 5.70 ± 3.84	BUN (mg/dl): 58.70 ± 22.78 Creatinine (mg/dL): 8.94 ± 2.63 Ferritin (ng/mL): 291.89 ± 264.53 Hemoglobin (g/dL): 10.98 ± 1.46 Iron (ng/dL): 70.44 ± 24.92 Phosphate (mmol/L): 4.57 ± 1.77 PTH (pg ⁄mL): 177.34 ± 162.60	7-M
45	Kutlu et al (2018), Turkey, Cross-sectional	Sample size: 237 Population: Adult	Prevalence: 44 (18.6) Diagnostic tool: IRLSSG	NI	NI	8-M
46	La Manna et al (2011), Italy, Cross-sectional	Sample size: 100 Population: Adult Mean Age (years): 65.0 ± 14.20 Sex: M: 63 (63%) F: 37 (37%) BMI, kg/m2: 24.70 ± 4.60 Duration of dialysis (months): 61.80 ± 86	Prevalence: 31 (31) Diagnostic tool: IRLSSG	NI	Albumin (g/dL): 3.60 ± 0.4 Ferritin (ng/mL): 158.40 ± 325.30 Creatinine (mg/dL): 9.10 ± 2.60 Hemoglobin (g/dL): 10.20 ± 1.20 Iron (ng/dL): 40.8 ± 21 Kt/V: 1.30 ± 0.4 Phosphorus (mg/dL): 4.90 ± 1.50 Potassium (mmol/L): 5.50 ± 0.6 PTH (pg/mL): 295.30 ± 254.60 Sodium (mmol/L): 139.20 ± 4.20	8-M
47	Lee et al (2013), Canada, Cross-sectional	Sample size: 500 Population: Adult Mean Age (years): 59.97 + 16.25 Sex: M: 299 (59.80) F: 201 (40.20) BMI, kg/m2: 29.13 + 7.29 Medication: anti-depressant	Prevalence: 184 (36.80) Diagnostic tool: IRLSSG	Congestive heart failure: 35 (19.02) Cerebrovascular disease: 36 (19.56) COPD: 40 (21.73) Diabetes mellitus: 66 (35.87) Hypertension: 138 (75)	Hemoglobin (g/dL): 12.94 ± 1.92	7-M
48	Li et al (2014), China, Cross-sectional	Sample size: 42 Population: Adult	Prevalence: 20 (47.62) Diagnostic tool: IRLSSG	NI	NI	7-M
49	Lin et al (2013), Taiwan, Cross-sectional	Sample size: 1,130 Population: Adult Mean Age (years): 61.90 + 12.60 Sex: M: 641 (56.73) F: 489 (43.27) Duration of dialysis (months): 76.80 ± 73.20	Prevalence: 286 (25.31) Diagnostic tool: IRLSSG	Diabetes mellitus: 128 (45.40) Hypertension: 147 (52.10)	Albumin (g/dL): 3.90 ± 0.4 BUN (mg/dL): 71.70 ± 18.0 Calcium (mg/dL): 8.70 ± 2.40 Creatinine (mg/dl): 10.2 ± 2.40 Ferritin (ng/mL): 403.0 ± 293.1 Hemoglobin (g/dL): 10.60 ± 1.30 Iron (ng/dL): 63.50 ± 31.20 Phosphate (mg/dL): 5.0 ± 1.40 PTH (pg/mL): 323.0 ± 376.90	8-M
50	Lin et al (2019), China, Cross-sectional	Sample size: 137 Population: Adult Mean Age (years): 55.47 ± 12.76	Prevalence: 28 (20.44) Diagnostic tool: IRLSSG	Alcohol use: 5 (17.90) Depression: 5 (17.90) Diabetes mellitus: 9 (32.10)	Albumin (g/dL): 3.97 ± 0.63 BUN (mg/dL): 30.34 ± 5.39 Calcium (mg/dL): 2.32 ± 0.26	8-M

		Sex: M: 74 (54) F: 63 (46) Duration of dialysis (months): 98.35 ± 71.66		Hypertension: 24 (86.0) Smoking: 9 (32.10) Sleep quality: 9.67 ± 6.05	Ferritin (ng/mL): 137.42 ± 139.98 Hemoglobin (g/dL): 10.54 ± 2.21 Iron (ng/dL): 15.29 ± 4.29 Kt/V: 1.49 ± 0.34 Phosphorus (mg/dL): 2.11 ± 0.70 Transferrin (mg/dL): 212 ± 52	
51	Loewen et al (2009), Canada, Case-control	Sample size: 12 Population: Adult Mean Age (years): 58 ± 11 Sex: M: 12 (75) F: 3 (25) BMI, kg/m2: 28 ± 6	Prevalence: 7 (58.33%) Diagnostic tool: IRLSSG	ESS Score: 10.80 ± 3.80 Poor sleep quality: 5 (71.43)	NI	7-M
52	Losso et al (2015), Brazil, Cross-sectional	Sample size: 166 Population: Adult Mean Age (years): 51.95 ± 15.27 Sex: M: 89 (53.61) F: 77 (46.39)	Prevalence: 51 (30.72) Diagnostic tool: IRLSSG	Diabetes mellitus: 15 (29.41) Hypertension: 22 (43.14)	Albumin (g/dL): 3.74 ± 0.54 Hemoglobin (g/dL): 11.92 ± 2.74 Kt/V: 1.59 ± 0.55	9-L
53	Malaki et al (2012), Iran, Cross-sectional	Sample size: 26 Population: Adult Mean Age (years): 35.7 ± 21.9 Sex: M: 6 (23.08%) F: 20 (76.92%) Duration of dialysis (months): 34.80 ± 18	Prevalence: 2 (7.69) Diagnostic tool: IRLSSG	NI	Creatinine (mg/dL): 8.02 ± 2.34 Ferritin (ng/mL): 506.77 ± 282.59 Hemoglobin (g/dL): 10.86 ± 1.52 Iron (ng/dL): 133.95 ± 160.25 Kt/V: 1.44 ± 0.47 Phosphorus (mg/dL): 6.18 ± 1.67	7-M
54	Merlino et al (2012), Italy, Cross-sectional	Sample size: 86 Population: Adult Mean Age (years): 62.68 ± 15.72 Sex: M: 57 (66.28) F: 29 (33.72) Duration of dialysis (months): 43.80 ± 56.60	Prevalence: 14 (16.28) Diagnostic tool: IRLSSG	ESS score: 4.81 ± 3.75 Insomnia: 13 (92.86) Sleep quality: 6.74 ± 3.52	Albumin (g/dL): 3.40 ± 1.45 BUN (mg/dL): 67.83 ± 24.16 Calcium (mg/dL): 6.98 ± 3.27 Creatinine (mg/dL): 8.69 ± 3.23 Ferritin (ng/mL): 408.56 ± 447.18 Hemoglobin (g/dL): 11.23 ± 2.80 Iron (ng/dL): 64.9 ± 28.47 Phosphorus (mg/dL): 3.92 ± 2.15 Potassium (mmol/L): 4.86 ± 0.86 PTH (pg/mL): 278.83 ± 249.73 Transferrin (mg/dL): 171.92 ± 41.54	7-M
55	Merlino et al (2006), Italy, Cross-sectional	Sample size: 883 Population: Adult Mean Age (years): 64.95 ± 12.85 Sex: M: 540 (61.16) F: 343 (38.84) BMI, kg/m2: 24.06 ± 4.12 Duration of dialysis (months): 68.73 ± 74.80	Prevalence: 162 (18.40) Diagnostic tool: IRLSSG	Insomnia: 112 (69.14) Obstructive sleep apnea: 25 (14.19)	NI	9-L
56	Merlino et al (2010), Italy, Case-control	Sample size: 138 Population: Adult Mean Age (years): 69.80 ± 11.70	Prevalence: 15 (10.87) Diagnostic tool: IRLSSG	NI	Albumin (g/dL): 3.99 ± 0.52 BUN (mg/dL): 55.90 ± 32.10 Calcium (mg/dL): 8.81 ± 1.60	8-M

		Sex: M: 85 (61.59) F: 53 (38.40)			Chloride (mmol/L): 104.90 ± 63.50 Creatinine (mg/dL): 2.20 ± 1.10 Ferritin (ng/mL): 115.30 ± 133.0 Hemoglobin (g/dL): 12.70 ± 1.60 Iron (ng/dL): 71.90 ± 22.30 Magnesium (mg/dL): 4.40 ± 2.0 Phosphorus (mg/dL): 1.60 ± 1.0 PTH (pg ⁄mL): 122.10 ± 144.90 Transferrin (mg/dL): 272.7 ± 59.1	
57	Miranda et al (2001), Chile, Cross-sectional	Sample size: 166 Population: Adult	Prevalence: 43 (25.90) Diagnostic tool: IRLSSG	NI	NI	8-M
58	Molnar et al (2007), Hungary, Cross-sectional	Sample size: 785 Population: Adult Mean Age (years): 49 ± 12 Sex: M: 463 (58.98) F: 322 (41.02) Duration of dialysis (months): 21 ± 21.48	Prevalence: 35 (4.5) Diagnostic tool: RLSQ	Diabetes mellitus: 6 (17.14)	Albumin (g/dL): 4.20± 0.3 GFR (mL/min/1.73m2): 50 ± 19 Hemoglobin (g/dL): 13.3 ± 1.90	9-L
59	Mucsi et al (2005), Canada, Cross-sectional	Sample size: 333 Population: Adult Mean Age (years): 54 ± 15 Sex: M: 193 (57.96) F: 140 (42.4) Duration of dialysis (months): 36.34 ± 40.71	Prevalence: 45 (13.51) Diagnostic tool: RLSQ	Diabetes mellitus: 11 (24) Insomnia: 16 (35.56)	Ferritin (ng/mL): 379 ± 236.50 Kt/V: 1.3 ± 0.29 Phosphorus (mg/dL): 1.95 ± 0.56 PTH (pg/mL): 32 ± NI	8-M
60	Mucsi et al (2004), Hungary, Cross-sectional	Sample size: 73 Population: Adult Mean Age (years): 58.69 ± 14 Sex: M: 31 (42.47) F: 42 (57.53)	Prevalence: 22 (30.14) Diagnostic tool: RLSQ	Diabetes mellitus: 18 (81.82)	Albumin (g/dL): 3.83 ± 0.40 Hemoglobin (g/dL): 10.74 ± 1.23 Kt/V: 1.23 ± 0.25	7-M
61	Murtagh et al (2007), United Kingdom, Cross-sectional	Sample size: 66 Population: Adult Mean Age (years): 82 ± 6.60 Sex: M: 32 (48.50) F: 34 (51.50)	Prevalence: 32 (48) Diagnostic tool: MSAS-SF	Cancer: 5 (15.63) Cardiovascular disease: 11 (34.38) Diabetes mellitus: 8 (25) Hypertension: 1 (3.13)	GFR (mL/min/1.73m2): 11.20 ± 2.80	7-M
62	Muzasti & Harahap (2019), Indonesia, Cross-sectional	Sample size: 106 Population: Adult Mean Age (years): 48.4 ± 13.29 Sex: M: 70 (66%) F: 36 (34%) Dialysis duration (months): 24.20 ± 12.45	Prevalence: 32 (30.20%) Diagnostic tool: IRLSSG	NI	Calcium (mg/dL): 8.1 ±1.01 Ferritin (ng/mL): 1193 ± 862.75 Hemoglobin (g/dL): 9.0 ± 1.47 Iron (ng/dL): 66.30 ± 31.10 Phosphate (mg/dL): 5.50 ± 2.09	8-M
63	Naini et al (2015), Iran, Cross-sectional	Sample size: 200 Population: Adult	Prevalence: 103 (51.5) Diagnostic tool: RLSQ	Diabetes mellitus: 21 (20.4) Hypertension: 9 (8.7)	Creatinine (mg/dL): 1.32 ± 0.51	8-M

		Mean Age (years): 45.86 ± 10.24 Sex: M: 100 (50) F: 100 (50)		Obstructive sleep apnea: 43 (41.7)		
64	Nikić et al (2007), Serbia, Cross-sectional	Sample size: 166 Population: Adult Mean Age (years): 56.12 ± 13.42 Sex: M: 112 (67.47) F: 54 (32.53) BMI, kg/m2: 23.34 ± 3.56	Prevalence: 31 (22.96) Diagnostic tool: IRLSSG	NI	BUN (mg/dL): 27.85 ± 6.68 Calcium (mg/dL): 2.26 ± 0.19 Creatinine (mg/dL): 928.59 ± 249.78 Hemoglobin (g/dL): 9.82 ± 5.23 Kt/V: 1.15 ± 0.19 Phosphorus (mg/dL): 1.67 ± 0.49	8-M
65	Nikola et al (2012), Serbia, Cross-sectional	Sample size: 96 Population: Adult Mean Age (years): 56.3 ± 11.4 Sex: M: 59 (61.46%) F: 37 (38.54%) Dialysis duration (months): 68.10 ± 54.10	Prevalence: 38 (39.58%) Diagnostic tool: IRLSSG	Cardiovascular Disease: 23 (60.50) Depression: 23 (60.50) Diabetes mellitus: 6 (5) Hypertension: 18 (47.40) Insomnia: 18 (47.40)	Albumin (g/dL): 3.45 ± 0.21 BUN (mg/dL): 23.80 ± 4.90 Calcium (mg/dL): 2.40 ± 0.2 Creatinine (mg/dL): 93.17 ± 16.67 Ferritin (ng/mL): 490.0 ± 490.4 Hemoglobin (g/dL): 11.39 ± 1.91 Phosphate (mg/dL): 1.5 ± 0.4 Potassium (mmol/L): 5.40 ± 0.9 PTH (pg/mL): 249.0 ± 283.90	8-M
66	Noda et al (2006), Japan, Cross-sectional	Sample size: 252 Population: Adult Mean Age (years): 59.30 ± 10.80 Sex: M: 160 (63.74) F: 92 (36.26) BMI, kg/m2: 20.60 ± 2.80	Prevalence: 52 (20.63) Diagnostic tool: two questions about RLS	Insomnia: 31 (59.62)	NI	8-M
67	Ogna et al (2016), Switzerland, Cross-sectional	Sample size: 282 Population: Adult Mean Age (years): 63.36 ± 10.65 Sex: M: 156 (55.32) F: 126 (44.68) BMI, kg/m2: 26.6 ± 4.61	Prevalence: 47 (16.67) Diagnostic tool: IRLSSG	Alcohol use: 9 (19.15) Depression: 6 (12.77) Diabetes mellitus: 11 (23.40) Hypertension: 32 (68.08) Smoking: 10 (21.28) Obstructive sleep apnea: 23 (48.94)	GFR (mL/min/1.73m2): 68.53 ± 18.94	9-L
68	Pan et al (2006), China, Cross-sectional	Sample size: 171 Population: Adult	Prevalence: 43 (25.15) Diagnostic tool: IRLSSG	NI	NI	8-M
69	Pavan et al (2014), India, Cross-sectional	Sample size: 50 Population: Adult Mean Age (years): 64.30 ± 14 Sex: M: 37 (74) F: 13 (26) BMI, kg/m2: 21.30 ± 2.60 Dialysis duration (months): 16 ± 3.40	Prevalence: 14 (28) Diagnostic tool: IRLSSG	NI	BUN (mg/dL): 68.70 ± 3.90 Calcium (mg/dL): 9.70 ± 3.84 Creatinine (mg/dL): 7.57 ± 2.36 Ferritin (ng/mL): 137.0 ± NI Hemoglobin (g/dL): 9.60 ± 0.78 Phosphorus (mg/dL): 4.50 ± 1.18	7-M
70	Pizza et al (2012), Italy, Cross-sectional	Sample size: 162 Population: Adult Mean Age (years): 66.5 ± 14.3 Sex:	Prevalence: 51 (31.48) Diagnostic tool: IRLSSG	Diabetes mellitus: 16 (31.37) ESS score: 6.98 ± 4.21 Insomnia: 34 (66.67)	Albumin (g/dL): 3.76 ± 0.42 Calcium (mg/dL): 8.83 ± 0.87 Creatinine (mg/dL): 9.58 ± 2.66	8-M

		M: 105 (64.81) F: 57 (35.19) BMI, kg/m2: 24.80 ± 4.40			Ferritin (ng/mL): 256.61 ± 343.32 Hemoglobin (g/dL): 10.72 ± 1.42 Iron (ng/dL): 46.51 ± 22.82 Kt ⁄V: 1.35 ± 0.35 Phosphorus (mg/dL): 5.25 ± 1.51 Potassium (mmol/L): 5.57 ± 0.69 PTH (pg ⁄mL): 331.43 ± 234.01	
71	Quinn et al (2011), Ireland, Cross-sectional	Sample size: 301 Population: Adult Mean Age (years): 71.21 ± 31.95 Sex: M: 140 (46.51) F: 161 (53.49) BMI, kg/m2: 23.66 ± 10.79 Medication: Antipsychotic, Lithium Antihistamine, Beta blockers	Prevalence: 55 (18.3) Diagnostic tool: IRLSSG	Anxiety: 5 (9.10) Cardiovascular disease: 16 (29.10) Congestive heart failure: 13 (23.60) COPD: 14 (25.50) Depression: 11 (20.0) Diabetes mellitus: 12 (21.80) Hypertension: 21 (38.20) Osteoarthritis: 11 (20.0) Peripheral vascular disease: 3 (5.50) Rheumatoid arthritis: 2 (3.60) Smoking: 9 (16.40)	NI	8-M
72	Rafie et al (2016), Saudi Arabia, Cross-sectional	Sample size: 137 Population: Adult	Prevalence: 50 (36.49) Diagnostic tool: IRLSSG	NI	NI	8-M
73	Razeghi et al (2012), Iran, Cross-sectional	Sample size: 108 Population: Adult Mean Age (years): 56 ± 15 Sex: M: 62 (57.41) F: 46 (42.59) Dialysis duration (months): 75 ± NI	Prevalence: 35 (32.41) Diagnostic tool: IRLSSG	Insomnia: 18 (51.43%) Poor sleep quality: 25 (71.43) Obstructive sleep apnea: 3 (8.57)	Albumin (g/dL): 3.8 ± 0.5 Ferritin (ng/mL): 626 ± 583 Hemoglobin (g/dL): 10.80 ± 2.10 Phosphorus (mg/dL): 5.60 ± 1.60 PTH (pg/mL): 518 ± 628	8-M
74	Riar et al (2019), Georgia Cross-sectional	Sample size: 124 Population: Children & Adolescent Mean Age (years): 13.40 ± 3.10 Sex: M: 80 (64.50) F: 44 (35.50)	Prevalence: 19 (15.30) Diagnostic tool: IRLSSG	Anemia: 13 (68.40)	Ferritin (ng/mL): 51.2 ± 191.56 Hemoglobin (g/dL): 11.70 ± 1.60	8-M
75	Rijsman et al (2004), Netherlands, Cross-sectional	Sample size: 48 Population: Adult Mean Age (years): 55 ± 12 Sex: M: 41 (85.42) F: 7 (14.58) Dialysis duration (months): 87.24 ± 166.68	Prevalence: 28 (58.33) Diagnostic tool: IRLSSG	Diabetes: 4 (14.29) Hypertension: 7 (25)	NI	7-M
76	Rohani et al (2015), Iran, Cross-sectional	Sample size: 163 Population: Adult Mean Age (years): 61.30 ± 13.30 Sex: M: 103 (63.20) F: 60 (36.80)	Prevalence: 61 (37.40) Diagnostic tool: IRLSSG	Cardiovascular diseases: 20 (32.80) Diabetes mellitus: 34 (55.70) Hypertension: 34 (55.70) Smoking: 29 (47.50)	BUN (mg/dL): 47.20 ± 12.40 Ferritin (ng/mL): 1281 ± 556 GFR (mL/min/1.73m2): 9.20 ± 3.10 Hemoglobin (g/dL): 12.70 ± 2.0 Kt ⁄V: 1.50 ± 0.2	8-M

		BMI, kg/m2: 23.60 ± 1.50 Dialysis duration (months): 22.80 ± 16.80		Insomnia: 54 (88.50)		
77	Sabry et al (2010), Saudi Arabia, Cross-sectional	Sample size: 88 Population: Adult Mean Age (years): 41.59 ± 16.30	Prevalence: 37 (42.05) Diagnostic tool: IRLSSG	NI	NI	7-M
78	Salman (2011), Syria, Cross-sectional	Sample size: 123 Population: Adult Mean Age (years): 41.95 ± 15.11 Sex: M: 70 (56.91) F: 53 (43.09)	Prevalence: 25 (20.30) Diagnostic tool: IRLSSG	NI	NI	8-M
79	Samavat et al (2017), Iran, Cross-sectional	Sample size: 235 Population: Adult Mean Age (years): 57.30 ± 15.90 Sex: M: 133 (56.59) F: 102 (43.41) BMI, kg/m2: 25.90 ± 5.50 Dialysis duration (months): 54.60 ± 76.30	Prevalence: 55 (23.4) Diagnostic tool: IRLSSG	Diabetes mellitus: 30 (54.50) Hypertension: 10 (18.20) Urologic disease: 3 (5.50) Insomnia: 29 (52.73) Sleep quality: 6.70 ± 4.30	Albumin (g/dL): 4.06 ± 0.75 Calcium (mg/dL): 8.50 ± 0.8 Hemoglobin (g/dL): 10.60 ± 1.80 Phosphorus (mg/dL): 5.10 ± 1.40 PTH (pg ⁄mL): 242 ± 413 Uric Acid (mg/dL): 6.90 ± 5.20 Vitamin D (ng/mL): 30.40 ± 29.70	8-M
80	Saraji et al (2017), Iran, Cross-sectional	Sample size: 260 Population: Adult Mean Age (years): 48.99 ± 15.72 Sex: M: 154 (59.40) F: 106 (40.60) Dialysis duration (months): 47.88 ± 40.44 BMI, kg/m2: 23.48 ± 4.34 Medication: Anti-histaminic, Benzodiazepines, Anticonvulsant, Gabapentin	Prevalence: 143 (55) Diagnostic tool: IRLSSG	Diabetes mellitus: 26 (81.20) Hypertension: 46 (59.10) Urologic disease: 17 (36.20)	BUN (mg/dL): 126.78 ± 34.95 Calcium (mg/dL): 8.43 ± 0.86 Ferritin (ng/mL): 1107 ± NI Hemoglobin (g/dL): 11.04 ± 1.98 Kt ⁄V: 1.36 ± 0.33 Phosphorus (mg/dL): 5.79 ± 1.37 PTH (pg ⁄mL): 485.28 ± 451.85	8-M
81	Shaikh et al (2014), Pakistan, Cross-sectional	Sample size: 100 Population: Adult	Prevalence: 32 (32) Diagnostic tool: IRLSSG	NI	NI	8-M
82	Sinha et al (2009), Canada, Cross-sectional	Sample size: 49 Participants: Children & Adolescence Mean Age (years): 13.86 ± 3.49 Sex: M: 35 (71.43) F: 14 (28.57) Medication: antidepressant, iron supplement, asthma	Prevalence: 14 (28.57) Diagnostic tool: Pediatric sleep questionnaire	Daytime sleepiness: 2 (14.28) Insomnia: 1 (7.14) Obstructive sleep apnea: 1 (7.14)	Hemoglobin (g/dL): 12.53 ± 1.55	7-M
83	Siddiqui et al (2005), United Kingdom, Cross-sectional	Sample size: 277 Population: Adult Mean Age (years): 61.79 ± 15.33 Sex: M: 144 (51.98) F: 133 (48.02	Prevalence: 127 (45.80) Diagnostic tool: IRLSSG	Diabetes mellitus: 12 (9.45) Smoking: 27 (21.26)	Albumin (g/dL): 3.98 ± 0.45 Calcium (mg/dL): 2.30 ± 0.2 Ferritin (ng/mL): 341.16 ± 251.21 Hemoglobin (g/dL): 11.40 ± 1.60 Phosphate (mg/dL): 1.50 ± 0.6 PTH (pg/mL): 30.57 ± 32.24	9-L

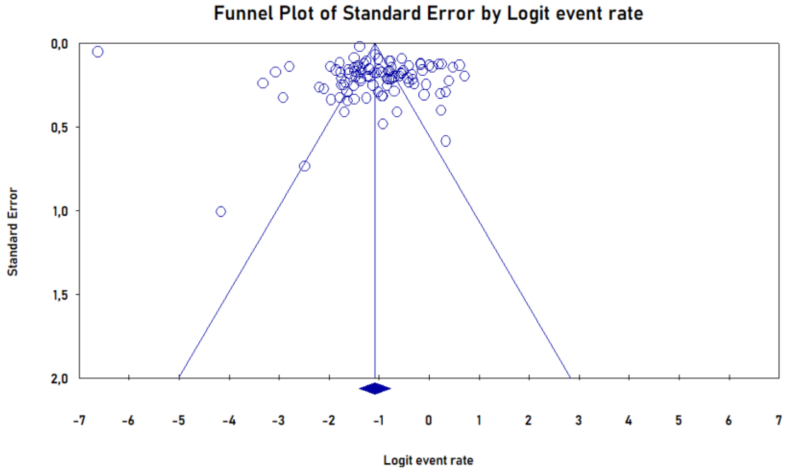
		Medication: betalockers, erythropoietin				
84	Soyoral et al (2010), Turkey, Cross-sectional	Sample size: 76 Population: Adult Mean Age (years): 52.28 ± 18.13 Sex: M: 42 (44.74) F: 34 (55.76) Dialysis duration (months): 45.61 ± 32.54	Prevalence: 11 (14.47) Diagnostic tool: IRLSSG	Diabetes mellitus: 9 (81.82)	Creatinine (mg/dL): 7.2 ± 2.5 Ferritin (ng/mL): 739.3 ± 345.3 Hemoglobin (g/dL): 10.60 ± 1.70 Iron (ng/dL): 116.60 ± 118.10 Kt ⁄V: 1.60 ± 0.2 PTH (pg ⁄mL): 301.80 ± 464.40	7-M
85	Stefanidis et al (2013), Greece, Cross-sectional	Sample size: 579 Population: Adult Mean Age (years): 65 ± 13 Sex: M: 343 (59.24) F: 236 (40.76) Dialysis duration (months): 45.61 ± 32.54	Prevalence: 154 (26.6) Diagnostic tool: IRLSSG	NI	Albumin (g/dL): 4.13 ± 0.32 BUN (mg/dL): 155 ± 33 Calcium (mg/dL): 8.80 ± 0.8 Ferritin (ng/mL): 254 ± 286 Hemoglobin (g/dL): 11.20 ± 1.30 Iron (ng/dL): 45.20 ± 25.50 Kt ⁄V: 1.10 ± 0.2 Phosphorus (mg/dL): 5.80 ± 1.70 PTH (pg ⁄mL): 356 ± 298 Transferrin (mg/dL): 190 ± 43	9-L
86	Szentkiralyi et al (2009), Hungary, Cross-sectional	Sample size: 949 Population: Adult Mean Age (years): 48 ± 13 Sex: M: 525 (55.32) F: 424 (44.68) Dialysis duration (months): 30 ± 32.59	Prevalence: 55 (5.79) Diagnostic tool: RLSQ	Depression: 31 (56.36) Diabetes mellitus: 6 (10.91)	Albumin (g/dL): 4.10 ± 0.4 GFR (mL/min/1.73m2): 41 ± 20 Hemoglobin (g/dL): 12 ± 2.20	8-M
87	Takaki et al (2003), Japan, Cross-sectional	Sample size: 490 Population: Adult Mean Age (years): 60.18 ± 11.64 Sex: M: 285 (58.16) F: 205 (41.84) Dialysis duration (months): 82.90 ± 69.20 Medication: Vitamin D, Benzodiazepines, Antidepressants	Prevalence: 60 (12.24) Diagnostic tool: RLSSG	Diabetes mellitus: 14 (23.33) Smoking: 16 (26.67)	Albumin (g/dL): 3.80 ± 0.3 BUN (mg/dL): 78.20 ± 12.1 Calcium (mg/dL): 9.40 ± 0.8 Creatinine (mg/dL): 11.90 ± 2.40 Hemoglobin (g/dL): 9.80 ± 1.10 Kt/V: 1.36 ± 0.23 Phosphorus (mg/dL): 6.20 ± 1.20 Potassium (mmol/L): 5.10 ± 0.5 PTH (pg/mL): 198.70 ± 216.60	9-L
88	Tekdöş Demircioğlu et al (2015), Turkey, Cross-sectional	Sample size: 118 Population: Adult Mean Age (years): 61.35 ± 13.17 Sex: (authors only provided data for RLS) M: 23 (46.94) F: 26 (53.06) Dialysis duration (months): 114.24 ± 83.65	Prevalence: 49 (41.53) Diagnostic tool: IRLSSG	NI	Ferritin (ng/mL): 873.36 ± 748.26 PTH (pg ⁄mL): 580.34 ± 588.10	9-L
89	Telarović et al (2007), Croatia, Cross-sectional	Sample size: 82 Population: Adult Mean Age (years): 64.21 ± 18.22	Prevalence: 49 (59.76) Diagnostic tool: IRLSSG	Cardiovascular disease: 41 (84) Diabetes mellitus: 16 (33) Polyneuropathy: 13 (27)	NI	7-M

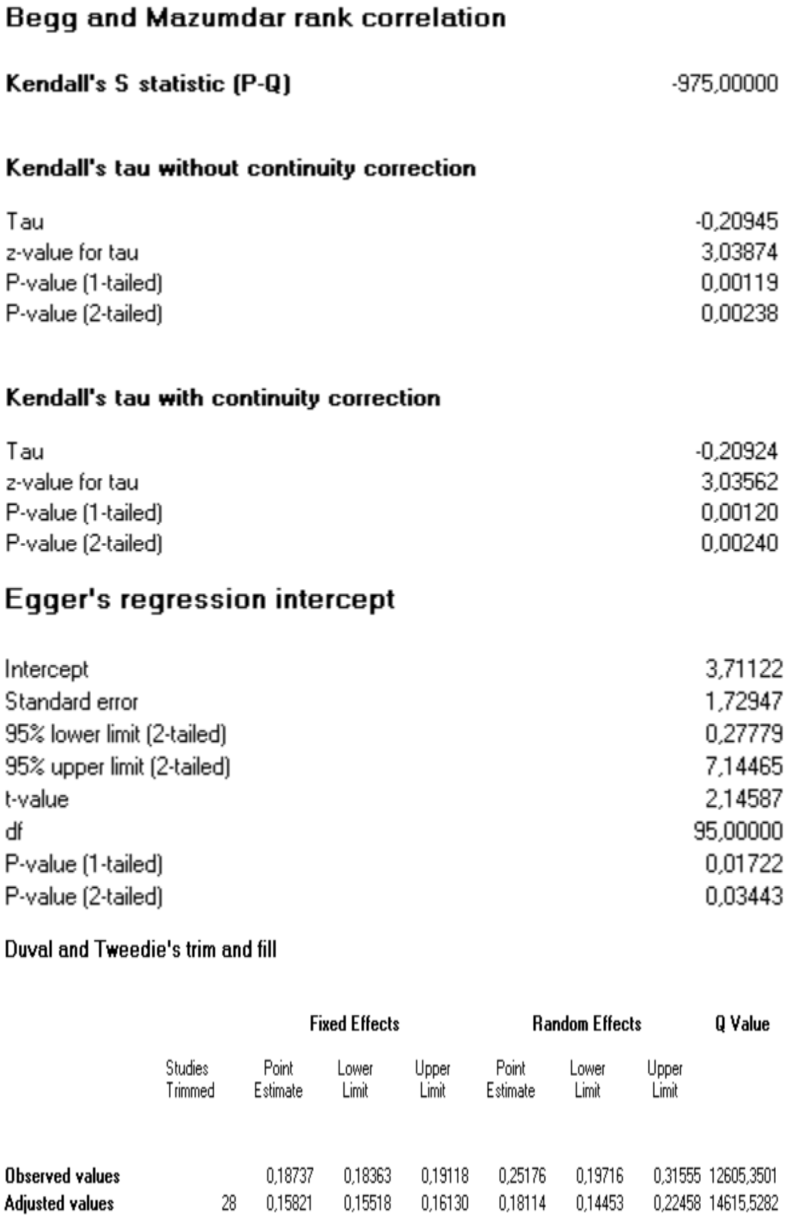
		Sex: M: 53 (64.63) F: 29 (35.37) Dialysis duration (months): 68.16 ± 6.56 Medication: Erythropoietin, Calcitriol, ACE inhibitors, β-Blockers. Ca2+ antagonists, Benzodiazepines				
90	Tuncel et al (2011), Turkey, Cross-sectional	Sample size: 81 Population: Adult Mean Age (years): 52.49 ± 16.03 Sex: M: 41 (51.62) F: 40 (48.38) Dialysis duration (months): 21.29 ± 33	Prevalence: 10 (12.35) Diagnostic tool: IRLSSG	ESS score: 2.5 ± 1.8	Ferritin (ng/mL): 1,236 ± 651 Hemoglobin (g/dL): 11.90 ± 2.10 Kt/V: 1.40 ± 0.3	7-M
91	Turk et al (2018), Turkey, Cross-sectional	Sample size: 220 Population: Adult Mean Age (years): 59.67 ± 1.38 Sex: M: 112 (50.91) F: 108 (49.09) Dialysis duration (months): 91.08 ± 8.64	Prevalence: 37 (16.82) Diagnostic tool: IRLSSG	Diabetes mellitus: 21 (56.80) Hypertension: 13 (35.10) Smoking: 28 (75.70) Sleep quality: 11.41 ± 0.65	Albumin (g/dL): 4.12 ± 0.02 Calcium (mg/dL): 11.39 ± 2.55 Ferritin (ng/mL): 644.97 ± 50.24 Hemoglobin (g/dL): 14.48 ± 2.93 Iron (ng/dL): 54.89 ± 3.06 Kt ⁄V: 1.74 ± 0.05	9-L
92	Wali & Alkhouli (2015), Saudi Arabia, Cross-sectional	Sample size: 355 Population: Adult Mean Age (years): 48.50 ± 15.40 Sex: M: 217 (61.13) F: 138 (38.87) BMI, kg/m2: 25.18 ± 6.80 Dialysis duration (months): 79.20 ± 72	Prevalence: 69 (19.44) Diagnostic tool: IRLSSG	Daytime sleepiness: 28 (40.58) Obstructive sleep apnea: 41 (59.42)	NI	9-L
93	Walker et al (1995), Canada, Cross-sectional	Sample size: 54 Population: Adult	Prevalence: 18 (33.33) Diagnostic tool: IRLSSG	NI	NI	7-M
94	Winkelman et al (1996), USA, Case-control	Sample size: 204 Population: Adult Mean Age (years): 56.80 ± 15.80 Sex: M: 96 (47.06) F: 108 (52.94) Dialysis duration (months): 55.20 ± 56.40	Prevalence: 41 (20.09) Diagnostic tool: IRLSSG	NI	Calcium (mg/dL): 9.0 ± 1.30 Hemoglobin (g/dL): 9.80 ± 1.40 Iron (ng/dL): 54.90 ± 29.30 PTH (pg ⁄mL): 462.30 ± 516.50	8-M
95	Xiao et al (2017), China, Cross-sectional	Sample size: 269 Population: Adult Mean Age (years): 51.80 ± 14.30 Sex:	Prevalence: 39 (14.49) Diagnostic tool: IRLSSG	Diabetes mellitus: 11 (28.2) Hypertension: 35 (89.7) Sleep quality: 11.86 ± 4.72	BUN (mg/dL): 25.11 ± 11.63 Calcium (mg/dL): 2.22 ± 0.23 Creatinine (mg/dL): 11.46 ± 3.85	8-M

		M: 188 (69.89) F: 81 (30.11) Dialysis duration (months): 45.46 ± 46.95			Ferritin (ng/mL): 310.95 ± 329.41 Hemoglobin (g/dL): 9.87 ± 1.35 Magnesium (mmol/L): 1.23 ± 0.25 Phosphate (mg/dL): 0.15 ± 0.09 Phosphorus (mg/dL): 2.07 ± 0.47 PTH (pg ⁄mL): 394.66 ± 351.81 Uric Acid (mg/dL): 6.69 ± 2.14	
96	Yang et al (2019), China, Cohort	Sample size: 578 Population: Adult Mean Age (years): 59.45 ± 14.06 Sex: M: 363 (62.80) F: 215 (37.20) BMI, kg/m2: 21.98 ± 3.44 Dialysis duration (months): 42.60 ± 38.88	Prevalence: 83 (14.36) Diagnostic tool: IRLSSG	Diabetes mellitus: 27 (32.50) Hypertension: 35 (42.20) Hyperparathyroidism: 70 (84.30)	Ferritin (ng/mL): 217.68 ± 225.27 Hemoglobin (g/dL): 9.81 ± 1.33 PTH (pg ⁄ml): 431.03 ± 336.11 Kt ⁄V: 1.29 ± 0.22	9-L
97	Yildiz et al (2016), Turkey, Case-control	Sample size: 156 Population: Adult Mean Age (years): 50.60 ± 14.10 Sex: M: 88 (56.41) F: 68 (43.59)	Prevalence: 73 (46.79) Diagnostic tool: IRLSSG	Diabetes mellitus: 13 (17.81) Hypertension: 24 (32.88) Smoking: 21 (28.77) Daytime Sleepiness: 6 (8.22) ESS score: 6.16 ± 11.22 Insomnia (ISI score): 11.92 ± 20.95	NI	9-L

Note: Note: BMI= body mass index, BUN= blood urea nitrogen, GFR= glomerular filtration rate, PTH= Parathyroid hormone, International restless legs syndrome study group (IRLSSG), Restless legs syndrome questionnaire (RLSQ), Polysomnography (PSG), The Memorial Symptom Assessment Scale Short Form (MSAS-SF), , ESS= Excessive daytime Sleepiness=, PSQI= The Pittsburgh Sleep Quality Index, OSA= obstructive sleep apnea, COPD= Chronic obstructive pulmonary disease, Kt/V= dialyzer clearance of urea * dialysis time/volume of distribution of urea.

Appendix 4. Publication bias





Begg and Mazumdar rank correlation

Kendall's S statistic (P-Q)	-975,00000

Kendall's tau without continuity correction

Tau	-0,20945
z-value for tau	3,03874
P-value (1-tailed)	0,00119
P-value (2-tailed)	0,00238

Kendall's tau with continuity correction

Tau	-0,20924
z-value for tau	3,03562
P-value (1-tailed)	0,00120
P-value (2-tailed)	0,00240

Egger's regression intercept

Intercept	3,71122
Standard error	1,72947
95% lower limit (2-tailed)	0,27779
95% upper limit (2-tailed)	7,14465
t-value	2,14587
df	95,00000
P-value (1-tailed)	0,01722
P-value (2-tailed)	0,03443

Duval and Tweedie's trim and fill

		Fixed Effects			Random Effects			Q Value
	Studies Trimmed	Point Estimate	Lower Limit	Upper Limit	Point Estimate	Lower Limit	Upper Limit	
Observed values		0,18737	0,18363	0,19118	0,25176	0,19716	0,31555	12605,3501
Adjusted values	28	0,15821	0,15518	0,16130	0,18114	0,14453	0,22458	14615,5282

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AUTHOR INFORMATION PACK

Update: March 2022

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Table 1. Effects of plant growth regulator types and concentrations on embryogenic callus induction from leaf tip explants of *D. lowii* cultured in ½ MS medium supplemented with 2.0 % (w/v) sucrose under continuous darkness at temperature of 25 ± 2 °C after 60 days of culture

Table 3. Maternal and child health care-seeking behaviour for the last pregnancy in women aged 15 – 45 years old

Type of care	Age Groups (Years)							
	<30		30 - 39		40 - 45		All Age	
	n	%	n	%	n	%	n	%
Place for antenatal care								
Village level service (Posyandu, Polindes or Poskesdes)	1	9.1	1	4.6	1	3.5	3	4.8
District Level service (Puskesmas/Pustu)	2	18.2	7	31.8	1	3.5	10	16.1
Hospital, Clinics, Private Doctor or OBGYN	1	9.1	4	18.2	2	6.9	7	11.3
Private Midwife	7	63.6	10	45.5	25	86.2	42	67.7
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Hospital	5	50.0	5	22.7	4	13.8	14	23.0
Birth Clinic/Clinic/Private health professional	5	50.0	15	68.2	21	72.4	41	67.2
Puskesmas or Pustu	0	0.0	2	9.1	0	0	2	3.3
Home or other place	0	0.0	0	0	4	13.8	4	6.6
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Exclusive breastfeeding								
No	4	36.4	10	45.5	18	62.1	32	51.6
Yes	7	63.6	12	54.6	11	37.9	30	48.4

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Reference to a Book:

de Virgilio, C. & Grigorian, A. 2019, 'Surgery: A case based clinical review' in Surgery: A Case Based Clinical Review, pp. 1-689.

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Harper, M.S. 2021, 'Mental health and mental health services' in Services to the Aging and Aged: Public Policies and Programs, pp. 283-297.

Reference to a Website:

WHO (2021) *WHO Coronavirus Disease (COVID-19) Dashboard: Situation by Country, Territory & Area*.

Reference in Conference:

Yuarnistira, Nursalam, N., Rachmawati, P.D., Efendi, F., Pradanie, R. & Hidayati, L. 2019, 'Factors Influencing the Feeding Pattern of Under-Five Children in Coastal Areas', IOP Conference Series: Earth and Environmental Science.

Reference in Statute:

Pemerintah RI (2014) *Undang-Undang Republik Indonesia Nomor 38 Tahun 2014 Tentang Keperawatan*. Indonesia. Available at: https://peraturan.go.id/common/dokumen/ln/2014/uu38-2014bt.pdf.

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