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EDITORIAL

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Transforming nurses from frontline to front leaders: lesson learned from the pandemic

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The Coronavirus Disease 2019 (COVID-19) pandemic has changed all aspects of life, including the way people work and interact with each other. During the pandemic, several essential industries, not to mention healthcare workers, have had to endure the chaotic or life-threatening situation to keep working at desks to ensure that the pandemic can be tackled. Their actions are initially a kind of contribution that is rarely noticed by the public, but they have begun to be recognized as the new everyday heroes.

Nurses are the frontline workers among other health workers who face the COVID-19 virus or other deadly infectious disease. Nurses directly provide essential healthcare services where they are most needed, both in hospital and community settings. Not only physical energy will be exploited, but mental sacrifices can also be affected. This phenomenon has been proven by the increase in mortality rate among nurses worldwide. The International Council of Nurses' latest data showed that more than 1500 nurses have died from COVID-19 in 2020 (International Council of Nurses, 2020) and up to 180,000 health and care workers could have died from COVID-19 in 2021 (World Health Organization, 2021). This crisis emerged the demand for nurses who intend and are able to substitute for those who have fallen. This challenging situation leads nurses to be capable of managing the crisis and, at the same time, they can be the new leaders on the frontline.

The lesson learned that can be recorded from the COVID-19 pandemic, is that nurses as the frontline workers continue to manage a tough healthcare facilities environment in order to save many people from COVID-19. They are potential candidates being front leaders as they have had experienced treating clients and community in quite complex ways during the pandemic. Because of that, it is essential to perceive them as future leaders such as by providing greater policy support at a national level. Equal opportunity to contribute to policy making process would create a solid environment for nurses. Standardized regulation on decent job and salaries also needs to be developed in order to protect the welfare of nurses. It goes without saying that nurse's salary in Indonesia varies across sectors, even though the nurses are often going beyond their duties, many of them have been expected to accomplish more with less appreciation. These unfair situations should be transformed into a good situation by equipping the nurses with decent salaries equal to other frontline health workers.

Talent management of nurses also needs to be developed at national level to accommodate regeneration and succession as a leader. This strategy will impact on how nurses can have the same benchmark as other health professions both regionally and nationally. A recent call from the World Health Organization (2020) mandated three pillars of essential aspects, namely, investment, education, jobs and leadership. This pandemic has opened an opportunity for nurses to move up the leadership ladder and expand the leadership position in every setting.

To sum up, we might call the frontline nurses' personnel as heroes in the pandemic era; however, just labelling them without also considering what they have to say eliminates any chance of progress. Concrete policy implementation is crucial, investing in the education sector is inevitable, and bottom-up coordination is critical in ensuring that frontline views are heard. Regardless of whether or not things are optimal, frontline nurses show up and perform their duties as do any leader who serves and protects clients and community.

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ORIGINAL ARTICLE

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Sociodemographic correlates of older adult acceptance of the COVID-19 vaccine

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ABSTRACT

Introduction: An increase of the COVID-19 global statistics in late 2019 prompted the swift manufacturing of vaccines to protect people, especially older adults, from the debilitating effects of the disease. This study aimed to determine the socio-demographic correlates of older adults and their relationship with COVID-19 vaccine acceptance.

Methods: This correlational study invited the entire population of older adults to answer the survey. In total, 89 elderly individuals participated in face-to-face interviews because of the old age limitations. The tool used consisted of two parts. The first part determined the socio-demographic correlates. The second part assessed the level of acceptance of the COVID-19 vaccine. Rank Biserial and Spearman Rho were used to measure the correlations between the socio-demographic variables and COVID-19 vaccine acceptance.

Results: The respondents were predominantly female (n = 45; 50.56%), with an elementary level of education (n = 48; 53.93%), below PHP 10,000.00 for monthly family income (n = 77; 86.52%), unemployed (n = 79; 88.76%), and Roman Catholic (n = 87; 97.75%). Generally, older adults will not accept the COVID-19 vaccine. Specifically, older adults will not accept the vaccine if it has less than a 50% effectiveness (n = 51; 57.30%) and if they have existing medical conditions (n = 51; 57.30%). Finally, the findings suggest that employment status has a significant negative relationship with the acceptance of the COVID-19 vaccine (r = -0.357, p = 0.0001).

Conclusions: 47.19% to 57.30% of older adults will not accept the COVID-19 vaccine. National and local government units need to intensify their vaccination campaigns to persuade the public to engage with the free COVID-19 vaccines.

Keywords: acceptance; COVID-19; hesitancy; pandemic; vaccine; vulnerable

Introduction

The novel coronavirus (COVID-19) pandemic, which started in Wuhan, China, is a global threat, with more than 3 million new reported cases in March 2021 (World Health Organization, 2021). The high statistics in terms of the number of COVID-19 cases prompted nations worldwide to develop mitigating policies to curb the surge of new infections. The health policies include the mandatory wearing of face masks and other personal protective equipment (PPE), as well as isolation and quarantine protocols, granular and community lockdowns, physical distancing, limiting through to prohibiting super spreading interactions like prayer meetings, social gatherings, and personal meetings, and hand sanitization. These non-pharmacological interventions have slowed the rate of coronavirus transmission (El-Elimat et al., 2020). However, pharmacological interventions such as vaccination remain the best solution to prevent COVID-19 infection (Chakraborty & Parvez, 2020).

Scientists from around the world raced against time to develop potential vaccines against coronavirus. In 2020, the WHO (2021) reported that at least seven vaccines were available for administration. Vaccines are considered helpful in protecting an individual from coronavirus infection through immunity development (CDC, 2021). In the Philippines, the Department of Health (DOH, 2021) conducted an initial vaccine rollout of the Chinese-made SinoVac and UK-made Astrazeneca vaccines to healthcare frontline workers.

Among those who most need the COVID-19 vaccine is the older population group, specifically individuals 65 years old and above, aside from frontline healthcare workers. This group was identified by the WHO (2021) as among the high-risk individuals clustered together with healthcare providers and persons with co-morbidities

because they comprise the majority of the morbidity and mortality cases of the disease. The Centers for Disease and Control Prevention (CDC, 2020) recommended that the older population should be included in the first layer of recipients of the COVID-19 vaccine since the risk of severe illness from the infection increases with age.

With the availability of the COVID-19 vaccine, the next concern that must be overcome by the health authorities and government is its acceptability by older adults as vaccine recipients. Understanding the perspectives of the vaccine recipients is essential when determining the best strategy to maximize vaccine uptake. This milestone in the vaccine roll-out for the older adult population sought to prevent an increase in the disease's morbidity and mortality cases.

Locally, the older adults' acceptance and hesitancy regarding the COVID-19 vaccines have remained unexplored. According to the report by the Biliran Provincial Health Office (BPHO, 2020), there was a low level of compliance with routine immunizations such as the pneumococcal and flu vaccines by older adults. Because of this, a considerable number of older adults were vulnerable to acquiring the infection. This study, therefore, sought to investigate the level of acceptance of COVID-19 vaccination among older adults.

Specifically, this study has been undertaken to determine the sociodemographic profile of older adults in terms of age, sex, education level, monthly income, employment status, and religion. Furthermore, this study wanted to determine the level of acceptance of COVID-19 vaccination among the older adults residing in one of the regions in the Philippines. After determining the sociodemographic profile and level of acceptance of older adults, the causal relationship between the variables was established.

Materials and Methods

Study Design

This study was a correlational research study in terms of its design. Correlational research is concerned with establishing relationships between two or more variables in the same population or between the same variables in two populations. Curtis, Comiskey, and Dempsey (2016) emphasized that exploring the relationships among the variables is a significant part of research in nursing. Understanding the associations and relationships among human phenomena is a consistent impetus for scientific inquiry in all social science disciplines. This impetus transcends even the most polarized paradigmatic distinctions between various research methods (Fitzgerald et al., 2004). Since the study's goal was to measure and explore the degree of relationship between the demographic characteristics of the older adults and their acceptability of the COVID-19 vaccine, it was appropriate to utilize a correlational research design.

Respondent

The COVID-19 coronavirus pandemic is a global health disaster of the 21st century. This pandemic has caused untold fear and suffering for older adults across the world. According to the World Health Organization (WHO) as cited in the paper by Chee (2020), older adults in aged care homes are at a higher risk of infection due to living in an enclosed environment with others. Older people are more susceptible to COVID-19 infection, caused by a defective immune response to infectious challenges (Benksim, Addi, & Cherkaoui, 2020). In addition, comorbid illnesses, malnutrition, drugs, and stress predispose the elderly to an increased risk of coronavirus by declining their immune function (Benksim, Addi, & Cherkaoui, 2020). Hence, this study sought the participation of the older adults in the community of Barangay Imelda.

In the Municipality of Naval, Barangay Imelda is held to be one of those barangays with the greatest number of older adults. The barangay is also the barangay furthest away from the urban center of Naval. This confirms their information inaccessibility regarding the benefits of the COVID-19 vaccine. For these reasons, the elderly in this barangay were relevant when it came to providing the data needed for this study.

The researchers used the list of the elderly provided by the barangay health unit as its sampling frame. The elderly listed reached 126 in total. Due to the small population, the researchers used complete enumeration as its sampling technique. However, only 89 were surveyed because only those who were still able to process information were included in the study.

Table 1 Socio-demographic profile of the older adults (n=89)

Demographic Variable	n	%
Sex		
Male	44	49.44%
Female	45	50.56%
Educational Attainment		
Did Not Attend School	2	2.25%
Pre-School Level	3	3.37%
Pre-School Graduate	2	2.25%
Elementary Level	48	53.93%
Elementary Graduate	31	34.83%
Junior High School Level	2	2.25%
College Level	1	1.12%
Family Income		
Below PHP 10,000.00	77	86.52%
PHP 10,000.00 - Php 19,000.00	12	13.48%
Employment Status		
Employed	10	11.24%
Unemployed	79	88.76%
Religion		
Roman Catholic	87	97.75%
Iglesia Filipina Independiente	1	1.12%
Others	1	1.12%

Excluding the few who were not capable of answering the survey increased the reliability of the results.

Instrument

The study developed a questionnaire that would capture its objectives. This self-made questionnaire consisted of 13 items and was pilot tested in Barangay P.S. Eamiguel. The internal consistency of the items was measured using Cronbach's Alpha. The alpha coefficient for the 13 items was 0.992, suggesting that the items had a relatively high internal consistency. To note, a reliability coefficient of 0.70 or higher is considered "acceptable" in most social science research situations. This includes research situations in the field of health and nursing.

The research instrument was divided into two. The first section contained the questions on the demographic profile: (1) Sex, (2) Educational Attainment, (3) Family Income, (4) Employment Status, and (5) Religion of the respondents. The second section contained the 13 items capturing the acceptance of the older adults of the COVID-19 vaccines. The details of the items are presented in Table 2. Furthermore, the respondents rated the variable "acceptance to COVID-19 vaccines" using a five-point Likert scale (Definitely not = 1, Probably not = 2, Probably = 3, Very probably = 4, Definitely = 5).

Data Collection

Initially, the researchers sought ethical clearance from the Research and Innovation Office of the Biliran Province State University, and permission from the Local Government Unit before the conducting of the study. Informed consent was secured with an emphasis on the study's intention and coverage. Subsequently, the researchers sought assistance from the Barangay Health Office to be provided with a list of older adults in the community. The list was then used as a reference to identify and locate the residences of the older adults in the barangay. Before letting the respondents answer the survey, transmittal letters were given to each of the respondents. After receiving approval through the signing the consent form to survey them, the researcher gave them the survey questionnaire. All of this happened in a face-to-face set-up.

The survey lasted last for a week. A repetition of the barangay visits was done until the data was completed. Since the number of respondents was manageable, the researchers were also those who conducted the survey. They did not seek the help of research assistants or enumerators from the research office of the university.

To emphasize, the survey followed the Inter-Agency Task Force (IATF) guidelines for COVID-19 when visiting the residences of the respondents.

Data Analysis

After gathering the data, the researchers encoded the responses in Microsoft Excel to summarize the data. The responses to some of the variables, particularly those used for profiling, were coded accordingly. Consequently, the researchers produced a descriptive summary with the

Table 2 COVID-19 vaccine acceptance

Statement	Definitely	Very Probably	Probably	Probably Not	Definitely Not
If a vaccine against COVID-19 that has less than 50% effectiveness is available in the market, I will accept it.	9	8	9	12	51
If a vaccine against COVID-19 that has more than 50% effectiveness in the market, I will accept it.	19	5	9	11	45
If a vaccine against COVID-19 has known minor side effect (such as dizziness, lightheadedness, fever, flu-like symptoms (cold, sneezy, body malaise), body pain) and is available on the market, I will accept it.	13	13	7	8	48
I will accept a COVID-19 vaccine if my other family members will take the vaccine shot too.	24	5	9	6	45
I will accept a COVID-19 vaccine if my friends and significant others will take the vaccine shot too.	24	9	3	5	48
I will accept a COVID-19 vaccine if it was recommended by the local health authorities.	26	7	2	8	46
I will accept a COVID-19 vaccine if it was recommended by the national health authorities.	25	9	5	7	43
I will accept a COVID-19 vaccine if it was proven safe and effective by the government.	27	6	6	6	44
I will accept a COVID-19 vaccine if information about the vaccine is provided by trusted health professionals before vaccination starts.	23	11	7	6	42
I will accept a COVID-19 vaccine if information about the vaccine is seen on online platforms such as Facebook, Instagram, etc.	8	12	10	9	50
I will accept a COVID-19 vaccine even if I have existing medical health problems (diabetes, hypertension, rheumatoid arthritis, etc).	13	7	8	10	51
I will accept a COVID-19 vaccine despite my old age.	26	5	2	9	47
I will accept a COVID-19 vaccine even if I am fearful of the vaccination outcome.	21	6	4	8	50

encoded data to determine the completeness of all observations.

The study used SPSS version 25 to analyze and determine the correlation of the demographic variables in relation to the acceptability of the older adults in terms of the COVID-19 vaccine variable. The statistical tools used to measure the correlations of the variables were the Rank Biserial and Spearman Rho. Rank Biserial was used to determine the degree of relationship between the Sex and Acceptance of the older adults of the COVID 19 vaccine and between Employment Status and the Acceptance of the older adults of the COVID 19 vaccine. Meanwhile, Spearman Rho was used to measure the other three demographic variables (Age, Educational Attainment, and Religion) in relation to the Acceptance of the older adults of the COVID 19 vaccine. Sex and Employment Status were run using a different statistical tool of correlation because their data was discrete and nominal in nature. The authors used the p-values of the correlation coefficients to reject or accept the null hypotheses at a significance level of 0.05 and below.

Data Collection

Initially, the researchers sought ethical clearance from the Research and Innovation Office of the Biliran Province State University, and permission from the Local Government Unit before the conducting of the study. Informed consent was secured with an emphasis on the study's intention and coverage. Subsequently, the researchers sought assistance from the Barangay Health Office to be provided with a list of older adults in the community. The list was then used as a reference to identify and locate the residences of the older adults in the barangay. Before letting the respondents answer the survey, transmittal letters were given to each of the respondents. After receiving approval through the signing the consent form to survey them, the researcher gave them the survey questionnaire. All of this happened in a face-to-face set-up.

The survey lasted last for a week. A repetition of the barangay visits was done until the data was completed. Since the number of respondents was manageable, the researchers were also those who conducted the survey. They did not seek the help of research assistants or enumerators from the research office of the university.

To emphasize, the survey followed the Inter-Agency Task Force (IATF) guidelines for COVID-19 when visiting the residences of the respondents.

Ethical Consideration

This study strictly followed the principles of ethical standards when conducting the research. The researchers obtained ethical clearance from the University Internal Review Panel before the actual conducting of the study. Before the data collection process, the researchers provided transmittal letters to the Mayor, Barangay Captain, and Municipal Health Officer.

Three basic principles were observed in the conducting of this study: the principles of respect for persons, beneficence, and justice. Privacy and confidentiality were strictly observed throughout. The respondents in this study were informed of the purpose of the research and provided a clear description of the extent of their involvement and the risks, benefits, and rights of being a study respondent. They were also given the study's strengths related to the actual determination of the acceptance level of older adults for COVID-19 vaccination. However, the actual implementation of the study was constrained due to strict adherence to the COVID-19 protocols, such as the wearing of a face mask, physical distancing, and limited hand hygiene.

A standard form of informed consent was read, elaborated on, and explained in the language that the respondents understood to secure the elements of adequate information and comprehension. The respondents were not coerced, forced, or bribed to participate in this study to secure the element of voluntary participation. The respondents were of legal age and not of unsound mind as declared by the court to secure the element of competency and they qualified based on the inclusion criteria of the study. It was emphasized that they could withdraw from the study at any time during the conducting of the research. The respondents were reminded that they could stop participating in the study at any time without any danger of repercussions.

All data gathered in this study is considered private and confidential. All materials gathered were handled with utmost care. The anonymity of the respondents was preserved. No identifying data was exposed in the report of the study including any names, addresses, etc. All data was destroyed upon the completion and publication of this study.

Compensation or the giving of tokens to respondents poses an ethical dilemma. Nonetheless, this study recognizes the ethical principles of justice and respect and the respondent's time and effort will be given due credit and recognition. Before starting the interview, a token was offered to the respondents. The respondents

Table 3 Employment status and COVID-19 vaccine acceptance

Statement	Correlation Coefficient	p-value	Decision
Q1	-0.414**	0.000	Reject H_o
Q2	-0.383**	0.000	Reject H_o
Q3	-0.286**	0.007	Reject H_o
Q4	-0.315**	0.003	Reject H_o
Q5	-0.305**	0.004	Reject H_o
Q6	-0.317**	0.003	Reject H_o
Q7	-0.311**	0.003	Reject H_o
Q8	-0.288**	0.006	Reject H_o
Q9	-0.317**	0.002	Reject H_o
Q10	-0.342**	0.001	Reject H_o
Q11	-0.394**	0.000	Reject H_o
Q12	-0.344**	0.001	Reject H_o
Q13	-0.357**	0.001	Reject H_o

*<0.05 **<0.01

were informed that the interview tokens were given based on their assessed needs.

Lastly, there was no known potential conflict of interest for this study.

Results

Out of the 89 respondents who participated in the study, 45 (50.56%) were female and 44 (49.44%) were male. Most of the respondents had reached the elementary level of education, totaling 48 (53.93%). Concerning family income, many older adults belong to a family that receives a monthly revenue of less than PHP 10,000.00 per month as most of them are unemployed (88.76%). Roman Catholicism (97.75%) is the predominant religion of the group.

The older adults will definitely not accept the vaccine in the circumstances presented in Table 2. However, more older adults will definitely not accept the vaccine if it has less than 50% effectivity and if they have existing medical conditions such as diabetes, hypertension, and rheumatoid arthritis at 51% and 57%, respectively.

Regarding understanding the correlation between the socio-demographic correlates and the acceptance of the COVID-19 vaccine, only the employment status of older adults, particularly those who were unemployed, showed a significant correlation. The majority of the socio-demographic correlates (sex, educational attainment, family income, and religion) had a negative correlation with COVID-19 vaccine acceptance.

Discussions

The COVID-19 pandemic has wreaked havoc on the global economy since its first occurrence in Wuhan, China. Because of the negative pandemic effects, the WHO and its partners, especially drug manufacturers, have raced against time to develop a vaccine that will help reduce the statistics of COVID-19 infection (WHO, 2021). The available COVID-19 vaccines ready for administration include SinoVac Astrazeneca, Moderna, Sputnik V, and Pfizer. However, successful vaccines will still rely on the uptake of the population (Zigron et al., 2021).

As of July 7, 2021, the WHO (2021) reported that 3,032,056,355 people have received the COVID-19 vaccine out of the 7,753,000,000 total population around the world (World Bank Group, 2021). In the Philippines, the COVID-19 vaccination rollout began in March 2021 to eligible priority groups which included older adults (Department of Health, 2021). The acceptance of these older adults of the available COVID-19 vaccines has been studied here in relation to their sociodemographic profile.

The COVID-19 vaccine acceptance of the older adults showed that most people belonging to this population group will definitely not accept the vaccine. Among the notifiable response where most older adults did not show acceptance of the COVID-19 vaccine was if the vaccines had less than 50% effectiveness. Harapan et al. (2020) and Alqudeimat et al. (2021) described in their studies that acceptance is relative to the effectiveness of a certain COVID-19 vaccine. The higher the effectiveness, the more people will definitely accept the vaccine. Therefore, the government must put out effective strategies that will persuade the population to avail the free COVID-19 vaccines if the one purchased has been known to have low effectiveness.

Furthermore, older adults who have existing co-morbidities such as diabetes and hypertension expressed their unwillingness to accept the COVID-19 vaccine. The previous literature showed a similar finding that people with underlying medical conditions are hesitant and resistant to accepting the COVID-19 vaccines (Murphy, 2021). Unacceptance was linked to the medical contraindication of vaccines and the fear of vaccine side effects. This result is counterintuitive to the somatic benefit-risk analysis where people with health problems should take extra protective measures from infectious diseases. Older adults with existing health problems are considered vulnerable to COVID-19 infection (CDC, 2021), therefore they need the vaccine more. The unacceptance of the COVID-19 vaccine from this group might hamper the achievement of herd immunity where more people are expected to be fully vaccinated.

Upon studying the relationship between the sociodemographic correlates of the older adults in relation to their willingness to accept the COVID-19 vaccine, only unemployment showed a significant correlation. This information revealed a contrasting result to those of the available studies in the literature where unemployed individuals are less likely to accept the COVID-19 vaccines (Malik et al., 2020; Echoru et al., 2021). Malik et al. (2020) reported that vaccine acceptance is directly proportional to literacy level. The higher the education level, the more accepting an individual is of the COVID-19 vaccine.

Strikingly, the study shared the same result as the study by El-Elimat et al. (2020). Their study reported that unemployed participants were more accepting of the COVID-19 vaccines than the employed participants. This is not a perplexing finding as most of the respondents in the study were unemployed due to old age. Most of them were retired individuals receiving pensions. Others were supported by their family.

Limitations in relation to the conducting of this study were identified. One limitation was the research locale, wherein all study participants lived in a mountainous barangay. A different finding may have been gathered if the study encompassed a wider coverage of older adults – those living in rural-upland, rural-coastal, and urban areas, respectively. Also, the study was conducted when COVID-19 vaccines were still undergoing clinical trial. As more studies proving the safety and effectiveness of the

COVID-19 vaccines emerge, the respondents might change their perception regarding acceptance.

Conclusions

Generally, the results of this study highlight the need to improve the level of knowledge and increase the trust in the COVID-19 vaccines to expedite their uptake in the older adult population. Educating them on the benefits of the COVID-19 vaccine is an essential milestone in preventing further morbidity and mortality cases of the COVID-19 disease, considering their high-risk category. Moreover, the local government should intensify its public awareness campaigns to reach everyone in the community. Providing rewards or incentives can also be a strategy to improve the level of vaccine uptake.

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ORIGINAL ARTICLE

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The effect of basic trauma and cardiac life support training in increasing the competence of emergency room nurses

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ABSTRACT

Introduction: Nurses on duty in the emergency room (ER) play an important role in the early identification of a life-threatening patient condition, immediate action, and the subsequent care of critically ill patients. Continuous training and improvement need to be done to improve the ER nurses' competency. This research aimed to analyze the differences in nurses' competencies.

Methods: This quantitative study employed a quasi-experiment design. The sample size comprised 50 nurses of ER in Surabaya with a total sampling technique. Variables used on this study were demographical data as the independent variables and dependent variables including knowledge, attitude and skills. Intervention was given by two methods, online training for knowledge and attitude, while offline training for skill improvement. After ensuring the distribution and homogeneity of the data, a paired t-test was employed for parametric statistical data analysis.

Results: There were differences in pre-test and post-test scores in the domain of knowledge, attitude and skill (p = 0.000), respectively. The mean of knowledge, attitude, and skills had increased significantly. Hence, the training is proven to improve those competencies as well as the sub-topic items.

Conclusions: Basic Trauma and Cardiac Life Support (BTCLS) training has improved nurse competency; it is advised to hold this training, especially in the ER. Indeed, it can improve healthcare services quality and improve patient safety at health facility. In addition, future research can modify the training time, training delivery methods, and content of BTCLS training materials to adjust with the current situation of the COVID-19 pandemic.

Keywords: attitude; competency; emergency nurse; knowledge; skill; training

Introduction

The nurse plays a crucial role in determining health services in hospitals, not only because nurses work on the frontline, but also being a majority compared to other health workers (WHO, 2020). By implementing professional nursing care, good quality health services can be accomplished. Nurses who work in the emergency room (ER) must adopt critical situations and provide nursing care with speed and accuracy that is different with other nursing situations (Laoh and Rako, 2014). Nurses on duty in the ER play a vital role in the early identification of a life-threatening patient condition, immediate action, and the subsequent care of critically ill patients (Cunningham *et al.*, 2017). Compared to other patient care units, the ER and ICU are places where the number of critically injured patients is the most, so it is essential to ensure that nurses working in these units have adequate competence (Sankar *et al.*, 2013).

Nurses must perform continuous self-development by increasing knowledge, attitudes, and skills to provide proper emergency services. Training is the effort to ensure that nurses have competency in emergency cases. This method is an option that does not require much cost but can provide the expected effect even if it is carried out by utilizing limited resources (Cunningham *et al.*, 2017). The competence of nurses in handling emergency cases is essential to increase the success rate, accuracy, and quality of emergency service in treating patients (Mason *et al.*, 2005). Therefore, competency in handling emergency cases is one of the most important factors determining healthcare service quality (Li *et al.*, 2016).

Corona Virus Disease 2019 (COVID-19) is a global crisis that happened in late 2019 and rapidly spread all over the world (Yie *et al.*, 2021). In this constraint, nurses are included in the first line in hospitals that provide healthcare services (Buchan *et al.*, 2019). Therefore, a nurse must have sufficient understanding in recognizing COVID-19 disease, including identifying the pathogen, signs and symptoms, how it spreads, how to break the chain of infection, and the treatment that must be given appropriately (Burnett, 2018; Corless *et al.*, 2018). Nurses' competency regarding COVID-19 disease will contribute to their environment because their competence will provide health protection for themselves and the surrounding community. The efforts to improve the nurses' competency are an investment during the COVID-19 pandemic (Ridley, Sanderson and Haines, 2021). This effort not only provides positive outcomes in dealing with the COVID-19 pandemic but also prepares for another outbreak that may occur in the future (Purba, 2020). To maximize healthcare personnel's capabilities and increase protection, vigilance, and control against COVID-19 infection, hospitals should provide training for nurses, either on-site or online (Wu *et al.*, 2020). The online training was an effective method for improving the competency of nursing workforce either in academic or clinical setting (Wong and Greenhalgh, 2013; Tobase *et al.*, 2017; Vaona *et al.*, 2018). Dr. Soetomo Hospital Surabaya routinely conducted emergency nursing training once a year and was designed for nurses to handle emergency problems. This training used an appropriate approach by referring to scientific foundations and good nursing processes. Hence, the training participant is expected to be able to demonstrate life saving skills, minimize organ damage, and reduce patient mortality and disability. This training was provided to new nurses who will be transferred or assigned to the ER. Competence is a set of abilities for individuals to carry out a job correctly and consists of knowledge, attitudes, and skills. However, research regarding the effect of the training using online and on-site approach toward nurse's competency has not been done.

This study aimed to analyze the differences in nurse competencies, in terms of knowledge, attitude, skills, in ER after attending BTCLS training.

Materials and Methods

Study Design

This quantitative research employed a quasi-experimental study, using a one-group pre-test-post-test design, with BTCLS training as an intervention. BTCLS training was held on 12-16 September 2021 and combining both offline and online sessions to reduce physical interaction during the COVID-19 pandemic. Before the training, the first observations (pre-test) measured the participants' competencies (knowledge, skills, and attitudes). Then the second observation (post-test) was made again after the training by re-measuring the participants' competencies (knowledge, skills, and attitudes). The first three days of BTCLS training were conducted online. The first day of BTCLS training includes participant registration, technical meeting, health protocol presentation as well as knowledge competency pre-test, while the second and third day of BTCLS training consisted of online lecture materials that includes the role of emergency nurses in improving quality profession during the pandemic, Basic Life Support, trauma of thorax and abdomen, triage, electrocardiogram (ECG) and acute coronary syndromes, burns, and fluid therapy. All of the online sessions of BTCLS training were held by Zoom Meetings. The fourth and fifth day of BTCLS training were conducted offline while maintaining health protocols. All of the participants and instructors took antigen swab test before the offline sessions of BTCLS training. Participants were divided into small groups following the six stations namely basic life support skills, initial assessment, transport skills, airway and breathing skills, ECG skills, and advanced life support skills. On the fourth day, the instructors held the pre-test of both the attitudes and skills of the participants during each station before giving out the demonstrations of the right methods for attitudes and skills. And lastly, the participants went through post-test for knowledge, attitudes, and skills on the fifth day.

Respondent

The sample size comprised 50 nurses with a total sampling technique. The participants worked in ER Dr. Soetomo Hospital Surabaya. The independent variable in this study was BTCLS training. The dependent variable is nurses' competence, which consists of knowledge, skills, and attitudes.

Instrument

Instruments for assessing knowledge, skills, and attitudes were obtained from the official assessment, Education and Training Board of the Regional Supervisory of the Indonesian National Nurses Association (PPNI) East Java; hence there was no need to test for validity and reliability (Zúñiga *et al.*, 2016; Stevanin *et al.*, 2017). The knowledge assessment consists of 35 multiple choice questions according to the material contained in the BTCLS training. Meanwhile, attitude and skill measurement are shaped as a checklist for the participant's emergency care completeness, and the BTCLS training assessors assessed it. The assessors were competent assessor whose having field experience on BTCLS and has been recognized as certified assessor in this area. Each assessment for knowledge, skill, and attitude is considered good if the total score is > 75% and not good if the score is < 75%.

Table 1 BTCLS Training Participants Based on Age, Gender, Education, and Length of Work

Characteristics	n	%
Gender		
Male	26	52
Female	24	48
Age		
25 – 30 years	11	22
31 – 35 years	27	54
36 – 40 years	7	14
> 40 years	5	10
Unit		
1st floor ER	25	50
Contagious ER	7	14
ER-ROI	2	4
Aster HCU	4	8
HCU Pandan II	1	2
Others	11	22
Education Level		
Bachelor	21	42
Associate Degree (D3)	27	54
Associate Degree (D4)	2	4
Period of Employment		
< 1 year	11	22
1-5 Year(s)	8	16
> 5 Years	31	62

BTCLS training is a nursing training to handle emergency problems caused by trauma and cardiovascular disorders. The training aims to enable nurses to provide life support to save lives and minimize patients' disability and organ damage. Nurse competency is the ability of each nurse to handle emergency cases under training standards. The competency consists of (1) knowledge: what nurses know about handling emergency cases; (2) attitude: how nurses handle emergency patients; (3) skill: nurses' ability to handle emergency patients according to applicable standards and procedures. Knowledge competency data are nominal. Meanwhile, the measurement scale for skill and attitude is ordinal data.

Data Collection

This research was divided into three stages, namely the preparation stage, implementation, and the final stage. The preparation stage is a preliminary study. The researcher conducted interviews with the Director of Medical & Nursing Services, the Director of Professional Education & Research, the Head of ED's Nurse, and the Head of the Nursing Division. Interviews were conducted to overview existing training and evaluation of emergency nursing throughout this period. Then further discussions were held with representatives from the Indonesian Emergency and Disaster Nurses Association (HIPGABI) to determine emergency nursing training tailored to the COVID-19 pandemic situation.

Data Analysis

The researcher identified the participants and conducted preliminary observations (pre-test). Furthermore, recording and documentation were accomplished during BTCLS training. The final observation (post-test) was conducted to see the effect of the training. In addition, the researcher also conducted additional interviews with the BTCLS training organizers. The final stage was data analysis using the SPSS program. The researcher first looked at the distribution and homogeneity of the data. A paired t-test was employed for parametric statistical data analysis.

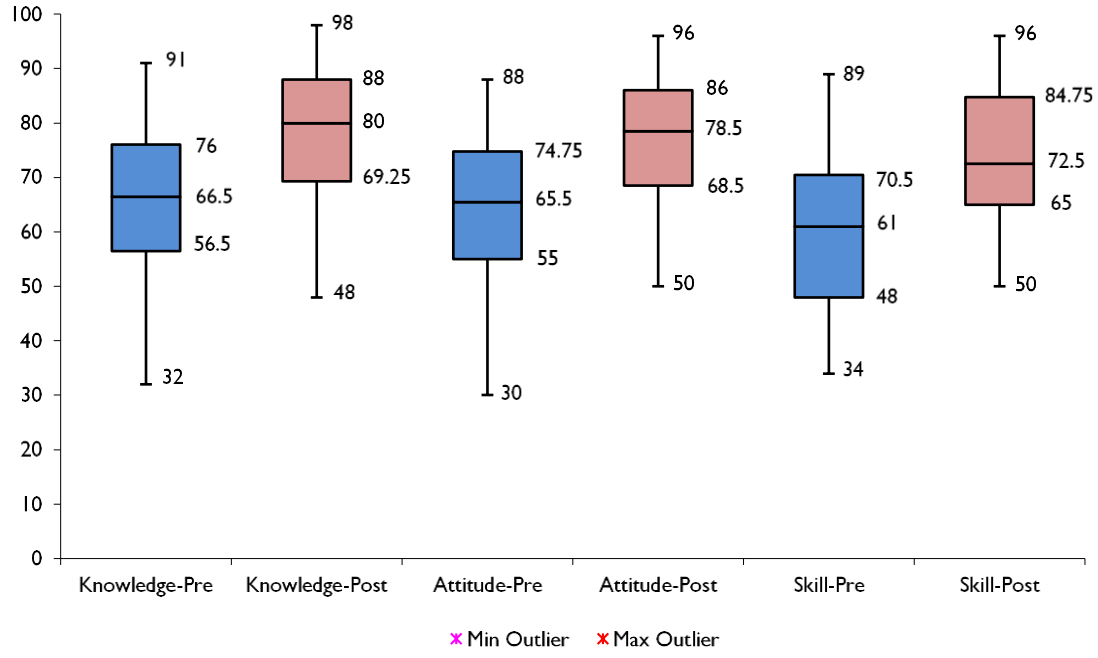

Figure 1. Boxplot graph of nurses' competency before and after BTCLS training

Ethical Consideration

In addition, at the implementation stage, the researcher also obtained ethical clearance from the health research ethics committee, Dr. Soetomo Surabaya Hospital. This research was conducted with ethical principles: informed consent, anonymity, and confidentiality. This study received ethical clearance from the ethics commission, with letter number 0240/KEPK/VII/2021, valid for one year since first issued on August 23rd, 2021.

Results

The normality test of the three competencies shows that the data obtained are normally distributed. Kolmogorov-Smirnov test results for pre-test knowledge p = 0.200, post-test knowledge p = 0.200, pre-test attitude p = 0.116, post-test attitude p = 0.200, pre-test skill p = 0.107, and post-test skill p = 0.094.

The homogeneity and normality test are assumptions of the hypothesis test formula for the t-test and ANOVA. Before testing the data by t-test and ANOVA, the assumptions of normality and homogeneity must be met. The next test is the homogeneity test, which determines the data variance. Levene's test results are as follows, knowledge p = 0.199, attitude p = 0.127, and skill p =

Table 2 Results of the pre- and post-data analysis training of BTCLS of nurses in Dr. Soetomo Hospital Surabaya

Variable	Δ Mean	Δ Std. Deviation	t	p-value
Knowledge (pre- and post-test data)	12.940	4.181	21.881	0.000
Attitude (pre- and post-test data)	14.300	5.273	19.176	0.000
Skill (pre- and post-test data)	14.380	5.102	19.928	0.000

Table 3 Results of the pre- and post-data analysis competencies in detail BTCLS training of nurses in Dr. Soetomo Hospital Surabaya

Variable	Δ Mean	Δ Std. Deviation	t	p-value
Knowledge				
Trauma	0.127	0.175	5.144	0.000
Life Support	0.154	0.187	5.844	0.000
Cardiac	0.313	0.210	10.540	0.000
Attitude				
Orientation phase	0.458	0.447	7.240	0.000
Show a listening attitude	0.197	0.368	3.775	0.000
Provide an opportunity to ask questions or clarify	0.700	1.015	4.876	0.000
Documents according to standard	0.760	1.333	4.030	0.000
Termination phase	0.907	0.771	8.316	0.000
Wash your hands according to standard	1.060	1.163	6.443	0.000
Aseptic and antiseptic principles for sterile procedures	1.100	2.092	3.718	0.001
Protection with universal precautions	1.100	2.092	3.718	0.001
Handling medical and non-medical waste	0.500	1.515	2.333	0.024
Skills				
Preparation	0.850	0.649	9.264	0.000
Assessing Patients	0.820	0.569	10.185	0.000
Airway	0.825	0.552	10.577	0.000
Breathing	0.845	0.463	12.916	0.000
Circulation	0.830	0.519	11.316	0.000
Disability	0.713	0.522	9.669	0.000
Exposure	0.750	0.672	7.892	0.000
Foley Catheter	0.927	0.592	11.068	0.000
Gastric Tube	0.873	0.466	13.251	0.000
Heart Monitor	0.760	0.797	6.743	0.000
Pulse Oximetry, X-Ray	0.520	0.707	5.202	0.000
Secondary Survey	0.667	0.738	6.390	0.000

0.088. The three competencies have the same variance, and the assumption of homogeneity has been met.

Table 2 show the results of the BTCLS training effect on nurse competencies (knowledge, attitude, and skills). In column 'p,' the effect is marked with a significance value below 0.05. There are differences in the pre-test and post-test scores of the nurse competency test. Each competency has a significance value of less than 0.000. Hence, this quasi-experimental research hypothesis concludes that BTCLS training significantly affects nurses' knowledge, attitude, and skills. The mean of knowledge has increased significantly by 12.94. This pattern also occurs in other nurse competencies: attitude and skills. The results show that the post-test scores of the majority of nurses are improved. The boxplot graph explains an increase in the post-test scores on knowledge, attitude, and skills compared to the pre-test scores (Figure 1).

Table 3 shows differences in post-test knowledge and pre-test knowledge in trauma, life support, and cardiac. Each of these categories has a p-value below alpha (0.05). Furthermore, the table also shows the difference of post-test attitude and pre-test attitude in the categories of orientation, listening, an opportunity to ask questions or clarify, standardized documents, termination, hand washing, aseptic and antiseptic principles, protection, and handling of medical and non-medical waste. Finally, the table describes the differences in each category of questions on skill competence. All categories of skill competency questions, including airway, breathing, circulation, disability, exposure, foley catheter, gastric tube, heart monitor, pulse oximetry and x-ray, and secondary survey showed significant differences

Discussions

This research showed that there were significant differences between knowledge before and after training. This finding aligns with Ha and Nuntaboot's (2020) research on nursing education and training as predictors of nurse competence. However, the difference is that the research results emphasize on narrative views' of participants on the training (Ha and Nuntaboot, 2020). This finding also parallels with prior research conducted by Fong *et al.* (2021). It is more relevant since the same methodology -quasi-experimental without a control group- was employed to examine the effect of orientation on nurse competence especially focus on increased knowledge (Fong *et al.*, 2021). Item analysis was also accomplished in this study, with good results in knowledge (trauma, life support, and cardiac). There was a significant difference in the percentage of trainees who answered correctly. Structured training is required in order to increase the competency of health workers in health facilities, including nurses.

This research demonstrated that there were significant differences between attitudes before and after training. This finding supports prior research on emergency, that training affects the knowledge and skills of healthcare personnel (Yildiz, Selimen and Dogan, 2014; Ameh *et al.*, 2016). However, the difference is that those studies only examined partial competencies (Yildiz, Selimen and Dogan, 2014; Ameh *et al.*, 2016). This study also included item analysis, which yielded positive findings in terms of attitude. There was a significant difference in the percentage of trainees who behave correctly in the orientation phase, listening attitude, opportunity to ask questions/clarification for patients, documents according to standards, termination phase, washing hands, aseptic principles and antiseptic, universal precaution protection, and handling medical and non-medical waste. Future training in increasing attitude should consider the general and specific competency of nurses.

This research revealed that there were significant differences between skills before and after training. This finding confirms prior research conducted by Kim and Shin (2016) in the area of maternal and child emergency nursing. Overall, this research on improving the emergency nurses' competency supports research from Ojifinni, Motara and Laher (2019) to include basic life support (BLS) and cardiopulmonary resuscitation (CPR) in the formal training to improve nurse competency. Park and Kim (2017) also put forward the same suggestion to conduct specific education and training regarding an emergency training to improve the nurses' competency. In this study, item analysis was also performed, and the results were positive for nurses' skill competency. There was a highlighted finding for nurses who acted correctly on preparation, assessing patients, airway, breathing, circulation, disability, exposure, foley catheter, gastric tube, heart monitor, pulse oximetry, x-ray, and secondary survey. Skill of nurses should be viewed as critical competency as it is related to patient safety and improving the quality of healthcare.

This study has several limitations, including without using a control group; since this research is the first to be conducted to assess the increase in knowledge, attitude, skills, and a category of questions at the research locus. Hence, it is hoped that further research can be conducted with re-assessments within a certain period (three months, six months, or one year) so that training can be refreshed to adjust with the needs of nurses.

Conclusions

There was an increase in emergency nurses' competency in term of knowledge, attitude, and skill after attending the BTCLS training. Repeated educational programs can improve these three domains as well as the contents of the domain. For future BTCLS training, recommendations include training time, training delivery methods, and content of BTCLS training materials. In addition, future research can modify the

training method as an intervention group and add a control group to the standard training method.

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Indonesians' readiness in facing long-term COVID-19 pandemic

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ABSTRACT

Introduction: Long-term COVID-19 pandemic which has existed in Indonesia since 2020 not only poses a risk to public health but also to their social conditions. Indonesia, as a country with strong social fabric within its people, has a high sense of social responsibilities in facing the pandemic. The aim of this study is to describe Indonesians' readiness in facing long-term COVID-19 pandemic.

Methods: This descriptive study used a cross-sectional design with a sample of 305 residents of five cities in Indonesia. They were chosen not randomized by distributing a survey invitation via WhatsApp group with the background of the general public, and health cadres. We waited until the response received reached the targeted number of respondents. The data were collected using Google Forms, and were analyzed by using a descriptive method (percentage, P-value, and odds ratio) by SPSS statistical software version 25.

Results: The readiness in facing the pandemic fell into two categories: the high readiness level (77.1%) and the low readiness level (22.9%). Gender and age do not affect the level of readiness, while the level of education and employment status influenced the level of readiness.

Conclusions: The majority of Indonesians have high readiness level. Public participation can decrease COVID-19 transmission rate.

Keywords: COVID-19; Indonesian; pandemic; readiness

Introduction

Coronavirus Disease 2019 (COVID-19) is a new strain that has never been identified before in humans (Tarantola, 2020). Based on the scientific facts available during the formulation of the research, COVID-19 can be transmitted human-to-human through droplets of cough or sneeze and is not airborne. Persons with the most risk of contracting this disease are those coming into close contact with COVID-19 patients, including those treating them (Heymann, 2020; Song and Lu, 2020). Standard recommendations in preventing the transmission of the virus include washing hands regularly with soap and running clear water, applying coughing and sneezing etiquette, avoiding direct contact with livestock and wild animals, and avoiding close contact with anyone exhibiting respiratory disease symptoms such as coughing and sneezing (WHO, 2020a; 2020c).

The public needs to be ready with the new habits like maintaining distance, washing hands, wearing masks, and not gathering. On the other hand, Indonesians have a habit of gathering and socializing with family, and friends, and this has the potential for transmission of COVID-19. Another problem is not meeting with family, and friends (Pasteruk, 2020). Not socializing in a short time doesn't cause problems, but not being able to meet for a long time will cause boredom (Hwang et al., 2020). A long-lasting pandemic can make people tired of wearing masks because it's uncomfortable and costs money (Claresta, Christian and Sa'id, 2021). We need to see Indonesian readiness to solve the problem, and carry out health protocols for a long time. Readiness is defined as a point of maturity to accept and practice the health protocol behavior that has been set in life.

The case of COVID-19 has spread throughout the world, numbering 237 countries based on WHO data in

March 2022. The incidence of COVID-19 based on WHO data on March 17, 2022 showed 462,758,117 confirmed cases with a mortality rate of 6,056,725 deaths. The WHO also reported data on confirmed cases of COVID-19 in South-East Asia of 56,626,996 (WHO, 2022). Data from the Indonesian Ministry of Health reported that, as of March 17, 2022, there were 5,939,082 Indonesians confirmed COVID-19 with 153,212 deaths. Based on WHO data in February 2022, Indonesia was placed 27 of 237 countries with the most COVID-19 cases (Kementerian Kesehatan Republik Indonesia, 2022). Jansen et al. (2021) stated that there is a faster transmission in the Omicron variant, making the potential for COVID transmission increase when public awareness is low.

Indonesia's position was included in countries with a high number of COVID-19 cases, in line with data monitoring health protocol compliance in July 2021. Task force COVID-19 reported that 27.03% people did not obey wearing masks, and disobedience to keep a distance was 28.38%. It is not only the responsibility of the government, but also community contribution to increase public participation of the importance for obeying health protocols (Satgas, 2021).

Indonesians have a successful history in solving problems by involving the community, such as a successful program to prevent dengue fever by establishing larva monitoring (Widyawati, 2019). The country also succeeded in controlling drug dropout in tuberculosis patients using drug monitoring, where support from the supervisor significantly influences the patients' obedience of taking TB drugs (Widani and Sianturi, 2020). These problems were solved by the community. History shows that the role of the community is very important in controlling COVID-19 in Indonesia.

Based on community roles win line with public health condition, community readiness in carrying out, inviting, and monitoring health protocols becomes important. Community readiness depends on individual commitment to change, facilitating change, and implementing change (Edwards et al., 2000; Castañeda et al., 2012). Indonesians are accustomed to the same behavior as their values. For instance, the residents of Sukoharjo, Province Central Java decided to isolate the village as a form of war against the coronavirus, and no one is allowed in or out until the situation return to normal, and each individual follows the rules (Pasteruk, 2020).

Seeing the long-term likelihood of COVID-19 pandemic, as well as compliance with fluctuating health protocols, a study was needed to determine the readiness of Indonesians in dealing with a lengthy COVID-19 pandemic. There was no research that discusses Indonesians' readiness in deal with a long-term COVID-19 pandemic, hence the objective of this research was to investigate Indonesians' readiness in facing a long-term COVID-19 pandemic.

Materials and Methods

Study Design

This research used a descriptive study with a cross-sectional design and was carried out in Indonesia between March and June 2021.

Respondent

All participants (n=305) were Indonesians living in five cities: Surakarta, Surabaya, Jayapura, Denpasar, and Sukoharjo. The data of the research were collected through questionnaire via Google Forms including demographic information (age, sex, level of education, and employment status), and measures of readiness in coping with COVID-19 undertaken.

Instrument

The measures of readiness were assessed by using the 5-point Likert scale to measure responses for 14 questions. The instrument made by the research team in consultation with linguists, and public health expert was then tested for validity and reliability. Validity and reliability tests were carried out on 20 respondents outside the research sample. Validity test was using Pearson product moment and reliability test using Cronbach's alpha. The results of the r table with 20 respondents and the level of significance is 5%, namely 0.444. A statement is declared valid if r count > r table. The questions 1 through 14 have r count more than r table and it can be concluded that all statements are valid. The results of Cronbach's alpha show a value of 0.786 and are more than the r table (0.444), so it can be concluded that all statements are reliable (Appendix 1).

Table 1 Demographic characteristics and readiness level of the respondents (n = 305)

Variables	Frequency	Percentage
Gender		
Female	266	87.2%
Male	39	12.8%
Age (years)		
17-35	69	22.6%
36-50	157	51.5%
>50	79	25.9%
Education level		
Elementary school	20	6.6%
Junior high school	45	14.8
Senior high school	139	45.6
Diploma Degree	35	11.5
Bachelor's degree	42	13.8
Master's degree	24	7.7
Occupation		
Unemployed	175	57.4%
Civil servants	35	11.5
Traders	19	6.2
Laborers	16	5.2
Students	21	6.9
Others	39	12.8
Readiness Level		
High readiness level	235	77.2%
Low readiness level	70	22.8%

Table 2 Relationship between characteristics of the respondents and readiness level

Variable	Readiness level		OR (95% CI)	P value*
	High (%)	Low(%)		
Gender				
Female	208 (68%)	58 (19%)		
Male	29 (10%)	10 (3%)	1.237	0.591
Age				
17-50 years old	171 (56%)	55 (18%)		
>50 years old	66 (22%)	13 (4%)	0.612	0.150
Level of education				
High	78 (26%)	32 (10%)		
Low	157 (51%)	38 (12%)	1.739	0.000
Employment status				
Employed	71 (23%)	26 (9%)		
Unemployed	166 (54%)	42 (14%)	2.164	0.000

Data Collection

We distributed survey invitations via WhatsApp to WhatsApp groups with the background of the general public, and health cadres, and waited until the response received reached the targeted number of respondents.

Data Analysis

The results show that Indonesians' readiness in facing the pandemic fell into two categories, namely the high readiness level and the low readiness level. Readiness level was determined by identifying 14 statements (Appendix 2). The statement consists of readiness in identifying guests after the trip, quarantine for people with a high risk of COVID-19, checking the health of residents, reducing the frequency of mobility, providing supporting facilities for health protocols, disinfection of public places, health education, participation in surveillance of suspected COVID-19, and sharing food. Each statement will get a value of 1-5. The maximum value for each respondent is 70. The result of the calculation of mean is 53. We measured group readiness levels with a formula, readiness value more than or equal to 53 was referred to as high readiness level, and readiness value less than 53 as low readiness level. The readiness measures collected were then grouped into those that carried the most (high readiness level) and those carried the least (low readiness level). Data analysis was performed by using the SPSS statistical software version 25 by showing percentage, odds ratio (OR), and P-value. The data were presented or summarized as mean, frequency, OR, and percentage.

Ethical Consideration

The study was approved by the Research Ethics Committee of the Indonesian Ministry of Health. The Ethical Approval was obtained from Health Research Ethics Committee of Poltekkes Kemenkes Surakarta, number LB.02.02/1.1/2424.4/2021 dated on January 31st, 2021. Permission to conduct the study was proposed to the Regional Research and Development Design Agency of Central Java Province. The researchers applied research ethics principles of anonymity, beneficence and non-maleficence, autonomy, and justice. An explanation of the background and aim of the study, as well as informed consent were contained in the Google Form, together with the instrument. Participants were reminded at the beginning of the survey that proceeding and completing the survey indicated voluntary consent to participate in the study. Anonymity and confidentiality were maintained throughout the study.

Results

A total of 305 people was sampled with 95% response rate of 321 respondents who were recruited. The respondents ranged from 17-63 years of age SD of 34±6.3 years. Table 1 shows demographic data of the respondents. The majority of participants were female (87.2%). A large number of respondents were within the age range of 36-50. Most of respondents (45.6%) graduated from Senior Secondary School, and a large number of respondents (57.4%) were unemployed. The majority of respondents had a high readiness level (77.1%).

Based on the research, it is reported that women (68%) had higher level of readiness in facing COVID-19. Respondents falling into productive age of 17–50 were readier in dealing with the impacts of the pandemic. It is also reported that respondents with higher levels of education were 1.739 times readier than those with lower levels of education, and those who were employed were 2.164 times readier than those who were not (Table 2).

Discussions

The research results show that the majority of Indonesians (77.1%) were of high readiness level in facing COVID-19. The factors influencing readiness in facing the pandemic were education level (p =0.000) and employment status (p =0,000), while gender (p=0.591) and age (p=0.150) were not found to be correlated with public readiness level. This result is influenced by several determinants of readiness.

The respondents with higher levels of education had 1.739 times higher readiness level than those with lower levels of education. Education and skills have a strong influence on individual well-being. Education creates many opportunities for individuals and is essential for high economic growth, and strong social cohesion

(Mojtahedi et al., 2021). Education guarantees income, social benefits, healthy neighbors, and healthy behaviors, so that those with higher levels of education are readier to face new diseases. This is in line with findings from Yanti et al. (2020) that show Indonesians have good knowledge, positive attitudes, and good behavior toward social distancing to prevent the transmission of the COVID-19 pandemic in Indonesia. It can be concluded that level of knowledge influences public readiness in facing COVID-19.

The respondents who were employed were 2.164 times readier than those who were unemployed. This is consistent with the findings of Weil (2017), stating that employment influences one's level of readiness in facing problems. Employed people will have better economic state, which enables them to make ends meet. Mojtahedi et al. (2021) said that people who lost their jobs during the pandemic felt depression, anxiety, and stress, so they had difficulty facing COVID-19.

As a consequence of the COVID-19 pandemic, many companies terminated their staff's employments. The rules of social distancing have forced coffee shops to lay off their employees. The implementation of the lockdown has also prevented the tourism, hotel and transportation sectors from allowing employees to work (Al-Fadly, 2020; Bottan, Hoffmann and Vera-Cossio, 2020). If this global health crisis is not resolved immediately, the economy will not do well, thereby causing an increase in vulnerability of transmission and rate of death (Viezzer and Biondi, 2021).

The results of the study show that most of the men and women have high readiness. Level of exposure risk, comorbidity, socioeconomic level, and individual experiences influence readiness in facing the pandemic. The WHO recommends that, in making decisions, governments should also consider gender factors in order to ensure public participation and readiness (WHO, 2020b).

Age correlates with level of experience and vulnerability to disease. In this research it was found that those aged 17-50 years, as well as those more than 50 years old, were in high readiness to face COVID-19, although Indonesians had no experience in dealing with diseases similar to COVID-19. Experience in facing diseases similar to COVID-19 provides more readiness. As an example, Taiwanese, as reported by Chiu (2020) were ready to face COVID-19 since they had experience in facing SARS in 2003. The researchers stated that COVID-19 prevention efforts have been conducted earlier in Taiwan, including countering false news spreading fear (Chiu, 2020). Vulnerability to COVID-19 should cause people to be more vigilant, in which the elderly are more vulnerable to the disease (Niu et al., 2020). However, since Indonesians have no prior experience, age did not significantly influence readiness.

Indonesians voluntarily raised funds to make washbasins, distribute face masks, disinfect places of worship, and help others economically since they have a culture of mutual assistance (*gotong royong*), which has long taken root in the country (Bowen, 1986). The history of three centuries of colonization enables Indonesians to achieve high levels of solidarity. Cooperation, mutual assistance, collective decision-making, and mutual respect are important parts in the national culture (Dewantara, 2017). The limitation of this research is that the sample coverage is not comprehensive as it does not cover all 34 provinces in Indonesia.

Conclusions

Research findings show that the majority of Indonesians sampled have high readiness level in facing the COVID-19 pandemic. Most males and females in Indonesia, both aged 17-50 years or more than 50 years, who are highly educated and have low education, as well as those who are working or not working have high readiness to face the pandemic. There is, however, a need of improvement in health education in order to improve readiness. We suggest that a wider survey is needed by adding a variable about COVID-19 vaccination. Health protocol compliance must also always be surveyed as a basis for determining government policies.

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Appendices

Appendix 1 Validity and reliability readiness level assessment

Statements	Pearson r Count	Cronbach's alpha
Statement 1	0.715	
Statement 2	0.617	
Statement 3	0.694	
Statement 4	0.568	
Statement 5	0.782	
Statement 6	0.600	
Statement 7	0.785	0.786
Statement 8	0.671	
Statement 9	0.598	
Statement 10	0.638	
Statement 11	0.641	
Statement 12	0.723	
Statement 13	0.652	
Statement 14	0.568	

Appendix 2 Readiness level assessment

	Statements	Totally Agree (5)	Agree (4)	Partially Agree (3)	Disagree (2)	Totally Disagree (1)
1)	Do you carry out identity checks and ask the city of origin where the migrants come from?					
2)	Do you ask visitors to check with the nearest health facility after the trip?					
3)	Do you ask visitors to apply self-quarantine measures for 14 days inside their homes after the trip?					
4)	Do you ask the arriving person to self-quarantine at the quarantine facility provided by the city government?					
5)	Do you check the body temperature and health status of the people who come?					
6)	Do you do road closures to reduce the frequency of mobility?					
7)	Do you build a sink and provide soap?					
8)	Do you distribute masks to the public?					
9)	Do you disinfect places of worship and public places?					
10)	Do you make health education posters or banners?					
11)	Do you suspend meetings and rallies?					
12)	Do you raise funds to ease the economic burden of the population?					
13)	Do you participate in surveillance activities against suspected COVID-19?					
14)	Do you donate food to members of the community affected by COVID-19 who are in need					

***Scoring: Total score: _____*

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ORIGINAL ARTICLE

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The association between self-control and satisfaction in life among Filipino older adults

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ABSTRACT

Introduction: Self-control has been associated with a host of positive life outcomes. This correlational study was aimed at determining the link between self-control and life satisfaction among the older population.

Methods: This study used a quantitative correlational design. Ninety-six (96) older adult residents of Iligan City and Lanao del Norte, Mindanao Philippines, who met the inclusion criteria were recruited. This quantitative study made use of two standardized instruments namely the Brief Self-Control Scale (BSCS) and the Satisfaction with Life Scale (SWLS). The association was assessed using Pearson correlation statistics.

Results: There is a significant relationship between the older adults' self-control and their life satisfaction. The computed r value is 0.248 ($p < 0.05$). Evidently, there is a positive relationship between self-control and life satisfaction. This current study has provided evidence to support the assumption that exercising self-control leads to life satisfaction.

Conclusions: As a significant positive relationship between the older adults' self-control exercise and their life satisfaction was proven, this means that effective exercise of self-control positively leads to better life outcomes such as satisfaction in life. Linking self-control exercise with life satisfaction offers an innovative way for us to know why some people may feel more satisfied with life than others.

Keywords: elderly; Filipino; life satisfaction; older adults; self-control

Introduction

The concept of attaining life satisfaction has always been an aspiration to most human beings. While self-control is attributed to a host of positive outcomes, it is still interesting to know the link between self-control and the satisfaction with life. The essence of self-control in attaining important life outcomes is widely recognized. High self-control, according to several authors, positively predicts a person's well-being, life satisfaction and positive affect. High self-control here means the ability of a person to regulate his thoughts, feelings and behaviors (De Ridder et al., 2012; Hofmann et al., 2014).

Several authors have pointed out that self-control is a powerful determinant of success across the life span (De Ridder et al., 2012). The practice of self-control is associated with positive outcomes such as better interpersonal relationships, good physical health and better intellectual performance (Finkel and Campbell, 2001; Schmeichel, Vohs and Baumeister, 2018). In this study, self-control is defined as the self's capacity to override or change one's inner responses, as well as to interrupt undesired behavioral tendencies and to refrain from acting on them (Tangney, Boone and Baumeister, 2018).

Exercising high self-control is a pertinent aspect of a person's behavior for a person to have a successful and healthy life (De Ridder et al., 2012; Tangney, Boone and Baumeister, 2018). It was found that behaviors such as minimized aggression, reduced criminality improved relationships, less abuse of alcohol, smoking and other prohibited substances and high self-esteem and improved interpersonal skills were all related to the practice of high self-control (Finkel and Campbell, 2001; Sayette and Griffin, 2004). Moreover, Hofmann et al. (2014) stated that self-control is a person's ability to override one's inner response and to interrupt undesirable behavioral inclinations or impulses.

Additionally, greater self-control is also positively attributed to psychological adjustments and negatively predicts psychopathology (Tangney, Boone and

Baumeister, 2018). It was also found that the more self-control a person exhibits, the fewer are the experience of symptoms and stress while having a better mental health (Boals, Vandellen and Banks, 2011). This finding was corroborated with the outcome of the study that there is a link between self-control and higher quality and satisfying relationships (Bogg and Roberts, 2004; Jensen-Campbell and Malcolm, 2007).

Moreover, several researchers have perceived self-control as a key aspect in personal conscientiousness, which is subsequently linked to longevity, physical health and other relevant health behaviors (Friedman et al., 1993; Bogg and Roberts, 2004; Goodwin and Friedman, 2006). Succinctly, self-control practice is an all-encompassing important human quality trait essential for attaining a good life, thus its practice results in many positive life outcomes.

The aging population is rapidly growing worldwide, and attention must be given to the older sector of the society. There are certain conditions associated with aging such as decline in economic resources, decrease in cognitive ability, failing health and weakening social support (Deary et al., 2009). The various changes that take place in old age suggest that aging might be linked to a decline of the older adults' well-being. An important measure of subjective well-being is life satisfaction. Life satisfaction is established as an essential indicator of wellness in general. It is also seen as a necessary gauge of positive functioning (Gilman, 2009). Numerous people and several researchers find getting old linked to a decline in happiness in older people. This is attributed to the physical, social and psychological changes that they experience in old age which clearly exhibit that the experiences that older people go through impact their satisfaction with life.

The theory of self-control in old age has an assumption that the exercise of self-control is linked to life satisfaction (Caorong, 2019). The aim of this study is to know and determine if the exercise of self-control is associated with life satisfaction. Determining the association between self-control and life satisfaction will help confirm the assumption of the theory of self-control in old age which states that the exercise of self-control among older adults leads to life satisfaction. The result of this study will give a better perspective on the concept of life satisfaction in late life and will provide and enhance the viewpoint on the link between life satisfaction and self-control.

Materials and Methods

Study Design

This study utilized a quantitative correlational research design to determine the relationship between the self-control of older people and their life satisfaction.

Respondent

The target participants were 60 years old and older adults from Iligan City and Lanao del Norte, the Philippines. Target population (N=96) was calculated based on correlation sample size calculator [α=0.05, ß=0.50, r=0.2]. Participants were purposively chosen to answer the research instruments. Inclusion criteria included: being a male or female, sixty years old and above, and those older adults demonstrating normal cognitive and mental functioning. Cognitive functioning was assessed utilizing the Short Portable Mini-mental Status Questionnaire or SPMSQ by Pfeiffer (1975). Participants who committed two or less errors were asked to join the study. However, those who committed three or more errors using the (SPMSQ) indicating cognitive impairment were not included.

Instrument

The Brief Self-Control Scale (BSCS) is a standardized instrument which measures self-control. It is comprised of statements which are measured on a scale ranging from 1 to 5 where 1 indicates 'not at all like me' and 5 indicates 'very much like me' (Tangney, Boone and Baumeister, 2018). The scale consists of a total of thirteen items with an internal consistency estimate (alpha) of 0.83 and 0.85 in two study samples. The test-retest reliability estimate was 0.87 (three-week interval). Self-control as defined by Tangney is the self's capacity to override or change one's inner responses, as well as to interrupt undesired behavioral tendencies and to refrain from acting on them (Tangney, Boone and Baumeister, 2018).

The Satisfaction with Life Scale (SWLS) is another standardized instrument used in this study which measures the life satisfaction element of subjective well-being. Life satisfaction judgments represent the cognitive component of subjective well-being, or the experience commonly referred to as happiness (Diener et al., 1985, 1999). The SWLS is Likert in type where a seven-point response category is used for the 5-item statements comprising the scale. The lowest score is five while the highest possible score that can be obtained is 35. Score interpretation included the following: 5-9 (extreme dissatisfaction with life); 10-14 (dissatisfied with life); 15-19 (slightly dissatisfied with life); 20 (neutral); 21-25 (slightly satisfied with life); 26-30 (satisfied with life) and 31-35 (extremely satisfied with life). The scale has a high internal consistency with a coefficient alpha of 0.79 to 0.89. Additionally, in a month interval, the test-retest correlation scores were 0.84 and 0.80.

Data Collection

The researcher collected data by distributing a standardized research instrument for the participants to answer. The instrument comprised the Brief Self-control Scale developed by Tangney, Baumeister and Boone (2018) and the Satisfaction with Life Scale (SWLS) by

Table 1 Profile of the participants (N = 96)

Variable	n	%
Age		
60-69 years old	60	62.50
70-79 years old	31	32.29
80 years old and above	5	5.20
Marital Status		
Married	51	53.12
Widow	37	38.54
Single	3	3.12
Separated	5	5.20
Religion		
Roman Catholic	82	85.41
Islam	9	9.37
Others	5	5.20
Educational Attainment		
No Formal education	18	18.75
Elementary Level	30	31.25
Elementary Graduate	7	7.29
High School Level	12	12.50
High School Graduate	8	8.33
College Level	7	7.29
College Graduate	10	10.41
Postgraduate Level	4	4.16
Employment Status		
Unemployed	53	55.20
Employed	43	44.7
Monthly Income (in PHP)		
5,000 and below	76	79.16
5,000-9,999	7	7.29
10,000-14,999	7	7.29
15,000-19,999	2	2.08
20,000-24,999	1	1.11
25,000-29,999	1	1.11
30,000 and above	2	2.08

Table 2 Descriptive statistics for the older adults' level of self-control (N = 96)

Self-control Categories	n	%
Very low (13-26)	0	0
Low (27-39)	27	28.01
Moderate (40-52)	55	57.30
High (53-65)	14	14.60

Note: Categories arbitrarily made by the researcher (Cutoff scoring was determined through averaging from perfect score into Quintiles); Perfect score is 65.

Diener et al. (1985). The survey took about 10 to 15 minutes to complete. The survey was conducted where older adults congregated in groups or individually at their homes or work area.

Qualified research assistants were employed to help in the qualitative data collection. They were at least high school graduates and able to communicate and document written information from the research participants. They were initially required to undergo a training that was personally conducted by the researcher herself before the data collection process. The research assistants were also asked to sign a confidentiality agreement form.

The administration of the research questionnaires was carried out by the researcher herself and the investigator's research assistants. The researcher hired three research assistants who helped in the data gathering process. The data collection was completed within four weeks. The participants' concerns and questions were addressed during the data collection process. The participants were also asked to indicate their agreement to participate in the research study by asking them to sign a consent form before giving them the questionnaire or allowing them to start answering the questions. Only those who were keen and willing to be included in the study were involved.

The study respondents were invited voluntarily by giving them a letter of invitation indicating the aims and purpose of the study. They were also informed of their right to refuse and it was highlighted to them that participation was voluntary. The participants were asked to sign an informed consent indicating their voluntary participation.

Data Analysis

The data gathered were tabulated and transferred to the Statistical Package for the Social Sciences for analysis (file version 1.0.0-51). Data analysis of the sample characteristics was utilized as descriptive statistics to determine the sample characteristics. The correlation of the two main variables (self-control and life satisfaction) was determined using Pearson's correlation coefficient. Correlation coefficients vary from -1 to +1, where 0 indicates no relationship, -1 indicates a perfectly negative linear relationship, and +1 indicates a perfectly positive linear relationship. For a positive coefficient, as one variable increases, the other also increases. For negative coefficients, as one variable increases, the other variable decreases (Pallant, 2020). Cohen's standard (Cohen, 2013) was used to evaluate the coefficient to assess the strength of the relationship between self-control and life satisfaction. Coefficients between 0.10 and 0.29 represent a small relationship; coefficients between 0.30 and 0.49 represent a medium relationship and coefficients 0.50 and above represent a large relationship. An alpha of 0.05 was used for analysis.

Ethical Consideration

Data collection started after approval from the Cebu Normal University-Research Ethics Committee (CNU-REC) with CNU REC Code 335/2019-06 Caorong. The study participants were purposively selected to join the study. They were screened following certain inclusion criteria such as the following: older adults aged sixty years old and above, cognitively, physically and psychologically well, and female or male residents of Iligan City and Lanao del Norte. Each of the participants was given a copy of the informed consent duly approved by the Cebu Normal University-Ethics Review Committee (CNU-REC).

Table 3 Descriptive statistics for the older adults' life satisfaction (n = 96)

Indicators	Mean	Standard Deviation	Descriptive Rating
I am satisfied with my life	5.50	1.472	Satisfied
The conditions of my life are excellent	5.44	1.609	Satisfied
In most ways my life is close to my ideal	5.34	1.368	Satisfied
So far I have gotten the important things I want in life	5.15	1.402	Slightly Satisfied
If I could live my life over, I would change almost nothing	5.07	1.643	Slightly Satisfied
Overall Mean	**5.30**		**Satisfied**

Scaling:
1.00-1.85 = Strongly Disagree/ Extremely Dissatisfied;
1.86-2.71 = Disagree/ Dissatisfied;
2.72-3.57 = Slightly Disagree;
3.58-4.43 = Neither Agree nor Disagree/ Neutral;
4.44-5.29 = Slightly Agree/ Slightly Satisfied;
5.30-6.15 = Agree/ Satisfied;
6.16-7.00 = Strongly Agree/ Extremely Satisfied
Categorization of scaling was determined through averaging from perfect score resulting to seven classified ranges.
*Perfect score is 7 in each item

Table 4 Correlation between the older adults' self-control and their life satisfaction

		Life-satisfaction
Self-control	Pearson Correlation	0.248*
	Sig. (2-tailed)	0.015
	N	96

* Correlation is significant at the 0.05 level (2-tailed).

Results

This section of the study presents the results and findings of this current study. To test the hypothesis that older adults' self-control is associated with life satisfaction, correlation statistics was performed. The presentation starts with descriptive statistics describing the characteristics of the respondents in terms of age, gender, religion, educational attainment, income and occupation. The older adults' self-control scores and their level of life satisfaction are also presented in this section of the study as well as the correlation between the two.

Table 1 indicates that the majority of the respondents who participated in the current study are young older adults, most are female Roman Catholics, and the majority of them still remain married in late life. Additionally, a great number of study participants did not reach college and more than half of them were unemployed. It can also be noted from the findings that the majority of the older participants have a monthly income of less than five thousand pesos.

Results as shown in Table 2 revealed that, generally, the respondents have moderate self-control (M=44.10, SD= 6.72) using the Brief Self-control Scale. This result is shown in the above figure, indicating that more than half of the older people involved in the study have moderate self-control. Yet it cannot be discounted from the figure above that there are fairly a number of study participants who have low level of self-control while participants of the study with high self-control are lesser in number.

It is established from the results above that the older adult participants are satisfied with life. The data show that, generally, the participants agree to the first three indicators listed in the scale while slightly agreeing to the other two indicators.

Table 4 shows the correlation between the two main variables of the current study, which are self-control and life satisfaction. Using Pearson correlation statistics, the computed r value signifies that there is a positive relationship between the older adults' self-control and their life satisfaction. It means that a significant positive relationship between the identified variables exist. This suggests that the higher the self-control, the more satisfied the older adult is. Although Pearson's correlation between the self-control of the older adult respondents and their life satisfaction is significant at the 0.5 significance level, the magnitude is relatively small. This may be due to the sample size (N=96), hence an indication that further study must involve a much larger sample.

Discussions

The aim of this current study was to determine the link between self-control and life satisfaction among the older people to validate a proposition of the Theory of Self-control in Old age which states that the exercise of self-control leads to life satisfaction. In this study, it was hypothesized that older adults who have high self-control have better life satisfaction.

Findings of this present study reveal that the majority of the older adult participants have moderate level of self-control while are also satisfied with life. The result of the study coincides with several modern empirical studies indicating the relevance of self-control in achieving important life outcomes. Good self-control as being able to give up immediate desires and focus on long-term

goals, positively predicts life satisfaction as was concluded by Hofmann et al. (2014) in their study.

The present findings reveal that the majority of the older adult participants of the study are satisfied with life. This result is arguably plausible as was concluded by a study of Mercier, Peladeau and Tempier (1998) to older people determining their satisfaction with life. It was found in their study that, with aging, older people's psychological state remains stable or even increases even with some inevitable aging changes being experienced. Moreover, the satisfaction with life does not necessarily change in late life. as was established by Carstensen, Isaacowitz and Charles (1999). The result of this study is also in consonance with the findings of a recent study conducted by Ng, Tey and Asadullah (2017) among China's eldest people where the majority of the older adults who participated in their study considered their satisfaction with life as very good.

Furthermore, as exercising self-control has been associated with many positive outcomes, including life satisfaction, the result of the current study positively linking self-control to life satisfaction is not at all unforeseen. This is corroborated by numerous studies claiming that high self-control positively predicts not only a person's life satisfaction but also their well-being (Hofmann et al., 2014). Moreover, in a study conducted by Dou et al. (2016) to Chinese employees, self-control was also found to be positively related to both job and life satisfaction. This provides evidence of the positive association between self-control and life satisfaction. Additionally, it was also concluded in a study that high trait self-control positively predicts happiness (Cheung et al., 2014). This current study has a similar finding, that there is an apparent positive association of self-control with life satisfaction. The higher self-control the more satisfied are the older adults.

Understanding the link between self-control and life satisfaction has potential applications across a broad range of human behaviors. Linking self-control exercise to life satisfaction offers an innovative way to make people know why some may feel satisfied and why some do not.

Conclusions

This current study has provided evidence to support the proposition claiming that exercising self-control leads to life satisfaction. The significant positive relationship between the older adults' self-control exercise and their life satisfaction means that effective exercise of self-control positively leads to better life outcomes such as satisfaction in life. Linking self-control exercise to life satisfaction offers an innovative way for people to know why some people are satisfied with life and others are not.

Findings of this research underscore the positive relationship of self-control and life satisfaction among older adults. It is recommended that further research be conducted using other variables such as quality of life to enhance the exploration concerning the relationship of self-control to the subjective well-being of the older people.

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ORIGINAL ARTICLE

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Anemia prevention behavior in female adolescents and related factors based on Theory of Planned Behavior: A cross-sectional study

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ABSTRACT

Introduction: Female adolescent is a group prone to iron deficiency anemia due to various factors such as having monthly menstruation and poor diet. Therefore, anemia prevention behavior needs to be done from an early age to avoid prolonged health problems. The purpose of this study was to analyze the factors that correlated with anemia prevention behavior in female adolescents based on the Theory of Planned Behavior.

Methods: This study used a descriptive correlational design with a cross-sectional approach. The population of this study is female adolescents in Madiun City. Purposive sampling was used to obtain 105 respondents. The instrument used was a questionnaire to measure the variables attitude, subjective norm, perceived behavioral control, intention, and anemia prevention behavior. Data analysis was performed using the Spearman Rho Test with a level of significance ≤ 0.05.

Results: There is a relationship between attitudes (p = 0.003; r = 0.292), subjective norms (p = 0.006; r = 0.266), and perceived behavioral control (p = 0.002; r = 0.299) with the intention to prevent anemia and also perceived behavioral control (p = 0.003; r = 0.292) and intention (p = 0.000; r = 0.392) with anemia prevention behavior.

Conclusions: Better attitude, subjective norm, perceived behavioral control, and intention possessed by a female adolescent will make better anemia prevention behavior too. Therefore, support from various parties is needed to intensify the promotion of anemia prevention, education on early detection of anemia, especially for female adolescents, and further research to determine effective health promotion methods.

Keywords: adolescent; anemia; behavior; healthcare; prevention; healthy lifestyle

Introduction

Female adolescent is a group that is prone to anemia (Andriastuti et al., 2020). Anemia is a condition of changing morphology and reducing the number of blood cells and hemoglobin so that they are not sufficient to meet the physiological needs of the body (Levy, De la Cruz Góngora and Villalpando, 2016). In female adolescents, iron deficiency anemia is the largest cause of morbidity and mortality (WHO, 2017). Several factors such as poor nutritional status, low socioeconomic status, comorbidities (malaria, thalassemia, etc.), impaired nutrient absorption, and irregular menstrual patterns will increase the chance of anemia (Abioye and Fawzi, 2020). In general, the prevalence of anemia in the world reaches 50-80% of the total population (Kassebaum et al., 2016). In Indonesia, the incidence of anemia reaches 23.7% with the prevalence of incidence in female adolescents aged 15-24 years old 32% (Ministry of Health Indonesia, 2019).

The incidence of anemia in female adolescents increases because every month they undergo menstruation, which causes an increase in iron expenditure (Swati and Sunita, 2021). In addition, many female adolescents are restricting food intake, causing an iron deficiency, and disrupting hormonal balance (Abioye and Fawzi, 2020). This is further exacerbated by the

perception of barriers such as feeling that iron tablets consumption does not provide benefits, unattractive forms of packaging and iron tablets, peers who do not consume iron tablets and dislike for the taste of iron tablets (Aprianti, Sari and Kusumaningrum, 2018).

Unsupportive behavior of female adolescents in anemia prevention efforts is influenced by knowledge levels, attitudes, perceptions, supporting environments, resources, and national policies (Roche et al., 2018). The better the support provided by the family, the more adaptive the health behaviors performed by adolescents (Annisa, Mulyono and Widyatuti, 2021). In addition, the presence of training, monitoring, availability of iron tablets, and strengthening health promotion can improve anemia prevention behavior (Gosdin et al., 2020). Some of the effects of anemia include decreased endurance, cognitive-developmental disorders, psychomotor disorders, and increased susceptibility to infection (Spezia et al., 2018). In female adolescents, the long-term impact will be more dangerous because it increases the risk of premature infant birth, bleeding, and maternal mortality (Levy, De la Cruz Góngora and Villalpando, 2016; Zekiye and Rukiye, 2021).

Based on basic health research (RISKESDAS) 2018, the prevalence of anemia in adolescents is 32%, which means that 3-4 teenagers out of 10 suffer from anemia (Ministry of Health Indonesia, 2018). According to findings, 23% of young girls and 12% of boys in East Java had anemia (Report of Office of Women's Empowerment, 2019). Through circular letter number HK.03.03/V/0595/2016 concerning the Provision of Blood Iron Tablets to Female Adolescents and Women of Childbearing Age, the government implements a program of giving one tablet per week throughout the year to female adolescents aged 12-18 years old (Ministry of Health Indonesia, 2016). In East Java Province, as many as 29.7% of female adolescents aged 10-19 years old have received iron tablets, but their consumption success rate is still low (Ministry of Health Indonesia, 2019). Handling anemia in adolescents is increasingly difficult because of behaviors such as consuming tea after eating, improper eating patterns, and consuming less iron from animal sources, causing low body mass (Mistry et al., 2017).

Implementing anemia prevention behavior from an early age is very important, especially for female adolescents to be able to prepare themselves well in facing pregnancy and childbirth. In the Theory of Planned Behavior (TPB), it is explained that the good and bad attitudes, subjective norms, and perceived behavioral control possessed by individuals will affect the amount of intention they have, resulting in differences in behavior displayed (Ajzen, 2005). The purpose of this study was to analyze factors related to anemia prevention behavior in adolescent girls based on TPB.

Materials and Methods

Study Design

This study used a descriptive correlational design through cross-sectional approach conducted in Madiun, East Java in February 2021.

Respondent

The participants involved was female adolescents selected by purposive sampling techniques. A total of 105 respondents met the inclusion criteria, and all were included in this research. The study's inclusion criteria were female adolescents aged 18-22 years old, have menstruation, and can use Google Form. The exclusion criterion is married female adolescents.

Instrument

The instrument in this study used a questionnaire prepared by the researcher, based on the TPB component and parameter, to obtain demographic data information and measure the independent variables (attitudes, subjective norms, perceptions of behavioral control, intentions) and dependent variable (anemia prevention behavior) in female adolescents. Demographic data consisted of name (initials), age, last education, age at first menstruation, menstrual pattern, knowledge about anemia, ever or not experiencing anemia, and sources of information about anemia. The number of statements on the questionnaire in each variable was attitude (n = 8), subjective norm (n = 7), perceived behavioral control (n = 7), intention (n = 6), and anemia prevention behavior (n = 7). All questions were measured using a 5-point Likert scale with answer choices on the independent variable (1 = strongly disagree; 2 = disagree; 3 = undecided; 4 = agree; 5 = strongly agree) and the dependent variable (1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always). The final results on the scoring were categorized into good, enough, and less. The instrument has been tested on 20 young women with an age range of 18-24 to get the results of the validity test ($r > 0.444$) and reliability (Cronbach's alpha attitude = 0.733; subjective norm = 0.704; perceived behavioral control = 0.636; intention = 0.727, anemia prevention behavior = 0.617).

Data Collection

Data collection used online questionnaire by compiling a list of prospective respondents based on criteria and large samples that have been determined from female adolescents who are members of the Madiun student organization. Furthermore, the researchers explained the research to respondents and examined the Google Form filled out by the respondent to ensure that the data submitted were appropriate and recorded in the researcher's database.

Data Analysis

The data were analyzed using the descriptive analysis method to determine the percentage and frequency distribution of the data and bivariate analysis to

Table 1 Demographic characteristics of respondents (N = 105)

Characteristics	Parameter	n	%	Mean	SD
Age	18 years old	7	6.7		
	19 years old	28	26.7		
	20 years old	29	27.6	20.11	1.13
	21 years old	28	26.7		
	22 years old	13	12.4		
Last education	Senior High School	98	93.3		
	Diploma	5	4.8		
	Bachelor	2	1.9		
Age at first menstruation	≤12 years old	62	59.1	12.32	1.28
	>12 years old	43	40.9		
Length of menstruation	3-4 days	2	1.9		
	4-5 days	21	20		
	5-6 days	22	21	NA	NA
	6-7 days	50	47.6		
	>7 days	10	9.5		
Many change of sanitary pad in a day	2 times	13	12.4		
	3 times	53	50.5	3 times	0.88
	4 times	24	22.9		
	>4 times	15	14.3		
Know anemia	Yes	103	98.1	NA	NA
	No	2	1.9		
Have anemia	No	53	50.5	NA	NA
	Yes	52	49.5		
Source of anemia information	Family	17	16.2		
	University	12	11.4		
	Social Media	25	23.8		
	School	47	44.8	NA	NA
	Book	1	1		
	Internet	2	1.9		
	Hospital	1	1		
Know the guidelines for prevention and control of anemia	Yes	10	9.5	NA	NA
	No	95	90.5		

Table 2 Relationship between attitudes, subjective norms, and perceptions of behavioral control with the intention to prevent anemia in female adolescent (N = 105)

Variable	Category	Intention						Spearman Rho Test	
		Less		Enough		Good			
		n	%	n	%	n	%	p	r
Attitude	Positive	7	6.7	28	26.7	18	17.1	0.003	0.292
	Negative	12	11.4	36	34.3	4	3.8		
Subjective Norm	Good	3	2.9	10	9.5	12	11.4		
	Enough	12	11.4	42	40.0	8	7.6	0.006	0.266
	Less	4	3.8	12	11.4	2	1.9		
Perceived Control Behavior	Good	2	1.9	17	16.2	14	13.3		
	Enough	17	16.2	40	38.1	7	6.7	0.002	0.299
	Less	0	0	7	6.7	1	1.0		

Table 3 Relationship between perceived behavioral control and intention with anemia prevention behavior in female adolescent (N =105)

Variable	Category	Anemia Prevention Behavior						Spearman Rho Test	
		Less		Enough		Good			
		n	%	n	%	n	%	p	r
Perceived Control Behavior	Good	4	3.8	24	22.9	5	3.8		
	Enough	23	21.9	34	32.4	7	6.7	0.003	0.292
	Less	5	4.8	3	2.9	0	0		
Intention	Good	2	1.9	16	15.2	4	3.8		
	Enough	17	16.2	39	37.1	8	7.6	<0.001	0.392
	Less	13	12.4	6	5.7	0	0		

determine the relationship between the independent and dependent variables using the Spearman Rho Test with $\alpha \leq 0.05$. If the value of $p < 0.05$ then H_0 was rejected. It means there is a relationship between attitude, subjective norm, and perceived control behavior with the intention to prevent anemia, also there is a relationship between perceived control behavior and intention with anemia prevention behavior.

Ethical Consideration

This research has been reviewed and approved by the Health Research Ethics Commission, Faculty of Nursing, Universitas Airlangga with No. 2166-KEPK. The ethical components considered in this study are informed consent, anonymity, and confidentiality.

Results

The majority of respondents in this study were 20 years old (27.6%) and the last education level was high school, namely 98 respondents (93.3%). In addition, as many as 62 respondents (59.1%) experienced their first menstruation at the age of 12 years old. Most of the young women in this study experienced menstruation for 6-7 days each month (47.6%). During menstruation they changed sanitary pad twice (12.4%), three times (50.5%), four times (22.9%), and more than four times (14.3%). Regarding knowledge about anemia, 103 respondents (98.1%) knew about anemia and 53 respondents (50.5%) said that they had anemia. Schools are the main source of information for a female adolescent to gain knowledge about anemia, as many as 47 respondents (44.8%), followed by social media (n = 25; 27.8%), and families (n =17; 16.2%). In addition, 95 respondents (97.5%) said they never knew about the Guidelines for Prevention and Management of Anemia, a guide in the form of a module issued by the Ministry of Health for adolescents and women of childbearing age to deal with anemia (Table 1).

Based on Table 2, it can be seen that there is a relationship between attitudes (p = 0.003; r = 0.292), subjective norms (p = 0.006; r = 0.266), and perceived behavioral control (p = 0.002; r = 0.299) with intention to prevent anemia and the relationship created has a moderate degree of strength. In the attitude variable, the highest number is found in respondents with negative attitudes and having enough intention to prevent anemia, namely 36 respondents (34.3%). Furthermore, in the subjective norm variable, the highest number is found in respondents with enough subjective norms and having enough intention to prevent anemia, as many as 42 respondents (40%). Meanwhile, in the perceived behavioral control variable, the highest number was found in respondents with enough behavioral control perceptions and had sufficient intention to prevent anemia, namely 40 respondents (38.1%).

Based on Table 3, it can be seen that there is a relationship between perceptions of behavioral control (p = 0.003; r = 0.292) and intentions (p < 0.001; r = 0.392) with anemia prevention behavior and the relationship created has a moderate degree of strength. In the behavioral control perception variable, the highest number is found in respondents with enough behavioral control perceptions and realizing sufficient anemia prevention behavior as many as 34 respondents (32.4%). Furthermore, in the intention variable, the highest number is found in respondents with enough intention or intention and realizing sufficient anemia prevention behavior, as many as 39 respondents (37.1%).

Discussions

Most female adolescents have enough behavior in preventing anemia and some are already in the good category. However, it was still found that some respondents fall into the category of lacking in anemia prevention behavior. Behavioral differences embodied by these female adolescents can be influenced by several factors, namely, age, gender, health information received, knowledge, and income of parents to affect the level of health knowledge due to low interest in health literacy (Fleary, Joseph and Pappagianopoulos, 2018). Behavior is also influenced by repeated habits that form a cycle (Jalambo et al., 2018). A person will display adaptive behavior when they know the benefits, have sufficient pressure or social drive, and support, both internal and external. TPB relates to attitudes, subjective norms, and perceived behavioral control that affect the magnitude of the intention to realize health behavior (Ajzen, 2005).The main findings of this research show that attitudes, subjective norms, perceived behavioral control, and intention have strong relationship with anemia prevention behavior among female adolescents.

There is a significant relationship between the attitude of female adolescents to prevent anemia. Adolescents with a positive attitude will have better abilities in realizing health (Guerin and Toland, 2020). However, not all respondents with a positive attitude have good intentions in preventing anemia. Some of them still have a negative attitude but have enough and good intentions to prevent anemia. This is related to the low level of knowledge of young women about signs and symptoms and how to prevent anemia. Someone who knows is not necessarily able to realize the information they get in the form of behavior (Fleary, Joseph and Pappagianopoulos, 2018). Another factor that causes this to happen is the age of the respondent in the adolescent stage, making decisions about an action to be taken is influenced by differences in the level of psychological maturity, cognitive abilities, and symptoms of depression (Mccue et al., 2019). Health workers are an important part of being able to increase awareness and modify interventions for female adolescent so that they have knowledge, attitudes, and behaviors that support preventing anemia (Nesrin, Anwar and Abdullah, 2021).

Subjective norms are also related to the intention to prevent anemia. This result is in line with research that states that adolescents have the intention to manifest health behaviors when they have high subjective norm support, especially from parents and peers (Zhao et al., 2020). The incidence of anemia will increase two times higher if adolescents only live with one of their parents (father or mother) and 2.4 times higher if they live with their guardian (Gonete et al., 2018). Adolescents who receive emotional and instrumental support from teachers and friends will also be more concerned with their health condition because they have a positive influence (Triana et al., 2019). The attention given by the people closest to them or those who are considered important and authorized, may not necessarily change the perspective of female adolescents to influence the intention to prevent anemia. In addition, adolescents

have a high sense of ego so that they seem unruly and act selfishly, and do not think about the impact of the choices they make (Krisnani and Farakhiyah, 2017).

On the other hand, there is a relationship between perceived behavioral control and the intention to prevent anemia. Adolescents with a strong perception of behavioral control will have 3.906 times higher intention to comply with iron tablet supplement consumption (Quraini, Ningtyias and Rohmawati, 2020). Beliefs in the perception of behavioral control can be influenced by the support received and the habits that are carried out to form a recurrent value (Triana et al., 2019). Most of the respondents in this study have a perception of sufficient behavioral control and sufficient intensity of anemia prevention. This is due to the ability to meet the body's lack of nutrition to prevent anemia, especially during menstruation. In fact, during menstruation, adolescent girls will lose hemoglobin more quickly, so they need to increase their intake of nutrients, especially iron (Masoud et al., 2020). However, this will be difficult if young women have low socioeconomic conditions, because they are related to the fulfillment of nutrition from the food that can be consumed daily (Banayejeddi et al., 2019).

Perceived behavioral control is also directly related to anemia prevention behavior. Some of the female adolescents in this study already had a good level of perception of behavioral control so that they would carry out anemia prevention behavior well. However, some female adolescents have a perception of sufficient behavioral control but can perform anemia prevention behavior well or vice versa. This is influenced by family support, information, communication, and the level of emotional quality (Park and Lee, 2020). In addition, the emergence of opportunities for adaptive behavior is higher when adequate health facilities are available. If individuals are aware that the perceived ease of accessing health services is higher than the barriers, it will form a positive perception of being able and utilizing the available facilities in realizing health behaviors (Roche et al., 2018).

Intention also has a significant relationship with anemia prevention behavior. In TPB, there is a base rate term which states that individuals will tend to perform behaviors that are mostly done by others, and vice versa (Ajzen, 2005). In addition, the good or bad health behavior that will be realized is also strongly influenced by various kinds of life contexts such as the environment, skills, and existing health programs (Nagy-Pénzes, Vincze and Biro, 2020). Good intentions can arise because of health-related actions taken every day. Female adolescents who regularly consume vegetables and fruit every day will meet their vitamin and iron needs (Ahankari et al., 2017). Awareness of the consumption of vegetables and fruit will arise from the knowledge that the older you get, the more your iron needs will increase (Masoud et al., 2020). Wrong dietary habits and consumption of unhealthy food (junk food) should be avoided (Jalambo et al., 2018). Female adolescents must also meet the necessary nutrients, not only macro but also micro (Htet et al., 2016). In addition, female adolescents who get iron tablets from school or have independent supplies tend to consume iron tablets regularly (Gosdin et al., 2020). This habit will directly or indirectly foster intention and shape anemia prevention behavior.

The limitation of this research is that it is a cross-sectional study that only emphasizes the measurement of variables at one time so that there is no follow-up on the results of observations. The parameters used in the study are few so that they have not been able to provide a more detailed description of the respondent's condition. In addition, the online data collection process made the researcher unable to see the respondent's physical condition (height, weight, signs of anemia, etc.), if they did not read the explanation, as well as the instructions for filling out the questionnaire properly.

Conclusions

The better intention possessed by adolescent girls, the better anemia prevention behavior is carried out, while attitudes, subjective norms, and perceived behavioral control are factors that affect the quality of the intentions. The factor that most strongly influenced the quality of intention was the perceived behavioral control, while the most influential support came from the family. It is necessary to increase knowledge about anemia prevention behavior to female adolescents and their families as the main source of support for adolescents in adaptive behavior. In addition, further research is expected to be able to find effective methods in increasing knowledge and awareness for young women in realizing anemia prevention behavior from an early age.

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ORIGINAL ARTICLE

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Knowledge and attitudes toward COVID-19 vaccination among student nurses from Saudi Arabia

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ABSTRACT

Introduction: Insights into the knowledge and attitudes of students can be achieved by analyzing their general understanding and prevention of the coronavirus. Therefore, it is imperative to identify attributes that influence the development of healthy behaviors among students. This study aimed to determine the dynamics of knowledge and attitudes of student nurses concerning the COVID-19 vaccine.

Methods: This descriptive-cross sectional study involved 250 student nurses from the University of Hail, Nursing College, selected by convenience sampling. The data were collected between August and September 2021 using questionnaires. The data were analysed using a t-test, one-way ANOVA, and Pearson's correlation test with a significance level of 0.05.

Results: The study results showed that participants have good knowledge (mean = 3.09; SD = 0.88) and attitudes (mean = 8.62; SD = 1.83). Gender (except for knowledge), marital status, and age were not relevant as explanatory factors of knowledge and attitude. There was a significant difference in both knowledge ($F = 2.233$; $p < 0.005$) and attitude ($F = 3.918$; $p < 0.004$) associated with the course year. There was no significant relationship between knowledge and attitude ($r = -0.013$; p-value = 0.834).

Conclusions: This information is critical for educators as they design techniques to help students put their knowledge into practice. In this way, educators may help health students develop skills and encourage students to become accountable health professionals who can support current societal healthcare demands.

Keywords: COVID-19; demographics; intention; student nurses; vaccine

Introduction

The most effective preventive measure to reduce the pandemic is predicted to be the coronavirus disease-2019 (COVID-19) vaccination (Szmyd *et al.*, 2021), and efforts have been made to produce the vaccines, especially in developing countries (Albaqawi *et al.*, 2021). Vaccination has had a 67% acceptance rate, despite the considerable demographic and geographic differences in vaccination uptake (Malik *et al.*, 2020) due to safety concerns. It is important to note that the success of a vaccination program is determined by the vaccination uptake by the public, healthcare workers (Kassianos *et al.*, 2018), and students (e.g., nursing students), who are critical advocates of vaccination. In addition, the campus environments of student nurses are often congested with intense movement and restricted space, i.e., environments that are considered high-risk during the COVID-19 pandemic. Therefore, nursing students also benefit from vaccination. Conversely, vaccination is a critical intervention with the potential to significantly limit the occurrence and spreading of this deadly infectious illness (Jiang *et al.*, 2021).

SARSCoV-2 vaccines became available at the end of 2020, and healthcare workers (HCWs) were among the first to be vaccinated in many countries (Szmyd *et al.*, 2021). Nursing students, in turn, cover inevitable shortfalls in the healthcare sector and also need vaccination as they have played a key role in the current response to the pandemic whenever possible (Fontenot *et*

al., 2021). However, university students' desire to become immunized to COVID-19 varies greatly (Jiang *et al.*, 2021), which could be the result of a lack of awareness that leads to the non-intention of being vaccinated. Indeed, safety issues and unfortunate events have been reported throughout the implementation of vaccination programs, damaging public opinion and influencing vaccination intentions (Grady and Mazzei, 2021). The resistance to COVID-19 immunization may increase the danger of pathogen transmission to the patients of healthcare workers while simultaneously reducing the chance of encouraging patients to get vaccinated (Biswas *et al.*, 2021). Indeed, this can due to the safety of the vaccine, its efficacy, and potential side effects. Accordingly, vaccination has been explored in the literature; however scarcely concerning the dynamics of knowledge, attitudes, and practices associated with COVID-19 among student nurses as advocate partners of the healthcare professionals.

The negative views and skepticism toward COVID-19 vaccines are key obstacles to expanding global vaccination coverage (Paul *et al.*, 2021). Nursing students are partners in supporting the vaccination programs for COVID-19. Thus, it is critical to understand the knowledge, attitudes, and practices of student nurses, helping them develop mitigation solutions for the current scenario. Most studies on the preventive behavior of nursing students during the COVID19 pandemic have shown a high level of commitment to preventive measures (Sun *et al.*, 2020). Moreover, vaccination acceptance rates among nursing students have been reported as satisfactory (Jiang *et al.*, 2021). It is significant, therefore, that deeper insights into existing students' knowledge and attitudes be achieved by analyzing their general understanding and prevention of the coronavirus. Hence, it is imperative to assist in the identification of attributes that influence the students in the development of healthy behaviors. This study aimed to determine the dynamics of knowledge and attitudes of student nurses toward the COVID-19 vaccine. To the best of our knowledge, this is the first study that explores the knowledge and attitudes of student nurses from the Hail region, Kingdom of Saudi Arabia.

Materials and Methods

Study Design

This study used the descriptive-cross sectional approach to determine the dynamics of knowledge and attitudes among student nurses concerning the COVID-19 vaccine.

Respondent

This study involved the active participation of 250 student nurses from the University of Hail, Nursing College. A non-probability sampling, specifically convenience sampling, was used. All full-time students were invited to participate in the study, and those who did not provide consent were excluded. The researchers used convenience sampling, which means that all students were invited to participate in the study

Instrument

The questionnaire comprised two parts. The first part consisted of the demographic characteristics, which include gender, marital status, age, and course year. The second part was adapted from Islam *et al.* (2021) and had 11 items categorized as knowledge (five items) and attitudes (six items).

The knowledge items asked about the general knowledge about the COVID-19 vaccine (e.g. "Do you know about the COVID-19 vaccine?"; "Do you know about the effectiveness of the COVID-19 vaccine?") and had three possible responses (i.e., "Yes," "No" or "Don't know"). The "Yes" response was assigned a score of 1, while the "No/Don't know" responses were scored 0. The total score ranged from 0 to 5 and was calculated by adding the raw scores of the five items, with the highest score indicating increased level of knowledge of COVID-19 vaccines.

The attitude section consisted of six items (e.g., "The newly discovered COVID-19 vaccines are wise"; "The COVID vaccines are essential for us") that can be answered through a three-point Likert scale ranging from 0 to 2, where 0 = Disagree, 1 = Undecided, and 2 = Agree. The total score was determined by adding the raw scores of the six items, which ranged from 0 to 12, with a higher overall score suggesting more favorable attitudes toward the COVID-19 vaccination.

The questionnaire was subjected to content validation by three panel experts of the Hail region, Saudi Arabia. These three experts unanimously agreed on the validity of the questionnaire. The questionnaire was subsequently tested with 15 student nurses who were no longer part of the sample. Reliability results were high (0.86 for knowledge and 0.89 for attitudes).

Table 1 Demographic characteristics of the participants (N = 250)

Demographic characteristics	n	%
Age		
20-22	118	47.2
23-25	101	40.4
26-28	20	8
29 years old and above	11	4.4
Gender		
Male	124	49.6
Female	126	50.4
Marital Status		
Single	246	98.4
Married	4	1.6
Year Level		
Level 5	50	20
Level 6	50	20
Level 7	50	20
Level 8	40	16
Internship	60	24

Table 2 Differences between demographic characteristics and knowledge and attitudes of the nursing students toward COVID-19 vaccine

Demographic characteristics	Knowledge				Attitude			
	Mean	Std. Deviation	t	p-value	Mean	Std. Deviation	t	p-value
Age								
20-22	3.00	0.901	3.673	0.073	8.93	1.884	2.623	0.071
23-25	3.06	0.863			8.33	1.866		
26-28	3.70	0.732			8.10	1.252		
29 years old and above	3.09	0.700			8.90	1.300		
Gender								
Male	2.94	0.895	-2.678	0.008*	8.77	1.928	1.287	0.199
Female	3.23	0.843			8.47	1.728		
Marital Status								
Single	3.09	0.884	0.783	0.434	8.63	1.839	0.686	0.494
Married	2.75	0.500			2.66	0.456		
Year Level								
Level 5	3.03	0.920	2.233	0.005*	7.93	1.550	3.918	0.004*
Level 6	3.00	0.890			9.33	1.660		
Level 7	3.40	0.672			9.10	1.450		
Level 8	3.09	0.641			8.90	1.300		
Internship	3.32	0.701			9.90	0.850		

* < 0.05

Data Collection

The researchers invited the students to participate through classroom announcements. The students were instructed as to what the study entails, extent of their participation, and their rights as participants, before deciding whether or not to participate in the study. Informed consent forms were distributed to the willing participants thereafter. Data were collected between August and September 2021.

Data Analysis

The SPSS v.22 was used to analyze the data. The demographic data were described using frequency and percentage values. A t-test was used to identify differences between gender and marital status for knowledge and attitude, while a one-way ANOVA was employed to determine differences between age and course year. Pearson's r was used to determine the relationship between knowledge and attitudes. The significance level of 0.05 was considered for the statistical analyses.

Ethical Consideration

The Institutional Review Board of the University of Hail has approved this protocol (H-2021-067). In the conduct of human study, the researchers followed the ethical guidelines outlined in the World Medical Association Declaration of Helsinki. All participants signed a written informed consent form.

Results

The participants were generally young, with 47.2% aged between 20 and 22 years. Gender was nearly equally distributed with males comprising 49.6% of the participants and females 50.4% (Table 1). Only 1.6% of the students were married, and most belonged to an internship program (24%).

The knowledge of the student nurses was good (3.09 out of 5), and they had a good attitude (8.62 out of 12) toward the COVID-19 vaccine (Table 2). There was a significant difference in knowledge ($t = -2.678$; $p < 0.008$) between the genders of the nursing students, such that female students had better knowledge (3.23 ± 0.843) than their male colleagues (2.94 ± 0.895). However, there were no differences in attitude between genders ($t = 1.287$; $p > 0.199$). In addition, neither knowledge ($t = 0.783$; $p > 0.434$) nor attitude ($t = 0.686$; $p > 0.494$) differed regarding the marital status of the participants. Furthermore, there was no significant difference in the knowledge ($F = 3.673$; $p > 0.703$) or attitude ($F = 2.623$; $p > 0.071$) of the nursing students associated with their age.

There was a significant difference in both knowledge ($F = 2.233$; $p < 0.005$) and attitude ($F = 3.918$; $p < 0.004$) associated with the course year (Table 2). There was no significant relationship between knowledge and attitude ($r = -0.013$; p-value = 0.834).

Discussions

This study aimed to determine the knowledge and attitudes of student nurses toward the COVID-19 vaccine. The knowledge of the student nurses recorded in this study was good, which can be credited to their ongoing study and their active participation in disseminating preventive information. The results of this study are similar to that of an earlier study where the mean knowledge score was 2.83 out of 5 (Islam *et al.*, 2021), also showing the good attitude of the student nurses toward COVID-19 vaccination. A positive attitude is a key to containing the outbreak and increasing willingness to receive the COVID-19 vaccine. This shows the students' willingness to be vaccinated and promote vaccination within their community or among their clients. Overall, these good results concerning the knowledge and attitudes of the student nurses show the professional foundation and basic awareness of the necessity, effectiveness, and safety of the COVID-19 vaccine. One

good example to strengthen their knowledge and attitudes is for the students to be given an opportunity to disseminate the value of having the vaccine to their clients or patients during their community and hospital practice.

There was a considerable disparity in knowledge between the genders, where females had greater scores than males. Previous research shows that females have a higher notion of self-education and self-control (Cornwell, Mustard and Van Parys, 2013), and, thus, performed better than male students. Such result is comparable to an earlier study (Pasay-An *et al.*, 2021), and shows that male students need to be more educated regarding the COVID-19 vaccine to perform their task in promoting the vaccination program. It is vital to emphasize, however, the importance of considering educational needs while developing educational initiatives, regardless of demographic considerations (Pasay-An *et al.*, 2021). This will help the student nurses better grasp their roles in promoting the COVID-19 vaccine. For example, nurse educators can encourage their student nurses to volunteer, either giving vaccine or doing health education in the vaccination area.

Marital status was not associated with the knowledge and attitudes toward the COVID-19 vaccine. Al-Hanawi *et al.* (2020) also reported that the marital status of participants was not significantly associated with knowledge and attitudes. While the result is not significant, there still needs a continuous effort to include all students (regardless of marital status) in the ongoing improvement plan for vaccine information dissemination. For example, offering and giving them an educational session and educational outreach materials to raise their public understanding on the value of vaccine to combat the disease. Meanwhile, there were also no significant differences in the knowledge and attitude among the nursing students of different ages. However, age was previously reported as an indicator of knowledge and attitudes toward the COVID-19 vaccine (Al-Hanawi *et al.*, 2020; Pasay-an, Magwilang and Pangket, 2020). A significant difference in knowledge and attitude was recorded regarding the course year, which agrees with the findings of Kumar, Pinky and Nurudden (2021) and indicates that students needed an educational program created for their specific needs.

Apparently, knowledge and attitudes are not related to one another, which agrees (Pasay-An *et al.*, 2021) and disagrees (Al-Hanawi *et al.*, 2020) with previous findings. This study found no significant connections between knowledge and attitudes concerning COVID-19, which implies that information does not necessarily convert into attitudes and/or behaviors, and that behaviors do not transcend into attitudes. One possible explanation is that student nurses have only recently learned about the vaccination and are currently making it work in their perspectives. In contrast, Erfani *et al.* (2020) discovered that increased knowledge of COVID-19 was associated with positive attitudes and excellent practices, suggesting that good knowledge leads to positive attitudes and good practices. In context, in developing the policy, the policy makers should consider that individual knowledge and attitudes are utilized to appraise events and their potential, as well as their repercussions.

Despite the fact that this study was conducted in a local context and the results are not generalizable, the findings are nevertheless relevant in the global arena. International policy makers, for example, can use the data from this study to plan certain initiatives based on the similar features found in this study. Furthermore, the data in this study can be utilized to evaluate and compare to data from other countries in reducing the gap on this topic.

Policy implication

This research has substantial policy implications. With the findings, policy makers in a university institution can adjust the instructional intervention to the vaccine's information drive. Moreover, this study contributes to the identification of relevant communication networks for the target demographic as part of the preventative program strategy. As a result, school or university officials can focus their efforts on programs geared at minimizing the spread of misinformation and conspiracy theories about the COVID-19 vaccine. Furthermore, the university has the ability to take unprecedented efforts and respond quickly in establishing tight control and preventative measures against COVID-19 to safeguard student safety.

Strengths and weakness of the study

This study targeting the knowledge and attitudes toward COVID-19 vaccination among the student nurses provides a useful tool for gauging vaccine acceptability. In addition, it provides the policy makers with relevant recommendations. However, it has substantial limitations. For example, the study was conducted in one setting and the use of non-probability sampling means it may not be possible to generalize. Also, the non-inclusion of practice of students in the study can be more explored as the researchers failed to do so.

Conclusions

Student nurses have a good knowledge and attitude toward the COVID-19 vaccine, and female students are more knowledgeable. Knowledge and attitude did not differ significantly between gender (except for knowledge), marital status, and ages. Lastly, a significant difference in knowledge and attitude was recorded for course year. This information is critical for educators as they design techniques to help students put their

knowledge into practice. Indeed, in this way educators may help health students develop skills and encourage them to become accountable health professionals who can support current societal healthcare demands.

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ORIGINAL ARTICLE

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Relationship between stress, anxiety, and depression with suicidal ideation in adolescents

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ABSTRACT

Introduction: Suicide is a significant mental health problem in adolescents worldwide that requires comprehensive treatment. This study examined the relationship between stress, anxiety, and depression with suicidal ideation among Indonesian adolescents.

Methods: This cross-sectional study examined 869 high school adolescents. Suicide ideation was a dependent variable, while stress, anxiety, and depression were independent variables in this study. The instrument used to measure stress, anxiety, and depression is the Depression Anxiety Stress Scale (DASS-21), while the idea of suicide was measured using the Scale for Suicide Ideation (SSI) instrument. Data were analyzed with Spearman statistical test to examine the association between variables.

Results: The results showed that teenagers who had suicidal ideation were 23.7% of respondents, while 12.4% had a high intention of suicidal ideation. A total of 44.4%, 72.7%, and 71.4% of teens experienced stress, anxiety, and depression in the mild to very severe categories, respectively. There was a significant relationship between suicidal ideation with stress levels (p-value < 0.001; r value = 0.267), anxiety (p-value < 0.001; r value = 0.237), and level of depression (p-value < 0.001; r value = 0.233) in adolescents.

Conclusions: The study's findings revealed that stress, anxiety, and depression significantly affect suicide ideation in adolescents. Therefore, to prevent increased suicide ideation in adolescents, mental and psychological health support measures must be given to deal with stress, anxiety, and depression.

Keywords: adolescents; anxiety; depression; stress; suicidal ideation

Introduction

Mental health problems in adolescents have become a worldwide concern. In the last few decades, research on mental health problems in adolescents has been carried out (Bruha et al., 2018), such as in the United States (Mojtabai and Olfson, 2020), UK (Fink et al., 2015), Italy (Frigerio et al., 2009), Australia (Allen and McKenzie, 2015), Korea (Roh et al., 2016), China (Wang, Zhang and Zhang, 2020), and Malaysia (Ahmad et al., 2015). Mental health problems in adolescents are very complex, consisting of bullying, gaming or internet addiction, emotional disorders (anxiety, depression, frustration, anger), and suicide-self harm (WHO, 2019a).

In 2015, suicide became the 20th most common cause of death globally. Data from WHO (2019) report that around 800,000 people die from committing suicide each year, accounting for 1.5% of all deaths and the second leading cause of death at 15-29 years (WHO, 2019b). In North America, suicide is the 10th most common cause of death (Fazel and Runeson, 2020). In recent years in Indonesia, the phenomenon of suicide has been increasingly worrisome. The WHO estimates that the suicide rate in Indonesia could reach 3.4% of 100,000

people if it does not receive serious attention from various parties (WHO, 2018). Meanwhile, data in East Java province in 2018 showed that as many as 549 suicide cases occurred in East Java (Badan Pusat Statistik, 2019)

Suicide is an action to end life intentionally and is carried out consciously (Wuryaningsih et al., 2018). Suicide consists of various terms, such as self-injury, suicide ideas, suicide plans, and completed suicide. Suicidal ideation is the thought of death caused by oneself. Suicidal ideation can be passive when there are only thoughts of suicide without the intention to act or can be expressed directly, verbally, or not shown at all (Stuart, 2016). Suicidal ideation was found prevalent in adolescents (Strandheim et al., 2014). Someone who has the idea of suicide experiences social isolation, low self-esteem, and lack of trust with others, tends to think negatively, is inflexible, and feels powerless over his life (Austin andKunyk, 2019). Suicidal ideation is positively and significantly related to the occurrence of suicide attempts (Ziaaddini, Navadeh and Saeedi, 2009). So, it is crucial to look at factors related to suicidal ideation.

Among adolescents, the prevalence of suicide attempts, suicide ideation, and self-harm reaches 6%, 18% 13.5%, respectively, where suicide behavior is influenced by internal and external factors such as low individual coping, misuse of smartphones, nutrition imbalance, bad lifestyle, low interaction in family, bullying, and social problems (Lim et al., 2019; Rohmana, Estelina and Iskandar, 2020; Ati, Paraswati and Windarwati, 2021). However, the risk of suicide is also related to attitude toward problems and personality aspects (Sharif et al., 2014), namely hostility, impulsivity, depression, and despair, while anti-social symptoms and depression often appear at a young age (Stuart, 2016). Research related to suicidal ideation among university students in Tehran showed that depression, anxiety, and daily stress were positively associated with suicidal ideation (Izadinia et al., 2010).

Stress is an intrinsic and extrinsic stimulus that causes a biological response and compensatory response to the stimulus (Stewart et al., 2019). Stress can cause various actions on the body, ranging from homeostasis changes to life-threatening effects (Stewart et al., 2019). Exposure to focus is at the core of the theory of suicide, and stress is associated with suicidal ideation, especially in adults and adolescents (Yaribeygi et al., 2017). Anxiety is a normal human emotion, which involves behavior, affective, and cognitive responses when facing the perception of danger. Anxiety is considered excessive or pathological when it causes significant distress or distraction. Anxiety often co-exists with depression (Craske and Stein, 2016). Depression is a common mental disorder characterized by constant sadness and a lack of interest or pleasure in previously beneficial or enjoyable activities (WHO, 2019). Depression is associated with substantial current and future morbidity and increases the risk of suicide (Thapar et al., 2012).

Based on the importance of the risk factors for suicidal ideation in adolescents and the limited research conducted on this topic, especially in Indonesia, the present study aimed to examine the relationship between stress, anxiety, depression, and associated factors with the emergence of suicidal ideation in adolescents. The study's results are expected to be a catalyst in providing healthcare for adolescents with suicidal ideation in Indonesia.

Materials and Methods

Study Design

A cross-sectional survey design was employed in this study.

Respondent

The population and sample were all adolescents aged between 15-16 years from five high schools in East Java Province, Indonesia. The total sampling method was employed to select respondents from five high schools in this study, with sample size of 869 adolescents. The inclusion criteria in this study were 1) high school first-grade adolescents aged 15-16 years, 2) willing to take part in the study, and 3) completing the questionnaire.

Instrument

Data were gathered using a questionnaire to determine the respondents' demographic data, suicide ideation, stress, anxiety, and depression.

Stress, anxiety, and depression were measured using the Depression Anxiety Stress Scale (DASS-21), validated, and translated into the respondents' national language (Indonesian language). DASS-21 is a well-established instrument for measuring depression, anxiety, and stress symptoms in clinical and non-clinical samples (Lovibond and Lovibond, 1995). The instrument consists of 21 questions with an answer rating scale of 0 (never), 1 (sometimes), 2 (often), and 3 (always). The score on DASS-21 will be multiplied by two to calculate the final score. The cut-off score for depression was 0-9 (normal), 10-13 (mild), 14-20 (moderate), 21-27 (high), and > 28 (very high). The cut-off points for anxiety were 0-7 (normal), 8-9 (mild), 10-14 (moderate), 15-19 (high), and > 20 (very high). The cut-off points for stress were 0-14 (normal), 15-18 (mild), 19-25 (moderate), 26-33 (High), and > 34 (Very High) (Lovibond and Lovibond, 1995; Brumby et al., 2011). The DASS-21 Indonesian version questionnaire has passed the validity and reliability test (Cronbach's alpha > 0.7).

Furthermore, suicide ideation was measured using the Scale for Suicide Ideation (SSI) instrument, validated, and translated into the respondents' national language (Indonesian language). The SSI instrument is an ideal tool in the psychological and clinical investigation of suicidal ideation and differentiates individuals based on their level of suicidal ideation (Beck, Kovacs and

Weissman, 1979). The cut-off points for suicide ideation were 0 (did not have suicide ideation), 1 (low/minimal suicide ideation), and >1 (high suicide ideation). The SSI Indonesian version questionnaire has passed the validity and reliability test (Cronbach's alpha > 0.7).

Data Analysis

The data analyses conducted were univariate and bivariate. Descriptive analysis as frequency and percentage were used for categorical variables. Spearman Rank Analysis was used to see the correlation between the two variables. Suicide ideation was a dependent variable, while stress, anxiety, and depression were independent variables in this study. Correlation analysis was said to be significantly related if the p-value<0.05. Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 16.

Ethical Consideration

This study was approved by the Health Research Ethics Committee of the Health Polytechnic of the Ministry of Health Malang with an Ethical Approval Certificate ("Ethical Approval") Reg. Number. 335 / KEPK-POLKESMA / 2019. Before participating in the research, participants were given an explanation related to the research to be conducted. For ethical reasons, informed consent was sent to the participants. Participants who agreed to participate in this research signed the informed consent. The participation of respondents in this study was voluntary. This study followed ethical research principles, which include beneficence, justice, and respecting human dignity.

Results

Mostly, adolescents in this study did not have suicidal ideation (76.3%). However, as many as 23.7% of adolescents had the intention of suicide ideation, while 12.4% of respondents had high suicide ideation. Most participants did not experience stress (55.6%) or depression (28.5%). In the anxiety variable, it can be seen that the majority of adolescents' experience anxiety in the very high category (36.1%), and as many as 27.3% of adolescents did not have anxiety. In conclusion, 44.4%, 72.7%, and 71.5% of adolescents experienced minimal to very high stress, anxiety, and depression, respectively (Table 1).

Table 2 shows as many as 413 (47.5%) of adolescents who did not intend suicide ideation also did not experience stress. In contrast, 3% of students had a high intention of suicide ideation and very high-stress levels. The bivariate analysis results in Table 2 concluded a significant relationship between stress levels with suicidal ideation in adolescents, as indicated by the p-value of < 0.001. In addition, the correlation coefficient of 0.267 indicated a positive direction between variables.

Table 1 Characteristics of research respondents (N = 869)

Characteristics	n	%
Sex		
Female	426	49.0
Male	443	51.0
Suicidal ideation		
High	108	12.4
Low	98	11.3
None	663	76.3
Stress		
Very high	65	7.5
High	96	11.0
Moderate	131	15.1
Mild	94	10.8
Normal/none	483	55.6
Anxiety		
Very high	314	36.1
High	104	12.0
Moderate	119	13.7
Mild	95	10.9
Normal/none	237	27.3
Depression		
Very high	190	21.9
High	112	12.9
Moderate	205	23.6
Mild	114	13.1
Normal/none	248	28.5

Based on Table 2, the analysis concluded a significant relationship between the level of anxiety with suicidal ideation in adolescents, as indicated by the value of p-value < 0.001. Furthermore, the correlation coefficient of 0.237 indicates a positive relationship between variables.

In terms of depression, it showed a significant relationship between the level of depression with suicidal ideation in adolescents, as indicated by the value of p-value < 0.001. The correlation coefficient of 0.233 shows a positive relationship between variables. This study concluded that stress, anxiety, and depression have a significant and positive relationship with suicide ideation in adolescents. This showed that the lower the stress, anxiety, and depression level, the suicidal ideation in adolescents was also getting lower, and vice versa.

Discussions

The present study investigates the relationship between stress, anxiety, and depression with the emergence of suicidal ideation in adolescents. Based on the findings, this study indicated that stress, anxiety, and depression had a significant and positive relationship with suicide ideation in adolescents. The results of this study were in line with research conducted by Izadinia et al. (2010), which showed that stress, anxiety, and depression correlate positively and significantly with thoughts of suicide. In addition, other studies also indicated that stress, depression, and anxiety were the major risk factors for suicidal behavior (Nguyen et al., 2013; Lew et al., 2019).

The idea of adolescent suicide arises because, at this stage, the emotional development that occurs is still unstable (Asante et al., 2017). The percentage of suicide ideas, suicide plans, and attempted suicides have a high

Table 2 Spearman rank correlation analysis of stress, anxiety, and depression with suicidal ideation

		Suicidal ideation								p-value	r
		High		Low		None		Total			
		n	%	n	%	n	%	n	%		
Stress	Very High	26	3.0	4	0.5	35	4.0	65	7.5	<0.001	0.267
	High	16	1.8	14	1.6	66	7.6	96	11		
	Moderate	25	2.9	26	3.0	80	9.2	131	15.1		
	Mild	15	1.7	10	1.2	69	7.9	94	10.8		
	Normal	26	3.0	44	5.1	413	47.5	483	55.6		
Total		108	12.4	98	11.3	663	76.3	869	100		
		Suicidal ideation								p-value	r
		High		Low		None		Total			
		n	%	n	%	n	%	n	%		
Anxiety	Very High	69	7.9	42	4.8	203	23.4	314	36.1	<0.001	0.237
	High	17	2.0	12	1.4	75	8.6	104	12.0		
	Moderate	5	0.6	12	1.4	102	11.7	119	13.7		
	Mild	7	0.8	14	1.6	74	8.5	95	10.9		
	Normal	10	1.2	18	2.1	209	24.1	237	27.3		
Total		108	12.4	98	11.3	663	76.3	869	100		
		Suicidal ideation								p-value	r
		High		Low		None		Total			
		n	%	n	%	n	%	n	%		
Depression	Very High	49	5.6	25	2.9	116	13.3	190	21.9	<0.001	0.233
	High	14	1.6	18	2.1	80	9.2	112	12.9		
	Moderate	27	3.1	21	2.4	157	18.1	205	23.6		
	Mild	6	0.7	14	1.6	94	10.8	114	13.1		
	Normal	12	1.4	20	2.3	216	24.9	248	28.5		
Total		108	12.4	98	11.3	663	76.3	869	100		

rate at 17 years and 18 years and above (Asante et al., 2017). The percentage of suicide risk rates are high at ages 15 until 18 years, and this age range is a stage of late adolescence (Yeomans and Christensen, 2017), where, in this study, the age of the respondents was between 15-16 years. The previous research stated that stress occurs a lot in adolescence, accompanied by depression and anxiety (Duarte et al., 2019). Youth is a period that often elicits stressful conditions because, during this time, puberty hits as the peak of growth and development, both physically and mentally (Miller and Prinstein, 2019). Stress can occur due to pressure on unwanted thoughts such as the burden or problems inside the family environment (Windarwati et al., 2020). Stress also happens to those who suppress their feelings and refrain from openly expressing emotions (Kim, Bassett and Voisin, 2019). Emotional status in adolescence is still changing between behavior that shows maturity with childish acts. Academic stress factors can play an essential role in determining adolescent mental health (Waghachavare et al., 2013). About 26% of high school students in the study had high levels of educational stress. Stress is a significant risk factor causing depression (Asante et al., 2017). Stress is related to anxiety and depression and is a significant risk factor for teen suicidal ideation.

This study suggested that the lower the stress level, the lower the suicide idea, and vice versa. Various work stressors and related life stressors, such as stressful events, loss, unemployment, and other environmental stressors, link to suicidal ideation (Ibrahim, Amit and Suen, 2014). This study showed that stress was positively related to suicidal ideation. The problem is how to adapt to stress without experiencing distress because distress can trigger psychological effects such as anxiety and depression. Interaction of various aspects of stress can complicate optimal stress management and generate suicidal ideation (Ibrahim, Amit and Suen, 2014).

The lower the anxiety indicated, the lower the suicidal ideation in adolescents. Adolescents who experience anxiety tend to have a higher level of vigilance and concern about something that has not yet happened. Adolescents who experience anxiety can affect daily activities related to weakness and powerlessness (Craske et al., 2017). Adolescence is a period where individuals are worried about their future and face various pressures from family, school environment, and peers. This situation makes adolescents feel anxious, with emotions that are still unstable, and difficulty in solving difficult problems can make teens have ideas for suicide or self-injury as a way out of anxiety experienced. People with anxiety were more likely to have suicidal ideation, attempted suicide, and completed suicide than those who did not experience anxiety (Malik et al., 2014).

There was a significant relationship between the level of depression with suicidal ideation in adolescents. The lower the depression level indicated, the lower the suicide idea. Depression in adolescents occurs due to overflowing emotions and immaturity in making decisions and continuing the physiological development process. The high incidence of depression is caused by the increased responsibility they have to bear, both responsibility to parents, teachers, and those closest to them. There are various physical, social, emotional, and academic challenges in adolescents. This stage is also the peak age of onset of many mental health disorders (Ibrahim, Amit

and Suen, 2014). Furthermore, psychological conditions of students generally cause depression in adolescents, relationship problems with friends (boy/girlfriend), academic problems at school, relationship problems with parents and family, relationship problems with classmates, financial issues, relationship problems with teachers, and physical health problems (Magklara et al., 2015). Lack of parental supervision, alcohol abuse, and smoking are also significant risk factors for teenage depression (Asante et al., 2017). Suicidal ideation in late teens is caused by depression (Asante et al., 2017). Depression is a significant cause of suicide in adolescents (Towsend, 2018). Depression is associated with feelings of individual despair, helplessness, and lack of social support and skills to overcome difficulties and a stressful life (Ibrahim, Amit and Suen, 2014). Depression can also be a response to the loss of parents, relatives, friends, or the end of a relationship with a lover (Towsend, 2018).

Early adolescence is the initial stage of puberty, the regulation system itself is still immature, so it tends to exhibit unstable emotions (Curtis, 2015). The frontal lobe, which is part of the brain to regulate reasoning and decision-making, begins to develop during early adolescence. Consequently, adolescents tend to act impulsively and think uncritically (UNICEF, 2011). In the late adolescence stage, emotions that are not yet sufficiently stable and a self-regulation system that is still developing gives this age stage an emotional status that is ever-changing between behavior that shows maturity and acting like children (Curtis, 2015). More complex problems in late adolescence lead to a higher prevalence of depression and a higher risk of suicide at this age. However, physical development and growth will continue at this stage, including the frontal lobe, which is part of the brain that governs reasoning and decision-making. Frontal lobes that experience further development cause late adolescents to tend to have the power of reasoning and the ability to make their own decisions well (Curtis, 2015). Therefore, coping mechanisms must be strengthened at this age. Anxiety and depression are related to the idea of suicide and self-injury. Adolescents with suicidal ideation and self-injury tendencies have higher depression, anxiety, and stress levels.

The use of a cross-sectional survey design in the present study is not without limitations. For instance, it cannot determine the causal relationship among variables. However, this study was conducted in a population with a large enough number and the same respondents (10th grade) characteristics, so the results are expected to reduce possible bias. Furthermore, this study can also add to the literature on risk factors for suicide in adolescents in Indonesia, which is still very limited.

Conclusions

This present study indicated that stress levels, anxiety, and depression correlated positively and significantly with suicidal ideation in adolescents. Stress, anxiety, and depression comprise a condition that is closely related to adolescent activities and is close to teenage life. Therefore, nurses have to provide mental health education in the form of counselling, psychoeducation, and screening to adolescents, teachers, and parents of students who are healthy and at-risk of mental health problems. At the same time, students who experience mental health problems that can cause suicide ideas should be given psychotherapy in the form of cognitive-behavioral therapy to overcome their problems. Mental Health Service Providers have to pay great attention to adolescents regarding psychological issues due to emotional burdens experienced by adolescents either at school, at home, or in the environment that can cause mental health problems, especially stress, anxiety, and depression in adolescents. Schools need to develop a school mental health unit to promote and prevent stress in adolescents through early detection, mental health therapy, and psychosocial support. Lastly, further research is needed to identify the causal relationship between stress, anxiety, depression with suicide ideation in Indonesia. It is hoped that a decrease in adolescent suicide ideation has implications for decreasing the incidence of suicide in adolescents.

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ORIGINAL ARTICLE

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The correlation between parental communication pattern, self-esteem, and moral disengagement with cyberbullying behavior in early adolescents: A cross-sectional study

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ABSTRACT

Introduction: Cyberbullying has become a new case in young millennials that can lead to being a serious problem if it is not faced properly. Many cases cannot be resolved because the victims did not tell the truth clearly to their parents and teachers. It may cause a lack of self-esteem among the students and also make the perpetrator become morally disengaged. The purpose of this study was to identify the correlation between parental communication patterns, moral disengagement, and self-esteem with cyberbullying behavior in junior high school.

Methods: A cross-sectional study was performed with 362 junior high school students in Indonesia using purposive sampling. Variables in this study were moral disengagement, self-esteem and parental communication patterns with cyberbullying behavior. The data were collected with the Rosenberg self-esteem scale, the cyberbullying behavior scale, the moral disengagement scale and the family communication pattern scale. Bivariate analysis with Chi-square was used to analyze the data.

Results: This study found out that there were 223 students, 61.6% were female, and 43.6% were aged 14 years. There were 187 students (51.7%) who had mild cyberbullying behavior. The study revealed that there were significant correlations among cyberbullying behavior with moral disengagement ($p = 0.005$, self-esteem ($p = 0.008$), and parental communication pattern ($p = 0.019$).

Conclusions: Parental communication, moral disengagement and self-esteem have a correlation with cyberbullying behavior. It was expected that the schools need to implement a training to improve social skills in junior high school students.

Keywords: cyberbullying; moral disengagement; parental communication pattern; self-esteem

Introduction

The development of communication and information technology also has great impact on the development of today's generation, which we know as millennials society (society 5.0 era). Convenience in almost all daily activities can now be accessed very easily everywhere and any time. But, besides those great impacts, we cannot be blind to one of the negative impacts which be experienced by our young generation, that is cyberbullying.

Cyberbullying is a type of bullying which uses digital technologies and take place on social media, messaging platforms, gaming platforms or websites (Febriana and Fajrianthi, 2019). Practically, it has many negative impacts on victims such as depression low self-esteem, difficulty concentrating in class, anxiety and suicide (Talaei and Ardani, 2009; Patchin and Hinduja, 2012; Rahayu, 2012). Other studies have found that bullying causes stress, emotional, social anxiety, and risk of drug use (Sartana and Afriyeni, 2017). Another study revealed that students who experienced bullying in cyberspace were twice as likely to experience adverse health effects, such as headaches and stomachache, than those who did

not experience bullying (Nursalam et al., 2019). In addition, another study stated that only one out of three adolescents who had been victims of cyberbullying shared their experiences with their parents, teachers and friends (Mendez-Baldwin et al., 2015). It shown that many cases are still undercovered and victims did not receive proper intervention to recover from the situation.

The Indonesian Child Protection Commission (KPAI) stated child victims of cybercrime in Indonesia reached 679 cases and are growing very rapidly (KPAI, 2019). The prevalence among junior high schoo students was around 48.2% (Safaria, 2016). One factor that makes a child becomes of cyberbullying perpetrator is a grudge against the victim (Pandie and Weismann, 2016). There are several factors influencing the motives of cyberbullying behavior, namely family factors, failure to control oneself, and environmental factors. The poor quality of communication between parents and adolescents can cause adolescent behavior deviations (Nursalam et al., 2019). Other research also stated that through positive communication and interaction within the family, parents and adolescents can strengthen interpersonal relationships, so that adolescents would not be easily influenced by negative invitations, including becoming bullies, by their friends (Firdanianty, Lubis, et al., 2016).

Based on the preliminary survey in four junior high schools in four different districts of Jambi City, Indonesia, it was found that junior high school students tend not to open up with their parents if they become victims of bullying in social media. Students are also reluctant to report the incident to their teachers and tell their close friends about problems instead. When it comes to asking about committing cyberbullying, they seemed to be reluctant to tell the truth. They said that they tend to be victims of bullying in social media. Considering the lack of research related to cyberbullying in Indonesia, this study aimed to identify the correlation among parental communication patterns, moral disengagement, and self-esteem with cyberbullying behavior in junior high schools in Jambi City.

Materials and Methods

Study Design

This was a quantitative study with a cross sectional design which aimed at determining the tendency of the early adolescents with cyberbullying behavior in junior high schools. The study sample was selected by purposive sampling technique. The study location was chosen by multistage random sampling. The study was carried out in two months between October and November, 2020. The independent variables were parental communication patterns, moral disengagement, and self-esteem, while the dependent variable was cyberbullying behavior.

Respondents

The population of this study was all students from four selected junior high schools in Jambi City, with 6,541 students in total. The sample size was 362 students selected by purposive sampling methods and calculated using Lemeshow formula (Sopiyudi Dahlan, 2016). The samples were divided into four junior high schools using proportional sampling technique. The inclusion criteria were students registered as first, second and third year in selected public junior high schools in four districts (Kota Baru District, represented by Public Junior High School 14; Telanaipura District, Public Junior High School 17; East Jambi District, Public Junior High School 9, and Paal Merah District, Public Junior High School 4). The students must be able to communicate and willing to participate. The students will be excluded if they did not attend school during the data collection process.

Instrument

Cyberbullying Behavior Questionnaire

The data were collected using Cyberbullying Behavior Questionnaire (CBQ), which consists of 20 items covering a wide range of work-related cyberbullying behaviors (Jonsson, Muhonen and Backstrom, 2017). The participants scored the items on a four-point scale, 1 = never, 2 = monthly, 3 = weekly, 4 = daily. The scale has an internal consistency with a coefficient alpha of 0.638 to 0.879 (Husna, Tentama and Purwadi, 2020).

Table 1 Demographic characteristics of the respondents (N = 362)

Variables	n	%
Genders		
Male	139	38.4
Female	223	61.6
Age (years)		
11	8	2.2
12	77	21.3
13	101	27.9
14	158	43.6
15	17	4.7
16	1	3
Cyberbullying information		
Social media	252	69.6
Friends	60	16.57
Teacher	15	4.1
Parents	10	2.76
Not know	25	6.9
Parents' education levels		
Primary school	29	8.0
Junior high school	86	23.75
Senior high School	197	54.1
Bachelor high school	50	13.8
Family Income		
≥ Rp 1.750.000,-	150	41.4
≤ Rp 1.750.000,-	212	58.5

Table 2 Relationship between parental communication pattern, self-esteem, and moral disengagement with cyberbullying behavior (N = 362)

Variable	Cyberbullying behavior				Total		p-value
	Mild		Strong				
	n	%	n	%	n	%	
Parental Communication							
Bad	86	46	103	58.9	189	52.2	0.019
Good	101	54	72	41.1	173	47.8	
Self-Esteem							
Low	86	46	101	57.7	187	51.7	0.008
High	101	54	74	42.3	175	48.3	
Moral Disengagement							
Mild	110	58.8	76	43.4	186	51.4	0.005
Strong	77	41.2	59	56.6	176	48.6	
TOTAL	187	100	175	100	362	100	

Rosenberg Self-Esteem Scale

Rosenberg Self-Esteem Scale (RSES) was developed by Rosenberg in 1965. It consists of 10 items that refer to self-respect and self-acceptance rated on a four-point Likert-scale, from 1 (totally disagree) to 4 (totally agree). Five items were worded positively (i.e., 1, 3, 4, 7, and 10) and five items negatively (i.e., 2, 5, 6, 8, and 9) (Martin-Albo, Nunez and Navarro, 2007). The scale has an internal consistency with a coefficient alpha of 0.40 to 0.97 (Tinakon and Nahathai, 2012).

Moral Disengagement Scale

Moral disengagement constructs include vilifying victims through attribution of blame, reinterpreting conduct or moral justification, hiding personal causal responsibility, and misrepresenting the consequences of individual action (Bussey, Fitzpatrick and Raman, 2015). The participants in this study were asked how much they agreed, starting from 1 = strongly disagree, 2 = disagree, 3= agree, 4 =strongly agree). The scale of internal consistency found a coefficient alpha of 0.80 to 0.87 (Whang and Yang, 2010).

Family communication pattern

The family communication pattern consisted of 28-item Likert scale (Gupta, 2019). This study used the four-point scale, namely 1 = strongly disagree; 2 = disagree; 3= agree; 4 = strongly agree. The scale of internal consistency had a Cronbach's alpha of 0.869.

The validity and reliability of the test were carried out at a public junior high school in Jambi City on August 8, 2020, with the total of 67 question items. The validity value with the RSES was 0.87. The CBQ was on a scale of 0.98, the moral disengagement scale was at 0.87, and the parental communication pattern scale was at 0.85. The reliability test of the overall instruments, cyberbullying behavior, self-esteem, moral disengagements and family communication pattern, were 0.88, 0.86, 0.83, and 0.81, respectively.

Data Analysis

The data were anslysed using univariate analysis to describe the demographic characteristics, cyberbullying behavior and all independent variables (i.e., self-esteem, moral disengagement and parental communication pattern). The normality data was tested by Kolmogorov Smirnov test for large sample. It was found that the p-value were under 0.05 for all variables, which means the data were not normal (Sopiyudi Dahlan, 2016). The data used median to categorize all variables. The bivariate correlation used Chi-square test to analyze independent and dependent variables. The correlation coefficients varied from -1 to +1. This study indicates a perfectly positive linear relationship. For a positive coefficient, as one variable increases, the other also increases. The analysis found strong relationship between independent and dependent variables in which $\alpha = 0.05$ was used for analysis. The data analysis was processed in Statistical Package for the Social Sciences (SPPS file version 1.0.0-51). The data analysis included data screening and assumption of primary data analysis.

Table 3 The types of cyberbullying behaviors in early adolescence (N = 362)

Type of cyberbullying	n	%
Flaming		
Low (6-9)	194	53.6
High (10-24)	168	46.4
Harassment		
Low (2)	215	59.4
High (3-8)	147	40.6
Denigration (put downs)		
Low (3-4)	245	67.7
High (5-12)	117	32.3
Cyber-stalking		
Low (2)	302	83.4
High (3-8)	60	16.6
Impersonation		
Low (1)	312	86.2
High (2-5)	50	13.8
Outing		
Low (2)	198	54.7
High(3-10)	164	45.3
Exclusion		
Low (1)	239	66.0
High (2-5)	123	34.0
Cyber-threat		
Low (3)	291	80.6
High (4-15)	71	19.4
Anonymity		
Low (3)	290	80.1
High (4-15)	72	19.9

Ethical Consideration

This research has got ethical approval with number: LB.02.06/2/123/2020. The ethical review was tested for all aspects in this research, including scope of study, methodology and the questionnaire. The researchers applied ethics principles of anonymity / confidentiality, beneficence and non-maleficence, autonomy, and justice. An explanation of the background and aim of the study, as well as informed consent, were contained together with the instrument.

Results

The total of 362 early adolescents registered in four junior high schools in Jambi City based on several sub-districts were recruited. The characteristics of early adolescents showed that the majority 223 (61.60%) were female, and almost a half, 158, were aged 14 years old (43.60%; see Table 1).

Table 2 shows that parental communication pattern, self-esteem, and moral disengagement have significant correlation with cyberbullying behavior of students at the four public junior high schools. All p-value were below 0.05; parental communication (p = 0.019); self-esteem (p = 0.008); and moral disengagement (p = 0.005).

Table 3 shows that all cyberbullying types were in low categories, but high categories in few variables nearly reached a half, namely flaming (n = 168; 46.4%), outing (n = 164; 45.3%), and harassment (n = 147; 40.6%).

Discussions

The majority of respondents were female and almost a half of 158 were at the age of 14 years old. Boys and girls both participate in cyberbullying, although for different reasons. They also use different methods. Girls tend to use a more passive approach, such as spreading rumors and reputation and relationship damage. Boys tend to use direct and cyber-threats intended to revenge. In addition, another view says that, in carrying out their actions, women are more often the target of cyberbullying, while men tend to be the main perpetrators of violence in cyberspace (Pandie and Weismann, 2016).

This study found there were associations between self-esteem, parental communication pattern, and moral disengagement with cyberbullying behavior. Several factors that could influence the variables were friends, parents and school environment, parents' educational levels, and parents' salary (Aini, 2018).

Self-esteem was a component of self-concept factors that can influence self-concept such as pressure from outside from good peers (Yuliayana and Wichaikull, 2014). A peer group was a group of friends who had strong emotional ties and students who could be accepted, socialized, exchanged ideas, and experiences in providing the change and the development of social life. The experience of being a victim can lower person's self-esteem, or people with low self-esteem are more likely to be targeted as victims.

The quality of communication between parents and adolescents should be improved so the adolescents could get guidance and education to avoid cyberbullying. The poor quality of communications between parents and adolescents can cause adolescent behavior deviations (Gunawan, 2013). Other research stated communication between parents and adolescents that is less than optimal will cause adolescents to be easily influenced by deviant behavior (Luk et al.2010). Positive communication and interaction within family, parents and adolescents can strengthen interpersonal relationships, so adolescents will not be easily influenced by invitations to do negative activities from their friends (Firdanianty, Djuara et al., 2016).

Reframing behavior is accomplished through moral justifications, euphemistic labelling, and advantageous comparisons, which enable the individual to view their immoral behavior as ultimately moral or benign. Individuals could also morally disengage by changing their perceptions of their own personal responsibility for the behavior by displacing or diffusing responsibilities to others. Moral disengagement mechanisms blame the target for their suffering, or dehumanize the target, act to reframe the individual's perceptions about the target's role for the behavior. Finally, the harmful outcomes of the immoral behavior can be minimized or viewed as providing benefits for the victim (Bandura, 2002). Cyber-communication may promote hostile attributions of intent, and triggering attributions of blame (Runions, 2013). Ambiguous communications, that are common on social media, may provoke self-justifications of cyber-aggression as retaliatory responses, with responsibility for the perceived provocation attributed to the other person; one's own behavior is perceived as merely a reaction. These processes may be particularly pertinent to aggressive-victims (i.e., bully-victims),whose responses to perceived provocation fuel cycles of bullying (Salmivalli and Nieminen, 2001).

This study also found most adolescents have mild moral disengagement, self-esteem and cyberbullying behavior. This study was in line with Jiang et al. (2021), that stated adolescents whose information was on the topic of self-acceptance and competence, or having good self-esteem, could judge themselves better than most people. According to other research, the sources related to bullying and self-esteem have consistently found that victims of bullying tend to have lower self-esteem than non-victims (Patchin and Hinduja, 2012). Among people with different levels of self-esteem, victims of bullying tend to have lower self-esteem than non-victims.

This study has several limitations. It only identified the correlation between independent and dependent variables with cross-sectional approach that cannot show causality. This study also did not examine any intervention to increase self-esteem, improve family

communication, address moral disengagement, or prevent cyberbullying behavior. Therefore, further study is needed to address these aspects.

Conclusions

There is a correlation between self-esteem, moral disengagement, parental communication pattern and cyberbullying behavior in early adolescence in junior high school. Further research need to address factors related to moral disengagement between genders, improvement by social group about self-esteem, and disengagement in cyberbullying behavior.

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ORIGINAL ARTICLE

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The development of assessment instrument for postpartum patients with severe preeclampsia-eclampsia based on need for help and self-care models

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ABSTRACT

Introduction: One of the causes of the high mortality rate of patients with severe preeclampsia-eclampsia in the postpartum period is the inaccurate assessment of the patient's need for help and independence in self-care. This study aimed to develop specific assessment instruments for postpartum patients based on Wiedenbach's need for help and Orem's self-care models.

Methods: This study used a research and development (R&D) approach. The samples were 30 midwives and 100 documents of postpartum patients with preeclampsia from Airlangga University Hospital, Surabaya, and 30 midwives from Haji Hospital Surabaya. Data were collected through document tracking and interviews. Data were analyzed with R&D methods.

Results: The results showed that the mean rank value of the new assessment instrument was higher (29.72) than the old assessment instrument (19.93). A significant difference was found between the new assessment instrument and the old assessment instrument (Wilcoxon test value -5.379 with $p < 0.001$). The new instrument had functionality, efficiency, and usability for assessment of the need for help and self-care of postpartum patients with severe preeclampsia and eclampsia.

Conclusions: Postpartum patients with severe preeclampsia-eclampsia should be assessed by the specific assessment instruments based on Wiedenbach's need for help and Orem's self-care models.

Keywords: assessment instruments; eclampsia; need for help; postpartum; self-care; severe preeclampsia

Introduction

Preeclampsia and eclampsia are one of the main causes of maternal and fetal mortality and morbidity in addition to bleeding and infection (triad complications) (Shamsi, Saleem and Nishter, 2013). In 2019, the maternal mortality rate of East Java Province reached 89.81 per 100,000 live births. The most common cause of maternal death in Surabaya is preeclampsia-eclampsia, which is 26.90% (Ministry of Health, 2021).

Preeclampsia is a widespread disorder of endothelial or vascular malfunction resulting in vasospasm after 20 weeks of gestation, resulting in decreased organ perfusion and endothelial activation, leading to hypertension, non-dependent edema, and proteinuria. It is called severe preeclampsia if the systolic blood pressure is ≥ 160 mmHg and diastolic blood pressure ≥ 110 mmHg accompanied by proteinuria of more than 5g / 24 hours (Peres, Mariana and Cairrão, 2018).

Eclampsia is an advanced condition of severe preeclampsia that is not resolved properly, leading to seizures. About 75% of eclamptic seizures occur before delivery, 50% within the first 48 hours after delivery, and can occur after 6 weeks postpartum. Eclampsia can lead to coma and even death, either before or after childbirth (Bernstein et al., 2017). The rate of caesarean sections in cases of severe preeclampsia is estimated to be high (around 70% or more in preterm pregnancies), because many obstetricians prefer performing caesareans in women with preeclampsia, even with a reassuring fetal status (Ferreira *et al.*, 2016). Postpartum patients with severe preeclampsia-eclampsia are most at risk of infection due to childbirth with caesarean section, at risk of bleeding due to decreased ability of uterine

contractions due to administration of MgSO4 and at risk of postpartum depression due to infant loss and inability to adapt to hormonal changes (Frawley et al., 2020; Hoedjes et al., 2011; Peres et al., 2018; Stern et al., 2014).

Several studies on the experiences of patients who received emergency treatment for severe preeclampsia indicated that patients felt that their lives were threatened, felt discomfort, tried to reduce discomfort, worried about the failure of treatment measures, felt close to death, felt that they did not get full support, expected friendly service and yearned for better conditions. The sense of loss can cause emotional distress to the mother, and leave a deep sense of grief. It is found that the patient expresses the need for professional support or social support (Frawley et al., 2020). To minimize the impacts, the needs and self-care of postpartum patients with severe preeclampsia and eclampsia should be identified as early as possible (Frawley et al., 2020). Assessment of the need and self-care of postpartum patients with severe preeclampsia and eclampsia is essential for professionals to meet the need and self-care of patients. Thus, an appropriate assessment instrument based on need and self-care of postpartum patients is needed. Based on a preliminary study on obstetric wards in several hospitals in Surabaya, there was no specific assessment instrument for postpartum patients with severe preeclampsia and eclampsia.

Wiedenbach's "need for help" model reveals that nurses are people who can help postpartum clients with preeclampsia-eclampsia overcome problems and improve their welfare through their actions, thoughts, feelings, words, writing, and body movements, while postpartum clients with preeclampsia-eclampsia are recipients of assistance (need for help) from health professionals either in the form of care, advice or education. Three goals put forward by Wiedenbach in helping clients are: (1) preventing maternal emergency, (2) reducing anxiety due to loss, (3) building effective coping in dealing with emergencies and losses by collaborating and coordinating with other health teams so that clients get actioned appropriate treatment procedures. In addition, Orem's "self-care" model sees that every individual has the ability and potential to care for himself and achieve prosperity (Alligood, 2018). In this case, the modification of Wiedenbach's need for help and Orem's self-care models can allegedly be applied to overcome the physical and psychological crisis and emergency problems of postpartum patients due to preeclampsia and eclampsia and help postpartum patients and their families achieve independence in self-care and baby care according to their abilities (Rahayu, 2015).

The development of assessment instruments has been carried out in several previous studies. Based on international joint commission accreditation standards, there is only a general nursing assessment instrument, not specifically for postpartum patients (Rachmania, Sunaringtyas and Widayati, 2019). The development of maternal assessment instrument has been done in Brazil which is tracing about the quality of life of the mother and her baby, not identifying about emergency care needs as an impact of preeclampsia and eclampsia (Zubaran *et al.*, 2009). Another study was conducted in Turkey aimed to compare the various existing instruments and determine which instrument is the most suitable for assessing the antenatal and postpartum period for Turkish society (Çakşak *et al.*, 2018). Similar studies found the evaluation of changes in postnatal care using the Parents' Postnatal Sense of Security (PPSS) instrument. The study evaluated two models of postnatal care using a questionnaire incorporating the PPSS instrument. The PPSS can be used by mothers and fathers in the postpartum period to identify the sense of security of parents in the postnatal period (Kvist and Persson, 2009). However, those studies have not linked with the assessment instrument in postpartum with preeclampsia-eclampsia.

To overcome the limitation and the weakness of the previous studies, the current study aimed to develop an assessment instrument for postpartum patients with severe preeclampsia-eclampsia based on Wiedenbach's need for help and Orem's self-care models according to research with R&D design. This study is expected to identify the need for help and self-care of such patients by nurses and midwives in the emergency and maintenance period. Thus the risk of morbidity and mortality due to severe preeclampsia and eclampsia can be reduced significantly.

Materials and Methods

Study Design

The study used a research and development (R&D) design, a method used to produce certain products and test the effectiveness of these products (Yoshikawa, 2012). The purpose of using this method was to develop an assessment instrument in postpartum patients with pre-eclampsia based on Wiedenbach's need for help and Orem's self-care models. The research was conducted in two stages, namely the development stage and the trial stage.

At the development stage, the study used a qualitative research design and was carried out in the obstetric ward and the Medical Record Section of Airlangga University Hospital, Surabaya. Data collection was carried out by interviewing and tracing the contents of postpartum patient documents with preeclampsia-eclampsia.

The trial stage used a quasi-experimental, and the respondents were 60 midwives who were in charge for postpartum patients with preeclampsia in the obstetric ward of Airlangga University Hospital, Surabaya, and Haji Hospital, Surabaya.

Respondent

At the development stage, the participants were 30 midwives and 30 postpartum patients with severe preeclampsia-eclampsia, as well as 100 medical records stored in Airlangga University Hospital, Surabaya.

In the trial stage, the respondents were 60 midwives and 120 postpartum patients with preeclampsia in the obstetric ward of Airlangga University Hospital and Haji Hospital. The respondents were selected using purposive sampling technique, which is a sample selection method based on the predetermined criteria: Midwives who have experience caring for postpartum patients at least 1 year, as well as postpartum patients who have preeclampsia-eclampsia and are not admitted to the intensive care unit.

Instrument

The data were collected using some instruments based on the two stages. In the development stage, the instruments used were observation sheets, interview guidelines, and documentation. In the trial stage, the instrument used was a questionnaire to test the effect of the instrument of Assessment of Postpartum Mothers with Severe Preeclampsia and Eclampsia based on the "Need for Help" and "Self-Care" models.

Data Collection

The development stage began with a search for the availability of assessment instruments used by health workers in conducting studies of postpartum patients with preeclampsia-eclampsia. At this stage, in-depth interviews and documentation studies were carried out on the use of the assessment format, which had been used for the past 1 year. In-depth interviews were conducted with 30 midwives to explore their opinion on the instrument for assessing postpartum patients with severe preeclampsia that has been used so far. The media used at this stage was an interview guide that had been prepared based on the "need for help" and "self-care" models. To trace the documentation that used so far, a checklist was used. The results of in-depth interviews showed that the instruments provided by the hospital were general for all obstetric patients, not specific for postpartum patients with preeclampsia-eclampsia, so that often the risk of emergency due to preeclampsia was not detected.

The results of the qualitative analysis in the first stage were used as a basis for developing thhe new assessment instruments for postpartum patients with preeclampsia based on Wiedenbach's need for help and Orem's self-care models. After the new assessment instruments for the postpartum patients were arranged, a focus group discussion (FGD) was then carried out by involving researchers, patients, midwives, and experts on the preparation of the instruments. The results of the FGD were used to make improvements to the development of the assessment instrument.

At the second stage, it began with the midwife filling out a questionnaire about the old assessment instrument. Then the midwife was introduced to the new assessment instrument. After understanding about how to use the new assessment instrument, the midwife tried to conduct an assessment using the new instrument on two patients. After using the new assessment instrument, the midwife was asked to fill out a questionnaire about it.

Data Analysis

At the development stage, data were analyzed using qualitative method. The analysis consists of three activities that occur simultaneously: data reduction, data presentation, data withdrawal conclusion/verification. In this case, it was carried out to obtain conclusions about the use of assessment instruments that have been used so far. At the trial stage, data were analyzed using the Wilcoxon test with the significance level < 0.001, because the result of the normality test of the post-test was not normal (Sugiyono, 2019). In this research, the validity test used the validity of the construction (construct validity) by asking for opinions from experts (experts' judgments). Instruments were made according to the aspects to be measured which were then consulted with experts to determine an opinion whether the instrument was feasible or not. In addition, testing the validity of the instrument was carried out using the Product Moment Correlation technique. If the results of r count > r table have a significance level 5% it will be declared valid. In this study, the reliability of the instruments that have been compiled was tested by using the Cronbach's alpha technique. If coefficient reliability (r11) is 0.7, then the instrument is declared reliable (Sugiyono, 2019).

Ethical Consideration

Prior to conducting the research, the research proposal was reviewed and received ethical approval from the Health Research Ethics Commission Team at Airlangga University Hospital No. 136/KEH/2019 and Haji Hospital Surabaya No.073/34/KOM.ETIK/2019.

Results

The results of the development stage are described in Table 1, Table 2, and Table 3, while the trial stage can be seen in Table 4, Table 5, and Table 6.

The results of the evaluation of the old assessment instruments in the obstetric ward are shown in Table 1. The finding showed that 5 of the 10 essential assessment components based on Wiedenbach's need for help and Orem's self-care models were not found. The old assessment instrument is (1) not specific assessment, (2) does not identify the risk of bleeding as an effect of administration of magnesium sulfate, (3) does not identify the ability to meet basic needs, (4) does not identify self-care abilities, and (5) does not identify parental readiness. Four components were partially

Table 1 Evaluation of old instrument

Instrument Standards	Information	Category
There is a focus or specific assessment format for postpartum patients with severe preeclampsia/eclampsia	The assessment format is not specific for postpartum patients with severe preeclampsia/eclampsia, still mixed with other cases (antepartum, intrapartum, and gynecology)	Not appropriate
Based on Wiedenbach's need for help model, the assessment of postpartum patients with severe preeclampsia/eclampsia should be sufficient to detect signs of eclampsia impending: 1. Headache complaint 2. Complaints of epigastric pain 3. Complaints of vision impairment 4. Complaints of nausea, vomiting 5. Help needed to deal with impending eclampsia in the hospital and after being discharged	In the assessment format there is already a complaint assessment of dizziness and nausea and vomiting, but it is not specific for signs of impending eclampsia	Partially suitable
Based on Wiedenbach's need for help model, the assessment of postpartum patients with severe preeclampsia/eclampsia should be sufficient to identify fluid balance: 1. Intake 2. Output 3. Assistance needed for fluid balance in the hospital and after hospital discharge	In the assessment format, there is already an assessment of fluid intake and output	Suitable
Based on Wiedenbach's need for help model, the assessment of postpartum patients with preeclampsia/eclampsia should be sufficient to identify signs of magnesium sulfate therapy poisoning: 1. Respiratory depression (RR <12 times/minute) 2. Tendon reflexes disappear 3. Declining awareness 4. Help needed to overcome magnesium sulfate intoxication	In the assessment, there has been an assessment of breathing, awareness, but there is no assessment of tendon reflexes	Partially suitable
Based on Wiedenbach's need for help model, the assessment of postpartum patients with preeclampsia/eclampsia should be sufficient to identify the risk of bleeding as an effect of the administration of magnesium sulfate 1. Uterine contractions 2. Height of the uterine fundus 3. Characteristics of vaginal discharge 4. Assistance needed to deal with the risk of bleeding in the hospital and after being discharged	In the assessment format, there is no assessment of uterine contractions, the height of the uterine fundus, or characteristics of vaginal discharge for postpartum	Not appropriate
Based on Wiedenbach's need for help model, the assessment of postpartum patients with preeclampsia/eclampsia should be sufficient to identify the risk of pulmonary edema as a hypoalbumin effect 1. Fluid restriction 2. Lung sounds 3. Respiration rate (RR) 4. Assistance needed to deal with the risk of pulmonary edema in the hospital and after hospital discharge	In the assessment, there is an assessment of lung sounds and RR, but there is no assessment of fluid restriction	Partially suitable
Based on Wiedenbach's need for help model, the assessment of postpartum patients with preeclampsia/eclampsia should be sufficient to identify the ability to meet basic needs 1. Oxygenation 2. Nutrition 3. Elimination 4. Mobilization 5. Rest and sleep 6. Assistance needed to meet basic needs in the hospital and after being discharged	In the assessment, there is an assessment of nutrition, but there is no assessment of oxygenation, elimination, mobilization, health, and sleep, and the assistance needed	Not appropriate

Table 1 Evaluation of old instrument (continuos)

Instrument Standards	Information	Category
Based on Wiedenbach's need for help model, the assessment of postpartum patients with preeclampsia/eclampsia should be sufficient to identify comfort 1. Pain scale 2. Causes of pain 3. The ability and habit of dealing with pain 4. Assistance needed for comfort in the hospital and after being discharged	In the assessment, there is an assessment of the scale of pain but there is no assessment of the causes of pain, as well as the ability and habits to deal with the pain	Partially suitable
Based on Wiedenbach's need for help and Orem's self-care models, the assessment of postpartum patients with preeclampsia/eclampsia should be sufficient to identify abilities to meet basic care 1. Personal hygiene 2. Perineal care 3. Wound care 4. Knowledge of postpartum danger signs 5. Help is needed about self-care in the hospital and after being discharged	In the study, there was no assessment of personal hygiene, milk production and breastfeeding, and perineal care/wound care	Not appropriate
Based on Wiedenbach's need for help and Orem's self-care models, the assessment of postpartum patients with preeclampsia/eclampsia should be sufficient to identify parental readiness 1. Mental readiness 2. Readiness of knowledge about baby's needs and care 3. Breast Production and Breastfeeding 4. Support system 5. Rocks needed for baby care in the hospital and after hospital discharge	In the assessment format, there is no assessment of parental readiness	Not appropriate

Table 2 First focus group discussion results

Strategic Issues	Causes	FGD results	Researcher Study
Specific assessment instrument for postpartum with severe preeclampsia-eclampsia	1. The unavailability of a special assessment instrument for postpartum patients with severe preeclampsia/eclampsia 2. The instrument of the outpatient assessment is made public for all cases treated in the midwifery ward	Development of specific assessment instruments for postpartum patients with severe preeclampsia/eclampsia	Development of a special assessment instrument is needed to identify the needs, abilities, independence, and assistance needed by postpartum patients with severe preeclampsia -eclampsia.
Self-management support	There are no instruments that show the self-management data of postpartum patients with severe preeclampsia/eclampsia who need support	Development of an instrument to explore the self-management data of postpartum patients with severe preeclampsia/eclampsia who need support	Development of the instrument needs to be done in the obstetric ward to overcome the emergency conditions and improve the ability and independence of postpartum patients with severe preeclampsia/eclampsia
Decision support	No instrument shows the decision support in the form of a written list of things that must be studied about the needs, abilities, and assistance needed by postpartum patients with severe preeclampsia/eclampsia	Development of Instrument which includes: 1. List of patient needs 2. List of patient abilities 3. List of assistance the patient needs	Development of an Instrument is needed to overcome the emergency conditions and improve the ability and independence of postpartum patients with severe preeclampsia/eclampsia
Service system design	No instrument shows the things that need to be studied about the needs, abilities, and assistance needed by postpartum patients with severe preeclampsia/eclampsia	1. Development of Instrument that includes a list of patient needs 2. List of patient abilities 3. List of assistance the patient needs	Development of an Instrument is needed to overcome the emergency conditions and improve the ability and independence of postpartum patients with severe preeclampsia/eclampsia
Clinical information	Clinical information such as signs of eclampsia impending, self-care ability, parental readiness has not been systematically arranged	Systematic development of clinical information 1. Subjective data 2. Objective data	Development of Instrument is carried out to determine the patient's development and arrange further self-management strategies

Table 3 Results of expert discussions

Instrument	Component	Feedback
Specific or focus assessment instrument for postpartum patients with severe preeclampsia-eclampsia	1. Self-management support	Specific data based on the model need for help and self-care
	2. Decision support	Data that examines the management of postpartum patients with severe preeclampsia/eclampsia which includes: 1. Symptoms of impending eclampsia 2. Fluid balance 3. Signs of magnesium sulfate poisoning 4. Risk of pulmonary edema 5. Risk of bleeding 6. Self-care ability 7. Comfort 8. Parental readiness 9. Meeting basic needs
	3. Service system design	Development of instruments is needed to improve the alarm warning to detect early and overcome emergencies and improve the ability of postpartum patients with severe preeclampsia/eclampsia in the obstetric ward
	4. Clinical information	An instrument is available that examines data about: 1. Symptoms of impending eclampsia 2. Fluid balance 3. Signs of magnesium sulfate poisoning 4. Risk of pulmonary edema 5. Risk of bleeding 6. Self-care ability 7. Comfort 8. Parental readiness 9. Meeting basic needs

Table 4 Normality test results

	Pre	Post
Kolmogorov-Smirnov Z	1.133	1.701
Asymp. Sig. (2-tailed)	0.153	0.006
Information	Normal	Abnormal

Table 5 Statistical test results

Group	N	Mean Rank	Z score	P-value
Old Instrument	100	19.93	-5.379	<0.001
New Instrument	100	29.72		

Table 6 Second FGD results

Strategic Issues	Cause	FGD results	Researcher
Specific assessment instrument or focus for postpartum patients with severe preeclampsia/eclampsia	It cannot be applied directly to postpartum patients with severe preeclampsia/eclampsia	It has been done even though it has not been a supplementary document	The assessment instrument of the postpartum patient with severe preeclampsia/eclampsia based on the "Need For Help" and "Self-Care" Models can already be used in the obstetric ward to get complete information from the patient

compliant, namely (1) detecting signs of impending eclampsia, (2) signs of magnesium sulfate therapy poisoning, (3) the risk of pulmonary edema as a hypoalbumin effect, and (4) comfort. There is only one component which was suitable, namely about fluid balance. Therefore, the old instrument is insufficient to assess the need for help and self-care of postpartum patients with severe preeclampsia/eclampsia.

The results of the FGD in the first stage are shown in Table 2. The finding showed that, based on five aspects of strategic issues, the development of an instrument to assess postpartum patients with severe preeclampsia or eclampsia was needed. The FGD recommendations are the approval of the development of a specific assessment instrument for postpartum patients with severe preeclampsia/eclampsia. Furthermore, a new assessment instrument was developed for postpartum patients with severe-eclamptic preeclampsia based on Wiedenbach's need for help and Orem's self-care models.

The results of discussions with experts on the four elements are shown in Table 3. The finding showed that the development of assessment instruments is needed to improve the alarm warning to detect early and overcome emergencies and improve the ability of postpartum patients with severe preeclampsia/eclampsia in the obstetric ward. Recommendations from an expert discussion on the instrument for the study of postpartum patients with severe preeclampsia/eclampsia were: 1) the development of a specific assessment tool for postpartum patients with severe preeclampsia/eclampsia, and 2) the components of the instrument should include: self-management support, decision support, service system design, and clinical information.

Before further analysis was carried out, the normality of the data was tested with the Kolmogorov Smirnov test because the data are more than 50. The data normality test can be seen at Table 4 and the test result at Table 5. In this study, the results of the pre-test data normality test were normally distributed, while the post-test was not normal. So that the statistical test used is the Wilcoxon Signed Rank Test. The old assessment instrument was rated lower with a mean rank of 19.93, while the new assessment instrument was with a mean rank value of 29.72. The Wilcoxon test results obtained a value of -5.379 with $p < 0.001$. So there is a significant difference between the old assessment instrument and the new postpartum patient assessment instrument.

The results of the second stage FGD are shown in Table 6. The finding shows the assessment instrument can be used in obstetric wards to get the more complete information from the patients. In addition, the experts recommended to improve the instruments by adding data components about the medication that patients should continue at home. This is important because treatment with antihypertensive drugs is recommended for severe postpartum hypertension.

Discussions

The results of this study illustrate that an instrument carried out to assess postpartum patients with severe preeclampsia/eclampsia was inadequate. Some previous studies have described that postpartum patients with preeclampsia are at risk for experiencing emergencies, namely eclampsia, bleeding, and dyspnea (Cairns et al., 2017; NICE, 2019; Kvist & Persson, 2009; Magee et al., 2014;Rana et al., 2019; Rawlins et al., 2018).

Based on the results of previous research, it illustrates that the need for help and self-care models are effective to be applied to patients with maternal complications, both physical and psychological. This model can be used in patients with preeclampsia, bleeding, preterm labor, and in patients with postpartum depression (Machmudah, 2015; Rahayu, 2015; Wulandari and Setyowati, 2015; Dwi Susanti *et al.*, 2016).

The results of this study illustrate that the assessment instruments that have been used so far are still general and not entirely specific to identifying the special needs of preeclamptic patients. Based on the input from the experts, the development of instruments for postpartum patients with severe preeclampsia/eclampsia using the "Need for Help" concept proposed by Wiedenbach with the goals in helping clients are: 1) to prevent maternal emergencies, 2) reduce anxiety due to loss, and 3) develop effective coping by collaborating and coordinating with other health teams so clients can get appropriate action and handling procedures.

In addition, the self-care theory by Orem, which believes that every individual has the ability and potential to care for themselves and achieve prosperity, was also used to develop the instruments. Changes that occur during the postpartum period cause a decrease in the client's independence to meet their needs. Nurses play a role in helping to increase the independence of clients to meet their self-care needs through a learning process or exercise in the form of self-care, creating an environment that facilitates the achievement of independence.

The statistical test showed that there is a significant difference between the old assessment instrument and the new one, which was considered more effective. Based on the results of data analysis from the results of filling out the questionnaire, almost all respondents gave the opinion that the assessment instrument for postpartum patients with severe preeclampsia-eclampsia based on Wiedenbach's need for help and Orem's self-care models met the criteria of functionality, efficiency, and usability. The effectiveness of using the need for help and self-care models in providing nursing care has been illustrated in the results of previous studies in different cases (Çapik *et al.*, 2015; Ferreira *et al.*, 2016; Hajira Irshad Ali, 2018).

Conclusions

The assessment instruments in obstetric ward have not been specific for postpartum patients with severe

preeclampsia/eclampsia, while the new instrument has been developed for postpartum patients with severe preeclampsia-eclampsia based on Wiedenbach's need for help and Orem's self-care models through FGD and expert discussion. The new assessment instruments met the criteria of functionality, efficiency, and usability.

For stakeholders, midwives recommend the use of the assessment instrument of the postpartum patients with severe preeclampsia-eclampsia based on Wiedenbach's need for help and Orem's self-care models in the obstetric ward setting.

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ORIGINAL ARTICLE

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Factors associated with compliance in implementing health protocols to prevent COVID-19 in Indonesia: A cross-sectional study

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ABSTRACT

Introduction: To prevent the COVID-19 spread, the government requires people to comply with health protocols in public facilities, namely by wearing masks, washing hands and keeping a distance. This study aimed to determine what factors affect and reason for compliance in implementing health protocols.

Methods: This research was an analytical survey research with a cross-sectional design conducted in Semarang City, Indonesia, with a total sample of 400 respondents. The independent variables were age, education, occupation, and health status. The dependent variable was compliance in wearing masks, washing hands and keeping a distance. Data were analysed with logistic regression test with significance level of 0.05.

Results: From the survey, 76.6% of respondents obeyed wearing masks, 57.4% of respondents obeyed to wash their hands and 71.1% of respondents obeyed to keep their distance. The backward type logistic regression test found that the factors associated with health protocol compliance were age, education, occupation, health status, existing regulations and the desire to maintain health with a significance value of <0.001. However, field of work was not associated with using masks (p = 0.273), while health status was not associated with handwashing habits (p = 0.344).

Conclusions: Factors that are associated with respondents' compliance with the health protocol are age, education, occupation, health status, self-motivation and regulation. The government need to raise awareness on adhering health protocols through the promotion about healthy lifestyle.

Keywords: adherence; COVID-19; health awareness; health protocols

Introduction

COVID-19 will not only have an impact on the health sector, but will also have an impact on the social, economic, educational and other fields (Ministry of Fianance, 2020). Research conducted by Sardar, Ray, Hasan, and Chitra (2022) shows that there is a reduction in the number of employees at companies even though online sales have increased. The government has formulated a strategy by making policies to deal with COVID-19 in the field of information and communication with a special task force to COVID-19 so that it can be accepted by the wider community by broadcasting live on TV, the government's official website, and creating an Android-based application for detecting COVID-19 events. Mass media have reported a lot of discussion about the COVID-19, including the number of COVID-19 cases, prevention, health protocols, and vaccinations.

In order to break the chain and deal with COVID-19, the government through the task force prepares health protocols for every activity that potentially transmit the disease. For the prevention of COVID-19 in public places and public facilities, the government has prepared a health protocol for the community in public places and facilities (Ministry of Health, 2020). By implementing the health protocol, it is expected the people in a country to be able to avoid COVID-19 infection, for which the health protocol must be adhered. However, people's compliance towards the COVID-19 health protocol has not been widely studied.

Compliance to implement health protocols is part of community behavior in preventing COVID-19. A study found that knowledge affects behavior (Istiqomah and Notobroto, 2016) and there is a significant positive relationship between education level and healthy living behavior (Putri, 2017). Knowledge has significantly associated with the behavior of using personal protective equipment (PPE). Based on the results of this study, knowledge plays an important role in people's behavior, knowledge influenced by information obtained from the community (Erawati, Alfiani and Kurniasih, 2020). However, it is different from previous research that good knowledge is not in line with good behavior (Erawati, Puspita and Cahyaningsih, 2020).

Based on this background, the aim of this study was to analyse what factors and reasons were associated with adherence in implementing health protocols to prevent COVID-19.

Materials and Methods

Study Design

This study was a quantitative research with an analytical survey approach with a cross-sectional design. The independent variables were age, education, occupation and health status. The dependent variable was compliance with the use of masks, hand washing and keeping a distance followed by reasons for compliance.

Table 1 Distribution of age, education, occupation, and health conditions (N = 400)

Variable	n	%
Age		
20-25 years	18	4.5
26 - 35 years	76	19
36 - 45 years	204	51.1
46 - 55 years	51	12.7
56 - 59 years	51	12.7
Education level		
SMP (Junior High School) or lower	34	8.5
SMA (Senior High School)	68	17.1
Universities	298	74.4
Occupation		
Public Services (security, banking)	60	14.9
Industry	17	4.3
Entrepreneur (trade, etc.)	25	6.4
Education	128	31.9
Health	34	8.5
Others (including Housewives)	136	34.0
Health Status		
Suffering from a disease	44	8.5
Healthy	366	91.5

Table 2 Distribution of health protocol adherence (N = 400)

Health Protocol Adherence	n	%
Wearing a Mask		
Always	306	76.6
Often	34	8.5
Sometimes	52	12.8
Never	8	2.1
Washing Hands		
Always	230	57.4
Often	68	17.0
Sometimes	94	23.4
Never	8	2.2
Keeping a Distance		
Always	284	71.1
Often	44	10.9
Sometimes	55	13.7
Never	17	4.3

Table 3 Distribution of reasons for complying with health protocols (N = 400)

Health Protocol	Reason			
	Regulations		Health intention	
	n	%	n	%
Wearing a Mask	56	14.9	340	85.1
Washing Hands in Public Facilities	56	14.9	340	85.1
Keeping a Distance in Public Facilities	68	17.0	332	83.0

Table 4 The results of data analysis of age, education, occupation and health status on the health protocol adherence

Variable	B	t	p-value
Wearing Mask			
Age	0.853	29.403	<0.001
Education	-0.648	-16.986	<0.001
Occupation	0.472	6.361	<0.001
Field of work	0.023	1.097	0.273
Health status	0.172	6.456	<0.001
Washing Hands			
Age	0.514	12.961	<0.001
Education	-1.054	-21.071	<0.001
Occupation	0.460	19.996	<0.001
Field of work	0.464	19.887	<0.001
Health status	0.078	0.948	0.344
Keeping a Distance			
Age	0.767	18.415	<0.001
Education	-0.858	-16.342	<0.001
Occupation	0.171	6.982	<0.001
Health status	0.558	6.486	<0.001

Table 5 Test results analysis of reasons for the habit of using masks, washing hands and keeping a distance

Variable	B	t	p-value
Hand wash	3.661	13.790	<0.001
Regulations	0.537	5.718	<0.001
Health	-1.599	-17.404	<0.001
Using Mask	4.892	37.122	<0.001
Regulations	0.126	2.710	0.007
Health	-2.009	-44.054	<0.001
Keeping a Distance	4.922	32.773	<0.001
Regulations	0.190	3.616	<0.001
Health	-2.056	-39.333	<0.001

Respondents

The study was conducted in the city of Semarang, with a population of 1,096,637 residents. After calculating with the Slovin's formula, the number of samples was 400 residents by accidental sampling (non-randomized). Inclusion criteria in sampling are residents of Semarang City aged 20-59 years who are productive. The exclusion criteria in this study were residents of Semarang City aged 20-59 years who were unproductive, getting sick, or not working.

Instrument

The research instrument used a closed questionnaire which was distributed online using a Google Form (Supporting Information 1). The form contains the first part, namely Informed Consent and the demographic characteristics of the respondents (age, occupation, education and health status). The second part consists of the habit of using masks, washing hands and keeping a distance. All independent variables are classified in Table 1. Questions related to compliance with using masks, washing hands and keeping a distance are classified as always (4), often (3), sometimes (2), and never (1), followed by the reason for compliance (i.e. regulation or health reasons).

The validity of the previous questionnaire was tested in 30 respondents from 400 respondents as sample of this study with the help of Pearson's SPSS Product Moment, it was obtained that arithmetic mean was 0.369 -0.976 or greater than r table, which is 0.349 (valid). Reliability test was by looking at the value of Cronbach's alpha and obtained a value of 0.897 (reliable).

Data Collection

Data collection was carried out within two months (November-December 2020). Data retrieval by accidental sampling was distributed in several WhatsApp groups with the help of 15 enumerators who had different characteristics (age and occupation) to avoid data bias in certain groups. The 15 enumerators were previously known to the researcher. The researcher coordinated with the enumerators regarding the explanation of the questionnaire, the enumerator's rights and the tasks carried out by the enumerator by distributing the questionnaire link via WhatsApp.

Data Analysis

The data analysis carried out was univariate and bivariate analysis. The distribution of characteristics, distribution of adherence and distribution of reasons for complying with the protocol were carried out by univariate analysis. To see what factors associated with the health protocol, bivariate analysis was carried out by performing a backward type logistic regression test with the help of SPSS 16. The t-table value with a sample of 400 was 1.966, and the researcher used a value of = 0.05. so that, if the analysis results get a t value of more than 1.966

or less than 0.05, it will be used as a factor that affects compliance in implementing health protocols. If the t value is less than 1.966 or is more than 0.05, it is not used as a factor that is associated with compliance in implementing health protocols.

Ethical Consideration

This research has passed the ethical test with no. 60/EC-LPPM/UWHS/XI-2020 was issued by the Ethics Committee of Widya Husada University Semarang.

Results

Table 1 shows the age characteristics of the majority of respondents are 36-45 years old, namely 51%. The majority of respondents were highly educated (74.4%). Regarding job characteristics, the majority of the respondents worked outside the field of education or internal industry, namely 34%. The characteristics of the health conditions of the majority of respondents are healthy, namely 91.5%.

Based on Table 2, it is known that the majority of respondents comply with health protocols, both in using masks, washing hands and maintaining distance; 76.6% of respondents always use masks, 57.4% wash their hands in public places and 71.1% of respondents keep their distance in public places.

Table 3 shows the majority of respondents comply with health protocols because they want to maintain their health to avoid COVID-19, which is 85.1%, but there are still those who comply because of regulations, which are 14.9% on compliance with wearing masks and washing hands and 17% on adherence to social distancing.

With a sample of 400 respondents, it was found that the df was 393 and the t-value was 1.966. After carrying out a backward test between the use of masks and the variables of age, education, occupation and health status simultaneously, it was found that the field of work had a t-value of less than 1.966 and a significance value was obtained of 0.273 or greater than 0.05 so that the field of work was not a factor affecting the use of masks in the prevention of COVID-19. However, age, education and health status are factors associated with respondents in wearing masks for the prevention of COVID-19.

Backward type logistic regression test between the variables of age, education, occupation and health status on hand washing found that the health status variable had a t-value of 0.948 or less than 1.966 and had a significance value of 0.344 or more than the probability value, which was 0.05 so that health status was not a factor that associated with respondents' compliance in washing hands in public facilities to prevent COVID-19 However, age, education, field of work are factors that were associated with respondents' handwashing habits in public facilities in preventing COVID-19.

Backward test between the variables of age, education, occupation and health status on maintaining distance in public places found the t-value in all independent variables is more than 1.966 and the significance value in all variables is less than the probability value. So age, education, occupation and health status are factors that were associated with social distancing habits in public places.

After a regression test was conducted between the habit of using masks and the reasons for complying with the regulations, it gave a significance value of 0.07 or more than 0.05. The habit of using a mask with a desire to be healthy gives a significance value of <0.001. The habit of washing hands, the habit of keeping a distance from the reasons for complying with regulations and maintaining health gives a significance value of <0.001.

Discussions

Factors Associated with Mask Use

The majority of respondents implemented health protocols, with an average of 68.4%. However, the habit of washing hands occupies the lowest average, which is 57.4%. This means that from all respondents there are those who always use masks, always keep their distance but don't always wash their hands.

According to UNICEF, the spread of COVID-19 is through splashes of phlegm containing the virus that enter the body through the eyes, nose or throat. However, it most often occurs through hands contaminated with droplets that eventually enter the body through the eyes, nose or throat (UNICEF, 2020). Droplets that are splashed directly can cause droplets to stick to objects which are then held by other people who are not affected by COVID-19. Droplets enter the oral or nasal mucosa or the conjunctiva of the eye. For this reason, the government made rules for all residents to always wear masks and wash their hands (Ministry of Health, 2020).

Based on the results of the backward test, it was found that the job characteristics had a significant value of 0.273 or more than 0.05, which means that work does not have a significant effect on the habit of using masks. The characteristics associated with the habit of using masks in this study are the characteristics of age, education and health status. This supports the research conducted by Juanda (2020) that education has a positive association on compliance and supports Notoatmodjo's theory that education is an exogenous factor that influences behavior (Notoadmojo, 2012). Research conducted by Ozdemir, Ng, and Chaudhry (2020) found that the strongest indicator of behavior change in preventing COVID-19 is that respondents who are older, highly educated, anxious and married report higher adoption/frequency of preventive measures.

Work does not affect the use of masks, meaning that masks have become a habit of the people during the

pandemic in 2020, Even though working in health, education, industry or other occupations does not have a significant effect on wearing masks. The reason for wearing masks is 85.1% for maintaining health, meaning that the community already understands the importance of masks in preventing COVID-19.

Factors Associated with Handwashing

The results of the backward test show that the characteristics of age, education and occupation have a significantly smaller value than the probability so that it can be interpreted that age, education and occupation have an effect on hand washing habits, but health status has a significance value greater than the probability value, which is 0.344. So that health status does not affect respondents in washing their hands.

Respondents who have poor health conditions do not care about washing their hands. Although people who have inherited diseases have a higher risk of getting worse if they get COVID-19 (Zandkarimi, 2020).

The results of this study are not in line with research conducted by Riyadi and Larasaty (2020) that health status has a positive association with health protocol compliance. If it is associated with 14.9% of respondents who obediently wash their hands for reasons of regulations, it is necessary to give rules for mandatory hand washing areas, because so far public places only the areas where masks are mandatory.

Factors Associated with Social Distancing

The results of the backward test showed that the characteristics of age, education, field of work and health status can predict respondents behaviour in complying social distancing. This supports previous studies that state health behavior is associated with age, education, occupation and health status. Supporting research conducted by Dewi, Adawiyah, and Rujito (2019) found age has a significant influence in complying with the use of PPE and research conducted by Mualama (2020) showed that the majority of adults in his research have a healthy lifestyle (Muamala, 2020). Recommendations from the WHO that maintaining physical distance, wearing face masks, avoiding crowds, and practicing hand hygiene are forms of controlling COVID-19, the correct use of masks is highly recommended (Claeson, 2021).

Reasons for Implementing Health Protocols

In this study, showing compliance in implementing health protocols because they want to maintain health or to avoid COVID-19 is higher than because of the regulation factor can mean that respondents are aware of the causes of COVID-19 transmission even though there are still those who carry out health protocols because of regulations. However, from the results of the regression test, it was found that the factor complying with the regulations on the habit of wearing masks got p = 0.07. It means that respondents think they can maintain their health and prevent COVID-19, only by wearing masks.

Contrary to what Claeson and Hanson (2021) said, the involvement of policy makers has an effect on changing people's behavior and research conducted by Stewart et al. (2020) found the need for collaboration from all parties, both health workers, government, communities, to form learning experiences for the community. The government sets rules for all citizens to always wear masks and wash their hands (Ministry of Health, 2020).

Socialization is an important step in implementing policies. Government and public health efforts in encouraging the prevention of COVID-19 are carried out by providing counseling or socialization (Sriarumtias *et al.*, 2020). Social media is one of the factors facing COVID-19 (Addis and Abate, 2021).

The socialization of COVID-19 prevention by always wearing masks for respondents has been successful; however, prevention of always washing hands and keeping a distance in public facilities still needs to be improved because there are still respondents who obey hand washing and keep their distance for reasons of only complying with regulations.

This study did not examine implementation policies in the prevention of COVID-19 so it cannot know what can be known in compliance with implementing health protocols.

Conclusion

Age, education, occupation and health status are compliance factors in implementing health protocols to maintain distance, but field of work was not associated with using masks, while health status was not associated with compliance in washing hands. People must be aware that maintaining health begins with self-prevention, not only because of obeying the rules. This study suggest that the government need to encourage and raise awareness about personal health than regulation enforcement. The socialization of preventing COVID-19 by always wearing masks has been successfully carried out, but not yet on the habit of washing hands and keeping a distance.

Supporting Information

Supporting Information 1

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Self-care differences in COVID-19 pandemic situation

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ABSTRACT

Introduction: Coronavirus Disease-2019 (COVID-19) pandemic has been happening for years now and no one can guarantee when this situation will end. The best thing that we can do in this new normal era is doing different self-care activity than what we usually do before the pandemic. This study aimed to analyze self-care differences before and after pandemic situation in the general population.

Methods: This cross-sectional study involved 645 respondents living in five congested communities in Surabaya, Indonesia. Sample was enrolled by means of cluster random sampling. Variables on this study was self-care activities related to new normal activies among community. Valid and reliable questionnaire of self-care activities was used in data collection. Independent sample t test was used in data analysis.

Results: Most respondents were female (54.6%) in their productive age (29.7 ± 11.5 y.o.), graduated (77.8%), private employee (35.5%), having no income (45.7%), and live with more than 3-5 family members at home (43.4%). Before pandemic, self-care was mostly sufficient (21.8 ± 5.9). After pandemic, self-care was improved greatly but still in sufficient level (28.5 ± 4.8). There was a significant self-care difference before and after pandemic situation in the general population (p = 0.000).

Conclusions: Self-care activities changes significantly after COVID-19 pandemic situation in the general population, but it was still in unoptimal level. Efforts to improve individual self-care in new normal era are needed to ensure this activity is implemented in its optimal level.

Keywords: COVID-19; new normal; pandemic; self-care

Introduction

The global pandemic of coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The World Health Organization (WHO) declared a public health emergency of international concern on 30 January 2020 and a pandemic on 11 March 2020. Since 2021, variants of the virus have emerged or become dominant in many countries with the Delta, Alpha, and Beta variants being the most virulent (Anaki & Sergay, 2021). At the present many countries have confirmed the high death rate, making COVID-19 one of the deadliest pandemics in history. The number of new COVID19 cases and deaths has continued to high and the trend slowly decreased with over 7 million cases and over 22,000 deaths reported, a decrease from 24% to 18% (WHO, 2022). WHO has come up with a plan to increase the awareness among the people about the current pandemic. This current strategic plan outlines the health system responsive and the international community stands ready to provide all necessary things in responding to COVID-19. To prevent the spread of COVID-19 we need to: 1) hand hygiene, 2) avoid touching our body especially eyes, nose, or mouth, 3) social distancing, 4) stay at home if necessary, and 5) seek medical care when people get sick (WHO, 2021a).

Indonesia still have confirmed positive cases of COVID-19 across all provinces in the country, and the high rate of infection was in DKI Jakarta ,as of 16 February, the Government of Indonesia reported 4 966 046 (64 718 new) confirmed cases of COVID-19, 145 622 (167 new) deaths and 4 375 234 recovered cases from 510 districts

across 34 provinces (WHO, 2021a). For identifying cases, the Real-Time Polymerase Chain Reaction Assay (RT-PCR) and the Molecular Rapid Test for Tuberculosis (TCM TB) methods are used (WHO, 2021a). The other highest case is Surabaya City, East Java Province which ranks second, with 2,296 cases. A sharp increase in the number of cases has been confirmed in the areas of East Java (Surabaya is the capital city), South Kalimantan, and South Sulawesi (WHO, 2021b). The impact of such an increase had a visible impact on human activity such as changing people's lifestyles in much of the world, reduced travel, the closing down of many business activities, and an increased time at home. These major changes, as well as the associated changes in impact on the environment.

COVID-19 pandemic has been happening for years now and no one can guarantee when this situation will end. The best thing that we can do in this new normal era is doing different self-care activity than what we usually do before the pandemic. Self-care model which firstly developed by Dorothea Orem in 1971 has become a famous nursing theory today. She defined self-care as individual actions to care for themselves independently with purpose of having the ability to maintain their health and well-being (Orem, 1971). This theory is the basis of nursing actions in empowering their clients today, especially in community setting. In the context of pandemic, self-care has never been more important or, arguably, more challenging to prioritize as millions of people have lost their jobs, are forced to stay at home, or suddenly are caring for children whose schools have been closed (Nolen, 2020).

Psychologically, the benefits of optimum self-care in this pandemic situation are helping us in alleviating the distress and anxiety caused by the pandemic and preventing lasting adverse psychological outcomes (Wise, 2020). A study towards 1,082 people from four countries (Chile, Colombia, Ecuador, and Spain) found that self-care partially mediates the relationship between stress and well-being during COVID-19 confinement in the general population (Luis, 2021). In the other hand, physically, the benefits of optimum self-care in this pandemic situation are helping us in countering the spread of the deadly Corona virus, maintaining our health and the health of people around us (Nolen, 2020). Another benefits reported in one study includes promoting healthy lifestyles and improve the quality of life in the aspect social, physical and emotional (Duggan, 2020).

At the present, the situation of the COVID-19 pandemic occurs in every place. An important thing to protect people from infection is self-care behaviors that are composed of wearing the hygenic mask, social distancing, and handwashing looking easily but high effectiveness to protect themselves. So life must go on with the new normal protocol from WHO (WHO, 2022). The WHO provides several indicators to be obeyed by all countries in the world in order to adjust their normal life called 'a new normal' with COVID-19, such as: 1) stopping or reducing COVID-19 transmission, 2) showing the capacity of the health system in responding to COVID-19, and 3) conducting a massive test to the high risk group. In order to address these three indicators, Indonesian government has implemented large scale social restrictions in various area, making policies related to referal system and effort in reducing COVID-19 transmission (Widyamurti, 2020). Considering that many provinces in Indonesia have shown improved health indicators, and given the need for people to restart productive activities in a safe manner, the Ministry of Health of Indonesia has issued guidelines for a new normal life. These guidelines are a point of reference for regional governments that implement the large-scale social restrictions (so called PSBB in Indonesia) to be transitioned into the new normal stage, one of which is the city government of Surabaya which manages 2.97 million people living in the 2nd biggest city of Indonesia. In this study, we aimed at analyzing self-care differences before and after the pandemic situation in the general population, especially among adults living in congested communities of Surabaya, Indonesia. This may evaluate the implementation of new normal life guidelines in congested communities of big cities in Indonesia, especially in the adult population. The self-care model of Orem (1971) which related to self-care activities was used as this study framework.

Materials and Methods

Study Design

This study utilized cross-sectional design.

Respondent

Population was all adults live in congested communities of Surabaya amounted to 2,119,107 people (N = 2,119,107). Sample size was calculated by the formula stated in Nursalam (2008) yielded minimum of sample size at 645 respondents.

Surabaya composes of 63 communities under the authority of respectable Public Health Center (PHC). There were five study sites enrolled by mean of cluster random sampling (7.9% cluster area), namely: district of Pacar Keling, Pucang Sewu, Klampis, Mulyorejo, and Pakis. There were 20% of sample size enrolled by mean of simple random sampling from each study site (n = 129 from each site). The randomization process was done by making lottery. Figure 1 below explains the study sites and sample selection process.

Instrument

Self-developed questionnaire of self-care activities consisted of 10 items. It assessed self-care activities related to pandemic, such as: 1) wearing mask, 2) washing

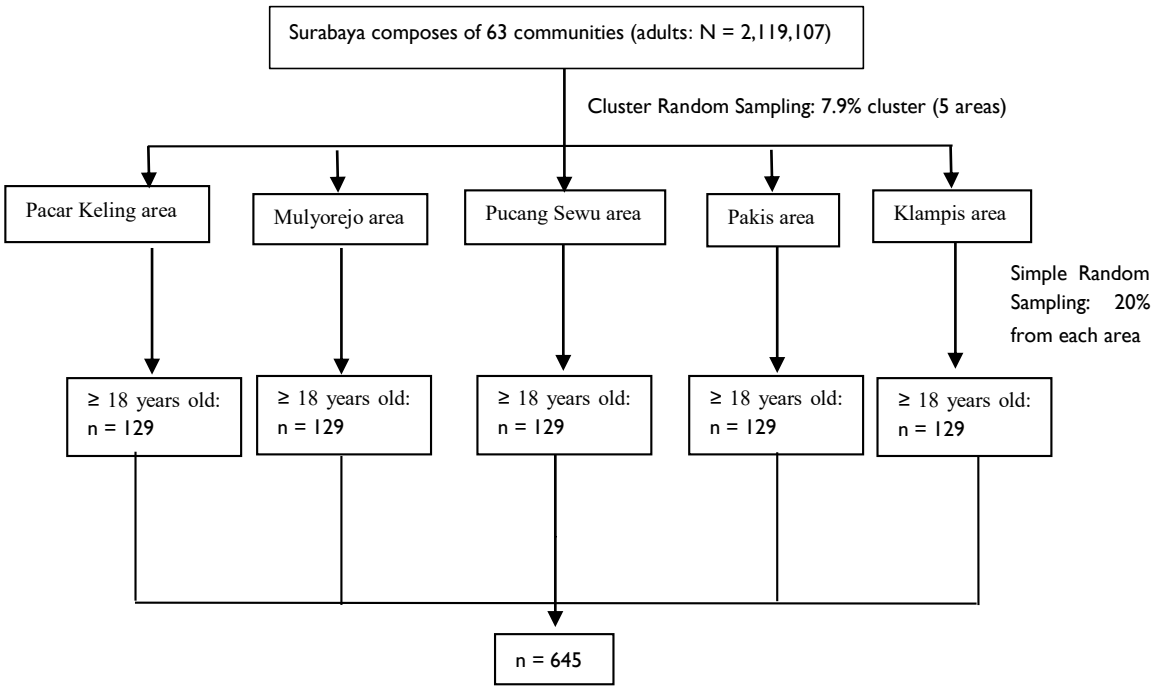

Figure 1. Study sites and sample selection process

hands, 3) social distancing, 4) avoiding crowd, 5) showering or changing clothes immediately after arriving home, 6) touching face, 7) using public eating utensils, 8) having meals outside, 9) exercising, and 10) observing body temperature. Instrument testing procedure involved content validity assessment by three experts, and reliability analysis with a trial in the congested community in Surabaya (30 adults from different site of Surabaya who were not being study respondents), then reported with Cronbach's alpha coefficient of 0.81.

Data Collection

The self-care activities was assessed before and after COVID-19 pandemic situation. Data was collected between February-April 2021. Self-care activities before the pandemic was assessed by recalling memory in the period before the pandemic, while self-care activities after the pandemic assessed self-care in the pandemic period. There were five research assistants helping the door to door data collection process in the field. As five study sites existed in this study, one assistant was responsible for 129 respondents in one study site. The roles of research assistant were helping the researcher to approach the promising respondents, to obtain informed consent, and to collect the data.

Data Analysis

There were 10 items in the self-care questionnaire. Likert scale of 1 to 4 was used to differentiate individual response: 1 = never (never done it at all), 2 = sometimes (doing it 1-2 days per week), 3 = often (doing it 3-4 days per week), and 4 = always (doing it >5 days per week). Self-care activities were categorized into three: less (score 10-20), sufficient (score 21-30), and optimum (score: 31-40). This category was made in order to ease the data interpretation in the result section. For data analysis process, raw total score will be analyzed. Descriptive statistic (Mean and Standard deviation or SD) and independent sample t test were used in data analysis. The software used was SPSS 19.0. Researchers conducted the data analysis alone.

Ethical Consideration

Ethical clearance was issued by the Ethical Committee of Saint Louis College (SLC), Bangkok, Thailand, with certificate number: E.010/2564.

Results

Most respondents were female (54.6%) in their productive age (29.7 ± 11.5 y.o.), graduated (77.8%), private employee (35.5%), having no income (45.7%), and live with more than 3-5 family members at home (43.4%). Table 1 presents the demography characteristic of study respondents in detail.

Before pandemic, self-care was mostly sufficient (Mean ± SD = 21.8 ± 5.9). After pandemic, self-care was improved greatly but mostly still in sufficient level (Mean ± SD = 28.5 ± 4.8). There was a significant self-care difference before and after pandemic situation in the general population (p = 0.000). Table 2 below explains self-care activities related to pandemic before and after pandemic in study respondents.

Discussions

In this study, most respondents reported sufficient level of self-care before and after pandemic. Based on category, this may seen as insignificant difference. But after doing statistical analysis by using the raw total score, it was found that self-care changed significantly or improved greatly after pandemic, although still in the same sufficient level. This may happen potentially due to the sufficient level of perceived self-care ability or self-care agency in most respondents. Most respondents stated that they complied with WHO self-care recommendations during the pandemic situation.

Table 1 Demographic characteristics of the respondents

Characteristic	Frequency (n)	Percentage (%)
Sex		
Male	293	45.4
Female	352	54.6
Age (years old / y.o.)		
Early adulthood (17-40 y.o.)	524	81.2
Midlife transition years (>40-45 y.o.)	33	5.1
Middle adulthood (>45-60 y.o.)	79	12.2
Late adult transition years (>60-65 y.o.)	5	0.8
Late adulthood (>65-85 y.o.)	4	0.6
Education		
Being student	143	22.2
Graduated	502	77.8
Occupation		
General service staff	6	0.9
Private employee	229	35.5
Government employee	13	2.0
Semi-government employee	2	0.3
Shopkeeper	49	7.6
Private business worker	55	8.5
Housewife	92	14.3
Student	137	21.2
Retired	8	1.2
Unemployed	54	8.4
Income		
No income	295	45.7
Less than minimum wage	104	16.1
Minimum wage (IDR 4.3 million)	39	6.1
Above the minimum wage	207	32.1
Family member at home		
0 (live alone)	7	1.1
1-3	255	39.5
> 3-5	280	43.4
> 5-8	90	14.0
> 8-11	11	1.7
> 11	2	0.3

Table 2 Self-care activities before and after pandemic

Item	Before Pandemic				After Pandemic			
	Never	Some-times	Often	Always	Never	Some-times	Often	Always
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Wearing mask	237 (36.7)	190 (29.5)	94 (14.6)	124 (19.3)	5 (0.8)	25 (3.9)	102 (15.8)	513 (79.6)
Washing hands	178 (27.6)	274 (42.5)	97 (15.0)	96 (14.9)	6 (0.9)	43 (6.7)	167 (25.9)	429 (66.5)
Social distancing	388 (60.2)	154 (23.9)	54 (8.4)	49 (7.6)	19 (2.9)	95 (14.7)	218 (33.8)	313 (48.6)
Avoiding crowd	230 (35.7)	230 (35.7)	99 (15.3)	86 (13.3)	50 (7.8)	153 (23.7)	193 (29.9)	249 (38.6)
Showering/ changing clothes immediately	90 (14.0)	272 (42.2)	131 (20.3)	152 (23.6)	15 (2.3)	89 (13.8)	167 (25.9)	374 (58.0)
Touching face	90 (14.0)	237 (36.7)	210 (32.6)	108 (16.7)	176 (27.3)	257 (39.8)	122 (18.9)	90 (14.0)
Using public eating utensils	107 (16.6)	172 (26.7)	193 (29.9)	173 (26.8)	179 (27.7)	238 (36.9)	105 (16.3)	123 (19.1)
Having meals outside	188 (29.1)	249 (38.6)	145 (22.5)	63 (10.5)	348 (54.0)	192 (29.8)	57 (8.8)	48 (7.5)
Exercising	157 (24.3)	290 (45.0)	121 (18.8)	77 (12.0)	114 (17.7)	248 (38.4)	158 (24.5)	125 (19.4)
Observing body temperature	391 (60.6)	133 (20.6)	58 (9.0)	63 (9.8)	65 (10.1)	144 (22.3)	155 (24.0)	281 (43.6)
Less self-care*				299 (46.3)				26 (4.0)
Sufficient self-care*				301 (46.7)				406 (63.0)
Optimum self-care*				45 (7.0)				213 (33.0)

* This category was made in order to ease the data presentation in this section, and not for statistical analysis purposes.

Results of independent sample t test showed that there was a significant difference of self-care activities before and after COVID-19 pandemic situation among adults living in congested communities of Surabaya, Indonesia (p = 0.000). This study result was supported by various studies. A study towards 1,508 participants in general population showed that 66-80% respondents complied with self-care recommendations, therefore the implementation of pandemic care program is recommended (Galindo-Vazquez, et al., 2020). Before and after pandemic most respondents had sufficient level of self-care, but there was a great improvement in the raw total score after pandemic. Nationally, this study findings were supported by a survey conducted in Bali, Indonesia, regarding the public knowledge and behavior toward COVID-19 pandemic which showed that most respondents have complied with the health protocols during the pandemic (Yanti, et al., 2020). In the region, this study findings were supported by a survey conducted in Malaysia, regarding the public knowledge, attitudes, and practices to mitigate the outbreak of COVID-19 which showed that most respondents implemented new normal health behavior, such as avoiding crowds (83.4%), washing hands (87.8%), and wearing face mask (51.2%) (Azlan, et al., 2020).

This study findings proved that the implementation of new normal life guidelines in congested communities of big city in Indonesia, especially in adults population, cannnot reach the maximum effectiveness. This possibly happened due to the negative attitude towards the COVID-19 pandemic situation. A study in North Sumatra, Indonesia, one month after the first cases were reported in Indonesia showed that the minority of respondents had negative attitude towards the outbreak in relation to two aspects, such as: 1) having to always maintain a distance of 1.5 metres when in crowds (78.6%), and 2) unable to regularly exercise or eat nutritious food (79.1%) (Sari, et al., 2021). Sufficient knowledge and positive attitudes are crucial to the prevention of COVID-19 (Lin, et al., 2020). The success of behavioral interventions and policies designed to reduce the impact of the COVID-19 pandemic depends on how well individuals are informed about both the consequences of infection and the steps that should be taken to reduce the impact of the disease (Green, et al., 1991). Moreover, understanding the complexity of health behavior will maximize their beneficial role, eliminate maladaptive prevention patterns, and facilitate the eradication of COVID-19 (Anaki & Sergay, 2021).

In contrary, another age and gender specific study towards 1,082 respondents in four countries in Europe showed that young female showed less adherence to health guidelines because they experienced greater level of stress and perceived the pandemic situation as more severe, but the older female groups were generally more involved in self-care activities and adopted more healthy daily routines; therefore genders and age ranges should be considered in determining COVID-19 prevention strategies in order to improve self-care and adherence to health guidelines (Bermejo-Martins, et al., 2021). The higher perception of stress, the less self-care activities are adopted, and in turn the lower the beneficial effects on wellbeing because self-care partially mediates the relationship between stress and wellbeing during COVID-19 confinement in the general population, and age affects this relationship also (Luis, et al., 2021). In this study, most respondents were mostly young female too. Stress level and perception towards COVID-19 pandemic were not identified in this study, but it is potential if the sufficient self-care ability happen due to the low stress level and positive perception towards the pandemic situation.

There are few study limitations we found. This study had formulate objectives in a very broad manner, so in the initial phase of the development of self-care questionnaire we had various questions at that period. The items in self-care questionnaire were developed to resistant making the result may out of date. Similarly with the new normal phenomena. It has been changing along with the period of time, so we need to study about self-care after pandemic continuously to be more fitted with the current situation.

Conclusions

Self-care changes significantly after COVID-19 pandemic situation in the general population, but it was still in unoptimal level. Efforts to improve individual self-care in new normal era are needed to ensure this activity is implemented in its optimal level in compliance with WHO recommendations.

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Conflict of Interest

There was no conflict of interest between authors and study funder declared regarding this study and publication.

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ORIGINAL ARTICLE

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Pandemic in Indonesian older people: The implication for sleep deprivation, loss of appetite, and psychosomatic complaints

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ABSTRACT

Introduction: During the COVID-19 pandemic, many individuals were concerned about being infected. Meanwhile, the older people felt isolated due to the detrimental effect on their mental and physical health. Therefore, this study aimed to identify the mental health issues suffered by the older people during the COVID-19 pandemic, the implication for sleep deprivation, loss of appetite, and psychosomatic complaints.

Methods: This was a descriptive-analytic study using a cross-sectional approach to find the mental health impact of the COVID-19 pandemic. The population of this study was older people (those aged ≥60 years) living in urban areas in West Java and Jakarta. The sample size was measured with the Lemeshow formula using a 95% confidence interval. A total of 259 older people participated in this study in cluster random sampling selection. Questionnaires were distributed to study participants consisting of sociodemographic characteristics, general anxiety disorder, history of chronic illness, COVID-19 related psychological concern, self-reported losing appetite, self-reported sleep deprivation and psychosomatic assessment. Statistical analysis used descriptive and logistic regression analysis.

Results: The average age of study participants is 65.3 years old (SD ± 6.8; min-max = 60 to 89 years old). Multivariable logistic regression model showed that sleep deprivation is significantly associated with non-college education background (OR = 2.28; 95% CI = 1.23 to 4.61), anxiety (OR = 7.09; 95% CI = 3.57 to 14.08), and the existence of chronic illness (OR = 2.75; 95% CI = 1.44 to 5.26). Subsequently, the psychosomatic symptom was associated with anxiety (OR = 5.27; 95% CI = 2.75 to 10.11) and chronic illness (OR = 2.80; 95%CI = 1.47 to 5.32). Loss appetite was associated with non-college education background (OR = 2.50; 95% CI = 1.16 to 5.41), anxiety (OR = 10.41; 95% CI = 5.01 to 21.63), and the existence of chronic illness (OR = 3.60; 95% CI = 1.72 to 7.55). The analysis showed that none of the COVID-19 related fear is associated with a sleep disorder, loss of appetite, and psychosomatic symptoms.

Conclusions: Sociodemographic factors, anxiety and medical factors contribute to the risk of mental health issues in older adults during the COVID-19 pandemic, implication for sleep deprivation, loss of appetite, and psychosomatic complaints.

Keywords: COVID-19 pandemic; losing appetite; mental health; sleep deprivation; psychosomatic symptoms

Introduction

Indonesia and almost all countries in the world have been facing a global COVID-19 pandemic since 2020 (World Health Organization, 2020). The pandemic situation has a remarkable effect on people's lives, social relations, and sociodemographic issues. The fast-spreading infectious disease has been causing universal awareness, anxiety, and distress, as natural psychological responses to the randomly changing condition (World Health Organization, 2020). A special concern needs to be addressed to the vulnerable groups such as older people.

The mental health issues over the pandemic have become a concern in the global health context. A study in American society reported that new measures such as self-isolation and quarantine had affected people's usual activities, routines, and livelihoods, leading to increased loneliness, anxiety, depression, insomnia, substance abuse, and self-harm or suicidal behavior (American Psychiatric Association, 2020) in the community.

During the pandemic, older people face significant fallout concerning their physical and psychological wellbeing. These adults experienced disproportionately greater adverse effects during this pandemic, including severe complications and higher mortality (Liu, Chen, Lin, & Han, 2020). The Indonesian government reported that 46% of fatality cases are suffered by older people (COVID-19 Response Acceleration Task Force, 2022). These high number of fatalities in older people are a result from aging process causing gradual decline in physical capacity and decline in immune function thus placing the older people in a high-risk group during the COVID-19 pandemic (Setiati, 2014).

Older adults are advised to reduce their social connections as much as possible. The government advises them to stay at home and reduce face-to-face interactions with others, avoiding contact with friends and family to minimize the spread of COVID-19 (Ministry of Health, 2020). Hence, this policy creates a dilemma for the older people and their family members. They feel lonely and, at the same time, worried about being infected. Furthermore, concerns about disruptions to their daily routines and access to care, difficulty adapting to technologies like telemedicine, and social isolation exacerbate existing mental health conditions (Armitage and Nellums, 2020). A survey conducted by the Center for Family and Ageing Studies (CeFAS) in 2020 identified three mental health issues suffered by older people in community-dwelling during the pandemic, including sleep deprivation, loss of appetite, and psychosomatic symptoms (Nugraha *et al.*, 2020). This study further intended to find the contributing factors of three mental health issues during the pandemic: the implication for sleep deprivation, loss of appetite, and psychosomatic symptoms.

Materials and Methods

Design and Participants

This was a descriptive-analytic study using a cross-sectional approach to find the mental health impact of the COVID-19 pandemic. Participants from West Java and DKI Jakarta (age 60 years old or more) were invited to participate in this study. The recruitment process was using older people community associations. Sample sizes were counted using Lemeshow formula for cross-sectional methods with 95% degree of the confidence interval and counted 384 samples. Subjects were selected using cluster random sampling, with inclusion criteria including: those aged 60 years old or more, having no communication constraint, able to speak and read Bahasa Indonesia, and agree to participate in this study. Trained staff performed face-to-face interviews to collect detailed information from all participants with the COVID-19 prevention protocol. A total sample of 259 satisfied study analysis and were included in this study; 125 people were excluded due to incomplete response, confirming 67.4% response rate.

Instruments

One set of questionnaires was distributed to the older people or their family members after study participants signed an informed consent and received brief study explanation from the researcher. The questionnaire consists of sociodemographic characteristics, including age, gender, and education background, checklist for chronic illness adapted from geriatric comprehensive assessment (GCA).

The self-reported individual concern about the pandemic was measured with a checklist that consists of the following questions: "I am afraid of getting infected;" "I am worried about the increasing number of cases;" "I am worried my family member will be affected;" "I am worried of unable to perform religious activities;" "I am worried on the difficulties to unite with my family" with "Yes" and "No" as a possible answer.

The anxiety disorders were assessed with the Indonesian version of General Anxiety Disorders (GAD-7) questionnaire. It explores the psychological condition of the older people by asking whether they were bothered by the following problems over the last two weeks, such as (1) feeling nervous, anxious, or on edge; (2) unable to stop worrying; (3) worrying too much about different things; (4) trouble relaxing; (5) being restless and hard to sit still; (6) becoming easily irritable; (7) feeling afraid (Johnson *et al.*, 2019).

The outcome variable sleep deprivation was assessed with the self-reported experience in: difficulty to start sleeping, waking up suddenly, short sleep time (less than 6 hours) with four possible answers for each question (0 = not at all; 1 = several days; 2 = more than a week; 3 = nearly every day) (Han, Kim and Shim, 2012).

The perception of losing appetite was assessed using the following question: "Please tell us first how your eating behavior is affected by certain emotional states and situations by circling a number on the scale below. The scale ranges from 1 to 9, where 1 represents much less food intake than usual, 9 much more than usual, and 5 the same as usual." This measure was adopted from Emotional Appetite Questionnaire (EMAQ) (Nolan, Halperin and Galiebter, 2010).

The perceived psychosomatic symptoms were measured with: "In the past two weeks, have you felt unwell, like have a fever, stomach discomfort, chill,

dizziness" and scored (0 = not at all; 1 = several days; 2 = more than a week; 3 = nearly every day) adapted from the Psychosomatic Problem Scale (PBS) (Frisenstam *et al.*, 2017).

Data Analysis

Statistical analysis consists of descriptive-analytic to explore the sociodemographic characteristics of the participants and the prevalence of anxiety, self-reported sleep deprivation, self-reported losing appetite, and self-reported psychosomatic symptoms. The bivariate Chi-square analysis was employed to assess the independent variable and outcome variables. Furthermore, a logistic regression analysis was conducted to identify factors contributing to mental health impact among older people.

Ethical Consideration

The study was conducted according to the guidelines of the Declaration of Helsinki, and informed consent was obtained from all subjects involved. The study participants have obtained written informed consent to publish this paper approved by the Institutional Review Board of the University of Respati Indonesia with ethical approval number: 023/SK.KEPK/UNR/V/2020.

Results

A total of 259 older people participated in this study after conducting surveys among older people and their family members from May to June 2020. Approximately 67.45% response rate or 259 responses are eligible for data analysis.

Table 1 Sociodemographic characteristics of the participants (N = 259)

Variables	n	%
Age		
60-70 years old	217	83.8
70 years old or more	42	16.2
Gender		
Male	65	25.1
Female	194	74.9
Education		
Non-college degree	172	66.4
College degree	87	33.6
The existence of chronic illness		
None	116	44.8
Having one or more chronic illness	143	55.2
Generalized Anxiety Disorder (GAD)		
Non-anxiety	191	73.7
With anxiety	68	26.3
To what extent do you worry about COVID-19?		
I am worried about getting infected	230	88.8
I am worried about the increasing number of cases	105	40.5
I am worried my family members will be infected	97	37.5
I am worried of being unable to unite with family	31	12.0
I am worried of being unable to perform religious activities	13	5.0
Mental health-related issues		
Sleep deprivations	80	30.9
Psychosomatic Symptom	75	29.0
Losing Appetite	65	25.1

As shown in Table 1, the average age of study participants is 65.3 years old (SD ± 6.8; min-max = 60 to 89 years old), three-quarters of study participants are female, more than one-third have a college degree, and more than half of study participants have one or more chronic illness. According to the anxiety measurement using Generalized Anxiety Disorder, 26.3% of the older people are categorized as having anxiety during the COVID-19 pandemic. Concerns about the COVID-19 condition are dominated by the fear of being infected as much as 88% followed by the increasing number of cases. Assessment on the mental health related issues identified the sleep deprivation as the most issues reported by study participants followed by self-reported psychosomatic symptom and self-reported in eating disorder identified by emotional appetite status.

Appendix 1 describes the bivariate association between risk factor of sleep deprivation, psychosomatic symptom, and loss of appetite. Among older people who suffer from anxiety disorder, 60.3% of them complained of having sleep deprivation, 55.9% of them reported psychosomatic symptoms, and 57.4% of them suffer from losing appetite (p-value < 0.0001). Approximately 40% of study participants who have chronic illness are likely to suffer from sleep deprivation, 34.3% lose their appetite, and 38.6% are identified as having psychosomatic symptoms ($p < 0.01$). Furthermore, 38.8% of older people that are worried about the increasing number of COVID-19 cases suffered from sleep deprivation ($p < 0.05$), and 58% are unable to unite with their family ($p = 0.05$), while 41.9% lose their appetite ($p = 0.045$).

The multivariable logistic regression model showed (Appendix 2) that sleep deprivation is associated with non-college education background (OR = 2.28; 95% CI = 1.23 to 4.61), anxiety (OR = 7.09; 95% CI = 3.57 to 14.08), and the existence of chronic illness (OR = 2.75; 95% CI = 1.44 to 5.26). The psychosomatic symptom was associated with anxiety (OR = 5.27; 95% CI = 2.75–10.11) and chronic illness (OR = 2.80; 95% CI = 1.47 to 5.32). Loss of appetite was associated with non-college education background (OR = 2.50; 95% CI = 1.16 to 5.41), anxiety (OR = 10.41; 95% CI = 5.01 to 21.63), and the existence of chronic illness (OR = 3.60; 95% CI = 1.72 to 7.55). The analysis showed that none of the COVID-19 related fear is associated with a sleep disorder, loss of appetite, and psychosomatic symptoms.

Discussions

The great pandemic of 2020 has been a unique stressor that has affected communities all around the world (World Health Organization, 2020). This study highlighted mental health issues in older adults during the COVID-19 pandemic, implication for sleep deprivation, losing appetite, and self-reported

psychosomatic symptoms. Several predictors show a statistically significant association with sleep deprivation, losing appetite, and psychosomatic complaints in this study.

This study identified the older people with anxiety, an existing chronic disease, and low education background (non-college degree) as likely to have greater sleep deprivation during the COVID-19 pandemic. Apart from the disease's effect, these psychological problems are also triggered by social distancing following the government regulation to stay at home and prohibition of going home for family gatherings in celebration of religious events (Ministry of Health, 2020). As a result of these policies, the older people lost their daily routines, such as regularly meeting friends and family and causing the older people to feel lonely. This can be a stressful mental health condition triggered by loneliness due to social isolation (Bergman *et al.*, 2020). More than 80% of the study participants reported that they are afraid of being infected by the COVID-19 while worrying about the increasing number of cases. These concerns can trigger a higher stress levels and lead to anxiety disorder that may affect deterioration of the normal sleep pattern (Han, Kim and Shim, 2012). The body's circadian rhythm regulation between sleep and awakening is regulated by two components, namely the circadian component (~24 hours) and the homeostatic component (Cardinali *et al.*, 2020). The circadian timing system is controlled by sunlight exposure, social adaptation, and environmental problems with daily routines such as waking up at a certain time, exercising, eating, socially engaging, and recreational activities. During the pandemic, some activities have changed due to limitations at certain times. This condition causes the older adult with anxiety to experience sleep deprivation. Anxiety is an emotional memory with theta frequency that may influence the rapid eye movement (Essien *et al.*, 2018). The complex interplay between sleep deprivation and anxiety could worsen the mental health condition. Furthermore, lower education background is likely to increase the stress level. Previous study identified the reverse association between education background and the stress level (Johnson *et al.*, 2019). One can assume that older people with higher education have better knowledge to cope with the pandemic and easily identify accurate information. In contrast, older people with lower-level education are likely vulnerable to wrong news (hoax), which may increase their anxiety level. Moreover, those with a college education background have a good circle of friendship to share accurate information. This finding proves that low level of education is also associated with a lack of sense of control and resilience (Niemeyer *et al.*, 2019) during the pandemic situation.

Anxiety, the existence of chronic illness and a non-college education background are significantly associated with self-reported losing of appetite. An Australian study explains that those who felt a high level of the adverse impact of the pandemic restrictions had significantly increased odds of being bothered by poor appetite (Owen *et al.*, 2021). The COVID-19 pandemic makes older adults worry about being infected and vulnerable to stress. Emotional eating is most commonly reported in anxiety. Stress can suppress appetite, and loss of appetite is a common feature of depression (Simmon *et al.*, 2016). Older adults with decreased physiological conditions interfere with their appetite. Furthermore, those with chronic diseases during the COVID-19 pandemic felt more anxious because they had comorbidities such as hypertension and diabetes mellitus, which can increase the risk of developing severe and fatal COVID-19 (Fang, Karakiulakis and Roth, 2020). Chronic illness can interfere with appetite through impaired agility and pain. It interferes with the eating process, which takes longer to reduce appetite.

Psychosomatic symptoms are reported by nearly 29% of the study participants. This finding is in line with previous study on the mental health impact of the pandemic. This study identified a statistically significant association between self-reported psychosomatic symptom with anxiety and chronic illness. Psychosomatic symptoms are decreased psychological state, hence negatively impacting physiological function (somatic) (Levenson, 2007). This occurs due to dysfunction or structural damage to organs by activating the involuntary nervous system and biochemical responses (Levenson, 2007). Older adults with anxiety are likely to have psychosomatic symptoms because pain and anxiety should be recognized as physiological problems associated with neurobiochemical changes (Satsangi and Brugnoli, 2018). Neuro-biochemistry is associated with stress resulting from stimulation of the sympathetic nervous system, specifically the fight-or-flight response. In acute stress especially in the COVID-19 pandemic, this response triggers the release of catecholamines, including Norepinephrine-Epinephrine (NE) and cortisol, from the adrenal glands. In prolonged or chronic stress, the sympathetic nervous system creates a continuous stimulus of the fight-or-flight response (Levenson, 2007). The secretion of catecholamines occurs continuously under prolonged stress conditions because catecholamines, such as NE, act as neurotransmitters in the brain. These substances can change cognition and other mental condition such as poor concentration, mood variations, tension, depression, and anxiety. At the same time, long-term stress-induced cortisol secretion from the adrenal glands can reduce immune function (Satsangi and Brugnoli, 2018). The increasing number of cases and a lot of uncertain issues spread around the older people, produce significant stressors that may increase stress level of older people and are likely to increase their psychosomatic complaints.

The strength of this study is that it captures the state of the COVID-19 pandemic related to mental health

issues, and its associated factors. To the best of our knowledge, this is one of the few studies examining the association of mental health issues focusing on the implication for sleep deprivation, loss of appetite, and psychosomatic complaints with COVID-19. On the other hand, this study has many limitations that may arise from sample distribution and lower response rate. Selection bias could be present in the data collection, because, in the pandemic situation, researchers should limit their contact to older people, and wearing certain personal protective equipments, which may become communication barriers for older people with decreasing visual and hearing capacity. Another limitation is due to the fact that we did not identify other factors that could become potential confounding that may distort the association between independent and dependent variables.

Conclusions

This study identified mental health issues suffered by the older people during the COVID-19 pandemic. Anxiety and chronic illness were identified as the risk factors for all mental health issues such as sleep deprivation, loss of appetite, and psychosomatic symptom. Additionally, lower education attainment is likely to increase the risk of sleep deprivation and loss of appetite two times above higher education.

These results have implications for delivering adequate education on COVID-19 through trustworthy information to alleviate fear and boost understanding among individuals with poor education and chronic illnesses. Awareness of these contributing factors and implementation of coping strategies and interventions may help safeguard older people as vulnerable group from psychological complications that impact quality of life and health span. Understanding the factors and mechanisms that drive older people's resilience can guide intervention approaches for other people. In addition, increasing components of wisdom like emotional regulation, empathy, and compassion can reduce any mental health issues. Further research should be conducted to understand the psychological and mental health effects of the ongoing COVID-19 pandemic among the older population.

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APPENDICES

Appendix 1 The association of sociodemographic factors with sleep deprivation, loss of appetite, and psychosomatic symptom

Variables	Sleep Deprivation			Loss of Appetite			Psychosomatic Symptoms		
	No = 0 n (%)	Yes = 1 n (%)	p-value	No = 0 n (%)	Yes = 1 n (%)	p-value	No = 0 n (%)	Yes = 1 n (%)	p-value
Gender									
Female	40 (62.5)	24 (37.5)	0.298	159 (74.6)	54 (25.4)	0.998	150 (70.4)	63 (29.6)	1.000
Male	134 (70.5)	56 (29.5)		30 (73.2)	11 (26.8)		29 (70.7)	12 (29.3)	
Age									
60-70 years	146 (68.5)	67 (31.5)	1.000	45 (70.3)	19 (29.7)	0.482	40 (62.5)	24 (37.5)	0.145
>70 years	28 (68.3)	13 (31.7)		144 (75.8)	46 (24.2)		139 (73.2)	51 (26.8)	
Education Background									
College degree	109 (65.3)	58 (34.7)	0.180	120 (71.9)	47 (28.1)	0.275	116 (69.5)	51 (30.5)	0.773
Non-college degree	64 (74.4)	22 (25.6)		68 (79.1)	18 (20.9)		62 (72.1)	24 (27.9)	
Anxiety Disorder Category									
Non anxiety	147 (79.0)	39 (21.0)	<0.0001	160 (86.0)	26 (14.0)	<0.0001	149 (80.1)	37 (19.9)	<0.0001
With anxiety	27 (39.7)	41 (60.3)		29 (42.6)	39 (57.4)		30 (44.1)	38 (55.9)	
Having chronic illness									
No	90 (78.9)	24 (21.1)	0.002	97 (85.1)	17 (14.9)	0.001	93 (81.6)	21 (18.4)	0.001
Yes	84 (60.0)	56 (40.0)		92 (65.7)	48 (34.3)		86 (61.4)	54 (38.6)	
To what extent do you worry about COVID-19?									
I am worried about getting infected	155 (68.9)	70 (31.1)	0.876	169 (75.1)	56 (24.9)	0.626	162 (72.0)	63 (28.0)	0.204
I am worried about the increasing number of cases	80 (76.2)	25 (23.8)	0.038	81 (77.1)	24 (22.9)	0.489	80 (76.2)	25 (23.8)	0.124
I am worried my family members will be infected	66 (71.7)	26 (28.3)	0.486	74 (80.4)	18 (19.6)	0.131	68 (73.9)	24 (26.1)	0.446
I am worried of being unable to perform religious activities	7 (53.8)	6 (46.2)	0.389	9 (69.2)	4 (30.8)	0.745	9 (69.2)	4 (30.8)	1.000
I am worried of being unable to unite with family	14 (45.2)	17 (54.8)	0.005	18 (58.1)	13 (41.9)	0.045	19 (61.3)	12 (38.7)	0.324

Appendix 2 Multivariable logistic regression model examining the mental health impact of COVID-19 pandemic in older people (N = 259).

Variables	Sleep Deprivation		Loss of Appetite		Psychosomatic Symptoms	
	Crude OR (95%CI)	aOR (95%CI)	Crude OR (95%CI)	aOR (95% CI)	Crude OR (95%CI)	aOR (95% CI)
Gender						
Female (ref)	1	1	1	1	1	1
Male	0.69 (0.38 to 1.26)	1.20 (0.60 to 2.38)	0.76 (0.403 to 1.42)	1.05 (0.50 to 2.23)	0.61 (0.34 to 1.11)	1.53 (0.78 to 3.01)
Age						
≥70 years old (ref)	1	1	1	1	1	1
<70 years old	1.01 (0.49 to 2.07)	1.50 (0.65 to 3.47)	1.08 (0.51 to 2.30)	1.31 (0.53 to 3.24)	0.99 (0.47 to 2.05)	1.21 (0.53 to 2.77)
Education Background						
College degree (ref)	1	1	1	1	1	1
Non-college degree	0.64 (0.362 to 1.15)	2.28 (1.13 to 4.61)*	0.68 (0.36 to 1.26)	2.50 (1.16 to 5.41)*	0.88 (0.50 to 1.56)	1.45 (0.75 to 2.80)
General Anxiety Category						
Non-anxiety (ref)	1	1	1	1	1	1
With anxiety	5.72 (3.14 to 10.43)*	7.09 (3.57 to 14.08)*	8.27 (4.39 to 15.61)*	10.41 (5.01 to 21.63)*	5.10 (2.80 to 9.29)*	5.27 (2.75 to 10.11)*
Having Chronic Illness	1	1	1	1	1	1
No (ref)						
Yes	0.86 (0.38 to 1.94)	2.75 (1.44 to 5.26)*	2.98 (1.60 to 5.55)*	3.60 (1.72 to 7.55)*	2.78 (1.55 to 4.98)*	2.80 (1.47 to 5.32)*
To what extent do you worry about COVID-19?						
I am afraid of being affected	0.86 (0.38 to 1.94)	0.95 (0.64 to 1.40)	0.74 (0.32 to 1.71)	0.71 (0.45 to 1.12)	0.55 (0.25 to 1.22)	1.20 (0.82 to 1.76)
I am worried about the increasing number of cases	0.53 (0.31 to 0.93)	0.51 (0.17 to 1.53)	0.78 (0.44 to 1.40)	0.34 (0.10 to 1.25)	0.62 (0.35 to 1.09)	0.69 (0.23 to 2.06)
I am worried my family members will be affected	0.40 (0.95 to 0.85)*	0.99 (0.83 to 1.17)	0.90 (0.80 to 1.02)	0.86 (0.70 to 1.06)	0.95 (0.85 to 1.06)	1.00 (0.84 to 1.19)
I am worried of being unable to perform religious activities	1.18 (0.89 to 1.56)	1.14 (0.76 to 1.71)	1.07 (0.79 to 1.45)	0.84 (0.53 to 1.35)	1.02 (0.75 to 1.37)	1.02 (0.67 to 1.56)
I am worried of being unable to unite with my family	1.76 (1.20 to 2.57)*	1.60 (0.86 to 2.98)	1.54 (1.04 to 2.27)*	1.04 (0.51 to 2.11)	1.27 (0.86 to 1.87)	1.18 (0.63 to 2.20)

*p-value < 0.05

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ORIGINAL ARTICLE

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Factors associated with the implementation of COVID-19 health protocols among Indonesian older adults living in rural areas: A cross-sectional study

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ABSTRACT

Introduction: Implementing health protocols became a challenge for older adults living in rural area. This study aimed to analyze the factors influencing implementation of COVID-19 health protocols among elderly in rural areas based on the Theory of Planned Behavior (TPB).

Methods: This study used an explanatory survey with cross-sectional approach. The sample consisted of 100 older adults who resided in rural areas. Data were collected using the TPB questionnaire and COVID-19 health protocol questionnaire, both have 21 items. The data were analyzed using bivariate and multivariate analysis. Bivariate analysis used Pearson correlation, Chi-square test, and Fisher's exact test. Multivariate analysis used multiple linear regression with a level of significance = 0.05. The independent variables were attitude toward behavior, subjective norm and perceived behavioral control while the dependent variable was the implementation of COVID-19 health protocols.

Results: Gender ($p < 0.001$), age ($p < 0.001$), employment status ($p < 0.001$), attitude toward behavior ($p < 0.001$), subjective norm ($p < 0.001$) and perceived behavioral control ($p < 0.001$) were significantly associated with the implementation of COVID-19 health protocols, while education level ($p = 1.000$) was not significantly associated with the implementation. The R-square shows 0.610 which indicates that TPB model can predict 61% of implementation of COVID-19 health protocols.

Conclusions: The most dominant factor in increasing the implementation of the COVID-19 health protocol is attitude toward behavior. Nurse need to provide education to elderly and their family to increase the implementation of COVID-19 health protocols as prevention of transmission of COVID-19.

Keywords: attitude; COVID-19; elderly; perceived behavioral control; subjective norm; theory of planned behavior

Introduction

Coronavirus Disease (COVID-19) is an infectious disease that has been affecting many countries globally since late-2019. Indonesia reported its first positive COVID-19 case on March 2, 2020 (Melia, Triana and Prasetyo, 2020). This disease can infect humans of all ages, including the elderly. The elderly population is a priority population in preventing the transmission of COVID-19 (Géa *et al.*, 2022). The COVID-19 patients aged 60 years and over have a higher mortality compared to younger patients (Karadavut and Altintop, 2022). Elderly with comorbidities such as heart disease, diabetes mellitus, hypertension, chronic kidney failure and chronic lung disease have a greater risk of being infected with COVID-19 compared to the same population without comorbidities (Tobing and Wulandari, 2021; Ventura, Molinelli and Barranco, 2021).

Implementing health protocols is one of the factors to prevent the transmission of COVID-19. In Indonesia, and many countries, the protocols consist of wearing a mask, avoiding crowds, keeping a distance and implementing clean and healthy lifestyles (Ministry of Health, 2020). The protocols need to be implemented by all population groups including the elderly regardless of the residence, both rural and urban. In rural areas, people tend to have

more difficult access to health services and receiving information (Murdiyanto, 2020), especially information about COVID-19 (Cahyawati, Lestarini and Saniathi, 2021). Consequently, people living in rural areas will be more likely to have different perceptions and beliefs about the pandemic situation compared to those living urban areas, which results in the low compliance to health protocols (Benu, Febriyanti and Tahu, 2022).

By January 2022, the number of confirmed positive cases for COVID-19 globally was more than 200 million and five million people have died (Murri *et al.*, 2022). In Indonesia, confirmed COVID-19 patients in August 2021 were 426,1759 people and until March 2022 were 5,939,082 people (Zakiah and Pujiati, 2022) . The number of confirmed cases of COVID-19 in East Java is 399,989. The highest case of death occurred in patients aged >60 years. The case fatality rate (CFR) in patients aged 60 years and over was 12.06% (Rubina *et al.*, 2022). The data show that the elderly need more protection in preventing the transmission of the disease.

The elderly as a vulnerable group have a higher mortality rate. This shows that the elderly need to protect themselves. Changes that occur among elderly cause them to be less disciplined in implementing COVID-19 health protocols (Kristamuliana, Renteng and Datu, 2021). Information that is less than optimal for the elderly in rural areas also makes negative perceptions of the elderly in implementing of COVID-19 health protocols (Nur, 2021). A good perception can reduce the risk of the elderly from transmission of COVID-19 because prevention efforts by implementing the COVID-19 health protocol are done in a disciplined manner (Prihati *et al.* 2020).

The Indonesian government has socialized the implementation of COVID-19 health protocols. There has been a lot of research on the implementation of the COVID-19 health protocol in the Indonesian people. The majority have the same conclusion: the implementation of the COVID-19 health protocol was in a low category (Daoust, 2020). A research explains factors influencing implementation of the COVID-19 health protocol are economic problems, indifferent attitude, vulnerability to the COVID-19 virus and distrust of the government with many inconsistent policies (Sari, 2021). Other research explains the factors are the community reaction towards pandemic situation, the perception of the effectiveness of self-quarantine, concern about self vulnerability, gender, educational status, marital status, health status and age. People who are married, have a good education background, and a younger age demonstrated a higher level in implementing the COVID-19 health protocol than people who are older (Riyadi and Larasaty, 2021). This is in accordance with the results of the study which explained that the majority of the elderly in rural areas had the implementation of the COVID-19 health protocol in the low category (Daoust, 2020). However, studies that identified the factors associated with the implementation of the COVID-19 health protocol, especially for the elderly in rural areas, are still limited.

The implementation of the COVID-19 health protocol is a behavior to prevent the transmission of COVID-19. Ogilvie *et al.* (2016) explain that behavior is formed by perceptions and beliefs. One theory that explains the behavior is the theory of planned behavior (TPB). TPB explains that behavior is influenced by attitudes toward behavior, subjective norms, and perceived behavioral control. Implementing the COVID-19 health protocol is a form of behavior that needs to be developed. TPB has analyzed a lot of behavior and has been successful in changing behavior from negative to positive. A research explains that TPB is able to improve the behavior of early detection for cervical cancer in women (Maurida, Sukartini and Indarwati, 2019), the background for changes in cataract surgery decisions (Wikamorys and Rochmach, 2017), and improve care adherence in diabetes mellitus clients (Lestarina, 2018). However, there is no research that uses TPB as a theoretical basis in analyzing the implementation of the COVID-19 health protocol for the elderly in rural areas. Based on this description, this study aimed to analyse the factors that are associated with the implementation of the COVID-19 health protocols among elderly in rural areas based on the Theory of Planned Behavior.

Materials and Methods

Study Design

This study used analytical observational with cross-sectional approach. The study was conducted in August 2021 in one of the rural areas in East Java Province, Indonesia. The independent variables were attitudes toward behavior, subjective norms, and perceived behavioral control. The dependent variable was the implementation of COVID-19 health protocols.

Respondents

The population of this study was the elderly aged 60 years and over. The total population in the study site was 7,949 people selected using quota sampling. After calculating the Slovin's formula with a confidence level of 0.1, it was determined that the sample size was 100 respondents. The study only included the elderly who were able to do activity daily living independently. The study excluded the elderly who had psychological problems or dementia.

Instruments

The instruments were questionnaires to assess the demographic data, TPB and COVID-19 health protocol. The TPB questionnaire was self-developed based on the TPB concept, consisting of attitudes toward behavior (6 questions), subjective norms (6 questions) and perceived behavioral control (9 questions) (Table 1). The TPB questionnaire used closed questions with a 4-item Likert

Table 1 21-item Theory of Planned Behaviour questionnaire

Component	Item	Statement
Attitude toward behavior	1	For me, wearing a mask, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle are very good things
	2	For me, efforts to prevent the spread of COVID-19 by implementing a health protocol is a very good thing
	3	For me, maintaining health is a very good thing
	4	Wearing a mask, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle really help to prevent me from transmission of COVID-19
	5	Wearing masks, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle are one of the efforts to prevent COVIDd-19
	6	Wearing a mask, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle make me confident about my health status
Subjective norm	7	My family thinks that wearing masks, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle are needed to prevent the transmission of COVIDd-19
	8	My peers think that wearing masks, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle are needed to prevent the transmission of COVID-19
	9	Health workers in my area think that wearing masks, avoiding crowds, washing hands with soap and practicing a clean and healthy lifestyle are needed to prevent the transmission of COVID-19
	10	I really don't care what my family has to say and I won't follow their advice
	11	I really care what my peers say and I will follow their advice
	12	I really care what my healthcare provider has to say and I will follow their advice
Perceived behavioral control	13	I object to wearing a mask, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle
	14	I feel comfortable if I wear a mask, stay away from crowds, wash my hands with soap and practice a clean and healthy lifestyle
	15	I find it easy to wear a mask, stay away from crowds, wash my hands with soap and practice a clean and healthy lifestyle
	16	I have time to wear a mask when I leave the house, stay away from crowds, wash my hands with soap and practice a clean and healthy lifestyle
	17	I don't have a mask so I don't wear a mask
	18	I have to go outside with a lot of people so I can't stay away from the crowd
	19	I have confidence that wearing a mask when leaving the house, avoiding crowds, washing hands with soap and practicing a clean and healthy lifestyle can prevent me from catching COVID-19
	20	Wearing a mask when leaving the house, staying away from crowds, washing hands with soap and practicing a clean and healthy lifestyle costs a lot of money
	21	I show my concern for my health by wearing a mask when leaving the house, staying away from crowds, washing my hands with soap and practicing a clean and healthy lifestyle

Table 2 Bivariate correlation between gender, age, profession and education on implementation of COVID-19 health protocols (n = 100)

Variable	Implementation of COVID-19 health protocols		Total n (%)	p-value
	Good n (%)	Poor n (%)		
Gender				
Women	48 (71.6%)	19 (28.4%)	67 (67.0%)	<0.001†
Men	3 (0.09%)	30 (0.91%)	33 (33.0%)	
Age				
60-70 years old	36 (46.2%)	49 (62.8%)	78 (78.0%)	<0.001†
70-80 years old	12 (100.0%)	0 (0.0%)	12 (12.0%)	
>80 years old	10 (100.0%)	0 (0.0%)	10 (10.0%)	
Employment status				
Self-Employed	0 (0.0%)	16 (100.0%)	16 (16.0%)	<0.001†
Retired Public Officer	23 (100.0%)	0 (0.0%)	23 (23.0%)	
Unemployed	28 (45.9%)	33 (54.1%)	61 (61.0%)	
Educational level				
Uneducated	28 (50.9%)	27 (49.1%)	55 (55.0%)	1.000‡
Elementary school	6 (60.0%)	4 (40.0%)	10 (10.0%)	
Junior high school	5 (35.7%)	9 (64.3%)	14 (14.0%)	
Senior high school	5 (35.7%)	9 (64.3%)	14 (14.0%)	
Bachelor degree	7(100.0%)	0(0.0%)	7 (7.0%)	

† Chi-square test; ‡ Fisher's exact test

scale. Favorable questions, i.e., number 1-9, 11, 12, 14-16, 19, and 21, were scored using the following: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Meanwhile, unfavorable questions, i.e., number 10, 13, 17, 18, and 20, have a different Likert scale (4 = strongly disagree, 3 = disagree, 2 = agree, and 1 = strongly agree). The categorization of the data results is divided to good category and poor category with the distribution based on the mean. A value less than the mean is included in poor category and a value more than the mean included in good category.

The COVID-19 health protocol questionnaire was adapted from the COVID-19 prevention and control guidelines issued by the Ministry of Health of the Republic of Indonesia, 5th Revision (Ministry of Health, 2020). The questionnaire assessed the implementation of

wearing a mask, avoiding crowds, keeping social distance and implementing clean and healthy lifestyles in 21 items of closed questions with the answer choices on a 4-item Likert scale (1 = never, 2 = sometimes, 3 = often, 4 = always) (Ministry of Health, 2020). The categorization of the data results is divided to good category and poor category with the distribution based on the mean. A value less than the mean is included in poor category and a value more than the mean included in good category.

All research instruments were considered valid and reliable. The validity was measured using Pearson correlation product moment and the reliability test was Cronbach's alpha. The validity and reliability tests were delivered to 25 respondents who were not the study respondents. The results of the validity test showed that all items had a significance level of < 0.05 and r-count > 0.396. The reliability test showed all questionnaires had Cronbach's alpha > 0.65; the TPB questionnaire (Cronbach's alpha = 0.874) and the COVID-19 health protocol questionnaire (Cronbach's alpha = 0. 958).

Data Collection

Data collection was carried out by enumerators who have shared perceptions with the investigators so that there was no interference by the investigators during the data collection process to reduce bias. The data collection procedures were conducted through several steps. First, the enumerators contacted the respondent and explained about the research. Second, the enumerators provided an explanation of the study protocol to the respondents, especially about the study purpose, benefits and that the participation was voluntary. Third, the enumerators asked the respondents about their willingness to participate in the study and to sign an informed consent. Fourth, the enumerators delivered the questionnaires to the respondents. The enumerators provided explanation regarding the questionnaires if the respondent did not understand its meaning.

Data Analysis

Coding was carried out after the questionnaires were filled out by the respondents. The coded data were processed using SPSS 20 software. The data were analyzed using bivariate analysis and multivariate analysis. Bivariate analysis used Pearson correlation, Chi-square test and Fisher's exact test. Chi-square and Fisher's exact tests were used to analyze the correlation between demographic data (gender, age, employment status and educational level) on the implementation of COVID-19 health protocols. Pearson correlation was used to analyze the correlation among TPB variables on the health protocol implementation. A multivariate analysis, multiple linear regression with significance value 0.05, was used to identify how the TPB variables can be predictors of the implementation of the COVID-19 health protocols.

Ethical Consideration

This research received ethical approval from the Health Research Ethics Committee of dr. Soebandi University (No. 200/UDS/VII/2021).

Results

The demographic characteristic showed that the majority of respondents were women (67.0%) and most of them showed a good category on implementation of COVID-19 health protocols (71.6%). The majority of the elderly aged 60-70 years old (78.0%) and most of them showed a poor compliance to COVID-19 health protocols (62.8%). Most respondents were unemployed (61.0%) and most of them had a poor compliance on COVID-19 health protocols (54.1%). The majority of respondents were uneducated (55.0%) and most of them have a good COVID-19 health protocol implementation (71.6%). The bivariate analysis between demographic characteristics on the health protocol implementation showed that gender ($p < 0.001$), age ($p < 0.001$) and employment status ($p < 0.001$) were associated with the COVID-19 health protocol compliance, while educational level was not associated with the compliance ($p = 1.000$) (Table 2).

The attitude toward behavior had maximum score of 24, mean = 19.80 and SD = 2.13. This means that there are respondents who get maximum score for this variable. The subjective norm had a maximum score of 22, mean = 18.50 and SD = 1.35. The perceived behavioral control had maximum score of 36, mean = 29.02 and SD = 2.23 which means that the respondents were in the range "agree" and "disagree." The implementation of COVID-19 health protocol had maximum score 81, mean = 62.80 and SD = 14.3 which means that the respondents were in the range of "always" and "often." The bivariate analysis among TPB constructs showed that attitude toward behavior ($r = 0.751$ and $p < 0.001$), subjective norm ($r = 0.726$ and $p < 0.001$) and perceived behavioral control ($r= 0.523$ and $p < 0.001$) has association on the implementation of COVID-19 health protocols. The relationship between attitudes toward behavior and the implementation of COVID-19 health protocols was very strong correlation ($r > 0.75$). The relationship between subjective norms, perceived behavioral control and the COVID-19 health protocol implementation was in strong category ($r = 0.50$-0.75). The regression equation formed through this study is 'implementation of the COVID-19 health protocol among elderly in rural areas = -60.864 + 3.552 attitudes + 3.820 subjective norms – 0.620 perceived behavioral control' (Table 3).

The results of multiple linear regression showed that the variable attitude toward behavior ($t = 4365$; $p < 0.001$) and subjective norm ($t = 3.298$; $p < 0.001$) had a partial influence on the implementation of the COVID-19 health

Table 3 SD, minimum and maximum value, mean and bivariate analysis among theory of planned behavior variable (N = 100)

Variable	SD	Min-Max	Mean	Pearson correlation			
				Attitude toward behavior	Subjective norm	Perceived behavioral control	COVID-19 health protocol
Attitude toward behavior	2.13	17-24	19.80	NA	0.807*	0.727*	0.751*
Subjective norm	1.35	15-22	18.50	0.807*	NA	0.646*	0.726*
Perceived behavioral control	2.23	23-36	29.02	0.727*	0.646*	NA	0.523*
COVID-19 health protocol	14.3	35-81	62.80	0.751*	0.726*	0.523*	NA

*p < 0.001

Table 4 Multiple linear regression (N = 100)

Model†	Unstandardized coefficients		Standardized coefficients	T‡	p-value
	B	Std Error	Beta		
(constant)	-60.864	14.157		-4.299	<0.001*
Attitude toward behavior	3.552	0.814	0.530	4.365	<0.001*
Subjective norm	3.820	1.158	0.360	3.298	0.001*
Perceived behavioral control	-0.620	0.620	-0.94	-1.000	0.320

† Dependent variable: implementation of COVID-19 health protocols; ‡ T-table (df 98) 1.644; * p < 0.05

Table 5 Model summary

Model	R	R square	F	p-value
1	0.781	0.610	50.052	<0.001*

protocol. Perceived behavioral control (t = -1,000; p = 0.320) had no partial effect on the implementation of the COVID-19 health protocol. This explains that, if the attitude toward behavior and subjective norm have high value so the implementation of COVID-19 health protocols become higher. Otherwise, if the perceived behavioral control has high value so the implementation of COVID-19 is lower. The dominant factor that has the most influence on the implementation of the COVID-19 health protocol is attitude toward behavior because it has a standard coefficient beta value of 0.530, which is greater than the other variables (Table 4). The model summary showed that the R-square was 0.610, which indicates that the strength of the relationship between the independent variables on the dependent variable was 61%, while the remaining 39% is explained by other factors. The F-test result showed that the p-value < 0.001 with F-value was 50.052 greater than the F-table (F-table = 2.70). This means that there is a simultaneous influence between attitudes toward behavior, subjective norms and perceived behavioral control on the implementation of COVID-19 health protocols among elderly in rural areas (Table 5).

Discussions

Demographic characteristic on the implementation of COVID-19 health protocols

There was association between gender, age and employment status on implementation of COVID-19 health protocols. The majority of women respondents showed implementation pf the COVID-19 health protocol in good category, while the majority of male elderly respondents did not. This is in line with the results of research that women's compliance in implementing the COVID-19 health protocol is better than that of men (Riyadi and Larasaty, 2021). Elderly women in rural areas have a better concern for health than elderly men in rural areas. This is also related to the dominant role in maintaining health in the family. Women have a role to protect the whole family, from regulating diet, maintaining cleanliness and modifying the home environment. Some respondents in elderly category (60-70 years old) have good category and others have poor category on implementation of COVID-19 health protocols. All respondent 70-80 years old and more than 80 years old have good category. This is in accordance with research which showed that the people who are more mature will have opportunity to perform the expected behavior (Ringroad, Daya and Tamantirto, 2016). The older have more life experience and will more care about their health. In addition, families with the elderly in rural areas will pay more attention to their family members in improving their health. Families are more protective in regulating the lifestyle of the elderly with old age. All retired respondents have good category in implementation of COVID-19 health protocols. This is contrary to research which showed that employment status was not related to implementation of the COVID-19 health protocol (Niruri *et al.*, 2021). All the elderly who have their own business need cooperation with other people so that the health protocol becomes difficult to

implement. Occupational activities, such as farm laborers and gardeners, need interaction with others as well. The results of this study explain that there is no relationship between education level on implementation of the COVID-19 health protocols. This is contrary to research which showed that educational level was related to implementation of the COVID-19 health protocol (Riyadi and Larasaty, 2021). Educational level does not fully influence individual knowledge in shaping attitudes. The majority of respondents do not have education, but the village government continues to make efforts to increase the knowledge of residents, including the elderly, about the COVID-19 health protocol.

Attitude toward behavior on the implementation of COVID-19 health protocols

There was an influence of attitude toward behavior and subjective norm on the implementation of COVID-19 health protocols among elderly in rural areas. The perceived behavioral control has no influence on the implementation of the COVID-19 health protocol among elderly in rural areas. Attitudes are formed from beliefs about behavior and the consequences. The elderly who have belief that implementing the COVID-19 health protocol during a pandemic can prevent them from transmission of COVID-19 will have a good attitude. A good attitude causes the expected behavior to be formed, that is the implementation of the COVID-19 health protocols including wearing a mask, avoiding crowds, keeping a distance and implementing clean and healthy lifestyles. This is in accordance with the results of a study which concluded that a positive attitude could affect the use of masks during COVID-19 (Pan and Liu, 2022). The belief in doing something for the elderly in rural areas is based on the sociodemographic characteristics of the individual and the socio-cultural impact from their interactions in the community (Watson and Austin, 2021).

The beliefs of the elderly in rural areas are formed from the information received by the elderly. Knowledge is a basic factor in the formation of beliefs (Simanjorang *et al.*, 2022). The village government provides intensive information to the community, including the elderly, about the implementation of the COVID-19 health protocols as an effort to prevent the transmission of COVID-19. Information on preventing the transmission of COVID-19 through the implementation of health protocols has been comprehensive in rural areas through health education by health workers through billboards or posters. A study explains that billboards and banners are media types that are considered effective for informing the prevention of COVID-19 in rural areas (Badri, 2020). This also shows that health workers in rural areas have optimal performance in improving health services, especially for the elderly (He and Tang, 2021). The government give more attention to activities to prevent the transmission of COVID-19. The government moves all its units to the lowest unit, that is village. This requires the village government, including stakeholders, to apply all policies that have been set by the central government, including in socializing the implementation of the COVID-19 health protocol and collaboration between sectors and across sectors. This activity has an impact on increasing public knowledge, especially among the elderly in rural areas.

Subjective norm on the implementation of COVID-19 health protocols

Subjective norms affect the implementation of the COVID-19 health protocol among elderly in rural areas. Subjective norms are formed by an individual's perception of the beliefs of the closest people. In rural areas, the family is the closest person for the elderly. They tend to follow the directions given by the family compared to other. Families provide support in caring for the elderly, one of which is doing activities that prevent the elderly from transmission of COVID-19. This is in accordance with the results of the study which concluded that the family has a role in healthcare for the elderly who live with their family (Zulfitri, Sabrian and Herlina, 2019). Therefore, the family belief about preventing the transmission of COVID-19 by implementing a health protocol makes the elderly have the same belief as their families (Nugraha, 2020). Families need to increase their knowledge in caring for elderly. The increased family knowledge has had an impact on change in their belief and formed good subjective norm for elderly (Badriah *et al.*, 2021).

Functional aspects of family support include the type or nature of family support and can be classified into four domains: instrumental support, emotional support, informational support and social integration. In rural areas, elderly are individuals who need protection and supervision from the family, so they can do anything to keep the elderly still health (Yuan *et al.*, 2011). Subjective norms are also influenced by peers and health workers. Behavior change in the elderly is influenced by peer support. Elderly tend to do something if they get support from their peers (Raue *et al.*, 2015). A good relationship between nurses and the elderly is well-established. This will have an impact on improving the quality of therapeutics so as to achieve successful implementation carried out by nurses (Happ and Raderstorf, 2019). The elderly are a vulnerable group. Families in rural areas believe that the elderly are individuals who have more life experience so they are wiser than others. Therefore, families with the elderly in rural areas will strive to maintain the health of the elderly, especially keeping the elderly from being infected with COVID-19.

Perceived behavioral control on the implementation of COVID-19 health protocols

There is a relationship between perceived behavioral control and implementation of the COVID-19 health protocol in the elderly in rural areas. This is in line with other studies which explain that perceptions of behavioral control affect behavior (Sin and Rochelle, 2022).Perceived behavioral control is formed from the individual's perception of support or obstacles. The influence formed by subjective attitudes and norms still needs to be strengthened with the support of the social environment to improve the implementation of the COVID-19 health protocol for the elderly in rural areas. Impact of perceived behavioral control actually depends on the factors determining behavior, such as access to information, access to health services, self-efficacy, availability of materials, financial and time (Zhang *et al.*, 2021). A sense of togetherness and cooperation is still entrenched in people in rural areas, including the elderly in East Java (Windarwati *et al.*, 2020). This is an inhibiting factor in the elderly, limiting interaction with other people (Utomo *et al.*, 2019). Changes that occur in the elderly because the aging process makes the elderly unable to make decisions on their own without assistance (Chen, Dai and Xia, 2022). Perceived behavioral control is individual perceptions of assessing barriers to behavior. The perception is about self-efficacy, self-awareness, time availability, access, infrastructure and individual financial conditions in implementing the COVID-19 health protocol. Some of the elderly in rural areas still work to meet their daily needs. Its makes the elderly difficult to implement the COVID-19 health protocol, especially in the aspect of staying away from crowds. The work that is mostly done by the elderly in rural areas is as farm laborers or garden workers. This makes the elderly do work in groups. The majority of the educational background of the elderly in rural areas did not attend school. Its causes the elderly to have low self-efficacy and self-awareness about their vulnerability to contracting COVID-19 and their belief in implementing the COVID-19 health protocol is still low. However, efforts to increase knowledge carried out by the village government by emphasizing policies that compel and bind the community to implement of COVID-19 health protocols have caused the elderly in rural areas to be able to override perceived barriers and implement COVID-19 health protocols.

Effect of attitude toward behavior, subjective norm and perceived behavioral control on implementation of COVID-19 health protocols

Attitude toward behavior, subjective norm and perceived behavioral control had simultaneous effect on implementation of COVID-19 health protocols among elderly in rural areas. Across a range of health behaviors, interventions to change attitudes, norms, or perceived behavioral control effectively changed behavior or behavioral intentions (Watson and Austin, 2021). Attitudes toward behavior, subjective norms, and perceived behavioral control have a strong relationship in conducting analyses to change behavior in individuals. The elderly in rural areas are a minority group and tend to have homogeneous characteristics and uphold the local culture. Good knowledge is the background for the formation of beliefs in implementing behavior. However, the existing belief needs to get support from family, health workers, and peers in terms of availability of time, infrastructure, and the financial condition of the elderly.

Limitations

There are some limitations of this research. The number of respondents is as many as 100 older persons. This can be improved to describe the real condition. Characteristic demographics were not included in the multivariate analysis because the scale was categorical and not a dichotomous table. In the process of collecting data, the information provided by the respondent through questionnaires sometimes does not show the actual opinion of respondents, this happens because sometimes there are differences of opinion, assumptions and different understanding of each respondent, as well as other factors such as honesty factor in filling respondents' opinions in the questionnaire. Respondents have different educational backgrounds. This will have an impact on the respondent's level of knowledge in determining attitudes that was not identified in this research. The pandemic situation at the time of the study showed an increasing fluctuation in transmission. The situation at the time of the study could affect the results of similar studies.

Conclusion

TPB construct and demographic characteristic such as gender, age and employment status have influence on the implementation of the COVID-19 health protocols among elderly in rural areas. The most dominant factor in increasing the implementation of the COVID-19 health protocol is attitude toward behavior. Based on the research above, it is necessary to improve attitudes, subjective norms and perceived behavioral control among elderly in rural areas to improve the implementation of the COVID-19 health protocol by increasing perceptions and beliefs of the elderly in implementing the COVID-19 health protocols, which will be in line with increasing knowledge of the elderly. This can be done use counseling methods or health education by involving the elderly group. Health workers need to work together with stakeholders in rural areas, including culture figure or religious leaders, to increase the perceptions and belief of the elderly in implementing the COVID-19 health protocol. Besides that, there is a need for

family involvement to make good family support in preventing the transmission of COVID-19 in the elderly in rural areas. Recommendation for further research is to use knowledge variables in identifying factors that influence the implementation of the aCOVID-19 protocol.

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ORIGINAL ARTICLE

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The effects of illness script method on clinical reasoning of undergraduate nursing students: A quasi-experimental study

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ABSTRACT

Introduction: The improvement of clinical reasoning in nursing students is a benchmark for students' abilities in carrying out nursing care. Disease script-based learning can help students recognize the information. The purpose of this study was to determine the effect of illness scripts on the clinical reasoning ability of nursing students.

Methods: The research design used was a quasi-experimental with a non-equivalent control group. A consecutive sampling technique was applied. The number of samples in each group is 35 respondents, the outcome was measured using Clinical Reasoning Assessment Tools. Data were analysed using Wilcoxon Signed Rank test.

Results: The results of this study indicate that there is an increase in the clinical reasoning ability of nursing students in the experimental group from the average value of 40.6 to 50.3. Most of the respondents in the experimental group had clinical reasoning at the intermediate learner level. The results of the Wilcoxon test showed that the Z-count value in the experimental group was 5.092 with a p-value < 0.001.

Conclusions: The primary finding in this study is that there is an effect of the illness script method on the clinical reasoning of undergraduate nursing students. The application of illness scripts in the nursing learning process at as early stage as possible is very relevant. This model helps students in increasing critical thinking about patient nursing problems.

Keywords: critical thinking; efficacy; learning strategy; nursing study

Introduction

Clinical reasoning is defined as an ability of decision-making, problem-solving, critical thinking, and clinical judgment (Hunter and Arthur, 2016). Good clinical reasoning skills improve the performance of safe and effective nursing care delivery (Alamouti *et al.*, 2020). Several studies have found that nurses with poor clinical reasoning skills were incompetent to synthesize a patient's worsening prognosis, leading to decision-making errors in inpatient care (Graan, Johanna and Williams, 2017; Guerrero, 2019). According to World Health Organization data, about 5% of outpatients experience diagnostic errors (World Health Organization., 2019). Some of the patients' diagnostic errors as caused by a lack of clinical reasoning (World Health Organization, 2016). Study from Iran showed the average score of clinical reasoning skills of nursing students is too weak at about 46% (Alamouti *et al.*, 2020). In Indonesia, the accuracy of nursing diagnoses reaches 64% as a-sufficient category (Trisno, Nursalam and Triharini, 2020). Research has found that the accuracy of nursing diagnoses is related to good clinical reasoning ability (Paans *et al.*, 2012).

Clinical reasoning ability needs to improve since taking formal nursing education. Nursing students are required to be agile in clinical reasoning. Clinical reasoning is a cognitive process and strategy used to identify, diagnose, and make clinical decisions regarding a patient's condition. Based on the cognitive perspective theory, it's explained the importance of cognitive structure in clinical reasoning. It consists of knowledge about pathophysiology, patient complaints, signs, symptoms, and other clinical information relevant to the context of the disease (Schmidt, Norman and Boshuizen, 1990). Various learning methods have been implemented

to improve cognitive structures in nursing students' clinical reasoning and are still unclear (Brown, Tyo and McCurry, 2019). A few educational models to improve the knowledge structure of clinical reasoning such as reflection and feedback models (Choi *et al.*, 2020), contextual learning (Yauri, Nash and Ramsbotham, 2019) and problem-based learning (Ju and Choi, 2017) were applied but still cannot overcome the knowledge structure clinical reasoning of undergraduates students. These learning approaches only produce hypotheses in the assessment process, problem formulation, diagnosis and outcome criteria, and intervention (Levett-Jones *et al.*, 2010). The reasoning process is very conceptual, and the thought process is slow (Peters *et al.*, 2017).

A strategy is needed to provide the ability to organize their specific knowledge and more efficiently, called script (Boushehri, Arabshahi and Monajemi, 2015). Undergraduate nursing students often struggle to develop these requisite skills (Blakey, Guinea and Saghafi, 2017). Scientific evidence found that interventions are underway to enhance clinical reasoning named illness script (Lee *et al.*, 2010). In medical education, illness scripts have a role in improving clinical reasoning abilities. However, studies in nursing education regarding the application of illness scripts in clinical reasoning are few. A study showed illness scripts proved to be effective and active learning strategies in improving clinical reasoning. The illness script needs to be adapted to nursing education (Lee and Bagnardi, 2010). The qualitative studies found that the illness scripts increased nurses' knowledge about patient problems and medical components of the disease scripts were also relevant in nursing (Vreugdenhil *et al.*, 2022).

Illness scripts play a role in recognizing information, comparing, and predicting information from a disease (Lubarsky *et al.*, 2015). An illness script is a specific script about the disease that consists of enabling conditions, faults, and consequences. Based on illness scripts theory, the reasoning process is led by the structure of knowledge in memory. It can easily interpret the prognosis of a complex health condition (Lubarsky *et al.*, 2015). Students need to understand the process of organizing knowledge about clinical and biomedical to improve the quality of nursing care. Therefore, it is the main reason to investigate the impact of illness scripts training on the clinical reasoning of undergraduate nursing students. This study aims to determine the effects of illness script methods on the clinical reasoning skill of nursing students.

Materials and Methods

Study Design

This quantitative study used a quasi-experimental approach with a control group pretest-posttest design. This design involves two groups of participants, and outcome data are collected before and after implementing an intervention. This design called controlled trials without randomization involves an intervention but lacks randomization (Polit and Beck, 2012). The independent variable in this study is the illness script method. Illness script means disease schemas into knowledge memory consisting of epidemiology, time course, pathophysiology, and medical conditions. The illness script stimulation is applied in the learning process. The dependent variable in this study is clinical reasoning. Clinical reasoning is defined as a complex and consequential cognitive process in managing and evaluating a patient's health problem (Pelaccia *et al.*, 2011).

This research was carried out during the COVID-19 pandemic, with a policy of limiting distance and use of personal protective equipment. Classes were carried out in a hybrid manner, where the intervention group conducted face-to-face learning meetings outside the network. The control group carried out face-to-face learning meetings online. The experimental group was given an illness script stimulation intervention, while the control group received a standard intervention carried out in the learning process. Pretest was conducted on both groups before being given the intervention. The intervention was given once a week for 14 weeks. The posttest was carried out after the illness script stimulation intervention at week 14.

Respondent

The population covered in this study were all second level nursing students. The number of samples in this study was 70 people, 35 respondents to each group. The sample size was determined by using a hypothesis test on the mean of two independent groups (Sastroasmoro and Ismael, 2014). A consecutive sampling technique was applied. The sample criteria in this study were determined based on the representative characteristics of the affordable population. After the prospective respondents met the inclusion and exclusion criteria of the study, then the researcher asked the prospective respondents' willingness to participate after receiving an explanation of the aims, objectives, benefits, research procedures, as well as the rights and obligations of being a respondent. For prospective respondents who were willing, the researcher then asked them to sign an informed consent form, then randomly divided them into experimental groups and control groups. The sample inclusion criteria of the respondents were: the students completing the medical surgical nursing course 1; completing the basics nursing science courses; a minimum grade point average 3. The exclusion criteria for this study are the students who are not willing to complete 14 face-to-face meetings.

Intervention

The intervention given is the illness script. In the learning process, practice is not carried out to the hospital, case stimulation is carried out theoretically and in laboratory practice. The intervention was carried out during the learning process. The duration of the intervention was once a week until 14 weeks. The illness script method steps are happened in series (Lee and Bagnardi, 2010; Lee et al., 2010).

First step. The tutor will provide stimulation in the lecture by introducing an overview of the disease scenario from the patient's clinical condition. Students simulate the clinical details of anatomy and physiology, etiology, pathophysiology, physical, and examination. The main components of the illness script are enabling conditions (such as age, sex, current medication, previous medical history, occupation, risk behavior, hereditary, and environment affect the probability of someone getting a disease); fault (pathophysiological malfunctioning); and clinical consequences (complaints, signs, and symptoms) (Yazdani and Abardeh, 2019).

Second step. Students identify possible conditions, errors, and clinical consequences. Students were guided to identify key findings and assist them. Students are allowed to explore relevant journals and references to strengthen literacy in simulated cases.

Third step. Students will represent and compose illness scripts based on their ability to memorize the information. Students represent illness script for three probable illnesses, inclusive of epidemiology, time course, signs and symptoms, pathophysiology, and pharmacology.

Fourth step. Student will analyze the illness script, looking for differentiating features. Fifth step. Students prioritizing care for the patient and determining how to evaluate the effectiveness of care.

Instrument

The instrument used in this research is Clinical Reasoning Assessment Tools (CRAT). The validity test of the CRAT instrument showed good and stable validities with an accuracy value of 72%. CRAT is also stable in the reliability test, with a Cronbach's alpha value of 0.821 (Arisudhana *et al.*, 2019). The clinical reasoning dimensions used in this measuring instrument are according to the theory proposed by Schmidt, Norman and Boshuizen in 1990 and Harasym, Tsai and Hemmati in 2008 (Yazdani and Abardeh, 2020). The dimensions are dispersed knowledge structure (DK), elaborated causal network (EC), encapsulation knowledge structure (EK), and illness script knowledge structure (IS) (Yazdani and Abardeh, 2020). The four dimensions turn into 25 statements in vignette form. Each has four answer choices. Answers that represent dispersed knowledge (DK) a score of 0, elaborated knowledge structure (EC) a score of 1, encapsulation knowledge structure (EK) a score of 2, and illness script knowledge structure (IS) a score of 3. The minimum score of all 25 items is 0, and the maximum value is 75. Furthermore, clinical reasoning is interpreted into four categories according to the theory proposed by Drefyus and Drefyus in 1980 and Benner's theories in 2005 (Yazdani and Abardeh, 2020). The clinical reasoning categories based on the calculation of the mean value are the Expert category (score > 58.3), Advance beginner (score 51-58.3), Novice (score 42-50) and Surface learner (score < 42).

The level of clinical reasoning based on the knowledge structure model starts from the surface learner to the expert level. In the first level, surface learners were defined as students only focused on understanding the main points and memorizing them. They don't like the material, feel pressured and rush to retain information. They only focus on memorizing information and do not understand the meaning behind the materials. They cannot remember information effectively (Gopakumar *et al.*, 2016). Research has found that students who adopt surface learning will receive less information (Gurpinar *et al.*, 2013). In the second level, a novice learner is defined as a student who does not have experience and understanding of clinical situations. Novice learners have difficulty understanding the clinical situation, such as difficulties paying attention first (Benner, Kyriakidis and Stannard, 2011). In the third level, advanced beginner learners had high awareness of feedback on any knowledge gained (Benner, Kyriakidis and Stannard, 2011). At this level, nursing students have good attention to learning materials. The student was active and had a good ability to identify aspects of clinical conditions (Benner, Kyriakidis and Stannard, 2011). The fourth level is defined as students at the expert learner level who have good skills in developing strategies for information management and improving practical skills (Benner, Kyriakidis and Stannard, 2011).

Data Collection

Respondents willing to participate in this study filled out a characteristic questionnaire with the assistance of the researcher. For both experimental and control groups, filling out questionnaires on the characteristics of respondents was done by online method. The next stage, respondents in both groups were asked to attend outside the network to campus to pretest clinical reasoning variables with clinical reasoning assessment tools. After the pretest, the experimental group received the illness script method in the learning process, while the control group used the conventional methods. The illness script method is an intervention in the learning process in the form of disease script stimulation with the dimensions of enabling factors, faults, and clinical consequences while the conventional method is a standard intervention in the learning process without case stimulation. The experimental group received an intervention for 14 weeks online, while the control group received a standard

intervention for 14 weeks online. At week 15, both groups conducted a posttest using clinical reasoning assessment tools.

Analysis

The data analysis used bivariate and univariate tests. A univariate test used analysis of the respondent characteristics such as ages, gender, grade point averages, senior high school background, and distribution of level clinical reasoning. A bivariate test was carried out on clinical reasoning variables using the Wilcoxon Signed-Rank Test ($\alpha = 0.05$).

Ethical Consideration

This study was conducted in Badung Regency Bali Province over 14 weeks in 2021. This research has been reviewed and declared ethically feasible by the Health Research Ethics Commission of STIKES Bina Usada Bali based on the Ethics Pass Certificate Number: 362/EA/KEPK-BUB-2020. Researchers maintain the confidentiality of all information obtained from questionnaire. As a guarantee of anonymity, the respondent's name was not put in the questionnaire. Data are not disseminated to anyone to enforce the principle of non-maleficence.

Results

Table 1 shows age average in the experimental group is 20 years old, and the control group is 20.14 years old. Gender in the experimental and control groups is dominated by females, 86% and 88%, respectively. The educational background of both groups is majority senior high school at about 22% and 24%, respectively.

The p-value in the experimental group was said to be significant with a p-value < 0.001 (P<0.05). In the control group, the p-value shows 0.069 (p>0.05), which means that the intervention is not significantly giving some effect. The results of the comparison test of the pre-post difference between groups got a p-value <0.001. It showed that the illness script learning method had a significant effect on clinical reasoning skills.

Table 3 shows that, after receiving treatment in each group, it is known that 31 respondents (89%) in the experimental group had an intermediate level of clinical reasoning. In the control group, 18 respondents (51%) had a novice level of clinical reasoning.

Discussion

Illness script content is presented in case vignettes. There was an increase in the average value of clinical reasoning in the experimental group who received illness script-based learning materials. Students in the experimental group had better abilities than students in the control group in understanding epidemiology, pathophysiology, and medical conditions. A study found that illness scripts can help students recognize information, compare, and predict prognoses of a disease. Illness script describes the information process being structured and retrieved from long-term memory to interpret, analyze and envision new information (Lubarsky *et al.*, 2015). Illness scripts worksheet is a form of case-based learning with a knowledge-oriented approach to the patient's clinical condition. Few studies were found that improving clinical reasoning skills used intervention as knowledge-oriented (Chamberland *et al.*,

Table 1. Respondent characteristics (n = 70)

Variable	Mean±SD		n (%)	
	Experiment	Control	Experiment	Control
Age	20±0.54	20.14±0.60		
Grade Point Average	3.56±0.20	3.55±0.18		
Gender				
Male			5(14%)	4(12%)
Female			30(86%)	31(88%)
Senior High School Background				
Senior High School			22(63%)	24(69%)
Vocational High School			13(27%)	11(22%)

Table 2. The effects of illness script method on clinical reasoning of undergraduate nursing students (n = 70)

Variable	Group	Mean±SD	Z	P-value
Clinical Reasoning	Control			
	Pre	39.8±2.5	-1.523	0.128
	Post	40.8±3.1		
	Experiment			
	Pre	40.6±3.02	-5.092	<0.001
	Post	54.3±3.7		

Table 3. Level of Clinical Reasoning (n = 70)

Clinical Reasoning Level	Control Group n (%)		Experimental Group n (%)	
	Pretest	Posttest	Pretest	Posttest
Surface Learner	29(83)	17 (49)	25(71)	
Novice	6(17)	18 (51)	10(29)	
Intermediate				31 (89)
Expert				4 (11)

2011; 2013; Schmidt and Mamede, 2015; Keemink *et al.*, 2018).

Based on script theory, illness scripts make it possible to integrate acquired information with existing knowledge, understand irregular and complex patterns of symptoms, identify similarities and differences in conditions between diseases, and predict the likelihood of disease progression. Knowledge will enhance through experience and learning. Teaching clinical reasoning using illness scripts can help students improve their skills in making diagnoses and interpreting clinical data (Lubarsky *et al.*, 2015). In the nursing process, providing stimulation based on illness script affects students' cognition of a patient's clinical condition and increases reasoning level. Meanwhile, another impact of reasoning enhanced students' proficiency in performing nursing care. Good levels of clinical reasoning include the process of revealing visible problems, determining nursing care goals, identifying appropriate actions, and evaluating the achievements of evidence-based nursing care. Nursing practice emphasizes good skills in assessment and comprehensive decision-making skills through critical thinking processes. Making decisions based on clinical conditions was the noteworthy element in nursing practice (McCartney, 2017).

The study found that the illness script was an interesting method as a form of learning approach and stimulating students' critical thinking (Lee and Bagnardi, 2010). In the concept of critical thinking, clinical reasoning has a broader nature. Clinical reasoning was a way for nurses to observe patient status, process relevant data/records, understand patient problems, plan and implement nursing care, evaluate outcomes, and reflect on results. The barometer of clinical reasoning includes control, recognition, and response to significant information, specific symptoms, use of questions that lead to pathophysiological reasons, asking questions in a chronological direction, focusing on agreement with the patient, summarizing, and understanding body semantics. These skills were learned by undergraduate nursing students, requiring involvement and willpower during practice. To acquire these skills, students must improve their critical thinking skills and understanding of care (McCartney, 2017).

Illness script also helps students understand the difficulty of learning materials (Lee and Bagnardi, 2010). Through illness script stimulation, the process of applying the knowledge, skills, and expertise of nursing students in the form of clinical reasoning gets better. A nurse needs to be guided by appropriate clinical reasons to get good results and prevent the risk of harm to patient safety (Guerrero, 2019).

This study contributes to outlining the illness script in the context of nursing and relates to the clinical reasoning in nursing. This study has several limitations. First, the participants were recruited from a single institution, perhaps limiting the generalizability of our findings. Second, the sample size is relatively smaller than necessary. Third, some variables cannot be measured, such as study habits and literacy levels which can affect the reasoning process.

Conclusions

The use of illness scripts in nursing education is very relevant. Effective and innovative teaching approaches are needed in nursing education. Based on the results of this study, the use of illness scripts is effective to improve the ability of nursing students in filtration of clinical information, analysis, clinical reasoning process, and making clinical decisions. This method helps educators evaluate the readiness of nursing students to face the nurse competency test and the Objective Structured Clinical Examination. In particular, this approach can assist in preparing nursing students for practices that require collaboration with multiple health disciplines.

The main finding of this research is the influence of disease text on the clinical reasoning of undergraduate students. The illness script can improve students' ability to memorize information, and increase knowledge, enhance clinical performance in the quality of nursing diagnoses, interventions, and outcomes. Using a clinical reasoning knowledge structure's model approach can help identify the stage of development of nursing students' thinking processes since the first semester.

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SYSTEMATIC REVIEW

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The relationship between genital hygiene behaviors and genital infections among women: A systematic review

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ABSTRACT

Introduction: Genital hygiene is an important part of women's health and is essential for protecting reproductive health. Women adopt many genital hygiene behaviors, which will have direct and indirect effects on genitals and possible sexually transmitted infections. This systematic literature review aimed to know the types of genital hygiene behaviors practiced by women and assess the relationship between genital hygiene behavior and genital infection.

Methods: A systematic search of the electronic databases, PubMed, Ovid, Web of Science, Scopus, ScienceDirect, JSTOR, and SAGE, for literature published between January 2001 and 2021. The keywords used were "genital hygiene behavior" AND "genital infections" AND "women OR female." The inclusion criteria focused on genital hygiene behavior and the incidence of genital infection. The included full papers with observational research methods followed the PRISMA guidelines. After reading the full content of the included studies, key themes and concepts were extracted and synthesized.

Results: In total 383 articles were screened. Five articles met the inclusion criteria and were analyzed. The analysis revealed four categories related to genital hygiene behavior among women: underwear hygiene, bathing habits, menstrual hygiene, and coital hygiene. Genital infections included bacterial vaginosis, trichomoniasis, and vulvovaginal candidiasis. The review showed that incorrect and inadequate genital hygiene behavior increases the risk of vaginal infection.

Conclusion: A higher incidence of genital infections occurred in women with improper genital hygiene practices. It is necessary for health professionals to educate women about good genital hygiene practices in order to reduce the rate of genital infections.

Keywords: genital hygiene behaviors; genital infection; systematic review; women's health

Introduction

Genital hygiene plays a key role in preventing genital infections. Early identification of genital infections, appropriate treatment measures, and necessary preventive measures are essential to protect and improve women's health (Hamed, 2015). Genital infection is a serious female health problem, which is related to a negative impact on sexual and family life (Sevil et al., 2013). In this case, genital infection has become a serious public health problem, which is common in both developed and developing countries. About 1 million women around the world suffer from genitourinary system infections, such as urinary tract infections and bacterial vaginosis, and 75% of them have had genital infections. The prevalence of bacterial vaginosis (BV) has been found to be 8%–75%, the prevalence of vulvar vaginal candidiasis (VVC) is 2.2%–30%, and the prevalence of trichomoniasis (VT) is 0%–34% (Karadeniz, 2019). More than one million Sexually Transmitted Infections (STIs) are spread worldwide every day (World Health Organization, 2021).

The factors that cause female genital infections vary widely. The closeness of the urethra, vagina, and anus to

each other is the most important factor in the susceptibility to genital infection, and certain factors will increase the risk of its occurrence (Calik et al., 2020). The understanding of reproductive health issues varies greatly among countries, societies, and individuals. Socioeconomic status, race, religious belief, and education level all affect women's views and behaviors on reproductive health. In particular, feminine hygiene habits are different among women with a high prevalence of behavioral defects, and these behavioral defects easily make them susceptible to vulvovaginitis (Attieh et al., 2016). Genital infections do not always threaten women's lives, but their symptoms can lead to serious illnesses (Hilber, Francis, et al., 2010). These infections can lead to ectopic pregnancy, sepsis, cervical cancer, infertility and congenital infections of the newborn (Centers for Disease Control and Prevention, 2019).

Care and treatment of women's vagina and genitals can reduce their susceptibility to sexually transmitted infections (STIs) and other sexual and reproductive diseases (Myer et al., 2005). A qualitative study has linked women's intravaginal practices and sexuality, and demonstrates that women in the four countries. Indonesia, Mozambique, South Africa, and Thailand, actively use a variety of practices to achieve a desired vaginal state. Moreover, that study discusses types of vaginal practices, products used in vaginal practices and health consequences arising from these practices (Hilber, Hull, et al., 2010).

The data obtained indicated that the prevalence rate of BV is relatively high and could be influenced by hygiene behavior and certain socio-demographic characteristics, which indicated that genital behavior needs attention (Bahram et al., 2009). Behavioral factors such as vaginal douching or menstrual hygiene practices have been suggested as important factors that might influence vaginal infections (Cottrell, 2001; Cottrell & Close, 2008; Ott et al., 2009). Differences in vaginal practices, exposure measurements, study design, study populations, and statistical analysis definitions and classifications can explain these conflicting results (Brown & Brown, 2000; Hilber, Francis, et al., 2010; Hilber, Hull, et al., 2010). Various personal hygiene methods can be very harmful to health (9). In this case, unhealthy and dangerous practices can be attributed to improper cleaning of the genital area after using the toilet and poor handwashing habits. Frequent genital cleaning, lack of adequate underwear, insufficient attention to menstrual hygiene, sterile childbirth or artificial abortion as a method of family planning can increase the risk of genital infections (Felix et al., 2020; Karadeniz, 2019).

To get a contextual understanding of the genital hygiene behavior needed to be carried out by women, a simple brief information sheet and knowledge of what behaviors need to be considered is needed. Although there are a few studies on women's specific hygiene habits in the United States, Egypt and Turkey and other countries, they are still rare (Attieh et al., 2016). Information about the literature review toward genital hygiene behavior is lacking. Therefore, we conducted the current study with a systematic literature review with the following objectives: (1) to determine what types of

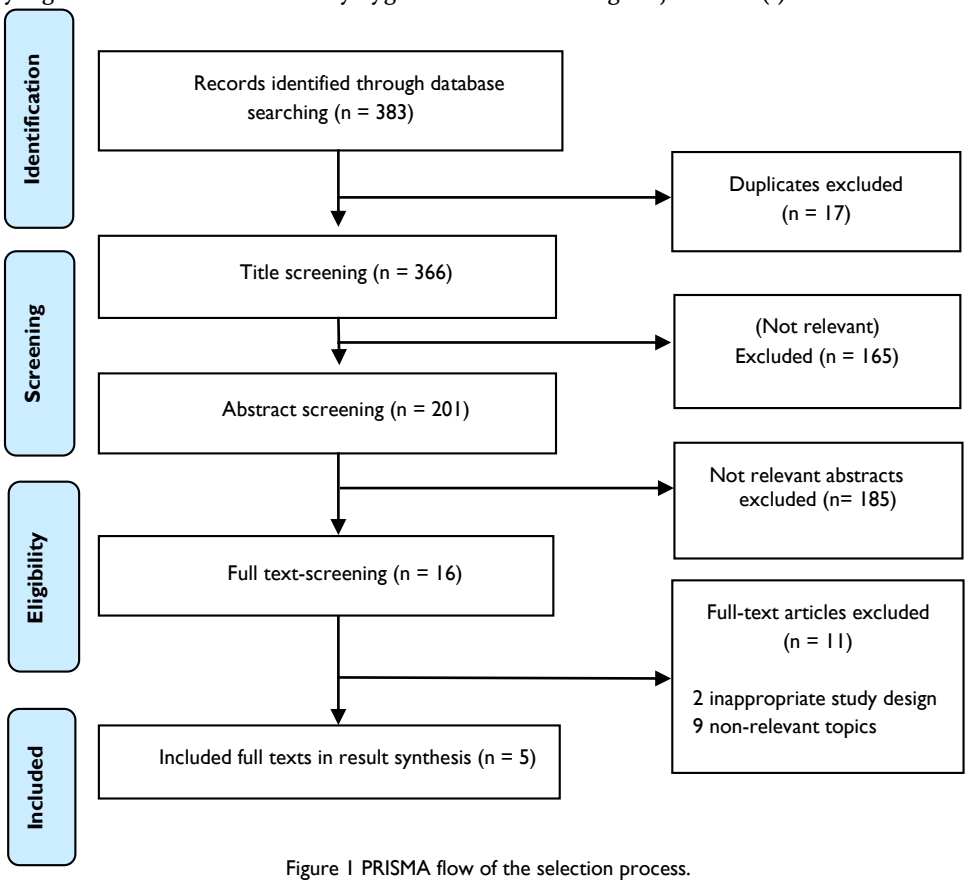

Figure 1 PRISMA flow of the selection process.

genital hygiene behaviors are practiced by women; (2) the relationship between genital hygiene behavior and genital infection.

Materials and Methods

Search Strategy

The primary question guiding this review was: "How does OSS enhance physical activity among adolescents?" Meanwhile, the secondary question was: "What are the characteristics of OSS utilised to enhance physical activity among adolescents?" The present systematic review was conducted in accordance with the PRISMA flow diagram guidelines (Moher et al., 2015). The authors searched electronic databases for literature published between 2001 and January 2021, only articles published in English were considered. A high-sensitivity search strategy was used to search the following databases: PubMed; Ovid; Web of Science; Scopus; ScienceDirect; JSTOR and SAGE. Relevant articles, which included the search term (genital hygiene behavior) AND (genital infections OR Sexually Transmitted Infections) AND (women OR female) in the title, were identified. Keywords were combined with the Boolean operator AND to limit the searches. An overview of the search terms can be found in Table 1.

Inclusion and Exclusion Criteria

The inclusion criteria were full paper articles with observational research methods. The exposure given was genital hygiene behavior, the research subjects were women with genital infection. The exclusion criteria in this study were non-observational studies, female populations under 15 years, the articles were not full text and were not published in English.

Operational Definition of Variable

A Genital hygiene behavior: a behavior or method of individual care to maintain cleanliness and health of their reproductive organs to achieve physical and psychological well-being. Genital hygienic practices include external washing, intra-vaginal cleansing, pre- and post-coital care, menstrual hygiene, and external application.

Genital infections can be caused by bacteria, fungi, parasites, or viruses growing in and around vagina and vulva (the area surrounding the vagina). Symptoms are such as soreness, itchiness, and an unusual vaginal discharge. Common types of vaginal infections are yeast infections, bacterial vaginosis, and trichomoniasis, a sexually transmitted infection.

Procedure

The studies were assessed according to the eligibility criteria and the selection process was divided into two phases. Data were managed by transferring references to a reference management tool (Mendeley). For further documentation the Review Manager, Covidence.org (The Cochrane Collaboration, Melbourne, Australia), was used (Helfer et al., 2015). Documentation of the selection process was done with management tools. As a first step, the duplicates from the initial search results were removed. The initial search results were filtered by title

Table 1 Overview of the search terms

#Genital Hygiene Behaviors	#Genital Infections	#Related
Genital Hygiene Behaviors	Sexually Transmitted Diseases	Associated
Genital Hygiene Practices	Vulvovaginal Health	Impacts
Reproductive Health Practices	Vulvovaginal Disorder	Outcomes
Intimate Feminine Hygiene	Genital Problems	
Feminine Hygiene Practices	Genital Infection	
Vaginal Hygiene Practices	Reproductive Health	
Intravaginal Practices		

Table 2 Quality assessment

First author (year)	Study purpose[1]	Literature[2]	Design	Sample			Outcome		Exposure[7]	Result			Conclusion[11]
				N	Describe[3]	Size[4]	Measure[5]	Valid[6]		Statistical[8]	Analysis[9]	Clinical[10]	
Sevil (2013)	Y	Y	cross-sectional	1057	Y	N/A	Y	Y	Y	Y	Y	Y	Y
Bahram (2009)	Y	Y	cross-sectional	500	Y	N/A	Y	Y	Y	Y	Y	Y	Y
Bitew (2017)	Y	Y	cross-sectional	210	Y	N/A	Y	Y	Y	Y	Y	Y	Y
Calik (2019)	Y	Y	cross-sectional	266	Y	N/A	Y	Y	Y	Y	Y	Y	Y
Hamed (2015)	Y	Y	case-control	200	Y	N/A	Y	Y	Y	Y	Y	Y	Y

[1] Was the purpose stated clearly?; [2] Was relevant background literature reviewed?; [3] Was the sample described in detail?; [4] Was sample size justified?; [5] Were the outcome measures reliable?; [6] Were the outcome measures valid?; [7] exposure was described in detail?; [8] Results were reported in terms of statistical significance?; [9] Were the analysis method(s) appropriate?; [10] Clinical importance was reported?; [11] Conclusions were appropriate given study methods and results.

and abstract. After comparison and approval of the first screening process, the full text that met the requirements was analyzed. Playback of the title, abstract, and full text were reviewed. If no full text was available, the article was excluded. The process was tracked in flow diagram according to PRISMA (Figure 1).

Quality Assessment

The authors independently rated the methodological quality of selected studies using the Critical Review Forms which, developed by CanChild (McMaster University, Canada), is a tool for conducting critical reviews of outcome measures and journal articles (Law et al., 1998a, 1998b). The quality of the studies was assessed with several questions with the answers "yes / no / not addressed" according to the criteria of the CanChild Critical Review Form (Law et al., 1998a, 1998b). After careful analysis of the quality related to results, the articles containing the highest quality and content for the work were included. The quality assessment of the studies can be found in Table 2. One researcher undertook this assessment independently, with a random 10% of the articles reviewed by a second researcher. There were no discrepancies in the application of the risk of bias assessment found when the random sample of articles was compared by a second reviewer.

Data Analysis

This systematic review adopted thematic synthesis. The five studies were read thoroughly to identify critical points and themes. We found the theme, which was type of genital hygiene behavior commonly practiced by women, and subtheme, which was underwear hygiene, bathing habits, menstrual hygiene and coital hygiene. For the analysis of the themes, we followed the Braun and Clark approach (Braun and Clarke, 2006). The first phase, familiarization, entails the reading and re-reading of the entire dataset. This is necessary to be able to identify appropriate information that may be relevant to the research question. In the second phase, we did the coding on the subthemes found. The coding process was performed to produce concise descriptive or interpretive labels that may be relevant to the research question. Phase three was generating themes, namely the type of genital hygiene behavior commonly practiced by women. Phase four reviewed potential themes, wherein we did not find any other potential themes. Phase five was defining and naming the theme while phase six involved producing the report in which we wrote and reported the findings from a review of the analyzed articles (Table 3).

The papers were synthesized under the following subheadings: Author, research aims, design and data collection, sample number and characteristics, type of genital hygiene behavior, type of genital infection, and research findings (Appendix 1). Independent reviewers extracted the data related to genital hygiene behavior carried out by women as well as STIs, or symptoms associated with genital infections

Table 3 Types of hygiene behavior performed by women

Theme	Type of Genital Hygiene Behavior
Subthemes	Underwear hygiene Bathing habits Menstrual hygiene Coital hygiene

Results

The search identified 383 publications. After duplicates were excluded (n = 17), a total of 366 publications was identified according to the search strategy. Some irrelevant titles were excluded (n = 165) and 185 abstracts did not meet the criteria, so they needed to be excluded. Examples of articles that did not meet the following criteria were not available in full text, use a language other than English, and not quantitative research. The full text was obtained for the remaining 16 articles which were eligible. After a detailed review, only five articles were found to meet the inclusion criteria and were selected for analysis. Of the eleven excluded articles, two had inappropriate study designs and the others had irrelevant topics. See Figure 1 for the selection process PRISMA flow.

Description of Study

A total of five studies were included in the review. The studies consisted of four cross-sectional studies, and one case-control study. The total sample analyzed was 2,233 respondents, from women aged 15 years to more than 60 years. The target population was students, married women, and non-pregnant women, as well as female patients undergoing treatment at the gynecology department. The studies were conducted in Turkey with the number of sample 1,057 female students with the mean age of 21.03 ± 1.70 years and another study from Turkey showed 266 married women, the mean age of 38.5 ± 7.9 (min = 20, max = 49); in Iran 500 non-pregnant women aged between 15 and 45 (mean age 36 years) were enrolled; in Ethiopia the respondents were 210 female patients aged between 15 and 64 years, and the last study conducted in Egypt was a case control study with a total 200 women. A study conducted by Bahram (2009) showed that 16.2% of women experienced BV, 6.6% VT, and 4.8% VVC. Meanwhile, Bitew et al.'s study (2017) showed that 48.6% of women experienced BV and 51.4% did not experience.

Type of Genital Hygiene and Genital Infections

Eight Most of the data collection techniques were carried out by questionnaires to assess genital hygiene behavior. It was found that several types of genital hygiene behavior were carried out by women, specifically underwear hygiene, bathing habits, menstrual hygiene,

and coital hygiene practices (Appendix 1). In addition, to determine genital infection, women had a history of genital infection that had been diagnosed by a physician with a genital infection within the past six months (Hamed, 2015; Sevil et al., 2013). A diagnosis was made to determine genital infection through a Pap smear test (Calik et al., 2020) and specimen collection for genital infection culture (Bahram et al., 2009; Bitew et al., 2017).

Genital infectious diseases obtained from the review were bacterial vaginosis, trichomoniasis, and vulvovaginal candidiasis (Bahram et al., 2009; Bitew et al., 2017) (Appendix 1). Some studies did not explain in detail the types of genital infections suffered by women, they only explained that women had experienced genital infections (but did not specify what type of disease) (Sevil et al., 2013) and the symptoms experienced by women, such as pathological vaginal discharge (Calik et al., 2020) and vaginal infections (Hamed, 2015).

Outcomes

From the five studies, four themes related to genital hygiene behavior were identified: underwear hygiene, bathing habits, menstrual hygiene, and coital hygiene. Meanwhile, three types of genital infections were identified based on data obtained from respondents: bacterial vaginosis, trichomoniasis, and vulvovaginal candidiasis (Appendix 1).

Sevil et al. (2013) examined the relationship between genital hygiene practices and genital infections in a group of university students, including 1057 female students aged between 17 and 27 years old. This study used a questionnaire developed in line with the purpose of the study to evaluate the relationship between genital hygiene practices and genital infection in a group of university students.

Some of the questions that respondents were asked about genital hygiene were (a) underwear hygiene and bathing habits, which consisted of five questions including the type of underwear used (hosiery/cotton, satin/flannel), the frequency of changing underwear (once a week, twice-three times a week, daily), daily pads (yes, none), bathing position (standing, sitting, sometimes sitting, sometimes standing), bathing frequency (daily/once every 2-3 days, weekly/once every fifteen days); (b) the toilet hygiene practice had six questions, which were genital area cleaning, type of genital area cleaning, agent used for genital area cleaning (water, soaps, cosmetics), drying genital area, material used for drying the genital area (toilet roll, cloth), frequency of cleaning genital hair, hand washing; (c) menstrual hygiene, consisting four questions, including the materials used during menstruation (pad, cloth), the frequency of changing materials during menstruation (per day), bathing during menstruation (yes, no) and the use of perfume for unpleasant odors during menstruation. Students who were diagnosed with genital infections by a physician in the past six months were considered "students with a history of genital infections." Of the 1,057 female students included in this study, there were 137 (13.0%) who had a history of genital infections.

An assessment of underwear and bathing habits of students with genital infection history did not demonstrate any relationships between the frequency of changing underwear and infection history ($\chi2 = 5.404$; $p = 0.067$). The frequency of genital infections was higher among those who used hosiery/cotton underwear and daily pads ($\chi2 = 5.602$; $p = 0.018$ and $\chi2 = 8.490$; $p = 0.004$, respectively). History of genital infections was significantly more common among those who bathed in the sitting position and in those who bathed once a week ($\chi2 = 49.570$; $p < 0.001$ and $\chi2 = 25.534$; $p < 0.001$, respectively).

Genital infection was significantly less common among those who told that they practiced genital cleaning ($\chi2 = 62.263$; $p < 0.001$), while they were more common among those who described that they cleaned the genitals randomly ($\chi2 = 14.350$; $p = 0.001$), used soap ($\chi2 = 10.170$; $p = 0.004$), did not dry the genital area ($\chi2 = 48.657$; $p < 0.001$), used cloth for drying ($\chi2 = 30.006$; $p < 0.001$), performed frequent genital area cleaning with materials such as razor ($\chi2 = 15.918$; $p < 0.001$) and did not always pay attention to hand washing ($\chi2 = 12.733$; $p = 0.002$). The frequency of genital infections was significantly higher among those who used cloth and those who did not bathe during menstruation ($\chi2 = 46.042$; $p < 0.001$ and $\chi2 = 8.984$; $p = 0.003$, respectively).

The cross-sectional study by Bahram et al. (2009) included 500 non-pregnant women between the ages of 15 and 45 years. This study aimed to determine the prevalence of BV and the effects of sexual and genital hygiene practices and sociodemographic in non-pregnant women. To diagnose BV, vaginal swabs were heat-fixed, gram-stained and examined with an oil immersion objective (1000x magnification) and analyzed according to the standardized quantitative morphological classification method of Nugent. The diagnosis of vulvar vaginal candidiasis has been suggested in women who presented with symptoms and/or signs of vaginitis, e.g., vaginal discharge, itching, external dysuria, and vulvovaginal erythema. Trichomoniasis was diagnosed by visualizing mobile trichomonads in the wet dissection smear immediately after sampling. All laboratory evaluations were carried out by microbiologists.

The questions on genital hygiene were (a) menstrual hygiene (bathing during menstruation, genital douching during menstruation, use of sanitary napkins, changing sanitary napkins after each urination, sexual abstinence during menstruation); (b) individual vaginal hygiene (regular underwear changing, underwear washing with hot water, use of loose underwear, ironing underwear, front-to-back cleaning of genitalia, use of private

bathroom, personal bathroom amenities, bathroom hygiene, sun drying bathroom amenities, shaving genital hair); (c) hygiene during intercourse (genital douching before intercourse, urination after intercourse, frequency of intercourse).

The prevalence of RTIs was 27.6%, including 16.2% for BV, 6.6% for VT, and 4.8% for VVC. There was a significant correlation between menstrual and individual vaginal hygiene and BV ($p < 0.01$ and $p < 0.001$). In contrast to coital hygiene, no significant correlation was observed between BV and coital hygiene. The data obtained suggest that the prevalence rate of BV is relatively high and could be influenced by hygienic behaviors and certain socio-demographic characteristics.

Bitew et al. (2017) conducted a cross-sectional study among 210 patients to assess the relationship between the prevalence of BV and genital hygiene behavior. Gram-stained vaginal swabs were examined microscopically and sorted by the Nugent method; Bacteria causing aerobic vaginitis were characterized and their antimicrobial susceptibility pattern determined.

Questionnaires on genital hygiene behavior included the number of pants worn daily (1-2 pants/day, one pants for 2-4 days); frequency of vaginal baths/day (1-3, ≥4). The overall prevalence of BV was 48.6%. The prevalence of BV was lower among patients who changed pants more frequently (two per day) than among those who changed their pants less frequently (one pants for 2–4 days) (AOR = 0.367; 95% CI = 0.201 to 0.672; $p = 0.001$). Patients who bathed their vaginal region more frequently were less affected than those who did not bathe their vaginal area as much (AOR = 1.847; 95% CI = 1.013 to 3.370; $p = 0.045$). This study found that the prevalence of BV was high and was affected by individual hygiene.

A cross-sectional study by Calik et al. (2020) recruited 66 married women aged 20 to 49 years. The data were collected using a questionnaire, the Genital Hygiene Behavior Inventory (GHBI), a gynecological examination and the Pap smear test. A specialist performed a Pap smear for the gynecological examination of the women and the results were recorded by the researcher after 20 days.

This study used a questionnaire in the form of GHBI and with a four-level item, and was developed by Ege and Eryılmaz (2005) to determine the genital behaviors of women aged between 15 and 49 years of age. The inventory was single-dimensional and included 24 positive and three negative items, consisted of three subdimensions including “general hygiene,” “menstrual hygiene”, and “abnormal finding awareness.” Each item contained the alternative answer “never”, “sometimes”, “frequently”, and “always”. In the inventory, the lowest and highest total points were 27 and 108 points, respectively. The high total points indicated good behavior in term of genital hygiene.

Of the women who reported having vaginal discharge (54.9%), 45.1% had abnormal discharge and odor (34.6%) and burning sensation (35%); speculum examination showed that 42.6% had a pathological discharge and the incidence of genital infections in vaginal cytology was 79%. It was found that 71.4% of women had pathological or non-pathological discharge; the mean GHBI score for women was 70.27 ± 10.05. It was found that the average GHBI value for women was slightly above the moderate value and that improper genital hygiene practices increased the risk of vaginal infection in women. At the same time, a significant relationship was found between genital discharge complaints and GHBI score hygiene behaviors ($p = 0.009$).

Hamed (2015), in his case-control study, evaluated the impact of genital hygiene practices on the incidence of vaginal infections and developed a care factsheet as a prevention message for women at risk, and not pregnant. Case group: women diagnosed with vaginal infection (n = 100). Control group: women without vaginal infection (n = 100).

Respondents were asked to complete a genital hygiene behavior questionnaire, which consisted of the following questions: (a) genital hygiene practices (type of underwear, frequency of underwear changes, external washing of the genital area, daily use of pads, drying after going to the toilet; (b) menstrual hygiene practices (bathing during menstruation, hand washing before and after using the toilet, type of material used during menstruation, frequency of changing pads, procedures for treating dirty sanitary pads); (c) sexual intercourse hygiene practices (genital care before intercourse, genital care after intercourse, use of local contraceptives, use of chemicals and lubricants during intercourse, use of douching after intercourse).

To assess the gynecological history, this was based on the presence of symptoms associated with a vaginal infection, the history of contraceptives and the presence of gynecological problems. Per-vaginal examination and investigations were done to obtain pertinent data about vaginal infection. The diagnosis of vaginal infection was determined by a physician. The results of this study show that women who suffered from vaginal infection were less likely to use cotton underwear and changed them less frequently ($\chi2 = 10.1$; $p = 0.006$ and $\chi2 = 20.7$; $p = 0.001$, respectively). Meanwhile, they were more apt to use the incorrect technique in washing the genital area ($\chi2 = 26.5$; $p = 0.001$), use intra-vaginal cleansing or douching ($\chi2 = 7.3$; $p = 0.007$) keeping their genital area moist or using reused cloth for drying it ($\chi2 = 7.3$; $p = 0.007$).

Women in the study group were less likely to bathe themselves, washing hands before and after using the toilet and used reusable cloth to absorb menstrual blood ($\chi2 = 6.7$; $p = 0.009$, $p = 0.010$ and $p = 0.001$, respectively). Meanwhile, almost one-fourth (24.0%) of the respondents in the case group less frequently changed their perineal pad and washed their reused cloth (37.0%) ($p = 0.023$ and $p = 0.001$, respectively). Almost one third

of women in the case group did not perform pre- or post-coital care compared to those in the control group ($\chi 2$ = 33.8; p = 0.001, and $\chi 2$ = 26.8; p = 0.001 respectively).

Discussion

The minimum age in this review is 15 years at which age a young girl can choose self-care, both personal hygiene and female organs. Adolescence is a period of the rapid growth of physical and emotional changes (Michael et al., 2020). It is the stage of life when a person enters puberty, but adolescents are found to lack basic information about their bodies. It is still regarded as taboo in a developing country, but today's young people are caught between the conservative culture and the fascinating Western culture due to the influence of the media (Deshmukh & Chaniana, 2020).

Underwear Hygiene

In this review, three of the five papers reviewed asked questions related to underwear hygiene behavior. The questions often arising regarding the cleanliness of underwear are type of underwear used and frequency of changing underwear. The type and cleanliness of underwear and the frequency of replacement are essential factors determining the risk of genital infection (Sevil et al., 2013). Many women who use underwear follow the trend where the type of material used cannot absorb sweat. It is a business trend to make nylon and synthetic lingerie more attractive, especially for young women (Ruiz et al., 2019). However, Felix et al. (2020) argued that nylon absorbs less sweat than cotton underwear, makes the crotch damp, and increases the risk of reproductive tract infections, so women must be wise in choosing the type of fabric in daily use. Cotton underwear is preferable to synthetic materials because cotton is breathable and allows air to circulate the external genitals. The ventilation helps to prevent the buildup of microorganisms and helps maintain healthy skin around the vaginal area (Hamed, 2015). However, one article in this review stated that the frequency of genital infections was higher in those who wore the hosier/cotton type of underwear (Sevil et al., 2013).

The use of underwear is significant and needs to be considered. Based on the Middle East and Central Asia (MECA) guidelines on female genital hygiene recommends wearing loose-fitting cotton underwear, minimizing wearing tight clothes, and changing underwear frequently (Arab, Almadani, Tahlak, Chawla, Ashouri, Tehranian, Ghasemi, Taheripanah, Gulyaf, & Khalili, 2011; Chen et al., 2017). Likewise, the Royal College of Obstetricians and Gynecologists '(RCOG) guidance on vulvar skincare provides recommendations for women to wear loose-fitting silk or cotton underwear and avoid close-fitting clothes (Chen et al., 2017; Hilber, Francis, et al., 2010). Clothing is one of the critical factors in the prevention of vulvovaginitis. Bacteria and yeast thrive in moist or damp places. Therefore, clothing that increases local heat and moisture, such as nylon underwear and tight-fitting garments, including leotards, tights, rubber pants, skintight jeans, nylon underclothing, and tight-fitting diapers, can contribute to vaginal infections and prepubertal vulvovaginitis (Klebanoff et al., 2010).

Bathing Habits

Three studies stated that genital hygiene practices include bathing and toilet habits, such as bathing frequency, bathing position, agent used for genital area cleaning, and the material used for drying the genital area (Bahram et al., 2009; Bitew et al., 2017; Sevil et al., 2013). The female genitals are constantly exposed to factors that affect homeostasis and especially the pH of the skin; these interfering factors include endogenous or physiological factors and exogenous or iatrogenic factors; endogenous factors are moisture, sweat (sweat), sebum secretion, anatomical wrinkles, genetic predisposition, and age; exogenous factors include soap, cosmetics, tight clothing, bathing habits, shaving, and applying topical creams or powders to the skin (Arab et al., 2011).

A study by Sevil showed that history of genital infections was significantly more common among those who bathed in the sitting position. This result is supported by Demir et al. (2020) that it is one of the personal hygiene habits that also contribute to genital cleansing. Women who often take a bath in the form of showers do not need additional applications in genital hygiene. Bathing by sitting on the stool may induce vaginal infection and urinary tract infection if the stool sitting is not hygienic (Demir et al., 2020). On the other hand, Bahram et al. (2009) stated there was a significant correlation between bathing in standing position and the incidence of bacterial vaginosis. In addition to bathing positions affecting the incidence of genital infections, other possibilities can also be influenced by cleaning materials or products such as soap/shampoo used when bathing because changes in the pH of hygiene products will affect the pH of the vagina.

Women who bathed their vaginal region more frequently were less affected by bacterial vaginosis than those who did not bathe their vaginal area as much (Bitew et al., 2017). Routine washing of the vulva is desirable to prevent the accumulation of vaginal discharge, sweat, urine, and fecal contamination to prevent offensive body odor. Although vulvar cleansing may be a helpful adjunct to medical treatment, vulvar cleansing products are not designed to treat infections. There has, however, been a surge in intimate hygiene products for cleanliness and odor control. Still, some may upset pH in the vulvovaginal area, which will affect the composition of the normal vulvovaginal microbiota needed for protection against infection (Chen et al., 2017).

Menstrual Hygiene

Current studies classify menstrual hygiene practices, including the material used during menstruation, frequency of changing the material during menstruation (per day), bathing during menstruation, genital douching during menstruation (Bahram et al., 2009; Hamed, 2015; Sevil et al., 2013). The frequency of genital infections was significantly higher among those who used cloth and those who did not want a bath during menstruation ($p<0.001$ and $p=0.003$, respectively) (Bahram et al., 2009). Similar results from Torondel et al. (2018) showed that women who used reusable sanitary napkins were more likely to get Candida and BV infections than women who used disposable sanitary napkins. In addition, regular body washing during menstruation was associated with a lower risk of BV. Unhygienic menstrual hygiene management (MHM) practices can create abnormally moist conditions in the vulvovaginal area, which can promote opportunistic infections such as Candida. Once infected, it can be difficult to remove Candida from clothing without proper cleaning and drying. Menstrual blood causes changes in vaginal pH (alkaline pH), but the relationship between vaginal microbiology and menstruation is complex. In one study, it was stated that the menstrual sample had been shown to contain the highest number of bacteria at the lowest concentration (Amabebe & Anumba, 2018).

Good menstrual hygiene helps protect the intimate health of bacterial infections, skin irritation and other health problems. Research conducted by Anand et al. (2025) on Reproductive Tract Infections (RTI) shows that the causes of RTI symptoms may be different and are not limited to unhealthy menstrual practices, although this can be one of the causes of reproductive morbidity. Awareness, accessibility, and confidentiality are some of the main concerns that require immediate attention to promote the use of sanitary napkins during menstrual periods (Anand et al., 2015). During menstruation, the blood vessels in the uterus are very susceptible to infection because blood and sweat come out and stick to the vulva, which can cause the genital area to become moist. In moist conditions, fungi, and bacteria in the genital area will thrive, this causes itching and infection in the area. One of the complaints felt during menstruation is itching caused by candida fungi, which will thrive during menstruation and can cause vaginal discharge and which can be caused by wearing cloth pad or disposable sanitary napkins.

Coital Hygiene

From the synthesis on coital hygiene, it was found that several female behaviors that are often practiced are genital douching before and after intercourse, urination after intercourse, and frequency of intercourse. Hamed (2015) said, in his case-control study, that almost one-third of women in the case group did not perform pre or post-coital care compared to those in the control group with statistically significant difference ($p=0.001$). Moreover, Bitew et al. (2017) argued that genital hygiene behaviors such as douching before and after intercourse significantly affect the incidence of vaginal infections. According to Verstraelen et al. (2010), the simplest explanation for this coital effect on the vaginal microflora is that unprotected sexual intercourse changes the physicochemical environment of the vagina and, thus, also influences the vaginal microflora. In particular, the alkaline prostate content of the ejaculate increases the vaginal pH, which remains elevated for up to eight hours after intercourse (Verstraelen et al., 2010). Post-coital intravaginal cleansing (IVC) could counteract the protective effect of a vaginal microbicide (Gafos et al., 2013). The female genitals are conducive to allowing bacteria, secretions, sweat, menstruation, urine, and feces to pass into the vagina during intercourse. The lack of ventilation can lead to infection; it is important to be careful in this zone (Amabebe & Anumba, 2018). Post-coital intravaginal cleansing is an important practice for some women in terms of managing their sexual health and sexuality (Hilber et al., 2012) to increase their confidence with their partner and manage unwanted vaginal odor. The practice of coital hygiene is very dependent on the individual and their partner. Support from the sexual partners is needed to improve good coital hygiene behavior in the prevention of genital infections among women (Umami et al., 2021).

This systematic review found that the incidence of genital infections is more common in women with inadequate genital hygiene (Bahram et al., 2009; Bitew et al., 2017; Calik et al., 2020; Hamed, 2015; Sevil et al., 2013). The prevalence of bacterial vaginosis is high and is influenced by individual hygiene (11,26). Inappropriate genital hygiene practices (Calik et al., 2020) increased the risk of vaginal infection in women. The present systematic review shows that clothing can cause alterations in the vaginal microbiota due to temperature variation, local humidity (Calik et al., 2020; Sevil et al., 2013), and compromised ventilation of the external genitalia, altering the genital ecosystem and causing irritation, an allergic reaction, or discharge (Felix et al., 2020). Sexual intercourse leads to BV if the sexual partner's natural genital chemistry changes the balance of the vagina and causes bacteria to grow.

Limitation

Limitation of this study included the search was restricted to English and full text. There may be relevant information that is published in other languages. This evidence synthesis is based on observational studies only. Cross-sectional data often lack directionality and do not provide information on mechanistic associations or causal effects between genital hygiene behavior and genital infection. In addition, poor data quality is a concern, such as the lack of diagnostic data regarding

genital infections, and some studies only state genital infection from symptoms, prior history of genital infection based on physician diagnoses. Due to the small number of papers, the five studies we reviewed were not strong enough to provide evidence of an association between genital hygiene and genital infection. There is a possibility of publication bias because we only used articles in English, presenting the possibility that articles using other languages also discuss the same topic as this study. However, we believe that the research protocol was methodologically strong to ensure a reliable study selection. For further research, it is hoped that more articles can be reviewed so as to reduce publication bias by including articles in both English and non-English languages and can use meta-analysis to find out better evidence in analyzing the relationship between genital hygiene and genital infection. For professional health workers, in health services, clinics and community, they can provide health education for women, especially in implementing good and correct genital hygiene behaviors.

Conclusion

Hygiene behaviors that are often practiced by women such as underwear hygiene, bathing habits, menstrual hygiene, and coital hygiene seem to be an important factor associated with the incidence of genital infections in women. Women need to practice proper personal hygiene to avoid harmful behavior in order to prevent the rate of genital infections due to wrong hygiene practices. These factors are in line with treatment goals centered on personal and reproductive hygiene care.

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Appendix 1 Summary of articles included in the systematic review

Author Year Country	Aims	Design and Data collection	Sample number and characteristics	Type of Genital Hygiene Behavior	Type of STIs/Genital infection	Research findings
Sevil et al. (2013) Turkey	To evaluate the relationship between genital hygiene practices and genital infection in a group of university students	Cross-sectional study; questionnaire	1,057 female students. A mean age of 21.03 ± 1.70 years.	1. Underwear hygiene and bathing habits (type of underwear used, frequency of changing underwear, daily pads, bathing position, bathing frequency). 2. Toilet hygiene practices (genital area cleaning, type of genital area cleaning, agent used for genital area cleaning, drying genital area, material used for drying the genital area, frequency of cleaning genital area hair, hand washing) 3. Menstrual hygiene practices (material used during menstruation, frequency of changing the material during menstruation (per day), bathing during menstruation, using perfume for malodor during menstruation).	In this study, students diagnosed by a physician with a genital infection within the past six months were considered as "students with history of genital infection" with the answers "yes/no	1. An assessment of underwear and bathing habits of students with genital infection history did not demonstrate any relationships between the frequency of changing underwear and infection history (χ^2=5.404; p=0.067). Frequency of genital infections was higher among those who used hosiery/cotton underwear and daily pads (χ^2=5.602; p=0.018 and χ^2=8.490; p=0.004, respectively). History of genital infections was significantly more common among those who bathed in the sitting position and in those who bathed once a week (χ^2= 49.570; p<0.001 and χ^2= 25.534; p<0.001, respectively) 2. Genital infection was significantly less common among those who told that they practiced genital cleaning (χ^2= 62.263; p<0.001), while they were more common among those who described that they cleaned the genital randomly (χ^2= 14.350; p=0.001), used soap/shampoo (χ^2= 10.170; p=0.004), did not dry the genital area (χ^2= 48.657; p<0.001), used cloth for drying (χ^2= 30.006; p<0.001), performed frequent genital area cleaning with materials such as razor (χ^2= 15.918; p<0.001) and did not always pay attention to hand washing (χ^2= 12.733; p=0.002) 3. The frequency of genital infections was significantly higher among those who used cloth and those who did not bathe during menstruation (χ^2= 46.042; p<0.001 and χ^2= 8.984; p=0.003, respectively)
Bahram et al. (2009) Iran	To determine the prevalence of bacterial vaginosis and impact of sexual and genital hygiene practices	Cross-sectional study; Questionnaire; Gynecological examination	500 non-pregnant women aged between 15 and 45 (mean age 36 years)	1. Menstrual hygiene (bathing during menstruation period, genital douching during menstruation period, using sanitary pad, pad change after each urination, sexual abstinence during menstruation period)	Reproductive Tract Infection (RTI) (27.6%); Bacterial Vaginosis (BV) (16.2%), Trichomoniasis (6.6%), Vulvovaginal Candidiasis (VVC) (4.8%).	There was a significant correlation between menstrual and individual vaginal hygiene and BV (P<0.01 and P<0.001) respectively. In contrast, no significant correlation was

	and socio-demographic characteristics in non-pregnant women			2. Individual vaginal hygiene (regular underwear changing, underwear washing with hot water, sunlight drying of underwear, use of loose underwear, ironing underwear before use, dryness of underwear during day, front to back douching and cleaning of genital area, use of private bathroom, use of personal bathing equipment, sanitation of bathroom before use, bathing in standing position, sun drying of bathing equipment, shaving of genital hair) 3. Coital hygiene (genital douching before intercourse, urination after intercourse, frequency of intercourse (less than 7 times a week))		observed between BV and coital hygiene
Bitew et al (2017) Ethiopia	To determine the prevalence of bacterial vaginosis and associated risk factors among women attending gynecology and antenatal clinics	Cross-sectional study; face-to face interviews using a structured questionnaire	210 female patients aged between 15 and 64 years.	1. Number of pants used per day (1-2 pants/day; one pants for 2-4 days) 2. Frequency of vaginal bathing per day (1-3; ≥4)	Bacterial vaginosis (n=102 (48.6%)); Non-Bacterial vaginosis (n= 108 (51.4%))	1. The prevalence of bacterial vaginosis was lower among patients who changed pants more frequently (two per day; 36.9%) than among those who changed their pants less frequently (one pants for 2–4 days; 57.6%) AOR= 0.367 CI 95% 0.201-0.672; p=0.001 2. Patients who bathed their vaginal region more frequently were less affected than those who did not bath their vaginal area as much (prevalence rate of 40.2% versus 53.9%) AOR= 1.847 CI 95% 1.013-3.370; p=0.045
Calik et al. (2019) Turkey	Identifying women's genital hygiene behaviors and the effects of these behaviors on vaginal infections	Cross-sectional study; face-to-face interviews, and a questionnaire of the Genital Hygiene Behavior Inventory (GHBI)	266 married women, the mean age of 38.5 ± 7.9 (min: 20, max: 49)	The Genital Hygiene Behavior Scale, which was designed as a self-report measure in the 5-point Likert scale, consisted of three subdimensions including "general hygiene," "menstrual hygiene," and "abnormal finding awareness" with 27 items in total. The highest score that can be gotten from the test form is 108 and the lowest score is 27. The high total points showed good behavior related to genital hygiene	1. Genital discharge complaints 146 women (54.9%); No genital discharge complaints 120 women (45.1%) 2. The speculum examination showed that 42.6% had pathological discharge and the incidence of genital infection was 79% in the Pap smear 3. PAP-Smear test results: a. Candida b. Trichomonas Vaginalis c. Bacterial Vaginosis d. Mixed Infections e. Normal discharge	1. The mean GHBI score of the women in the study was found to be 70.27 ± 10.05 2. At the same time, a significant relationship was found between genital discharge complaints and GHBI score hygiene behaviors (p=0.009) 3. The study showed that incorrect and inadequate genital hygiene behavior increases the risk of vaginal infection.
Hamed A.G. (2015) Egypt	To assess the impact of genital hygiene practices on the occurrence of vaginal infection, and to develop a	Case-control study; a structured interview and assessment sheet	Total 200 women. 1. Case group: women diagnosed as having vaginal infection (n=100) a mean age of 27.7±6.3	1. Genital hygienic practices (type of underwear, frequency of underwear change, internal vaginal cleaning or douching, external washing of the genital area, cleansing genital area with hand, direction of cleaning the genital area, use daily pads, drying after using toilet	Vaginal infection (the presence of symptoms associated with vaginal infection)	1. Women who suffered from vaginal infection were less likely to use cotton underwear and changed them less frequently (χ^2= 10.1; p=0.006 and χ^2= 20.7; p=0.001, respectively). Meanwhile, they were more apt to use

	nursing fact sheet as a prevention message for vulnerable women		2. Control group: women free from vaginal infection (n=100) a mean age of 25.5±4.8	2. Menstrual hygienic practices (bathing during menstrual period, washing hands before and after using the toilet, type of material used during menstrual period, frequency of changing pads, method of dealing with dirty pad) 3. Coital hygienic practices (genital care before intercourse, genital care after intercourse, using of local contraceptive, use of chemical substance and lubricant during intercourse, use of vaginal douching after sexual intercourse)	Symptoms: Vaginal discharge (80%); dysuria, offensive odor, and dyspareunia (62%, 60% and 54% respectively)	the incorrect technique in washing the genital area (χ^2= 26.5; p=0.001), use intra-vaginal cleansing or douching (χ^2= 7.3; p=0.007) and keeping their genital area moist or using reused cloth for drying it (χ^2= 7.3; p=0.007) 2. Women in the study group were less likely to bath themselves, washing hands before and after using the toilet and used reusable cloth to absorb menstrual blood (χ^2= 6.7; p=0.009, p=0.010 and p=0.001, respectively). Meanwhile, almost one fourth (24.0%) of the respondents in the case group less frequently changed their perineal pad and washes their reused cloth (37.0%) (p= 0.023 and p=0.001, respectively) 3. Almost one third of women in the case group did not perform pre- or post-coital care compared to those in the control group (χ^2= 33.8; p=0.001, and χ^2= 26.8; p=0.001 respectively)