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Determinants of Behavioral Compliance in Coronary Heart Disease Therapy Among Patients at Bandung Heart Clinic

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ABSTRACT

Background: Coronary heart disease (CHD) ranks seventh among non-communicable diseases (NCDs) in Indonesia, with a projected increase in mortality by 2030 to approximately 23,6 million. The rehabilitation of CHD, which constitutes long-term treatment, significantly depends on patient adherence. **Objective:** This study aims to investigate the determinants of patient adherence behavior at the Bandung Heart Clinic. **Methods:** It employed a cross-sectional research design, gathering data from 471 CHD patients with a history of atherosclerosis at the clinic between January and October 2022. The minimum sample size of 80 respondents, calculated using the Lemeshow formula, was increased to 150 to mitigate potential dropouts. The research instrument used was a questionnaire that had been validated and deemed reliable, except for one question regarding family support. Sampling was conducted using accidental sampling and involved interview data collection. **Results:** Bivariate data analysis, using the chi-square test, indicated significant associations between gender ($p=0.09$), employment status ($p=0.01$), health insurance participation ($p=0.012$), healthcare accessibility ($p=0.022$), family support ($p=0.006$), and treatment motivation ($p=0.22$) with patient adherence behavior. Additionally, female patients ($OR=3,316$) patients who are members of a health insurance ($OR=2,617$), patients with high treatment motivation ($OR=1,983$), patients who receive support from their families ($OR=2,476$) are more likely to exhibit adherence behavior compared to those who are not. **Conclusion:** In summary, it can be concluded that gender, employment status, health insurance participation, family support, and treatment motivation have significant correlations with patient adherence behavior in the context of CHD at the Bandung Heart Clinic. **Keywords:** Adherence, Coronary Heart Disease, Lawrence Green, Therapy.

INTRODUCTION

Worldwide, in 2020, cardiovascular disease mortality reached 9.4 million, with coronary heart disease accounting for 45% of these deaths. This information is supported by international statistical data. Mortality due to this disease is projected to increase to 23.6 million by the year 2030. (Mendis et al., 2011; Wong, 2014)

Coronary Heart Disease (CHD) can be categorized as a fairly common type of cardiovascular disease. It includes disorders of the heart and blood vessels, such as stroke, rheumatic heart disease, and other related conditions. (World Health Organization, 2022)

Based on the 2018 Riskesdas data, it is reported that Coronary Heart Disease (CHD) has a doctor-diagnosed prevalence of 1.5% in the entire population of Indonesia, estimated at 1,017,290 individuals. From this data, it can be concluded that coronary

heart disease ranks seventh among Non-Communicable Diseases (NCDs) in Indonesia. West Java Province is one of the regions with a CHD incidence rate exceeding the national average in 2018, standing at 1.6% or an estimated 186,809 people, with the majority of patients residing in urban areas. (Kementerian Kesehatan RI, 2018)

According to the Guidelines for Cardiovascular Disease Management, it is explained that efforts can be made to prevent the severity of and complications in coronary heart disease (CHD) patients. Control of coronary heart disease by patients can be achieved through pharmacotherapy or medication-based therapy and lifestyle modifications. (PERKI, 2022)

The guideline also states that cardiac rehabilitation can improve the quality of life for patients. This improvement can be demonstrated through the Health-Related Quality of Life (HRQOL)

scale, where patients who consistently adhere to heart therapy have a higher quality of life compared to those who rarely or do not participate in therapy programs. According to a study, the quality of life for non-compliant CHD patients is 3.23 times lower than CHD patients who consistently undergo therapy and rehabilitation. (Nuraeni et al., 2016)

A critical aspect in the management of coronary heart disease (CHD) patients is their adherence to the treatment regimen, given that rehabilitation is part of chronic therapy. The chronic therapy process for CHD encompasses monthly medical check-ups, daily medication intake, and adopting a healthier lifestyle, including a balanced diet, regular exercise, and smoking cessation. When CHD patients do not adhere to chronic treatment, they face risks such as complications and even mortality.

In the United States, chronic treatment for CHD is guided by clinical guidelines issued by organizations like the American Heart Association, sharing similar management procedures with those in Indonesia. In 2014, the American Heart Association highlighted that non-adherence to medication or therapy is a common issue among coronary heart disease patients. (American Heart Association, 2014; Mufarokhah et al., 2016)

In another study, a doctor responsible for the cardiac rehabilitation department at a hospital in Bandung City stated that only approximately 11.35% of coronary heart disease (CHD) patients have consistently adhered to their treatment therapy in the past year. (Puspa Delima et al., 2018)

The researcher conducted a preliminary study concerning the adherence of coronary heart disease (CHD) patients at the Bandung Heart Clinic, which is the sole cardiac clinic in Bandung. The findings of this preliminary study revealed information about the consistency of CHD patient visits from July to September 2022. The high number of patients does not align with the number of visits each month. This incongruence is a clear indication of patient non-adherence to the therapy regimen.

The study draws on Lawrence Green's behavior change theory as a framework to examine the relationship between predisposing factors, enabling

factors, and reinforcing factors with the adherence behavior of coronary heart disease (CHD) patients. The research aims to explore the connection between characteristics, knowledge, healthcare accessibility, family support, the role of healthcare professionals, and treatment motivation with adherence behavior in CHD patients at the Bandung Heart Clinic.

METHODS

This study is a quantitative research conducted with a cross-sectional approach. The research subjects are coronary heart disease (CHD) patients with a history of atherosclerosis at the Bandung Heart Clinic within the timeframe of January to October 2022, with a total population of 471 patients. The minimum sample size calculated using the Lemeshow formula is 80 respondents. Additional samples were included to account for potential dropouts and to ensure more representative data, resulting in a total of 150 respondents. Data collection was carried out using interviews based on a prepared questionnaire.

The sampling technique used was accidental sampling. The selection of respondents was guided by the clinic's administrative department based on the research respondent criteria. Data collection took place over a 15-30 minute period and was conducted while respondents were waiting for the results of an electrocardiogram (EKG) before their doctor's appointment.

Behavioral adherence data were obtained through interviews using a standardized questionnaire, the Modified Morisky Adherence Scale, which had been modified to align with the operational definitions of the study. Measurement included patient consistency in attending medical check-ups, adherence to medication, and adopting a healthier lifestyle. Knowledge, healthcare accessibility, family support, the role of healthcare professionals, and treatment motivation data were collected using prepared questionnaires.

The research questionnaire was subjected to validity and reliability testing with 30 CHD patients from the Healthy Heart Club, the Healthy Heart Foundation, and patients at Al-Islam Hospital in Bandung.

The results of the validity and reliability tests indicated that almost all questions in the adherence, knowledge, healthcare accessibility, healthcare professional roles, and treatment motivation questionnaires were valid and reliable. However, one question in the family support questionnaire was not valid and reliable but was still included in the questionnaire.

Univariate analysis to understand the data characteristics was the first data analysis process after data collection was completed. After understanding the data characteristics, bivariate analysis was conducted using the Chi-Square test, supplemented with multivariate analysis using logistic regression. This research has obtained ethical approval from the Research Ethics Committee of the Faculty of Public Health, Diponegoro University, No. 059/EA/KEPK-FKM/2023.

RESULTS AND DISCUSSION

The characteristics of the respondents include gender, highest education level, employment status, duration of coronary heart disease (CHD), and participation in health insurance. According to Table 1, there were 150 research respondents, with the majority being male (62%), while the remaining were female (38%). Respondents with a higher education level (high school and higher) accounted for 70.7%, which is more than those with lower education (elementary and junior high school), who made up 29.3%. Meanwhile, a higher

percentage of respondents were unemployed (58.7%) compared to those who were employed (41.75%). Most of the respondents had been suffering from CHD for more than 10 years (54.7%), while the rest had been living with CHD for 10 years or less (45.3%). The majority of respondents used personal funds (65.3%) for their healthcare expenses, while 34.7% utilized health insurance.

The frequency distribution for other variables includes adherence behavior, knowledge level, healthcare accessibility, family support, healthcare professional roles, and treatment motivation. The research findings show that nearly all respondents have a high level of knowledge (70%), while a small proportion has a low level of knowledge (30%). Regarding access to healthcare services, the results indicate that 50.7% of respondents have good access, while 49.3% have poor access. In terms of family support, the majority of respondents (54%) reported receiving support from their families, while 46% of respondents reported not receiving such support. Furthermore, in terms of the role of healthcare professionals, the study shows that the majority of respondents (77.3%) consider the role of healthcare professionals as important, while 22.7% of respondents consider it less important. Concerning treatment motivation, more respondents have a high motivation for treatment (50.7%) compared to those with low motivation for treatment (49.3%).

Table 1. Relationship Between Respondent Characteristics, Knowledge Level, Healthcare Accessibility, Family Support, Healthcare Professional Roles, and Treatment Motivation with Adherence Behavior.

Variable	Adherence Behavior in Therapy				p-value
	Compliance				
	Adherent		Non-Adherent		
	f	%	f	%	
Gender					
Man	41	43,2%	51	56,8%	0,009
Woman	53	79,1%	14	20,9%	
Highest Education Level					
Lower Education	59	55,7%	47	44,3%	0,100
Higher Education	18	40,9%	26	59,1%	
Employment Status					
Not Working	56	63,6%	32	36,4%	0,001
Work	21	33,9%	41	66,1%	
Duration of CHD					
≤ 10 Years	35	51,5%	33	48,5%	0,997
> 10 Years	42	51,2%	40	48,8%	
Health Insurance Participation					



Health Insurance	34	65,4%	18	34,6%	0,012
Personal Expenses	43	43,9%	55	56,1%	
Knowledge Level					
High Knowledge	55	52,4%	50	47,6%	0,695
Low Knowledge	22	48,9%	23	51,1%	
Health Care Accessibility					
Good Access Affordability	46	60,5%	30	39,5%	0,022
Poor Access Affordability	31	41,9%	43	58,1%	
Family Support					
Family Support	50	61,5%	30	39,5%	0,006
Less Supportive Families	31	41,9%	43	58,1%	
Healthcare Professional Roles					
The Role of High Health Workers	61	52,6%	55	47,4%	0,572
The Role of Health Workers is Low	16	47,1%	18	52,9%	
Treatment Motivation					
High Treatment Motivation	46	60,5%	30	39,5%	0,022
Low Treatment Motivation	31	41,9%	43	58,1%	

Based on the data presented in Table 1, the chi-square test results reveal that factors related to the adherence behavior of coronary heart disease (CHD) patients are gender, employment status, health insurance participation, healthcare

accessibility, family support, and treatment motivation. Factors unrelated to adherence behavior in CHD patients are the highest education level, duration of CHD, knowledge level, and the role of healthcare professionals.

Table 2. Multivariate Analysis Results Using Logistic Regression.

Variable	B	SE	Wald	df	Sig	Exp(B)	95% CI for Exp (B)	
							Lower	Upper
Gender	1,199	0,387	9,583	1	0,002	3,316	1,552	7,082
Insurance	0,962	0,394	5,947	1	0,015	2,617	1,208	5,669
Treatment Motivation	0,684	0,361	3,593	1	0,05	1,983	0,977	4,024
Family Support	0,907	1,168	6,305	1	0,012	2,476	1,220	5,024

Table 2 presents the results of the multivariate logistic regression model. Based on these results, gender, health insurance participation, treatment motivation, and family support influence the adherence behavior of coronary heart disease (CHD) patients with p-values of 0.002, 0.015, 0.05, and 0.012, respectively. Additionally, female patients are 3.3 times more likely to exhibit adherence behavior compared to those who are not. Patients who are members of a health insurance scheme are 2.6 times more likely to engage in adherence behavior compared to those without health insurance. Patients with high treatment motivation are 1.98 times more likely to exhibit adherence behavior compared to patients with low treatment motivation. Those who

receive support from their families are 2.4 times more likely to be engaged compared to those who feel unsupported.

Gender

When it comes to maintaining health, women often tend to be more attentive to their health compared to men. The Ministry of Health of the Republic of Indonesia has stated that this is because of women's inherent nature to be more health-conscious compared to men (Kementerian Kesehatan RI, 2018). Furthermore, sickness behavior patterns can also be influenced by gender. Women tend to self-treat more frequently when feeling unwell compared to men. This strengthens the statement that there will likely be more female patients who are diligent in adhering to therapy compared to male patients.

This research clearly indicates that gender is one of the variables associated with patient adherence behavior, as evident from the chi-square test results with a p-value of 0.009 and logistic regression with an odds ratio (OR) of 3.3. This study aligns with the research conducted by Alzaru (2022), which found a correlation between gender and adherence behavior with a p-value of less than 0.05 (Al-Zaru et al., 2022). However, there are studies with different findings, such as the research by Hazrati-Meimaneh (2020), which showed that both male and female respondents displayed a similar awareness of adhering to treatment (Hazrati-Meimaneh et al., 2020).

Based on the field research results, female respondents tend to be more compliant in both medication and non-medication therapy. In this study, it was found that only 15.8% of female respondents were employed. According to the initial hypothesis, employed CHD patients might have limited time to focus on their health and prioritize their work. The data suggests that female patients attending the cardiac clinic are influenced by the availability of time and opportunities, where women are more likely to have the time and opportunity to visit the cardiac clinic compared to men. Additionally, female respondents tend not to have high-risk factors compared to males. Most women had never smoked, either before or after being diagnosed with CHD. This may explain why female respondents find it easier to avoid smoking behavior as they were not active smokers before being diagnosed.

Highest Education Level

The highest level of education attained can be defined as an individual's most recent formal education. The level of education is associated with the adherence of CHD patients to their therapy. Research subjects who tend to have higher levels of knowledge mostly exhibit adherence to therapy and rehabilitation.

In this study, it is explained that the highest level of education does not correlate with the adherence behavior of CHD patients. This research aligns with the study by Maytasari (2020),

which found no correlation between the level of education and adherence behavior in taking medication, with a p-value of 0.693 ($p > 0.05$) based on the Chi-Square test (Maytasari & Sartika, 2020). However, Heryati (2014) suggested that individuals with higher levels of education tend to have broader knowledge compared to those with lower levels of education because education forms the foundation for successful treatment. (Heryati, 2014). Ferreira (2019) also stated that low education levels in patients constitute the highest-ranked obstacle according to the World Heart Federation survey, with 89% of survey respondents in agreement (Ferreira et al., 2019).

Based on the data obtained in the field, the lack of significant differences may be influenced by the employment status of highly educated respondents. According to the analysis, 63.2% of highly educated respondents are employed. The busyness and pressure of work are often cited as reasons for a patient not paying much attention to their health. Some respondents even prioritize their work over their own health. Additionally, it can be concluded that both highly educated and less educated respondents equally want to recover from their illness, so the level of education does not have a significant relationship with treatment adherence.

Employment Status

Employment is a necessary part of life to support oneself and one's family. Tedious and repetitive means of earning a living are not a source of pleasure. People with busy and demanding daily schedules typically have less time for medical treatment.

In the bivariate analysis, employment status appeared to be related to adherence behavior, but after retesting through logistic regression, it was found that employment status is not a significant factor. Research by Tambuwun (2021) suggests that employed patients tend to have limited free time to visit available healthcare services (Tambuwun et al., 2021). Keenan (2017) described the same factors in a review of secondary prevention in patients with coronary artery disease (Keenan, 2017). On the



other hand, Violita (2015) states that the primary reason for respondents' non-adherence to treatment is not necessarily their busy schedules but rather their fear of consuming a large quantity of medication (Violita et al., 2015).

Based on the field research, employment can consume a lot of time, and as a result, some respondents mentioned challenges in finding time for therapy, including monthly medical check-ups and adopting a healthier lifestyle. The pressures experienced during work can also be one of the reasons why respondents find it difficult to avoid smoking and consuming coffee.

Duration of CHD

The level of compliance among Indonesian patients with coronary heart disease (PJK) in therapy and control is quite low. Adherence to therapy tends to decrease as individuals have been suffering from PJK for a longer period. This is because most patients may become weary of treatment. (Ketut Gama & et al, 2014)

The duration of suffering from PJK is one of the variables that is not related to patient adherence behavior. Research by Pratiwi (2020) states that there is no significant relationship between the duration of the disease and adherence behavior because other dominant factors are suspected to be at play. (Pratiwi et al., 2020) However, a study by Al-Noumani (2023) indicates that prolonged disease duration reduces adherence levels. This could be closely related to long-term therapy and taking more medication more frequently. (Al-Noumani et al., 2023)

The management of chronic PJK is lifelong, but when the condition improves, doctors may adjust the medication dosage or reduce the frequency of medical check-ups. Based on the field research, the lack of a significant difference in adherence may be influenced by the respondents' self-motivation. The analysis showed that 48.8% of respondents who have been undergoing treatment for more than 10 years still maintain high levels of motivation.

The rehabilitation process can be tedious for patients who have been

undergoing treatment for more than 10 years. However, in reality, there are still many respondents who have been receiving treatment for more than 10 years and continue to exhibit high adherence behavior. Motivation within an individual can be a strong driving force to continue doing what is needed to achieve desired goals. In this context, the duration of suffering from coronary heart disease is not significantly related to adherence behavior because any potential boredom that may arise after years of treatment does not affect the strong motivation that comes from within an individual.

Health Insurance Participation

The participation of respondents in health insurance, which helps provide funds if they suffer from health disorders or diseases, was shown to have a relationship with patient adherence behavior. This was demonstrated through the chi-square test with a p-value of 0.012, and an odds ratio (OR) of 2.6 was obtained through logistic regression analysis.

Research by Emiliana (2021) states that health insurance can support individuals in adopting healthy behaviors and adhering to treatment regimens. (Emiliana et al., 2021) However, this contradicts research by Marsha (2021), which suggests that even when respondents do not have health insurance, they tend to be adherent to their treatment. (Gladis Makatindu et al., 2021)

Based on the field research, health insurance can be one of the reasons why patients with coronary heart disease tend to be more adherent in their treatment. This is because insurance covers the cost, allowing the majority of respondents to make the most of this opportunity to maintain their health.

Knowledge Level

The level of knowledge can influence patient adherence to treatment because the better a patient understands their disease, the more likely they are to adhere to treatment and rehabilitation. This is because patients who are knowledgeable about their condition tend to be more vigilant

and concerned about complications and the potential severity that may occur if they do not take good care of themselves.

In this study, knowledge was found to be a factor that is not related to patient adherence behavior. West (2020) stated that knowledge and adherence are not significantly correlated (West et al., 2020). However, Fitria & Mutia (2016) emphasized that knowledge is necessary to obtain information that supports health and can improve motivation in life. (Fitria & Mutia, 2016)

Based on the data collected in the field, the majority of respondents had good knowledge of coronary heart disease, its impact, and the stages of rehabilitation. In theory, the better an individual's knowledge, the better their health behavior should be. However, despite having a high level of knowledge, many respondents were not adherent to their treatment. This suggests that even respondents with high levels of knowledge do not guarantee their adherence to treatment. Some of the reasons obtained in the field include respondents stating that they sometimes already know about the dangers and restrictions for coronary heart disease patients, but it is still difficult to avoid habits such as smoking because they feel it has become a necessity. Other reasons include having busy schedules and high mobility, which often lead to forgetting to take daily medications.

Health Care Accessibility

The utilization of healthcare facilities, particularly the distance and travel time to healthcare facilities like clinics, can significantly affect treatment adherence. The term "accessibility" in this research refers to factors such as distance, travel time, and the ease of transportation in reaching healthcare services. Patient adherence to therapy can be influenced by the accessibility of healthcare services. Research has shown a relationship between access to healthcare facilities and adherence to treatment.

Accessibility was found to have a significant relationship based on the results of the chi-square test ($p=0.022$). However, after being tested using logistic regression, this variable was determined to have no significant influence. A study by Gladis et al. (2021) suggested that healthcare services with good accessibility were associated with better adherence levels (Gladis Makatindu et al., 2021). In contrast, Pratiwi et al. (2020) found different results, indicating that this factor did not have a significant relationship compared to other factors, such as predisposing factors like motivation to adhere to treatment (Pratiwi et al., 2020)

Bandung Heart Clinic is located in the heart of Bandung City on Jl. Buah Batu. There are various transportation options available to reach the Bandung Heart Clinic, including public minivans (angkot) and online motorcycle taxis (ojek online). Based on additional field data, the accessibility of healthcare services can be one of the reasons why patients with coronary heart disease are more adherent to their treatment. The availability of both public and private transportation for monthly medical check-ups, along with relatively short travel times and good road access, can encourage better adherence to treatment. Furthermore, respondents with good accessibility to healthcare services tend to pay more attention to their lifestyle because they can afford healthcare expenses, including choosing safer food for coronary heart disease patients

Family Support

Coronary heart disease (PJK) is a condition that may require lifelong treatment. Support from individuals in one's surroundings, such as family and friends, can play a crucial role in adhering to therapy. Generally, individuals with coronary heart disease need emotional support and attention from their surroundings, making it easier for them to follow medical advice

In this study, family support emerged as a significant factor in patient adherence to coronary heart disease treatment, as evidenced by both the chi-square and logistic

regression tests with $p=0.006$ and $OR=2.4$. In line with the research conducted by Liang (2022), family support for patients with coronary heart disease (CHD) is associated with the well-being of the patients and plays a crucial role in patient adherence to treatment (Liang et al., 2022).

Based on additional field data, family support can be one of the reasons why patients with coronary heart disease are more adherent to their treatment. The presence of someone who consistently supports the treatment process can instill new motivation in patients. Rehabilitation for coronary heart disease is a long-term treatment process. On the other hand, individuals diagnosed with this condition often experience stress and unfounded fears. Therefore, having someone reassuring, reminding, and accompanying the patient throughout the treatment process can be a powerful motivator for patients to pay more attention to their health, including the therapy they are undergoing

Healthcare Professional Roles

The involvement of healthcare professionals (doctors, nurses, pharmacists) in motivating patients with coronary heart disease during their treatment is crucial. Support from competent healthcare professionals is another aspect that can influence patient adherence. Good service from healthcare staff can lead to positive behavior. On the other hand, the friendly attitude of healthcare professionals who quickly help and provide explanations about the prescribed medications and the importance of regular medication can positively affect patient behavior.

In this study, the role of healthcare professionals was found not to have a significant relationship with patient adherence to treatment. Pratiwi (2020) explained that there is no correlation between the role of healthcare professionals and treatment adherence, possibly due to other more influential factors (Pratiwi et al., 2020). However, Jaarsma (2021) stated that although there are guidelines for self-care, healthcare professionals still

need to provide specific recommendations such as nutritional intake, medication adherence, psychological status, smoking habits, symptom monitoring, and many more (Jaarsma et al., 2021).

Based on data obtained in the field, most respondents felt greatly helped by the active role of healthcare professionals in providing information and motivation. Some respondents even decided to continue their treatment at the clinic because they felt comfortable with the attending doctor and the integrated healthcare system. However, in reality, many respondents still do not adhere to their treatment, even though they acknowledge that the role of healthcare professionals at the Bandung Heart Clinic is good. Some factors that can influence this include time constraints for respondents in completing their monthly medical check-ups.

Treatment Motivation

Motivation for treatment from within an individual significantly influences their health behavior. Patients with high treatment motivation tend to be more compliant with their doctor's advice, diligent in following their treatment regimen, and never miss their daily medications.

In this study, treatment motivation was found to be one of the factors significantly influencing patient behavior, as evidenced by the chi-square test results with $p=0.022$ and confirmed by logistic regression results with an OR value of 1.9. This aligns with the research by Widianingrum (2018), which explains that patient motivation is influenced by both internal and external factors and can significantly affect patient adherence. (Widianingrum, 2018) However, a study by Purnamasari & Meutia (2023) describes that patients tend to lack the desire to control their disease, leading to reluctance to follow medical or non-medical treatment, resulting in a negative relationship (Purnamasari & Meutia, 2023).

Based on additional data obtained in the field, treatment motivation can be one of the reasons why coronary heart disease patients are more

adherent to their treatment. The emergence of self-motivation becomes the foundation for consistency in maintaining their health. The long rehabilitation process often triggers feelings of boredom, whether in taking daily medications, undergoing medical check-ups, or even in adopting a healthy lifestyle. Having self-motivation indirectly has a positive impact on patients because they tend to have a constant goal of being healthier than the day before. Therefore, patients with high treatment motivation are more consistent in following both medical and non-medical treatment regimens.

CONCLUSION

This research indicates a significant relationship between gender, employment status, health insurance participation, healthcare access, family support, and treatment motivation with the adherence behavior of coronary heart disease patients, especially at Bandung Heart Clinic.

Based on these findings, healthcare providers can consider expanding the availability of medical check-ups during weekends or evenings since the majority of respondents face time constraints in their monthly check-ups. Additionally, healthcare providers can establish post-hospital health promotion programs aimed at monitoring patient adherence to medication and healthy lifestyles. Family support and treatment motivation are significant factors related to adherence behavior. Therefore, these programs can involve forming communities or organizing regular activities for coronary heart disease patients. This would undoubtedly help improve patient consistency in adhering to both medical and non-medical treatment. This program would benefit patients and enhance the clinic's reputation as a comprehensive healthcare facility.

Employment status is a significant factor because most employed patients tend to have time constraints in maintaining their health. This should be a concern for other institutions to

continue monitoring their employees' health by granting permission for monthly medical check-ups.

Future research can focus on comparing the adherence of coronary heart disease patients undergoing treatment in specialized cardiac clinics/hospitals with those treated in general clinics/hospitals. This would provide a more comprehensive picture of the factors related to patient adherence to treatment.

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Determinants of Mental Health Literacy Among Correctional Officers

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ABSTRACT

Background: : Inmates are at higher risk of developing mental problems. Correctional officers have an important role in supporting inmate's mental health. Correctional officers' insufficient understanding of mental health can contribute to adverse outcomes for mentally ill inmates in the criminal justice system. **Aims:** This study aimed to determine factors associated with correctional officers's mental health literacy. **Methods:** This is quantitative research using a cross-sectional approach. This research used secondary data from a study about Correctional Officer's Perceptions towards Mental Health, which was conducted in June 2023. The population was 1564 officers in Central Java. The independent variable was demographic factors, history of seminar/training about mental health, and previous contact with someone who has a mental health problem. The dependent variable was mental health literacy, measured with the Mental Health Knowledge Questionnaire (MHKQ). Data was analyzed bivariate with a chi-square test. **Results:** About 66% of correctional institution officers had low mental health literacy. The status as a healthcare worker ($p=0.01$), longer working duration ($p=0.03$), experience of attending mental health seminars ($p=0.00$), and contact with someone that has mental health problem ($p=0.03$) have a significant correlation with officer level of mental health literacy. **Conclusion:** Correctional officers often have limited mental health knowledge. Level of experience, job scope, contact experience with someone with a mental health problem, and mental health training positively impact their literacy. Increasing mental health education in correctional facilities is vital to enhance this, focusing on risk factors and care delivery.

Keywords: Correctional institution officer, Mental health literacy, Mental health, Inmates.

INTRODUCTION

Moving seven years closer to the 2030 SDG goal, which aims to decrease one-third of premature deaths from non-communicable diseases, the worrisome aspect remains the problematic state of mental health, a significant non-communicable disease. Mental health has become a challenge and is reported to be one of the primary causes of the global health burden (WHO, 2011). Based on recent research, it has been found that 1 in 2 people worldwide will experience mental health issues during their lifetime. (McGrath et al., 2023). Inmates are at higher risk of physical and mental health problems than the general population (Butler, et al., 2022). Rates of mental disorders in inmates are very high; Depression, anxiety, substance use, and psychiatric disorders predominate

(Gómez-Figueroa & Camino-Proañó, 2022). It is acknowledged that the loss of freedom, autonomy, and contact with family and friends has a significant physical, social, and psychological impact on the prison population and highlights that the level of mental disorder and behavior in this population is significantly higher (Gómez-Figueroa & Camino-Proañó, 2022).

In addition, overcrowding is a clear cause and contributing factor to many correctional facilities' health problems, including infectious diseases and mental health problems. The latest data shows that 22 national correctional systems have doubled capacity, and another 27 operate at 150-200% (MacDonald, 2018).

The Ministry of Law and Human Rights (Kemenkumham) reported that as of March 24, 2023, the number of inmates in correctional facilities (prisons) in

Indonesia reached 265,897 people. This number exceeds the total capacity of the country's prisons, which is 140,424 people (DataIndonesia.id, 2023). According to early detection conducted by the Directorate of Correctional Services in April 2023, 1 in 3 Indonesian inmates reported mental health problems (Direktorat Jenderal Pemasyarakatan, 2023).

Based on the Correctional Services Act 22 of 2022, correctional facilities, as the communities closest to inmates, play a vital role in reducing mental health problems among inmates. This is by the law, which states that correctional facilities are responsible for providing rehabilitation and care services to inmates. Additionally, the law emphasizes the rights of inmates to receive both physical and mental care, access to medical services, and humane treatment while being protected from harmful actions (UU No. 22 Tentang Pemasyarakatan, 2022). Factors contributing to poor outcomes for mentally ill inmates are the attitudes and lack of mental health knowledge among correctional officers working in the criminal justice system (Hebert, 2020). Improvement in mental health literacy can result in advancements in risk mitigation, compassionate care for incarcerated individuals, and collaborative efforts among various professionals and healthcare providers (S. Darani et al., 2021). On the other hand, Several studies indicate that inadequate management of inmate's mental health problems can lead to high rates of suicide attempts, deaths, and recidivism among inmates (Baranyi et al., 2019). Knowledge and skills about mental health can be defined as mental health literacy (MHL). MHL includes knowing how to prevent mental illness, the ability to recognize signs and symptoms of mental illness in its early stages, knowledge of help-seeking options and available treatments, knowledge of self-help strategies, and mental health first aid skills to help and support others affected by mental illness (Jorm, 2015). Thus, mental health literacy is essential to encourage help-seeking behavior, reduce or prevent disease progression, and improve quality of life (Bennett et al., 2023).

Therefore, this study aims to determine the level of mental health literacy among correctional officers and identify the factors that determine this level of literacy. This study was conducted in the Central Java Province because of the region's varying correctional facilities, including public prisons, women's prisons, juvenile prisons, and high-security prisons. This is expected to provide a more comprehensive understanding of the study's topic. According to the latest national health data (Kementerian Kesehatan Republik Indonesia, 2019), Central Java Province ranks fifth in Indonesia regarding the largest prevalence of schizophrenia and psychosis mental disorders.

METHODS

This quantitative study uses an analytical observational design and a cross-sectional approach. Used secondary data from a study about Correctional Officer's Perception towards Mental Health, conducted in June 2023. The population was 1564 officers in Central Java. According to the Slovin formula, the minimum sample size required is 319 individuals. The inclusion criteria for this study were correctional officers working in correctional facilities for at least one year. The exclusion criteria for this study were respondents who did not complete the questionnaire. Based on those criteria, data used in this study are 1161 correctional officers. Questions that support these research variables were selected. The independent variables in this study include demographic factors (age, gender, employment type, highest education level, years of work), history of attending seminars or training on mental health, and history of contact with individuals with mental health issues. The dependent variable is the level of mental health literacy among correctional officers. The measurement instrument used in this study is the Mental Health Knowledge Questionnaire (MHKQ), developed by Wang and adapted into 13 items for the Indonesian context (Farida, 2021). A higher score indicates a higher level of knowledge. The answer choices are "Yes" and "No," with "Yes" being assigned a value of 1 and "No" a value of 0. A higher score corresponds to a higher level of mental health literacy. The data

is divided into two groups based on the median literacy score. The data obtained will be analyzed using univariate and bivariate analysis with the chi-square test using the SPSS application.

RESULTS AND DISCUSSION

After processing the data from 1,161 respondents, the distribution of respondents is as follows:

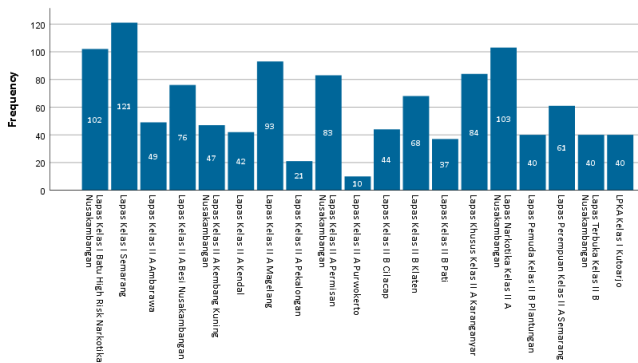


Diagram 1. Respondent Demographic Data

The research respondents ranged in age from 19 to 58 years old. Most respondents were male (86.5%) and predominantly belonged to non-healthcare professions (97.1%). Most respondents had completed their education up to high school level (61.1%), followed by those with a Diploma or Bachelor's degree at 30.1%. Respondents had varying work experience in the correctional institution, ranging from 1 to 38 years (Table 1).

Table 1. Respondent Characteristic

Characteristic	f	(%)
Age	≤ 40 years	804 69,3
	> 40 years	357 30,7
Sex	Male	1004 86,5
	Female	157 13,5
Scope of Work	Non-Healthcare Staff	1127 97,1
	Healthcare Staff	34 2,9
Education	Highschool	709 61,1
	Diploma	37 3,2
	Vocational	349 30,1
	Bachelor's degree	66 5,7
Work Experience in	1-10 years	661 56,9
	> 10 years	500 43,1

Correctional Facilities

In addition, from the descriptive analysis, it was also found that only 24.2% of the respondents had ever received seminars/training related to mental health. Meanwhile, more than half of the respondents (56%) had contact with someone with mental health issues in their surrounding environment, whether within the family, at work, or in the community (Table 2).

Table 2. Respondent's history of contact with mental health issues

History	Ever	f	(%)
Received training/seminar about mental health	Ever	281	24,2
	Never	880	75,8
Had contact with someone who had a mental health problem	Ever	650	56,0
	Never	511	44,0

The results of the measurement of mental health literacy in respondents showed that the minimum mental health literacy score is 3, with a maximum score of 13. The average literacy score is 8.63, and the median score is 9. The total score is then grouped into two categories: high level of mental health literacy and low level of mental health literacy. This grouping is based on a median rating, where respondents with a small score equal to 9 belong to the lowest group, and those with a score above nine are classified into the lower group. The results showed that 66% of respondents had a low level of mental health literacy (Table 3).

Table 3. Distribution of respondents based on mental health literacy

Level of Mental Health Literacy	f	(%)
Low Literacy	766	66,0
High Literacy	395	34,0

Based on the analysis conducted for each item of the Mental Health Knowledge Questionnaire (MHKQ), consisting of 13 items, it was found that respondents tended to answer incorrectly

on items related to the causes of mental health problems, such as "mental disorders are caused by false thoughts," "external pressures cause all mental disorders," and "individuals with a family history of mental disorders are at higher risk of psychological problems and mental disorders." Additionally, respondents also answered incorrectly on items related to specific disorders, such as "some mental disorders like bipolar disorder can be cured within a certain timeframe," as well as on items related to awareness of mental health issues, including knowledge about World Mental Health Day and World Suicide Prevention Day. The summary of respondents' answers can be seen in Table 4.

Each independent variable was analyzed bivariate with the dependent variable. From the analysis results, a significant relationship was found between the status as a healthcare worker ($p=0.01$), longer working duration ($p=0.03$), experience of attending mental

health seminars ($p=0.00$), and a history of contact with individuals with mental health issues ($p=0.03$) with a high level of mental health literacy. Healthcare workers tended to have mental health literacy 1.015 times higher than non-healthcare workers. Workers working for more than ten years tended to have mental health literacy 0.746 times higher than those working for 1-10 years in correctional institutions. Workers who had attended mental health seminars tended to have mental health literacy 1.846 times higher than those who had not attended seminars. Workers with a history of contact with individuals with mental health issues tended to have mental health literacy 1.323 times higher than those without a contact history. The study did not find a significant relationship between gender, age, education level, and mental health literacy among correctional facility staff (Table 5).

Table 4. The distribution of respondent answers is based on Mental Health Literacy items.

Items	True		False	
	N	%	N	%
Mental disorders are caused by incorrect thinking. (false)	128	11	1033	89,0
Many people have mental problems but do not realize it. (true)	1058	91,1	103	8,9
External stressors cause all mental disorders. (false)	635	54,7	526	45,3
Most mental disorders cannot be cured. (false)	1035	89,1	126	10,9
Psychological or psychiatric services should be sought if one suspects the presence of psychological problems or a mental disorder. (true)	920	79,2	241	20,8
Mental disorders and psychological problems cannot be prevented. (false)	917	79	244	21
Some mental disorders like bipolar disorder can be treated within a specific timeframe. (false)	444	38,2	717	61,8
Individuals with a family history of mental disorders are at higher risk of experiencing psychological problems and mental disorders. (true)	773	66,6	388	33,4
Psychological issues in teenagers do not affect academic performance. (false)	866	74,6	295	25,4
Individuals with negative characteristics are more likely to experience mental health problems. (true)	897	77,3	264	22,7
Mental health issues are more likely to occur when individuals experience significant psychological stressors in their lives, such as the death of a family member. (true)	976	84,1	185	15,9
I have heard about World Mental	797	68,6	364	31,4

Health Day					
I have heard about	Suicide Prevention	570	49,1	591	50,9
Day					

Table 5. Result of Bivariate Analysis.
 Level of Mental Health Literacy

Variables	Level of Mental Health Literacy						OR (95% CI)	P value
	Low		High		Total			
	N	(%)	N	(%)	N	(%)		
Age:								
> 40 years	237	66,4	120	33,6	804	100	1,027 (0,789 - 1,336)	0,90
≤ 40 years	529	58,0	275	34,2	357	100		
Sex:								
Male	673	67,0	331	33,0	157	100	1,399 (0,992 - 1,975)	0,07
Female	93	59,2	64	34,0	1004	100		
Scope of Work:								
Non-healthcare staff	751	66,6	376	33,4	1127	100	1,015 (0,503 - 2,048)	0,01*
Healthcare Staff	15	44,1	19	55,9	34	100		
Education:								
Highschool	465	65,6	244	34,4	709	100	0,69	
Vocational	26	70,3	11	29,7	37	100		
Bachelor's degree	235	67,3	114	32,7	349	100		
Postgraduate	40	60,6	26	39,4	66	100		
Work Experience in Correctional Facilities:								
1 - 10 years							0,747 (0,583 - 0,957)	0,03*
> 10 years	417	63,2	243	36,8	660	100		
Received training/seminar about mental health:								
Never	611	69,4	269	30,6	880	100	1,846 (1,402 - 2,432)	0,00*
Ever	155	55,2	126	44,8	281	100		
Had contact with someone who had a mental health problem:								
Never	355	69,5	156	30,5	511	100	1,323 (1,034 - 1,694)	0,03*
Ever	411	63,2	239	36,8	650	100		

As the closest community to inmates, frontline correctional officers play a central role in managing mental health issues (Dvoskin & Spiers, 2004). Community knowledge about mental health issues clearly impacts attitudes and help-seeking journeys and prevents stigma and discrimination against patients with mental health problems. God. It is also a foundation for designing evidence-based community mental health interventions (Tesfaye et al., 2021). People who know about mental illness or have contact with people diagnosed with mental illness are less likely to have discriminatory attitudes. Interactions

between correctional officers and inmates significantly impact inmates' mental health and improve conditions for inmates (Stringer, 2019). However, correctional staff training on mental health is often considered inadequate (S. Darani et al., 2019). This is in line with the findings of this study, which indicate that only 24.2% of respondents have received training related to mental health. The scarcity of training can also be observed from the results of grouping literacy scores, where only 34% of respondents have a high level of mental health literacy. The low level of literacy can lead to correctional officers being inadequately prepared when they need to interact with mentally ill inmates

and handle related situations to calm them (S. A. Darani et al., 2023).

The item of mental health literacy most frequently answered incorrectly by respondents is related to the causes of mental health problems and the need for treatment, primarily when it is associated with specific disorders. This aligns with previous research that found that most people do not know the causes, treatments, and prevention of mental illness (Yin et al., 2020). These findings can serve as a foundation for developing mental health training content that can be provided to correctional officers to support their role in mental health issues within correctional facilities.

In this study, the length of time working in a correctional facility was significantly associated with higher mental health literacy scores. Individuals who had been working in the facility for a longer time showed higher levels of literacy. This could be attributed to their increased exposure and interaction with inmates in the correctional facility over the years, contributing to a better understanding of mental health issues. This research also found a relationship between contact with individuals with mental health issues and their literacy level. This is in line with previous research findings that stated people's perceptions of mental illness are influenced by their encounters with people with mental illness, media representations, cultural stereotypes, and personal experiences of mental illness (Tesfaye et al., 2021)

This research also found a significant relationship between the scope of work (healthcare and non-healthcare personnel) and mental health literacy. Healthcare personnel demonstrated a higher level of literacy. However, considering the limited number of healthcare staff within correctional facilities, it is essential to consider collaborative schemes among teams to provide adequate mental health services. Successful collaboration between correctional officers and treatment staff requires a foundation of mutual respect, shared training, and ongoing communication and collaborative supervision (Appelbaum et al., n.d.)

The research did not find a significant relationship between gender, age, and level of education with mental

health literacy levels. The lack of a significant relationship between gender and literacy levels was also found in previous studies in the Chinese, Indonesian, and Ethiopian populations (Girma et al., 2013; Idham et al., 2019; Li et al., 2018). However, some studies have also studied type measured among medical students and mental health staff, proving that women have better mental health knowledge and are more prepared to interact with people with mental disorders (Li et al., 2014; Rong et al., 2011). The lack of a significant relationship between educational attainment and age with mental health literacy found in this study contradicts the results of a previous study of the Chinese population, which found that the age and educational level of the participants had a significant impact on their mental health literacy level (Hebert, 2020; Tesfaye et al., 2021). Such differences in research results are not uncommon in the social and behavioral sciences, as various factors, including the specific study population, cultural context, sample size, and methodology, can influence them. It is essential to consider these factors when interpreting and generalizing research findings.

CONCLUSION

Inmates have a higher risk of experiencing mental health problems compared to the general population. Inmates are exposed to many risk factors in correctional institutions that may lead to mental health issues. Correctional institutions, as the closest community to inmates, are crucial in ensuring inmates receive the necessary support and care for mental health problems. The knowledge and perceptions of correctional officers regarding mental health issues can support the existence of a good mental health system in correctional institutions. Based on this research, it was found that the level of knowledge among correctional officers is low. The duration of employment, scope of work, contact, and experience in mental health training are positively related to the literacy level of officers. This can be used to develop more effective training programs by empowering healthcare staff and individuals with contact experience to

share their insights. It is also essential to ensure the sharing of experiences from more experienced staff to new staff, especially related to dealing with mental health issues. The findings of this study also demonstrate the importance of increasing mental health education within the correctional facilities environment to improve the literacy of officers, specifically related to mental health risk factors and how to deliver care.

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Opportunity for a Healthy Campus Program as a Sustainable Development Goal: Assessing Lifestyle Factor and Mental Health Status

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ABSTRACT

Background: Globally, mental health has become a major issue in health development today. Campus communities cannot be separated from the problem of mental health. **Aims:** This study aims to describe the relationship between demographic and lifestyle factors with mental health status in campus communities. **Method:** This study used a quantitative method with a cross-sectional design. Data collection was conducted through an online survey on 11-30 October 2021 at one of the universities in Yogyakarta. There were 503 respondents consisting of students, lecturers, and education staff. The instrument of mental health was the Self-Reporting Questionnaire-29 (SRQ-29). **Result:** There were indications of needing referral due to anxiety and depression as much as 33.4%, and there were 5.28% of respondents requiring referral due to psychotic disorders, drugs, and PTSD. Demographic factors associated with mental health status were job status, sex, and age. Meanwhile, lifestyle aspects that are associated with mental health status are physical activity duration and fruit and vegetable consumption per day. This was indicated by the respective p-values of 0.000 (job status), 0.042 (sex), 0.027 (age), 0.003 (duration of physical activity), and 0.011 (consumption of fruits and vegetables per day). Furthermore, multivariate analysis showed that the duration of physical activity, as well as fruit and vegetable consumption, had a negative linear effect on the incidence of mental health disorders. **Conclusion:** The main findings provide baseline data for developing healthy campuses as part of sustainable development goals (SDGs), particularly for mental health programs.

Keywords: Healthy Campus, Lifestyle, Mental Health, Sustainable Development Goals (SDG's).

INTRODUCTION

Globally, mental health has been a central issue of health development over the past three decades. Mental health has an intrinsic and instrumental value critical to individual well-being. Mental health issues are a global goal of the third sustainable development goal (SDGs) to ensure healthy lives and promote the well-being of people of all ages (Tenaga *et al.*, 2022). Complex interactions between stresses and vulnerabilities at individual, community, and structural levels determine mental health (WHO, 2022). Approximately one billion people were experiencing mental health disorders, including 14% of adolescents worldwide, in 2019. Mental

illness is the leading cause of disability, affecting one in every six years of life. In 2018, in Indonesia, more than 19 million people over the age of 15 suffered from mental and emotional illness, and more than 12 million people over the age of 15 suffered from depression (Rokom Kemenkes, 2021). One in ten Indonesians experience mental and emotional disorders. The number of people with mental disorders in Yogyakarta is the highest in Indonesia (Kemenkes RI, 2018). One in three Indonesian adolescents experiences mental health problems (Gloriabarus, 2022). There have been five recorded incidents of suicide experienced by students in Yogyakarta throughout 2023. The series of suicides experienced

by students in Yogya this year is partly due to the increase in mental health disorders during the COVID-19 pandemic. During the pandemic, students are also mostly participating in online learning, making it very rare for them to interact directly with their friends or lecturers. Because they have no one to talk to, many of them choose to keep their problems to themselves. This leads to increased boredom and stress experienced by students, and in more severe situations can experience depression (Kumparan, 2023).

Lifestyle factors are crucial in positively influencing medical conditions, mental health, and the risk of disease, morbidity, and mortality. Measures such as having a healthy diet, participating in physical activity, stopping smoking, and avoiding the consumption of harmful substances have a major impact on mental health status. Achieving a healthy lifestyle includes creating a safe environment, ensuring adequate sleep patterns, managing stress, obtaining social support, and engaging in mentally beneficial activities (Zaman, Hankir and Jemni, 2019). In addition, factors such as age (Idris and Hasri, 2023; Liu *et al.*, 2023), gender (França *et al.*, 2017; Kim *et al.*, 2022), and employment status (Idris and Hasri, 2023) can also affect mental health.

Mental health disorders can have a significant impact on a person's physical health. People suffering from severe mental illness are more susceptible to physical illnesses such as nutritional and metabolic diseases, cardiovascular diseases, viral diseases, respiratory diseases, musculoskeletal diseases, sexual dysfunction, pregnancy complications, and stomatognathic diseases, and may be associated with obesity (De Hert *et al.*, 2011). In addition, some rare mental health disorders, such as somatic symptom disorder, illness-induced anxiety disorder, and conversion disorder, may also affect cognitive function (Razzak *et al.*, 2022). Lifestyle significantly influences a person's mental health, and a healthy lifestyle can help maintain and improve mental health (Yoo and Kim, 2020).

Health promotion is an approach to improving public health that requires broad participation. It can be understood as action and advocacy to address the full

range of potentially modifiable determinants of health, including actions that enable people to adopt and maintain healthy lifestyles and those that create living conditions and environments that support health (Boxer, 2005). Mental health promotion is an integral part of health promotion theory and practice. Interventions can be applied at the population, subpopulation, and individual levels, and across settings and sectors within and beyond the health sector (Singh, Kumar and Gupta, 2022). Mental health promotion focuses on helping people acquire the knowledge and skills they need to promote and protect their mental well-being, while simultaneously working to create positives in our shared social environment that benefit us all (Kalra *et al.*, 2012). A healthy campus is part of a health promotion program and mental health is one of the issues of a healthy campus. This study analyzes the relationship between demographic factors and lifestyle with mental health status among the campus community as baseline data to initiate a healthy campus.

METHODS

This study uses an explanatory quantitative method with a cross-sectional design (Swarjana, 2016). The research was conducted at one of the universities in Yogyakarta with the population being students, lecturers, and education staff. The campus that became the research location is one of the universities in Indonesia that won a research grant on developing a healthy campus from the Ministry of Health of the Republic of Indonesia in August 2021. Data collection was collected through an online survey from 11-21 October 2021. Meanwhile, the research sample was students, lecturers, and employees willing to voluntarily complete questionnaires distributed directly via WhatsApp. Sampling was carried out consecutively and obtained 503 respondents, including 108 lecturers and education staff and 395 students.

Mental health measurement tools using Self-Reporting Questionnaire-29. This questionnaire consists of 29 questions that the respondents themselves fill in. Mental health status categories are divided into 2, namely need to be referred and do not need to be referred to mental health professionals. The

analysis of the questionnaire is as follows: If in questions 1-20 there are at least 5 (five) Yes answers, the respondent should be referred to mental health professionals (psychiatrists, psychologists, general practitioners, and nurses who have been trained in mental health). Meanwhile, for questions 21-29 if there is only 1 (one) Yes answer, then the respondent should be referred to a mental health professional (Kemenkes RI, 2019). Descriptive data analysis using SPSS version 22. This research has received a certificate of ethical feasibility from Respati University Yogyakarta with no: 228.3/FIKES/PL/XI/2021. Analysis was carried out up to multivariate analysis. Univariate analysis uses frequency distribution analysis, bivariate analysis uses the Chi-Square test, and multivariate analysis uses the binomial logistic regression test, provided that the p-value in the bivariate analysis is not more than 0.25 (Sugiyono, 2019).

RESULTS AND DISCUSSION

Description of Demographic Factors and Lifestyle with Mental Health Status

The majority of respondents were university students (78.7%). The average respondent came from the faculties of health, social sciences and economics, and science and technology (99.4%). Female respondents accounted for 80.3%, with an average age range between 17 and 45 years, which is around 94.8%. Most respondents participated in physical activity 1-3 times per week (77.5%) with an activity duration of less than 1 hour (73.6%). Most respondents consumed fruits and vegetables 1-3 times per day (85.1%). A total of 94% of the respondents did not smoke, and among those who smoked, most smoked less than or equal to 5 cigarettes per day (97.6%) with a smoking duration of less than or equal to 5 years (98.2%). Furthermore, about 40% of respondents had anxiety and depression, about 35% had psychotic disorders, and 35.4% had PTSD. There were indications of needing referral due to psychological disorders, as much as 33.4%, and there were 5.28% of respondents requiring referral due to PTSD, drug, and psychotic disorders. A more detailed explanation is presented in Table 1.

Table 1. Description of Demographic Factors, Lifestyle, and Mental Health Status of Respondents (N=503).

Variables	n	%
Demographic Factors		
Job Status		
Students	396	78.7
Lectures and Staff	107	21.3
Faculty		
Non-Faculty (HRD, LPPM)	3	6
Faculty of Public Health, Faculty of Social Science and Economics, Faculty of science & technology	500	99.4
Sex		
Male	99	19.7
Female	404	80.3
Age		
17 - 45 years	477	94.8
46 - 65 years	26	5.2
Lifestyle		
Total of Physical activity (Weeks)		
≤ 3 times	390	77.5
>3 times	113	22.5
Length of physical activity		
≤1 hour	370	73.6
>1 hour	133	26.4
Eat fruits and vegetables (day)		
≤3 times	428	85.1
>3 times	75	14.9
Smoking		
Yes	30	6
No	473	94
Smoking duration (Years)		

>5 Years	8	1.8
≤5 Years	495	98.2
Body mass index (BMI)		
Abnormal	207	41.2
Normal	296	58.8
Mental Health Status		
Anxiety & depression		
Yes	201	40
No	302	60
Drug uses		
Yes	4	0.8
No	499	99.2
Psychotic disorder		
Yes	181	36
No	322	64
Post-Trauma Syndrome Disorder		
Yes	178	35.4
No	325	64.6
Mental Health Status : Anxiety & depression (SRQ 1-20)		
Need to refer	168	33.4
No need to refer	335	66.6
Mental Health Status: Drug, psychotic, PTSD (SRQ 21-29)		
Need to refer	26	5.2
No need to refer	477	94.8

Relationship between Demographic and Lifestyle Factors with Mental Health Status

Demographic factors associated with mental health status (psychological disorders-SRQ 1-20) were employment status, gender, and age. Meanwhile, lifestyle aspects associated with mental health status (psychological disorders-SRQ 1-20) were duration of physical activity, and fruit and vegetable consumption per day. This results indicated by the

respective p-values of 0.000 (job status), 0.042 (gender), 0.027 (age), 0.003 (duration of physical activity), and 0.011 (consumption of fruits and vegetables per day). The results are shown in Table 2. Furthermore, the results of bivariate tests between demographic factors, and lifestyle with mental health status for SRQ 21-29 (drugs, psychotic, PTSD) showed that only job status was associated with mental health (p-value 0,000).

Table 2. Correlation of Demographic and Lifestyle Factors with Mental Health Status (SRQ 1-20).

Variables	Mental Health Status No. 1-20			P-value	PR (95% CI)
	Need to refer	No need to refer	Total		
Job Status					
Students	155 (30.8%)	241 (47.9%)	396 (78.7%)	0.000*	3.22 (1.90-5.44)
Lecturers & Staff	13 (2.6%)	94 (18.7%)	107 (21.3%)		
Faculty					
Non-Faculty	0 (0%)	3 (0.6%)	3 (0.6%)	0.554	1.50 (1.41-1.60)
Faculty of Public Health, Faculty of Social Science and Economics, faculty of science & technology	168 (33.4%)	332 (66%)	500 (99.4%)		
Sex					
Male	24 (4.8%)	75 (14.9%)	99 (19.7%)	0.042*	0.68 (0.46-0.98)
Female	144 (28.6%)	260 (51.7%)	404 (80.3%)		
Age					
17 - 45 years	165 (32.8%)	312 (62%)	477 (94.8%)	0.027*	2.99 (1.02-8.75)
46 - 65 years	3 (0.6%)	23 (4.6%)	26 (5.2%)		

Total of Physical activity (Weeks)					
≤ 3 times	135 (26.8%)	255 (50.7%)	390 (77.5%)	0.337	1.185 (0.863-1.629)
>3 times	33 (6.6%)	80 (15.9%)	113 (22.5%)		
Length of physical activity					
≤1 hour	138 (27.4%)	232 (46.1%)	370 (73.6%)	0.003*	1.65 (1.17-2.32)
>1 hour	30 (6%)	103 (20.5%)	133 (26.4%)		
Eat fruits and vegetables (day)					
≤3 times	153 (30.4%)	275 (54.7%)	428 (85.1%)	0.011*	1.78 (1.11-2.86)
>3 times	15 (3.0%)	60 (11.9%)	75 (14.9%)		
Smoking					
Yes	10 (2%)	20 (4%)	30 (6%)	1.000	1.00 (0.59-1.68)
No	158 (31.4%)	315 (62.6%)	473 (94%)		
Smoking duration (Years)					
>5 Years	2 (0.4%)	6 (1.2%)	8 (1.6%)	0.724	0.74 (0.22-2.49)
≤5 Years	166 (33%)	329 (65.4%)	495 (98.4%)		
Body mass index (BMI)					
Abnormal	67 (13.3%)	140 (27.8%)	207 (41.2%)	0.753	0.94 (0.73-1.22)
Normal	101 (20.1%)	195 (38.8%)	296 (58.8%)		

Multivariate Analysis of Demographic and Lifestyle Factors with Mental Health Status

The results of multivariate analysis showed that employment status, gender, and age did not influence mental health in questions 1-20. On the other hand, the duration of physical activity and fruit and vegetable consumption significantly influenced mental health in questions 1-20. Variables tested multivariately must have a p-value ≤ 0.25 . Physical activity and fruit and vegetable consumption each have a β (beta) value of -0.757 and -0.977. These values indicate a negative linear relationship between physical activity levels and fruit and vegetable intake and the incidence of mental health disorders. From these results, it can be concluded that the higher the level of physical activity and the greater the intake of fruit and vegetables, the lower

the possibility of mental health disorders. Thus, physical activity and consumption of fruits and vegetables are preventive or protective factors against mental health disorders. Respondents with physical activity more than 3 times a week have a chance of not experiencing mental health disorders by 0.46 compared to respondents with physical activity less than 3 times a week. Respondents with fruit and vegetable consumption more than 3 times a day have a chance of not experiencing mental health disorders by 0.48 compared to respondents with fruit and vegetable consumption less than 3 times a day. Meanwhile, the multivariate results also showed that the variables of employment status and smoking did not affect mental health status in questions 21-29. A more detailed explanation is shown in Table 3 below.

Table 3. Multivariate Analysis of Demographic and Lifestyle Factors with Mental Health Status.

Variables	β	P value	Exponen (β)/ Odds Ratio
Mental Health Status (SRQ 1-20)			
Job Status	-18.762	0.999	0.000
Sex	0.253	0.376	1.288
Age	-0.039	0.957	0.961
Duration of Physic Activity	-0.757	0.002*	0.469
Eating Fruits & Vegetables	-0.977	0.029*	0.488
Mental Health Status (SRQ 21-29)			
Job Status	18.721	0.999	0.000
Smoking	0.700	0.281	2.014

The SDGs are global and national commitments to improve the welfare of society, including 17 global goals and targets for 2030 declared by both

developed and developing countries at the UN General Assembly in September 2015. The 17 goals are (1) No Poverty; (2) No Hunger; (3) Healthy and Prosperous Lives; (4) Quality Education; (5) Gender

Equality; (6) Clean Water and Sanitation; (7) Clean and Affordable Energy; (8) Decent Work and Economic Growth; (9) Industry, Innovation and Infrastructure; (10) Reduced Inequalities; (11) Sustainable Cities and Settlements; (12) Responsible Consumption and Production; (13) Addressing Climate Change; (14) Ocean Ecosystems; (15) Land Ecosystems; (16) Peace, Justice and Resilient Institutions; (17) Partnerships for the Goals (Bapenas, 2023). Improving the mental health of the campus community is part of the third SDGS goal, which is to ensure healthy lives and improve the well-being of people of all ages. The mental health program is one of the healthy campus programs at the university. The Sustainable Development Goals (SDGs) is a global development agenda to end poverty, improve well-being, and protect the planet, through the achievement of 17 goals by 2030 (Tenaga *et al.*, 2022).

The results showed that mental health category No. 1-20 refers to anxiety and depression. In this category, around 40% of the total respondents experienced anxiety and depression, with 33.4% of them needing to be referred for further treatment. The results of this study are in line with the results of research at universities in Bangladesh which states that mental health disorders include "psychological distress" relating to the anxiety levels they reported. At the same time, depression (35%) and stress remained (20%)(Gamage and Herath, 2021). Furthermore, mental health in categories No. 21-29 refers to substance use, psychotic disorders, and PTSD. In this category, around 0.8% of respondents showed indications of drug use, 36% experienced psychotic disorders, and 35.4% experienced PTSD, of which 5.2% needed to be referred.

The most significant correlates of positive screening were older age and female gender (Odriozola-González *et al.*, 2020). Various studies have also shown that mental health disorders are more common among students than among workers (lecturers and educational staff) (Odriozola-González *et al.*, 2020; Aziz *et al.*, 2021). Different proportions are also seen in male and female students, possibly due to different responses and perspectives in dealing with problems and

pressures from the environment and campus (Rosemary Rizanna, 2019)

This study's results align with Dale *et al.*'s findings, which show that lifestyle factors such as physical activity are associated with better mental health (Dale *et al.*, 2021). Another study in Switzerland also stated that loneliness is associated with poor physical and mental health, as well as unhealthy lifestyles (Richard *et al.*, 2017). Other findings from Perret *et al.*'s research suggest that lifestyle affects levels of resilience, affecting mental health (Perret *et al.*, 2020).

Other studies have also shown that exercise, in general, is associated with better mood and improved quality of life. The impact of physical health on mental health is well-documented, with many psychological effects, such as self-esteem, cognitive function, mood, depression, and quality of life, remaining the focus of further research. These findings confirm the importance of exercise in improving outcomes for people with mental illness (Mahindru, Patil and Agrawal, 2023). Lifestyle changes influence changes in mental health. Increased leisure time, activity, and decreased sleep duration are the lifestyle changes most closely associated with changes in mental health (Tanaka *et al.*, 2021).

The results showed that healthy lifestyle choices, such as increasing physical activity, not smoking, and maintaining a regular social rhythm, were associated with improved mental health over 1 year (Velten J *et al.*, 2018). Economic challenges, particularly a sense of despondency, contribute to the increase in mental health issues. Measures such as social distancing and other societal challenges further exacerbate depression within communities, which mostly led people to smoke as stress release during the health pandemic (Rosemary *et al.*, 2023).

Based on Dharmayani *et al.*'s research, fruit and vegetable intake is associated with mental health, including reducing the risk of depression (Dharmayani *et al.*, 2021). In healthy adults, vegetable consumption is also associated with psychological health (Tuck, Farrow and Thomas, 2019). A Japanese study showed that higher fruit and vegetable consumption in middle age

was associated with a lower risk of developing major depressive disorder later in life (Narita *et al.*, 2022). Higher fruit and vegetable consumption was also associated with lower levels of psychological distress (Richard *et al.*, 2015), and higher fish, fruit, and vegetable intake was also associated with lower incidence of mood disorders (Huang *et al.*, 2019).

There are many ways to overcome mental health problems, such as a) asking for help because we do not have to face everything alone, talking to people we trust and discussing what the problem is; and b) breathing slowly and long. This simple action will reduce anxiety levels; c) eating a healthy and balanced menu because the body needs the energy to overcome stress; d) taking time to relax and do activities that you like; e) exercise regularly; f) doing tasks regularly, not piling up work (Kemenkes RI, 2019).

Expanding access to services, promoting promotive efforts, and increasing public awareness of mental health disorders should be a priority direction of national mental health policy. By not always relying on medical treatment and focusing more on family and community-based care, the welfare of people with mental disorders can certainly be improved (Ridlo and Zein, 2018).

Mental health prevention and control efforts that can be carried out include advocacy and socialization to regents/mayors and DPRD's to make policies that favor the improvement of community mental health; optimizing the role of district/provincial health offices in mental health efforts; increasing the coverage of mental health services in health services; building effective partnerships with non-governmental organizations, professional organizations, the private sector, by forming community mental health teams in provinces, districts/cities; encouraging family and community empowerment in mental health efforts; and developing mental health information systems through various surveys and research (Kemenkes RI, 2019).

The key to successful prevention and treatment of mental health problems is to increase and optimize preventive, curative, and rehabilitative efforts. This can be done by encouraging university

leaders to implement a healthy campus program. In addition, early detection of mental health problems in the campus environment needs to be intensified. The implementation of a healthy campus can be strengthened through regulations such as a healthy campus provost's decree. In addition, partnerships with health centers and hospitals must be established for further treatment of campus residents with mental health problems.

CONCLUSION

Factors such as gender, age, physical activity, and fruit and vegetable consumption were associated with mental health conditions (anxiety and depression). Job status is also associated with mental health problems both psychological and substance use, psychotic disorders, and PTSD. The variable length of physical activity affects mental health conditions. It is necessary to implement prevention and treatment programs for mental health disorders, such as anxiety and depression, especially among university students. This finding provides baseline data for developing a healthy campus, particularly for mental health programs. The program, e.g. increasing health literacy related to mental health, campaigns to increase physical activity, fruit and vegetable consumption, and avoiding smoking, are needed to help improve mental health status. In addition, advocate university leaders to create healthy campus regulations, provide mental health counseling, collaborate with the health office for further treatment, and ensure the program's sustainability.

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Determinants of Unintended Pregnancy in Central Java in 2022

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ABSTRACT

Background: Unintended pregnancy presents major challenges to maternal and child health. Despite extensive family planning initiatives in Indonesia, particularly in Central Java Province, the reduction in unintended pregnancies remains limited, from 13.5% in 2017 to 11.3% in 2022. A thorough comprehension of the issue based on target characteristics is essential for crafting effective targeted programs. **Objective:** This study aims to analyze the determinants of unintended pregnancy among women of childbearing age in Central Java Province. **Methods:** This study is non-reaction research utilizing secondary data analysis from the 2022 Family Data Update in Central Java Province. The research focuses on women of childbearing age (15-49 years) who are currently pregnant. **Result:** The prevalence of unintended pregnancies among women of childbearing age in Central Java Province is 11.3%. There is a significant association between age at first marriage ($p=0.000$), desired number of children ($p=0.000$), employment status ($p=0.000$), health insurance enrollment ($p=0.000$), contraceptive use in the last 12 months ($p=0.000$), maternal age ($p=0.000$), and education level ($p=0.000$) with unintended pregnancies. Women of childbearing age who marry before the age of 21, desire more than 2 children, are unemployed, enrolled in health insurance, have used contraception in the last 12 months, and aged over 35 are more likely to experience unintended pregnancies. **Conclusion:** the determinants of unintended pregnancies among women of childbearing age in Central Java Province include the age at first marriage, the desired number of children, employment status, health insurance enrollment, contraceptive use in the last 12 months, and maternal age.

Keywords: Family planning, Reproductive health, Unintended pregnancy, Women of childbearing age.

INTRODUCTION

The Sustainable Development Goals (SDGs) is a global commitment to realize development that maintains sustainable improvement of people's economic welfare and maintains the sustainability of people's social life. Sustainable development includes efforts to maintain the quality of the environment, as well as ensuring justice and the implementation of governance that is able to maintain the improvement of the quality of life across generation (BAPPENAS, 2020b). The third agenda of the sustainable development goals is "healthy and prosperous lives" where the main issues are maternal mortality and child mortality (BAPPENAS, 2020a).

Both of the aforementioned issues continue to be urgent matters in Indonesia.

Based on the 2020 population census data, the maternal mortality rate in Indonesia is still relatively high, with 189 maternal deaths per 100,000 live births. This includes deaths occurring during pregnancy, childbirth, or the postpartum period. Likewise, the Infant Mortality Rate in Indonesia remains high, standing at 19.83 per 1000 live births (Badan Pusat Statistik, 2023).

The high maternal and child mortality rates are consequences of complications occurring during pregnancy, before delivery, during childbirth, and after delivery (World Health Organization, 2023). Complications can be anticipated if pregnant mothers and their families adequately prepare for pregnancy. Unfortunately, it is regrettable that many pregnancies are currently unintended, thereby increasing the risk of problems for both the mother and the baby. If a mother

does not plan her pregnancy, she may engage in unhealthy behaviors or delay seeking healthcare (Centers for Disease Controls and Prevention, 2023).

Unintended pregnancies can occur due to mistimed conception (when a woman does not want to become pregnant until later) or unwanted conception (when a woman does not want to become pregnant at all) (Nebraska Department of Health and Human Services, 2023). According to the Program Performance and Accountability Survey (PPAS) data, the percentage of unintended pregnancies in Indonesia increased from 14.9% in 2018 to 17.5% in 2019 (Indrayathi *et al.*, 2022). High rates of unwanted pregnancies were also observed in six provinces on the island of Java, reaching 12.8% in 2018 (Romadlona, 2023). Despite various reproductive health and family planning education programs implemented by the government, the reduction in unintended pregnancies is not significant. This is evident in Central Java Province, where more than 9,000 unintended pregnancies were reported in the year 2022, indicating the need for further measures or improvements in the effectiveness of existing programs (Perwakilan BKKBN Provinsi Jawa Tengah, 2023).

Several previous studies using 2017 DHS data have indicated that demographic, socio-economic, and family factors are associated with unintended pregnancies (Wulandari and Laksono, 2021). Other sources explain that factors such as the use of modern contraceptives and the number of children are also related to this issue (Bain, Zweekhorst and Buning, 2020). However, there is still limited research on desired ideal number of children and other maternal factors. Based on the background mentioned above, this study aims to analyze the determinants of unintended pregnancies among women of childbearing age in Central Java Province using the latest relevant data. The findings of this research are expected to provide insights in determining the direction of program policies that align with the characteristics of the target population, ensuring that each pregnancy is planned and healthy, thereby minimizing the risks of maternal and child mortality.

METHODS

This study is a non-reaction research utilizing secondary data analysis. The data source is derived from the 2022 Family Data Update of Central Java Province by the National Population and Family Planning Board. The dependent variable is "pregnancy" categorized into "intended pregnancy" and "unintended pregnancy". Independent variables involve age at first marriage, desired number of children, employment status, health insurance enrollment, contraceptive use in the last 12 months, maternal age, and education level.

The data include married women of childbearing age (15-49 years) who are currently pregnant, constituting a total of 86,135 samples. Data analysis includes descriptive analysis using frequency distribution, bivariate analysis utilizing chi-square tests to assess inter-variable relationships, and multivariate analysis using logistic regression tests. Data processing is performed using IBM SPSS version 25, with a significance level set at $p < 0.05$ and a confidence interval of 95%.

As the study relies on secondary data analysis, ethical clearance or informed consent is not explicitly mentioned. However, official permission for data usage has been obtained from the Representative Office of the National Population and Family Planning Board in Central Java, specifically from the Data and Information division

RESULTS AND DISCUSSION

Respondent's characteristics in Central Java are predominantly in the category of intended pregnancies (88.7%). However, the percentage of unintended pregnancies remains relatively high (11.3%). This is attributed to some respondents expressing a desire to delay having children at the time of pregnancy, while others do not want more children. Nearly half of the respondents indicated that their age at first marriage was below 21 years (42.3%), suggesting that the promotion of family planning programs advocating an ideal marriage age of 25 for men and 21 for women is not yet optimally implemented (Badan Kependudukan dan Keluarga Berencana Nasional, 2021). On the other hand, the family planning program's recommendation to have a

maximum of 2 children has been well-implemented, as evidenced by over 70% of respondents stating that their ideal number of children is a maximum of 2 (71.5%) (Arsyad *et al.*, 2021).

Furthermore, based on the frequency distribution, respondents are predominantly in the categories of

unemployed (56.4%), enrolled in health insurance (71.5%), not using contraception in the last 12 month (85.1%), being aged 35 years and below (83.7%), and having secondary level of education (67.9%). Description of respondent characteristics presented in table 1 below.

Tabel. 1 Frequency distribution of respondent characteristics

Background Characteristic	N	%
Pregnancy	86,135	100.00
Intended Pregnancy	76,374	88.7
Unintended Pregnancy	9,761	11.3
Age at First Marriage	86,135	100.0
<21	36,404	42.3
>= 21	49,731	57.7
Desired Number of Children	86,135	100.0
<= 2	61,561	71.5
> 2	24,574	28.5
Employment Status	86,135	100.0
Unemployed	48,571	56.4
Employed	37,564	43.6
Health Insurance Enrollment	86,135	100.0
Enrolled	61,598	71.5
Not Enrolled	24,537	28.5
Contraceptive Use in the Last 12 Month	86,135	100.0
Used	12,864	14.9
Not Used	73,271	85.1
Maternal Age	86,135	100.0
<=35	72,077	83.7
>35	14,058	16.3
Education Level	86,135	100.0
Primary Education	16,268	18.9
Secondary Education	58,494	67.9
Higher Education	11,373	13.2
Total	86,135	

After identifying the characteristics of the respondents, a Chi-square test with a significance level of $p < 0.05$ was conducted to determine the relationship between variables such as age at first marriage, desired number of children, employment status, health insurance enrollment, contraceptive use in the last 12 months, maternal age, and educational level with pregnancy categories.

The bivariate analysis results reveal a significant correlation between unintended pregnancies and all independent variables among women of reproductive age in Central Java Province. Specifically, the age at first marriage variable is linked to unintended pregnancies ($p=0,000$). Women marrying at the age of 21 and above exhibit a lower likelihood of experiencing unintended pregnancies compared to those marrying at less than 21 years old. This pattern is

consistent with findings from a study in Oromia, Ethiopia, suggesting that negotiation power dynamics play a role. Women marrying at a younger age are more likely to be influenced by their husbands, their husbands' families, and societal norms, potentially contributing to a lower inclination to seek reproductive health services for preventing unintended pregnancies. Moreover, it may be explained by the general lack of knowledge about contraceptive use among women at this age, coupled with potential hesitancy to access reproductive health services at a younger age (Merga *et al.*, 2021). In line with research in East Java Province, it is found that the younger the age at first marriage, the higher the chances of becoming pregnant and giving birth. This, of course, increases the risk of unintended pregnancies. Furthermore, the study explains that an increase in the age at first marriage will reduce the risk of unintended pregnancies (Lutfiya *et al.*, 2022).



The variable of desired number of children is significantly associated with pregnancy categories. Women of reproductive age who desire more than 2 children are more likely to experience unintended pregnancies compared to those who desire a maximum of 2 children ($p=0,000$). Consistent with previous research in Indonesia, it is explained that an increased desire for more children and the actual number of children desired elevate the risk of unintended pregnancies (Junadi, Eryando and Hartanto, 2018). This contradicts findings in Jimma Town, which indicate that a lower desire for children increases the risk of unintended pregnancies (Beyene, 2019). Essentially, if women aim for a smaller number of children, subsequent pregnancies are more likely to be unintended as they have

already reached their ideal number of children. However, women desiring more children often face limitations in reproductive health knowledge and contraceptive awareness, making it challenging to plan pregnancies effectively. Additionally, women aspiring for larger families tend to reside in rural areas, which pose limitations on healthcare and contraceptive access, thereby increasing the likelihood of unintended pregnancies (Ahinkorah *et al.*, 2020).

The distribution of pregnancy categories in women from couples of childbearing age in Central Java Province based on the characteristics of respondents listed in the following Table 2.

Table. 2 Percentage of Unintended Pregnancies by Respondent Characteristics.

Respondent Characteristics	Pregnancy				p-Value
	Intended		Unintended		
	N	%	N	%	
Age at First Marriage	76,374	88.7%	9,761	11.3%	0.000
<21	32,059	88.1%	4,345	11.9%	
>= 21	44,315	89.1%	5,416	10.9%	
Desired Number of Children	76,374	88.7%	9,761	11.3%	0.000
<=2	56,005	91.0%	5,556	9.0%	
> 2	20,369	82.9%	4,205	17.1%	
Employment Status	76,374	88.7%	9,761	11.3%	0.000
Unemployed	42,660	87.8%	5,911	12.2%	
Employed	33,714	89.8%	3,850	10.2%	
Health Insurance Enrollment	76,374	88.7%	9,761	11.3%	0.000
Enrolled	54,434	88.4%	7,164	11.6%	
Not Enrolled	21,940	89.4%	2,597	10.6%	
Contraceptive Use in the Last 12 Month	76,374	88.7%	9,761	11.3%	0.000
Used	10,343	80.4%	2,521	19.6%	
Not Used	66,031	90.1%	7,240	9.9%	
Maternal Age	76,374	88.7%	9,761	11.3%	0.000
<=35	65,033	90.2%	7,044	9.8%	
>35	11,341	80.7%	2,717	19.3%	
Education Level	76,374	88.7%	9,761	11.3%	0.000
Primary Education	14,097	86.7%	2,171	13.3%	
Secondary Education	52,094	89.1%	6,400	10.9%	
Higher Education	10,183	89.5%	1,190	10.5%	
Total	86,135				

The variable of employment status is significantly associated with unintended pregnancies ($p=0,000$). Women who are unemployed tend to have a higher likelihood of experiencing unintended pregnancies compared to employed women. This aligns with research in North Sumatra, which indicates that unemployed wives are 1.674 times more likely to experience unintended pregnancies than employed wives (Hutasoit *et al.*, 2023).

The statement explains that women with employment access are more likely to access pregnancy prevention efforts, including information and contraceptive tools. Additionally, employment provides higher financial opportunities and is indirectly related to better pregnancy planning and increased access to prevent pregnancies. Consistent findings come from Iran, where research shows a high prevalence of unintended pregnancies



among unemployed women (Almasi-Hashiani *et al.*, 2019). Similarly, studies in South Africa demonstrate a similar trend, as financial limitations for unemployed women lead to economic instability and difficulties in supporting their families (Haffejee *et al.*, 2017). Moreover, unemployed women are less likely to use contraceptives regularly, resulting in higher contraceptive failure rates.

The health insurance enrollment variable is significantly associated with unintended pregnancies ($p=0,000$). Women of childbearing age with health insurance tend to have a higher likelihood of experiencing unintended pregnancies compared to those without health insurance. This contrasts with research in Ghana, which indicates that the likelihood of unintended pregnancies is lower for women enrolled to health insurance compared to those not enrolled (Oyediran and Davis, 2023). But we have similar finding in Mississippi, where a majority of women enrolled to public health insurance report their pregnancies as unintended because, in reality, they intended to delay pregnancy (Center for Mississippi Health policy, 2018). Indonesia implements a national health insurance system as a publicly oriented health insurance. However, it is regrettable that family planning services (contraception) are not explicitly excluded, even though contraceptive commodities are not comprehensively covered in reimbursements to first or second-level health facilities. Coordination between local governments and national health insurance providers has not been effectively established, resulting in high national health insurance coverage but also a high unmet need for contraception (Teplitskaya, Ross and Dutta, 2018). Consequently, it is not surprising that unintended pregnancies remain prevalent.

The variable of contraceptive use in the past 12 months is significantly associated with unintended pregnancy ($p=0,000$). Women of childbearing age who did not use contraception in the last 12 months tend to have a lower likelihood of experiencing unintended pregnancies compared to those who have used contraception. This tends to be ironic considering that contraceptive use is a step towards family planning. However the same result had been found in DHS analysis in Indonesia where contraceptive use has a

significant relationship with unintended pregnancy (Luthfina, 2021). This result also aligns with research in Australia, indicating that women using contraception, especially oral contraceptives, have a higher tendency for unintended pregnancies. The reason behind this is that contraceptive methods relying on user accuracy are more susceptible to failures. On one hand, users may feel secure having used contraception, but on the other hand, improper usage such as irregular consumption of contraceptive pills carries a higher risk of failure. In contrast, individuals not using contraceptives tend to employ other methods more cautiously, such as withdrawal or calendar-based methods (Coombe *et al.*, 2016).

The maternal age variable is significantly associated with unintended pregnancies ($p=0,000$). Women aged more than 35 years are more likely to experience unintended pregnancies compared to those aged 35 or below. This aligns with previous research using DHS (Luthfina, 2021) and PPAS data (Sihite and Simbolon, 2023), indicating that mothers aged 35 and below have a lower tendency to experience unintended pregnancies compared to those above the age of 35. Similarly, studies in India have shown a higher prevalence of unintended pregnancies in women aged more than 35 (Dutta, Shekhar and Prashad, 2015). Women above the age of 35 face higher health risks during pregnancy, such as the risk of premature birth, genetic issues in the fetus, and other complications (Garcia, Walker and Thorntom, 2022). Consequently, many women in this age group may avoid pregnancy due to concerns about these health risks. However, women aged 35 and above are also more susceptible to changes in menstrual cycles and irregular ovulation. This can lead to difficulties in identifying fertile periods and challenges in choosing suitable contraceptive methods, thereby increasing the risk of unintended pregnancies (Merck Serono, 2017).

In bivariate analysis using the chi-square test, the education level variable shows a significant relationship with pregnancy categories ($p=0,000$). The prevalence of unintended pregnancies is higher in women with a primary education level compared to those with secondary and higher education levels. This aligns

with research in the United States, indicating that lower maternal education increases the risk of unintended pregnancies (Van Arnam *et al.*, 2020). It is logical to assume that with higher levels of education, there is an increase in awareness of reproductive health. Moreover, as educational attainment rises, there is an increase in communication between spouses regarding pregnancy, awareness of long-term family planning, and the likelihood of receiving sufficient Antenatal Care (ANC) (Alene *et al.*, 2020).

However, after conducting multivariate analysis with logistic regression, the association between education level and unintended pregnancies becomes statistically insignificant, with p-values of 0.149 for primary education, 0.893 for secondary education, and 0.120 for higher education. Consequently, the education level variable is excluded from the model, and the final model is presented in Table 3 below.

Table. 3 Determinants of Unintended Pregnancy in Central Java.

The Characteristics of Respondent	Unintended Pregnancy			
	B	OR	p-Value	(95%CI)
Age at First Marriage				
<21	Reference			
>= 21	-0.055	0.947	0.014	0.906-0.989
Desired Number of Children				
<= 2	Reference			
> 2	0.550	1.734	0.000	1.657-1.815
Employment Status				
Unemployed	Reference			
Employed	-0.217	0.805	0.000	0.770-0.841
Health Insurance Enrollment				
Enrolled	Reference			
Not Enrolled	-0.126	0.881	0.000	0.840-0.925
Contraceptive Use in the Last 12 Month				
Used	Reference			
Not Used	-0.734	0.480	0.000	0.456-0.505
Maternal Age				
<=35	Reference			
>35	0.619	1.858	0.000	1.765-1.956
Constant	-1.626	0.197	0.000	

The results of the multivariate analysis reveal that getting married at the age of 21 and above, being employed, not enrolled to health insurance, and not using contraception in the last 12 months are protective factors against unintended pregnancies among reproductive age in Central Java Province. On the other hand, women desiring more than 2 children and those aged over 35 are identified as factors increasing the risk of unintended pregnancies.

The highlight characteristic in Central Java Province is contraceptive use. According to the performance report of the National Population and Family Planning Agency of Central Java Province for the year 2022, the prevalence of modern contraceptive use stands at 65.05% (Perwakilan BKKBN Provinsi Jawa Tengah, 2020). However, it is noteworthy that the most widely used contraceptive method in Central Java is short-term

methods, which have a relatively higher failure rate, contributing to a significant incidence of unintended pregnancies. Despite achieving a relatively high prevalence of modern contraceptive use, addressing the issue of unintended pregnancies may require a focus on improving the effectiveness and accessibility of contraceptive methods, along with comprehensive family planning education and services.

CONCLUSION

This research indicates that the determinants of unintended pregnancies among women of childbearing age in Central Java Province include the age at first marriage, desired number of children, employment status, health insurance coverage, contraceptive use in the last 12 months, and maternal age. The findings can serve as valuable input for formulating policy directions at both the regional and

national levels. There is a need for strengthened health promotion in reproductive health, family planning programs, and the promotion ideal age of marriage, particularly for women at high risk of unintended pregnancies. Efforts should be directed towards enhancing women's access and understanding of suitable contraceptive methods, ensuring their proper and effective use, and achieving more optimal integration between national health insurance programs and family planning initiatives. Additionally, there is a call for an improvement in the quality and availability of employment opportunities for women, coupled with increased access to education. Through this comprehensive approach, it is anticipated that family quality and well-being will improve, contributing to the attainment of the Sustainable Development Goals (SDGs), especially SDG 3 on Health and Well-being.

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Effectiveness of Counseling in Increasing Mothers' Behavior (Knowledge and Attitudes) Regarding Post-Placental IUD Selection to Realize the SDG Goals of Good Health and Well-Being

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ABSTRACT

Background: The low coverage of post-placenta IUDs is due to the non-optimal family planning counseling for third-trimester pregnant women. **Objective:** This study aims to analyze the effectiveness of ABPK and SKB counseling in increasing mothers' knowledge and attitudes about choosing a post-placenta IUD at Tawangrejo Health Center, Madiun City. **Methods:** This type of research is quasi quasi-experimental nonequivalent control group design. Data were analyzed using Marginal Homogeneity, Mann-Whitney, Mc Nemar, and Chi-Square. **Results:** The results showed that the Marginal Homogeneity test in the experimental group (SKB) obtained an increase in knowledge with a p-value of 0.000 (<0.05) and the control group (ABPK) obtained an increase in knowledge with a p-value of 0.000 (<0.05) so that it can be interpreted both effective in increasing the mother's knowledge about the selection of the Post Placenta IUD at the Tawangrejo Health Center. The result of the McNemar test on the attitude of the ABPK group was 0.227 (> 0.05) and the attitude of the SKB group was 0.146 (> 0.05) so it can be interpreted that both were not effective in increasing the attitude of mothers about the selection of the Post Placenta IUD at the Tawangrejo Health Center. The results of the Mann-Whitney test on knowledge after ABPK with knowledge after LCS show a p-value of 0.02 the mean rank at ABPK is 23 and the mean rank SKB is 28 meaning that there is a difference between ABPK counseling and SKB counseling in improving mothers' attitudes about choosing the Post Placenta IUD and counseling SKB is more effective. **Conclusion:** The conclusion of SKB counseling is more effective in increasing the mother's knowledge about the selection of the Post Placenta IUD at the Tawangrejo Health Center. Suggestions to further improve SKB counseling in Post Placenta IUD family planning services.

Keywords: ABPK, Counseling, Post placenta IUD, SKB.

INTRODUCTION

Sustainable Development Goals or SDGs are sustainable development goals prepared by the United Nations (UN) in order to improve the welfare of people throughout the world. In general, this program aims to solve social and economic problems in countries that need assistance. The SDGs aim to maintain a sustainable increase in the economic welfare of society and maintain the sustainability of society's social life. Apart from that, this program aims to maintain the quality of the environment and carry out inclusive development and implement governance that can maintain the improvement in the quality of life from one generation to the next.

Indonesia is a country with a very large population. The population needs to be controlled so that there is no further

population explosion which of course will cause various problems for the nation. According to the BKKBN in 2021 Indonesia's Total Fertility Rate (TFR) is 2.24, this figure is still higher than the ideal TFR standard of 2.1. This shows that the average number of children born to a woman during her reproductive period reaches 2 to 3 children. TFR is an important and strategic indicator to determine the extent of a country's success in controlling its population through the Family Planning program (Rotinsulu et al., 2021). According to Law No. 10 of 1992 Family planning is an effort to increase awareness and community participation through maturing the age of marriage, birth control, fostering family resilience, increasing family welfare to create small, happy and prosperous families. In addition, the family planning program is

also designed for the purpose of creating progress, stability, economic, social and spiritual welfare for each resident (Direktorat Jenderal Peraturan Perundang-Undangan Kementerian Hukum dan Hak Asasi Manusia, 2021).

The family planning program in Indonesia was initiated in 1951 and continued to grow until 1970 when the Family Planning Coordinating Board (BKKBN) was formed (Kementerian Kesehatan RI, 2018). The family planning methods that are developing in Indonesia can be divided into 2 according to the period of use, namely Long-Term Contraceptive Methods (MKJP) and Short-Term Contraceptive Methods (Non MKJP). Long Term Contraceptive Method (MKJP) is a contraceptive that can be used for a longer period of time, which is more than 2 years (Wahyuni & Mahanani, 2019). Which includes MKJP, among others; Intra Uteri Device (IUD), implant, Female Operation Method (MOW) and Male Operation Method (MOP). Meanwhile, the short-term method includes; injections, pills, condoms, diaphragms, and the Lactation Amenorrhoe Method (LAM). One method of family planning currently being developed is post-placental family planning using an IUD. Post-placental IUD is the installation of an IUD after 10 minutes of the placenta being born or a maximum of 48 hours after the placenta is born (Faiza & Akbarani, 2019). The family planning currently being developed is post-placental family planning using an IUD. Post-placental IUD is the installation of an IUD after 10 minutes of the placenta being born or a maximum of 48 hours after the placenta is born (Utami et al., 2013). From the KBPP annual report data in the Delivery Room of the Tawangrejo Health Center in Madiun City in 2021 there were 75 normal deliveries, but only 5 people participated in post-placental IUD KB or only 6.6%.

The success of the family planning program in this case the post-placental IUD is of course very closely related to Information and Education Counseling (IEC) (Febrianti, 2018). There are 2 officers' tools in providing counseling to clients, namely "Decision Making Assistance Tool (ABPK) and Balanced Counseling Strategy (SKB). The study was conducted to determine the effectiveness of counseling using ABPK and SKB in increasing mothers' knowledge and

attitudes about choosing a post-placental IUD at the Tawangrejo Health Center, Madiun City (Lestari et al., 2021).

METHODS

This type of research is quasi-experimental. The form of quasi-experimental research using nonequivalent control group design. In this case the group was randomly selected to be used as the experimental group and the control group (Heryana, 2019). Furthermore, both the experimental group and the control group were given a pretest to determine the condition of the group before being given treatment. After being given treatment, both the experimental group and the control group were given a posttest to find out the condition of the group after treatment. The treatment given is by providing counseling to the case group and the control group differently. starting with a pre-test, then treatment is given in the form of counseling. Taking aids decision (ABPK) and balanced counseling strategy (SKB) for one month, after which a post test is given. The sampling technique is simple random sampling. After that the sample was divided into 2 groups with the same number (Nursalam, 2016). The results of the pretest and posttest were then analyzed whether there was an increase before and after the treatment. Then an analysis was carried out between the experimental group and the control group which was more effective (Suharto, Agung, Heru Santoso WN, 2022).

After the data is collected then analyzed with descriptive statistical

analysis. The data is then entered in the frequency distribution table and cross table. Data is presented in cross-table and textual form. To analyze the effectiveness of ABPK and SKB counseling in increasing mother's knowledge about the selection of post-placental IUDs at the Tawangrejo Health Center using the Marginal homogeneity test with $p = 0.05$ with the help of a computer. The criterion for rejecting the null hypothesis is when the significance value is obtained for $p < 0.05$. H_0 was rejected, which means that there is effectiveness of counseling using ABPK and SKB in increasing mother's knowledge about choosing a post-placental IUD at the Tawangrejo Health Center. If the p value

> 0.05 means that Ho is accepted, it means that there is no effectiveness of counseling using ABPK and SKB in increasing mother's knowledge about choosing a post-placental IUD at the Tawangrejo Health Center (Basuki, 2014).

While the analysis of the effectiveness of ABPK and SKB counseling in improving mothers' attitudes about choosing a post-placental IUD at the Tawangrejo Health Center used the McNemar test with $p = 0.05$. The criterion for rejecting the null hypothesis is when the significance value is obtained for $p < 0.05$. Ho was rejected, which means that there is effectiveness of counseling using ABPK and SKB in improving mothers' attitudes about choosing a post-placental IUD at the Tawangrejo Health Center. If the p value > 0.05 means that Ho is accepted, it means that there is no effectiveness of counseling using ABPK and SKB in increasing the mother's attitude about choosing a post-placental IUD at the Tawangrejo Health Center (Machali, 2015).

RESULTS AND DISCUSSION

Characteristics Respondents

Table 1. Characteristics of pregnant women based on age, education, occupation and parity at the Tawangrejo Health Center in Madiun City

No	Characteristics	Class ABPK		Class SKB	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
1	Age				
	Age Under 20 th	3	12	3	12
	20 s/d 35 years	19	76	17	68
	Over 35 years	3	12	5	20
	Summary	25	100	25	100
2	Education				
	Basic	1	4	2	8
	Intermediate	16	64	16	64
	College	8	32	7	28
	Summary	25	100	25	100
3	Work				
	Doesn't work	20	80	19	76
	Work	5	20	6	24
	Summary	25	100	25	100
4	Paritas				
	Gravida 1 s/d 3	23	92	24	96
	Gravida ≥ 4	2	8	1	4
	Summary	25	100	25	100

most of the respondents ranged from 20 to 35 years a number of 19 respondents (76%) and a small number of respondents aged less than 20 years a number of 3 respondents (12%) and aged more than 35 years a number of 3 respondents (12%). Meanwhile, in the SKB class, almost the same results were obtained, namely the age characteristics of the respondents, mostly ranging from 20 to 35 years, 17 respondents (68%) and a small number of respondents aged less than 20 years, 3 respondents (12%) and aged more than 35 years. a number of 5 respondents (20%). While the characteristics of education in the ABPK class, it was obtained that most of them had secondary education (high school equivalent) of 16 respondents (64%), some had higher education (university and diploma) of 8 respondents (32%) and a small portion had basic education (graduated elementary school or SLTP equivalent) of 1 respondent (4%). Meanwhile, in the SKB class, the data obtained were that most of them had secondary education (high school equivalent) of 16 respondents (64%), some had higher education (university and diploma) of 7 respondents (28%) and a small portion had basic education (graduated elementary school or junior high school equivalent) a number of 2 respondents (8%).

The characteristics of the work of the respondents in the ABPK class were mostly unemployed, 20 respondents (80%) and only a small number worked both civil servants and private employees, 5 respondents (20%). Meanwhile, in the SKB class, the job characteristics of the respondents were also almost the same, namely the majority did not work, 19 respondents (76%) and only a small portion worked both civil servants and private employees, 6 respondents (24%).

The characteristics of the respondents based on parity in the ABPK class can be seen that the majority of pregnant women with children 1 to 3 are 23 respondents (92%) and a small proportion of pregnancies to 4 or more are 2 respondents (8%), as well as the majority of SKB classes are pregnancies of children 1 to 3, a total of 24 respondents (96%) and a small proportion of pregnancies to 4 or more, a number of 1 respondent (4%).

From table 1 it can be seen that in the ABPK class the age characteristics of

Mother’s Knowledge Before and After Being Given ABPK Counseling

After being given counseling using ABPK, good knowledge experienced a significant increase from previously only 20% to 80% while sufficient knowledge decreased from 64% to 20% and poor knowledge also decreased from 16% to 0%.

From the results of the study it can be illustrated that knowledge after receiving counseling using the LCS has increased, namely good knowledge increased from 40% to 96% and sufficient knowledge decreased from 52% to 4%, while knowledge was lacking which was previously 8% to 0%

The Effectiveness of ABPK And SKB Counseling In Increasing Mother’s Knowledge And Attitudes About The Selection Of Post Placenta IUD

Mother’s knowledge about the selection of the Post Placenta IUD before and after counseling both ABPK and SKB was analyzed using the marginal homogeneity test on the computer, with the following test results: the significance value of knowledge obtained before and after ABPK counseling was 0.000, which means less than 0.05 so it can be interpreted that ABPK counseling is effective in increasing mother’s knowledge about the selection of the Post Placenta IUD. Whereas in LCS the significance value also shows the number 0.000 which means less than 0.05 so that it can be interpreted that LCS counseling is also effective in increasing mother’s knowledge about choosing a Post Placenta IUD.

The mother’s attitude regarding the choice of post-placental IUD before and after both ABPK and SKB counseling was analyzed using the Mc-Nemar test on a computer, with the test results as follows: the significance value for attitudes before and after ABPK counseling was 0.227, which means greater than 0, 05 so it can be interpreted as ineffective in improving mothers’ attitudes regarding post-placental IUD selection. Meanwhile, the significance value of attitude before and after being given SKB counseling was 0.146, which means more than 0.05, so it can be interpreted as not being effective in improving mothers’ attitudes regarding choosing a post-placental IUD.

Comparison of the Effectiveness of ABPK and Skb Counseling in Increasing Mother’s Knowledge About Post Placenta Iud Selection

After doing the analysis, it can be seen that ABPK and SKB counseling are both effective in increasing the mother’s knowledge about the selection of Post Placenta IUD KB. So it needs to be tested again with the help of a computer to find out which one is more effective between the two.

The results of the Mann-Whitney test on the results of the knowledge post test after ABPK and SKB show a result of 0.02 which has a meaning smaller than 0.05 so that it can be interpreted as significant meaning that there is a difference in effectiveness between ABPK and SKB counseling in increasing mother’s knowledge about selecting IUD Post Placenta.

Whereas in the Chi Square test on the mother’s attitude before and after ABPK and SKB counseling showed a value of 0.133, which means more than 0.05 so that it can be interpreted as insignificant, which means that there is no difference in the effectiveness of ABPK and SKB counseling in improving mothers’ attitudes about choosing the Post Placenta IUD. Next, it is necessary to find out which one is more effective. For this reason, the Mann-Whitney test was carried out.

Table 2. The results of the Mann-Whitney test on the effectiveness of ABPK and SKB.

No	Variable	Mean Rank	information
1	Knowledge Post Counseling ABPK	23	Smaller
2	Knowledge Post Counseling SKB	28	Smaller

That the mean rank value of SKB is greater than ABPK so it can be interpreted that SKB is more effective than ABPK. SKB counseling were proven to be effective in increasing mother’s knowledge about choosing a post-placental IUD, this is in accordance with the results of calculating the data using the marginal homogeneity test which showed a significance value of 0.000. It can be concluded that counseling using ABPK and SKB is equally effective in increasing mother’s knowledge about

choosing a post-placental IUD. This is in accordance with Long's opinion cited by Nursalam and Pariani (2001)(14), that information, in this case counseling, both ABPK and SKB is an important function to help reduce anxiety. Someone who gets information will be able to enhance the level of knowledge of a matter(15).

There is also agreement with research conducted by Herawati, Dian Wilopo, Siswanto Agus Hakimi, Mohammad in 2018 entitled the effect of family planning counseling using decision-making aids for pregnant women on the use of postpartum contraception using the Randomized Controlled Trials (RCT) method(16). This study shows that family planning counseling using a Family Planning Assistance Tool (ABPK) for pregnant women is effective in increasing postpartum contraceptive use(17). Counseling using ABPK and SKB was not effective in increasing mothers' attitudes about choosing a post-placental IUD, because the significance results on the Mc Nemar test both showed a value of more than 0.05. This is because attitudes are formed not in a short time, as argue that attitude is a mental and nervous state of readiness which is regulated through experience which exerts a dynamic or directed influence on individual responses. So mothers who have bad experiences will tend to have a negative attitude even though they have been given information. Similar to research conducted by Sukarni, Sudirman, Herlina Yusuf in 2020 that there is no relationship between counseling and choosing a contraceptive method, as indicated by a p-value of $0.735 > 0.05$ (18).

This study aims to find out which is more effective, ABPK or SKB counseling in increasing mothers' knowledge and attitudes about choosing a Post Placenta IUD. After testing, it was found that ABPK and SKB counseling were equally effective in increasing mother's knowledge but equally ineffective in increasing mother's attitude(19). The results of the Chi Square test on the post test ABPK and SKB attitudes showed a result of 0.133 which means more than 0.05 so it can be concluded that it is not effective and there is no difference between ABPK and SKB counseling in improving mothers' attitudes about choosing a Post Placenta IUD(20). Therefore a Mann Whitney test was carried out on knowledge after ABPK

and knowledge after SKB with a significance result of 0.02 so that it was concluded that there was a difference in the effectiveness of ABPK counseling with SKB. The mean rank results for knowledge of SKB are greater than those of ABPK, so it can be concluded that SKB counseling is more effective than ABPK counseling in increasing mother's knowledge about the selection of the Post Placenta IUD at the Tawangrejo Health Center(21).

CONCLUSION

Based on the results and discussion of research on the effectiveness of ABPK and SKB counseling in increasing mothers' knowledge and attitudes about choosing a Post-Placental IUD at the Tawangrejo Health Center, the following conclusions are drawn: ABPK counseling is effective in increasing mother's knowledge about choosing a Post Placenta IUD, SKB counseling is effective in increasing mothers' knowledge about the selection of the Post Placenta IUD, ABPK counseling is not effective in increasing mothers' attitudes about choosing a Post Placental IUD, SKB is not effective in increasing the attitude of mothers about the selection of the Post Placenta IUD, SKB counseling is more effective in increasing mothers' knowledge about the Post Placenta IUD compared to SKB counseling.

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CERIA: A Community Empowerment as Dementia Preventive Measure among Elderly

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ABSTRACT

Background: Dementia is predicted to double in the next 15 years and causes adverse socioeconomic effects, yet the clinical therapy for dementia has not shown satisfactory results for many years. Preventive efforts involving the active role of the elderly and supported by the development of information technology are strongly needed. **Method:** This is a quasi-experimental study aimed to evaluate the effectiveness of CERIA as community-based intervention and to increase the awareness of dementia. CERIA (Cerdas Hindari Demensia) was implemented for 32 elderlies in Pasar Minggu District, South Jakarta who were willing to participate. The interventions implemented were memory training, brain vitalization gymnastics, playing angklung, and storytelling to toddlers. We measured the pre-and post-intervention scores of the elderly using an assessment tool of dementia screening, then compared the results using Student T-test. We also created a dementia prevention manual book (Buku Panda) and built a smartphone app for educational purposes. **Results:** As many as 97% of the elderly have a good daily activity score and 90.9% have a good body balance. Assessment of pre-intervention cognitive function showed a mean value of 27 and increased to 29 after intervention. The pre-intervention emotional assessment showed a mean value of 1 and decreased in post-intervention to 0. Some of the most afflicted diseases of the elderlies were hypertension (30,3%) and diabetes mellitus (18,2%). **Conclusion:** This dementia prevention program has a strong potential to be implemented in wider scope. Further improvement involving parties such as the Ministry of Health is needed to replicate this effort.

Keyword: Community empowerment, Dementia, Elderly, Preventive measure.

INTRODUCTION

The global population is rapidly aging, and projections indicate a two-billion increase by 2050. This trend poses a multifaceted challenge with social, economic, and mainly health impacts, straining healthcare, welfare, and social care system. It also has significant implications for sustainable development. A scoping review has addressed efforts targeting older people under SDGs 1, 3, 10, and 11, although limited research is available on SDG-targeted efforts focused on older adults. Despite these challenges, aging presents opportunities, with older adults contributing to communities through works, volunteering, and informal care (Shevelkova, et al, 2023).

World Health Organization promoted the concept of healthy aging in 2015 as a process of developing and

maintaining functional ability for well-being in older age, including happiness, satisfaction, and fulfilment, with functional ability encompassing health-related attributes supporting valued activities. WHO stated that ageing is also influenced by external factors like the built environment, societies and communities, policies, services, and systems, rather than biological process only (World Health Organization, 2015).

It is widely known and has become commonplace in society when the elderlies experience cognitive function decline. Dementia, a term for several diseases that affect memory, thinking, and the ability to perform daily tasks, are mainly affects older people but not all people will get it as they age (World Health Organization, 2023). Dementia becomes epidemic as the number of elderly increases (Sindi, et al,

2015). One of the most common causes of dementia is Alzheimer's disease (60-70% of total cases). Alzheimer's Indonesia on its page stated that every 3 seconds, 1 person in the world experiences dementia. Currently, more than 55 million people have dementia worldwide (Alzheimer's Indonesia, 2023).

In Indonesia, it is estimated that there were around 1,2 million people with dementia in 2016, which will increase to 2 million in 2030 and 4 million people in 2050 (Alzheimer's Indonesia, 2023). The estimated life expectancy of Indonesians in 2045 will increase to 77.6 years because of the decrease in mortality, and this increases the population of the elderly (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2013).

Dementia causes parental dependence and disability, and increases social, economic, and medical burden as its progression in cognitive capacity impairment can interfere with daily functioning or activities. Deterioration in cognitive capacity occurs because of the loss of the relationship between neurons or synapses and the breakdown of neurons themselves due to the formation of intracellular and intracellular neurofibril beta plaque formation (Shevelkova, et al, 2023).

Dementia is diagnosed based on careful medical history, physical examination, laboratory test, and the characteristic changes in thinking, day-to-day function and behaviour associated with each type (Alzheimer's Association, 2023). Until now, there is no cure for dementia. Some medications only help to manage dementia symptoms (World Health Organization, 2023). Therefore, early intervention and prevention of dementia should be one of the primary focuses in public health, especially in primary health care (Shevelkova, et al, 2023).

Efforts in preventing dementia should also include the development of protective factors, including (1) psychosocial factors (high levels of education and socioeconomic status, social activities, and cognitive stimulation), (2) healthy lifestyle (physical activity), (3) healthy nutrition intake, and (4) the use of medicinal drugs to treat risk factors, because if dementia has occurred, the only thing that can be done is brain reservation and cognitive reservation to prevent the progression of dementia (Shevelkova, et

al, 2023) (Pusat Data dan Informasi Kementerian Kesehatan Republik Indonesia, 2013).

CERIA (Cerdas Hindari Dementia), is a community development program that helped the elderly being physically active and taking part in activities and social activities that stimulate the brain and maintain daily function. The interventions are community-based activities which are hoped to maintain their quality of life and promote well-being. Our program aimed to evaluate the effectiveness of CERIA as community-based intervention, increase awareness of dementia and perform some activities involving brain stimulation. The primary focus is to do screening of cognitive function for pre- and post-intervention in the elderly in Kebagusan District, Pasar Minggu, and do early intervention in primary until tertiary preventive measures.

METHODS

Design & Participants

This is a quasi-experimental study conducted in Kebagusan District, Pasar Minggu, South Jakarta from May - October 2017. We included the reachable population of 32 elderlies aged 50 years old or older who all live in the neighborhood, willing to participate by signing an inform consent form, and are physically active. Exclusion criteria are bedridden elderly and unstable medical conditions. Samples were taken by consecutive method.

We conducted weekly meetings with the participants and gave different interventions each week. Assessment for dementia was done using the same tool at the baseline (on the first week before any intervention was given) and on the last week (after all the interventions had been given). Based on the results of the initial assessment, we excluded those with impaired ADL from having these interventions and referred them to the neurologist to be further examined.

Participants in each weekly session were not steadily maintained; one individual may come in 2 sessions and not in the others, another came in all sessions; it is subject to the participants' convenience. In the end, there were 33 elderly who were exposed to at least one intervention and did both pre- and post-intervention tests, all of which were included in the analysis.

Tools

We used ABCDE screening tools for dementia to assess the conditions of the subjects pre-and post-intervention. ABCDE stands for A) Activity daily living, measured using Katz Index; B) Balance test, done using Romberg's test; C) Cognitive, done using Mini Mental State Examination (MMSE) questionnaire; D) Disability and Disease, recording of comorbidities occurred in the subject; and E) Emotion, measured using Geriatric Depression Scale (GDS) (Mayza, 2016) (Forbes, et al, 2013). ABCDE method introduced by Ministry of Health is a comprehensive examination including both physical and mental aspects (Sulistyaningsih, et al, 2021).

Activity Daily Living (ADL). The Katz Index for ADL was developed by Katz et al. in the 1960s. It measures six self-care tasks with dichotomous ratings (dependent as 0/independent as 1) as listed: bathing, dressing, toileting, transferring to and from a chair, maintaining continence, and feeding. The measurement result of six points indicates independence while less than two points is considered major functional impairment (Katz, et al, 1970) (Wallace, et al, n.d).

Balance. Romberg's test was a standardized tool used widely in clinical settings to assess a patient's ability to maintain body balance. Participants were told to stand erect, and the balance was observed. The participant is then told to close his eyes and be observed for one minute. This test is said to be positive if the subject is not able to maintain balance while observed, as implied by abnormal movements such as swaying or toppling over or even signs that the participant will fall. This tool was chosen for its simplicity to be done in many situations (Katz, et al, 1970) (Wiratman, 2017).

Cognitive. MMSE was also a widely used tool in neurological clinics. It consists of 11 instructions each assessing different cognitive domains such as orientation, registration, attention and calculation, memory recall, or language.^{9,14}

Disability and Disease. Known history of life-long diseases such as diabetes Mellitus, hypertension, and dyslipidemia were recorded as they would impact the well-being as well as become risk factors for dementia (Piolatto, et al, 2022).

Emotion. We used Geriatric Depression Scale (GDS) as our preferred method of assessing emotion. GDS consists of 15 yes-no questions, each question has a 0 or 1 score depending on the question. A score of 10 or more is indicative of depression, while 5-9 means the subject is at a higher risk of developing depression (Sulistyaningsih, et al, 2021).

Interventions

Memory Training. We did memory recall training as part of our intervention to maintain cognitive function. We did the training by playing a 5 to 10-minute short film and asked participants about some key events, characters, or plots during the film.

Brain Vitalization Gymnastics. This is the gymnastics that stimulate the brain through some physical movements.

Playing angklung. Angklung is a traditional musical instrument originating from the Sundanese tribe of West Java, Indonesia. Angklung is very easy to play and was widely taught all around Indonesia, usually to elementary school students. This instrument was unique as it had to be played in a group, for one instrument being played by one person only represents one *melody*. Thus, playing *angklung* improves the cognitive function of the brain, as it demands concentration, trains auditory stimulation, and needs coordination between auditory stimuli and hand movement, while also inducing interpersonal social abilities among its players.

Storytelling to toddlers. The act of storytelling itself has various advantages for the elderly. It restricts cognitive function degradation.

Additional Instruments

In addition to the programs, we created supplementary instruments as a means of sustainability and ease of replicability of our program in the future. *Buku Panda (Panduan Pencegahan Demensia)* is a book that contains general information about dementia and written information about our program. It is provided as a manual book for the elderly group to run our program independently. All screening assessment tools as well as descriptions and materials for our interventions were given in the book.

Mobile Application. We developed an Android application to be used by healthcare workers to assist them while

doing this program. The application contains all our screening/assessment tools as well as brief information about dementia and the CERIA intervention. Using this application, all assessment scores are readily stored on our cloud-based server and may be quickly analyzed. We hope this will ease future analysis and replication efforts of this program. This application may be found in the Google Play Store under the name CERIA.

RESULTS AND DISCUSSION

This intervention was conducted on 32 elderly people in Kebagusan District, Pasar Minggu, South Jakarta with a mean age of 61.9 years. The female elderly have greater frequency compared with male, that is women equal to 71.8% and males equal to 28.2%. Preliminary screening is performed before interventions that include daily activities, balance, cognitive function tests, depressive symptoms checkups, and comorbid disease.

Table 1. Baseline characteristics of subjects (n=32).

Variable	Frequency n(%)
Number of subjects based on age	
40-49	2 (6,25)
50-59	9 (28,125)
60-69	16 (50)
70-79	5 (15,625)
Sex	
Men	9 (28,125)
Women	23 (71,875)
Comorbid diseases	
Hypertension	9 (28,12)
Diabetes Melitus	6 (18,75)
Others	4 (12,5)
No disease	13 (40,62)

As many as 2 people (6.25%) experience impairment of daily activities. Examination of balance by using the Romberg test sharpened showed impairment in 2 elderly people (6.25%). On examination of cognitive function using MMSE, the average pre-intervention score in the elderly was 27.

Table 2. Screening results.

Variable	Frequency n (%)
Activity daily living	
Normal	30 (93,75%)
Impaired	2 (6,25%)

Balance	
Normal	30 (93,75%)
Impaired	2 (6,25%)
Cognitive function by MMSE	(Mean of MMSE)
Pre-Intervention	27
Post-Intervention	29
Depressive symptoms	(Mean of GDS)
Pre-Intervention	1
Post-Intervention	0

The examination of depressive symptoms using the Geriatric Depression Scale on pre-intervention showed a mean of 1 that classified into the normal category. A comorbid disease that is most suffered by the elderly is hypertension with an amount of 9 people (28.12%).

The results obtained were augmenting cognitive function improvement from the mean increase of MMSE score from 27 to 29. There were significant differences in MMSE scores before ($M = 27$ $SD = 3,53009$) and after intervention ($M = 29$, $SD = 2,94004$); $p = 0.004$, hypothesis test using Student T-test.

Examination of depressive symptoms also decreased from a mean of 1 to 0 after intervention. There were significant differences in the GDS Score before ($M = 1$, $SD = 1.20439$) and after intervention ($M = 0$, $SD = 0.84190$); $p = 0.096$, hypothesis test using Student T-test.

Preliminary screening was carried out using ABCDE tools. Almost all subjects who were screened in pre-intervention demonstrated good physical activity scores. The Romberg test was performed on all subjects in the pre-intervention stage as a screening test. Both ADL Katz Index Score and Romberg test were not carried out in the post-intervention since we did not attempt on improving motoric skills and balance of the body in the elderly.

In MMSE screening, there was a mean increase of 2 points. Many factors can contribute to the improvement of MMSE score, such as diet, social interaction, and physical activity. Activities that require cognitive skill and mental stimulation have been shown to protect against the progression of brain aging. Few studies investigated that decreases in mental engagement or cognitive stimulation during life are associated with dementia risk (World Health Organization, 2023). The elderly population in Kebagusan District were

experiencing retirement, which is a risk factor for dementia.

Exercise programs have a significant impact in improving the ability to perform activities daily living and cognition in elderly people. The evidence shows that exercise affects structural and functional changes in neurons. The increase of production of brain-derived synaptic proteins (BDNF) has induced exercise-related neurogenesis and neuron modelling. Meta-analyses written by Kuiper et al. (2016) confirmed that multiple aspects of social relationships are associated with cognitive decline. The modulation function of social circumstances involves the significant influence of social networks, encompassing both direct and indirect interactions among individuals through which information, attitudes, and norms are exchanged (Piolatto, et al, 2022).

From the GDS, the average score decreased from 1 point to 0 point. This shows a positive result as a high GDS indicates the presence of depressive symptoms in the elderly. Higher score on the GDS is mainly obtained in the elderly who were illiterate, who had one or no children, who were bedridden, who were without visits from relatives, and who had no activities outside (Jung, et al, 2017) (Patra, et al, 2017). Our results are in line with a systematic review by Mammen et al. (2013) which included 30 follow-up studies. They concluded that baseline physical activity is inversely related to depressive symptoms. The relationship between depression and future daily activity dependence is also found; lack of motivation and initiation is mainly found in people with depression, and this leads to restriction of daily physical activity. This explains that depression is strongly linked to lack of social interaction, physical activity, motivation, and initiation. In addition, a robust level of social involvement and expansive social connections have been linked to improved glucose regulation in adults without diabetes, as well as enhanced self-management of diabetes, leading to a decreased risk of dementia. This suggests a potential connection between social relationships and cognitive abilities (Marseglia, et al, 2019).

CONCLUSION

This program has the potential as a preventive measure for dementia that can be implemented in a wider scope. Several long-term efforts have been created, such as the PANDA book as a guideline for dementia prevention in the community and the CERIA application as a comprehensive dementia screening tool. From the results, it can be concluded that interaction with other people in daily life and physical activity on a regular basis play important roles in improving and maintaining cognitive function in the elderly and prevent the development of dementia.

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Health Promotion Strategies in Correctional Institution to Achieve Sustainable Development Goals (SDGs')

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ABSTRACT

Background: Overcapacity in Correctional Institution (Lapas) is a prevailing issue faced by the Directorate General of Corrections (Ditjenpas). The current number of prisoners in correctional institution is nearly twice their ideal capacity, significantly impacting the health conditions of prisoners. **Objective:** To provide recommendations for health promotion strategies aimed at realizing healthy correctional institution in Indonesia, based on research conducted at Class IIA Kendal correctional institution. **Method:** This research is descriptive with a qualitative approach. Data collection methods comprised observation, interviews and documentation. **Results:** Achieving a healthy correctional institution requires a holistic approach through health promotion strategies encompassing several key aspects. Firstly, policy advocacy stands as the backbone in advocating for structural changes to improve healthcare access, adequate human resources and inclusive policies for prisoners. Furthermore, training prisoners and staff forms the foundation for improving healthcare services by providing necessary training, knowledge and support. Health education for prisoners serves as a long-term program to enhance their understanding of personal health and minimize disease risks. Lastly, enhancing personal hygiene behaviour is crucial in creating a clean environment, minimizing disease spread and supporting the overall health of both individuals and the correctional institution community. **Conclusion:** Realizing a healthy correctional institution through health promotion strategies is not solely a local effort but also a significant contribution towards achieving SDGs.

Keyword: Correctional institution, Health promotion, Prisoners, SDGs.

INTRODUCTION

Correctional institutions serve as a system aimed at rehabilitating offenders and embodying justice with the goal of achieving social reintegration or the restoration of unity in the life, livelihood, and existence of prisoners within society (Sejarah Pemasarakatan, 2022). Correctional institutions operate as an independent correctional execution body. As per its establishment history, correctional institutions have a structure under the command of Directorate General of Corrections (Ditjenpas) but administratively fall under the Regional Office (Kanwil) of Kemenkumham (Sejarah Pemasarakatan, 2017). Ditjenpas is an implementing element that is subordinate to and accountable to the Minister of Law and Human Rights of the Republic of Indonesia. Ditjenpas is led by a Director General (Dirjen) and is tasked with formulating and implementing policies in the field of Corrections in accordance with

legal regulations (Struktur Organisasi, 2023).

The problem of overcapacity, commonly referred to as exceeding the capacity, occurs in the majority of correctional institution in Indonesia. Thus, this demands serious attention and must be earnestly addressed as it often leads to increasingly complex issues if left unattended. Health issues, for instance, are among the concerns (Rumadan, 2013). According to data from Ditjenpas, it is known that the total number of prisoners in correctional institution, State Detention Houses (Rutan), Special Correctional Institutions for Children (LPKA), and Women's Correctional Institutions (LPP) is nearly double the ideal capacity. The occupancy rate is 1.97 times the available capacity (Ditjenpas, 2023). It's known that data from the Ditjenpas indicates that the total number of inmates in Prisons, Detention Centers, Narcotics Prisons, and Narcotics Detention Centers in Indonesia as

of September 2023 was 268,599, while the capacity was only for 136,604 individuals.

Based on data from the Directorate General of Corrections' Correctional Database System (SDP), over the past five years from 2018 to 2023, the number of prisoners in Correctional Institution, Detention Centers, Narcotics Prisons and Narcotics Detention Centers has shown consistent fluctuations. In 2019-2020, there was a decrease due to the assimilation policy during the COVID-19 pandemic. The prisoner count, which was around 260,000 in 2019, dropped to 251,000 in 2020 following the implementation of the assimilation program for a year. After this program, there was a visible trend of an increase in inmates across Correctional Institution, Detention Centers, Narcotics Prisons and Narcotics Detention Centers, which continued in 2021 and 2022, ultimately reaching 268,055 prisoners by 2023.

Research indicates that the issue of overcrowding among detainees and prisoners triggers various ongoing problems such as disruptions in security and order, violations of human rights and the health issues of prisoners (Sianturi, 2022). Acute Respiratory Tract Infections (ARI) are among the commonly contracted diseases among prisoners, attributed to several factors such as sanitation, overcapacity and personal hygiene (Hidayat & Karmila, 2020). It's known that ARI remains a global health issue, causing nearly four million deaths. ARI is caused by viruses and bacteria present in the air that are inhaled by new hosts and enter the respiratory system (Melinda & Samsualam, 2022).

One case of a correctional institution facing overcapacity and health issues is Class IIA Kendal correctional institution. Based on research findings obtained through interviews, observations, and field data analysis, it was discovered that Class IIA Kendal correctional institution is experiencing overcapacity. According to data from Class IIA Kendal correctional institution, the capacity is stated to be 126 prisoners. However, the number of occupants as of December 2023 is 341 individuals. This indicates that Class IIA Kendal correctional institution's capacity is exceeded by 2.7 times compared to its ideal capacity. The correctional institution is currently housing around 341 prisoners, with all occupants being male.

Based on data collected from the Prisoners Education Section, Sub-Section of Prisoners Education and Care at Class IIA Kendal Correctional Institution, it's indicated that skin diseases and respiratory ailments are the most prevalent among the prisoners in Class IIA Kendal correctional institution. Medical records from January 2023 to August 2023 highlight respiratory diseases, specifically Acute Respiratory Tract Infections (ARI), dominate among the prisoners. This is followed by cases of hypertension, hearing impairments and dental issues.

There's a need to establish a health promotion strategy tailored to the situation and conditions of Class IIA Kendal correctional institution. The hope is that the health promotion strategy devised in this research can serve as a recommendation in achieving a healthier prison environment.

The presence of primary healthcare services, such as the clinic in the correctional institution, is a necessity. Primary healthcare services offer basic health services, including health promotion, disease prevention, diagnosis, treatment and rehabilitation. The existence of primary healthcare services is pivotal in achieving The Sustainable Development Goals (SDGs). It can drive greater progress in SDGs by addressing broader health determinants and fostering equality and social justice throughout the community (Hone, et al, 2018).

Transforming correctional institutions is one of the visions of SDGs. Presently, approximately 11 million individuals are held in prisons and this number has been increasing since the turn of the 21st century. Correctional institution populations are more susceptible to physical and mental illnesses, thus creating a healthy correctional institution environment is a realization of the SDGs. Health in correctional institution must be at the forefront of SDGs (Ismail, et al, 2021). The aim of this descriptive study is to provide recommendations for a health promotion strategy to achieve healthy correctional institutions in Indonesia. Drawing on research conducted at Class IIA Kendal correctional institution, it's hoped that the resulting recommendations from this health promotion strategy will serve as a reference for policymakers.

METHODS

This research is a descriptive study utilizing a qualitative approach. The informants for this study consist of healthcare personnel from the Class IIA Kendal Correctional Institution clinic, administrative staff, and the Sub-Section of Prisoners Education and Care. Informants were selected based on their roles and capacities in carrying out health development within Class IIA Kendal Correctional Institution. The clinic staff at Class IIA Kendal Correctional Institution handle patients visiting the clinic daily, documenting their ailments. Administrative staff are responsible for registering the number of inmates and analysing various needs required by prisoners within Class IIA Kendal Correctional Institution. Meanwhile, the Head of Sub-Section of Prisoners Education and Care is responsible for creating health and development programs for inmates in Class IIA Kendal Correctional Institution.

The inclusion criteria for this research encompassed informants responsible for and involved in health programs at Class IIA Kendal Correctional Institution. These informants possessed data concerning prisoner records, medical data, and health programs within the correctional institution. Data collection was conducted through observation methods, observing both medical and non-medical facilities related to health at Class IIA Kendal Correctional Institution.

Subsequently, interviews were conducted with healthcare personnel, administrative staff, and the Head of Sub-Section of Prisoners Education and Care to gain insight into the health development programs at Class IIA Kendal Correctional Institution. Further, secondary data regarding disease trends and inmate health programs at Class IIA Kendal Correctional Institution were obtained from these informants. Documentation in this research included recording interviews, photographing the research process, and copying relevant research-related documents. The researcher served as the primary instrument in conducting the research, aided by observation guides, interview guides, and documentation guides. Data analysis techniques employed included data displays, reduction, and drawing conclusions.

RESULTS AND DISCUSSION

Policy Advocacy

Field observations reveal that the Sub-Section Head of Prisoner Education and Care oversees and implements health programs in Class IIA Kendal correctional institution. This subsection comprises Civil Servants (ASN) responsible for general guidance and health guidance for the prisoners. It ensures the availability of medical services, health education and disease screening in collaboration with the local Community Health Center (Puskesmas). The health promotion strategy will likely be an initiative and program implemented by the Sub-Section of Prisoners Education and Care (Kemenkumham, 2022).

Analysis of the healthcare human resource needs at Class IIA Kendal correctional institution is notably inadequate. Data from August 2023 indicates that there are only two personnel handling healthcare issues. However, ideally, 13 healthcare personnel are needed to operate the Class IIA Kendal correctional institution clinic for a more optimal realization of a healthy prison. These 13 required healthcare personnel include general practitioners, dentists, nurses, dental nurses, midwives, psychology graduates, psychologists, psychiatrists, pharmacists, pharmacy assistants, laboratory analysts, nutritionists and sanitarians (Lembaga Pemasyarakatan Kelas IIA Kendal, 2023).

General practitioners are responsible for conducting examinations, diagnosing, and treating various common health complaints of patients. Additionally, they provide health advice and offer initial medical care, referring patients to specialist doctors when further treatment is necessary (Haleem, et al, 2021). Dentists are accountable for examining, diagnosing, and treating various dental and oral conditions of patients, such as fillings, tooth extraction, and dental treatments (Dentist, 2022).

Nurses provide medical care, respond to patient conditions, and support the healing process by offering holistic care (Jasemi, et al, 2017). Dental nurses assist dentists in dental care procedures, educate patients on proper dental care, and maintain a sterile clinic environment (Mahasneh, et al, 2020). Midwives provide holistic midwifery care, support the childbirth process, prenatal and postnatal

care, and offer reproductive health education (Guzewicz, P., & Sierakowska, 2022).

Psychology graduates are responsible for providing counseling services, psychological evaluations, and interventions to support the mental health of patients with various psychological conditions. Psychologists evaluate, diagnose, and provide counseling and psychological interventions to help patients overcome mental, emotional, and behavioural issues (Wiedermann, et al, 2023). Psychiatrists diagnose, treat, and manage mental disorders, providing medication therapy and counseling according to patients' needs (Stein, et al, 2020).

Pharmacists provide pharmacy services, including drug management, consultations regarding drug usage, and ensuring safe and proper drug distribution to patients. Pharmacy assistants aid pharmacists in drug management, provide patient information about drug usage, and maintain pharmacy operational efficiency (Rahayu, et al, 2021). Laboratory analysts perform testing and analysis of biological samples, presenting accurate data to assist in patient diagnosis and treatment (White, et al, 2021).

Nutritionists are responsible for designing appropriate nutrition programs and providing nutritional education to patients (Puri, et al, 2021). Finally, sanitarians ensure the cleanliness and safety of the clinic environment, conducting inspections and overseeing compliance with sanitation and hygiene standards to maintain a healthy environment for patients (Agustin, et al, 2020).

Given this on-site situation, a health promotion strategy can be executed through advocacy efforts. Advocacy directed towards the Ditjenpas is essential to understand and assess the far-from-ideal conditions in Indonesian correctional institutions. For instance, using the findings of this study as a reference in formulating correctional institution policies. Policies that ensure fairness in correctional institution aim to reduce disparities within the population. Eliminating disparities is one of the objectives of the Sustainable Development Goals (SDGs) (Munodawafa, et al, 2021).

According to the WHO, there are two crucial reasons for providing adequate

healthcare services in correctional institution. One of these is the importance of maintaining health within correctional institutions, affecting public health at large. It's known that the correctional institution population has a high prevalence of serious and often life-threatening conditions (Enggist, 2014). Prisoners have rights that must be fulfilled and protected as mandated by Law No. 12 of 1995 concerning Corrections. Article 14 of Law No. 12 of 1995 concerning Corrections states that the rights of prisoners include the right to worship, the right to receive adequate healthcare, the right to education, the right to remission and the right to conditional release.

Training of Personnel

To achieve a healthy correctional institution, training personnel is necessary to enhance service quality. Based on data from the Sub-Section of Prisoners Education and Care in August 2023, no healthcare personnel have received training for roles such as Therapeutic Community Counselor (TC), TC Program Instructor, TC Program Manager, Rehabilitation Assessment, Criminon, Methadone, Tuberculosis (TB DOTS), TB-HIV, TB Laboratory, HIV Counseling, HIV Laboratory, Palliative Care, and TOT Peer Educator (PE). Training to enhance health knowledge is a crucial element of health promotion and is indispensable for realizing the conditions of a healthy correctional institution.

Furthermore, based on the health program records conducted in collaboration with the local Community Health Center, Class IIA Kendal correctional institution has conducted several activities. In August 2023, there were records of promoting Clean and Healthy Living Behaviour (PHBS), Communicable Diseases (Sexually Transmitted Infections, TB, Scabies, Hepatitis, Dengue Fever, Malaria, Leprosy, and Diarrhea), and Non-Communicable Diseases (Respiratory Diseases, Digestive Diseases, Hearing Impairments, Mental Disorders, Cancer, Heart and Blood Vessel Diseases, and Hypertension). Health promotions related to neurological diseases, strokes, diabetes mellitus, kidney failure, hepatitis cirrhosis, physical disabilities, and dental diseases were also conducted.

The training conducted by Class IIA Kendal Correctional Institution and the

local Health Center is held regularly once a month. This training activity is accompanied by disease screening for prisoners at the correctional institution. The training session takes place monthly at Class IIA Kendal Correctional Institution, with the content delivered by the local Health Center. The Health Center is responsible for creating the training modules. Each training session lasts approximately two hours, with an attendance of around 50 prisoners.

The importance of training prisoners in health promotion programs cannot be overlooked. Through this approach, prisoners are provided with knowledge, skills and support to become agents of change in improving their health and that of the entire correctional institution population. By training prisoners to actively engage in health promotion activities, such as educating on healthy lifestyles, accessing healthcare services, and fostering a mindset that supports mental health, this will cultivate a healthier and sustainable correctional institution culture.

Health Education

Correctional institution has the potential to become epicentrum for various communicable diseases. The density of prisoners within correctional institution has led to the spread of Acute Respiratory Infections (ARIs). Some studies indicate that density is associated with increased occurrences of SARS-CoV-2 in correctional institutions. Moreover, density has also been linked to increased occurrences of other acute respiratory infections.

Experts suggest the need for evidence-based health education regarding the dangers of bacteria, viruses, and germs within correctional institutions. This is to enhance prisoners' personal hygiene practices and self-protection. Research indicates that health education and literacy in correctional institutions tend to be low, with tightly controlled information transfer, thus creating fertile ground for misinformation.

Therefore, health education becomes crucial in raising awareness among prisoners in correctional institutions. Access to education is a right for prisoners in correctional institutions. Health education to enhance self-protection awareness can be achieved through training, posters, videos, and

other means. Health education can also involve training guided by healthcare professionals, resulting in a significant impact from such health training.

Health professionals also need to educate on the correct usage of antibiotics to prevent the danger of antimicrobial resistance. Prisoners need to be educated about the empirical evidence regarding the dangers of antimicrobial resistance. To prevent ARIs, prisoners also have the right to receive quality food, access and infrastructure for healthcare services.

Research indicates that medical staff in correctional institutions face financial shortages, thus impeding their ability to provide adequate education. This requires attention from the government to realize the importance of education within correctional institutions. Conceptually, prisoners in correctional institution require health aspects, well-being, skill development, employability, work readiness, and community relations. Additionally, prisons should provide consultation services, both physical and psychological, as part of education.

Correctional institutions also need to implement smoke-free policies to reduce the risk of ARIs. This smoke-free policy is also part of health education. It's known that the most at-risk group for ARI complications is smokers, who are at risk of cardiovascular and respiratory problems. A smoke-free prison policy can enhance the respiratory health of prisoners. Research results show that smoke-free prison policies have a positive effect on reducing ARIs in correctional institutions.

Moreover, waste management within correctional institutions also needs attention to prevent the spread of ARIs. Studies indicate that poor wastewater management affects the spread of ARIs within correctional institutions. Therefore, communities need to pay attention to proper wastewater treatment systems in their areas.

Improving Personal Hygiene Behaviour

Overcapacity of prisoners poses a challenge for correctional institutions. The impacts of overcapacity are related to security, cleanliness and the threat to individual rights. Personal hygiene behaviour is part of the cleanliness aspect that needs improvement in correctional institutions. One way is to enhance water availability within the correctional

institution, which is the best alternative way to improve prisoner's personal hygiene practices.

Personal hygiene behaviour is also influenced by the environmental conditions and infrastructure within the prison. Good environmental conditions and infrastructure affect handwashing and toilet cleaning practices among prisoners. The significant practice of handwashing before meals and after using the toilet significantly reduces the risk of infection in correctional institution. Personal hygiene practices like wearing shoes, washing hands before meals and after using the toilet affect the reduction of infection spread in correctional institution.

The perception of prisoners regarding disease prevention in correctional institution needs improvement. Enhancing knowledge related to personal hygiene will reduce disease risks in correctional institution. Understanding the health impacts on prisoners in correctional institution must be improved. Healthcare practitioners and policymakers need to understand that correctional institutions are vulnerable places for prisoners.

CONCLUSION

Achieving healthy correctional institutions in Indonesia requires serious attention. Health promotion strategies involving policy advocacy, training staff, health education and improving personal hygiene behaviour need to be implemented. First, through policy advocacy, we can fight for the necessary structural changes to improve access to healthcare services with adequate healthcare personnel. This is a crucial foundation to address disparities and ensure adequate health rights for prisoners.

Furthermore, training staff is key to improving the quality of healthcare services in correctional institutions. By providing adequate training, knowledge, and skill support to staff, correctional institutions can significantly enhance healthcare services. Additionally, health education for prisoners are a long-term investment to improve their understanding of personal health, minimize disease risks and cultivate a mindset that supports healthy lifestyles.

Lastly, improving personal hygiene behaviour is a crucial aspect of realizing

healthy correctional institution. By raising awareness and promoting cleanliness practices among prisoners, correctional institutions can reduce disease transmission and create a cleaner environment.

Realizing healthy correctional institutions through health promotion strategies is not merely a local effort but also a significant contribution to achieving the Sustainable Development Goals (SDGs). By focusing on policy advocacy, training prisoners and staff, health education and improving personal hygiene behaviour, healthy correctional institutions become a critical foundation in the efforts to achieve the SDGs, especially in reducing disparities, ensuring well-being for the entire population, and fulfilling the health rights of prisoners. Creating a correctional institution environment that supports health not only impacts more effective incarceration but also broader social and community welfare.

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Need Assessments of Learning Model for Anemia Prevention Among Vocational High School Students

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ABSTRACT

Background: The sustainable development goals (SDGs) provide an integrated framework of targets and indicators, including the elimination of stunting. The nutritional status of adolescent girls is a strong determinant of the health, low birth weight, and stunting of their future offspring. The health problems for adolescents or students include anemia. If the incidence of anemia in students is not addressed immediately, it will have an impact in the future, namely on students experiencing anemia when they're pregnant in future. So, It is necessary to develop a learning model for anemia prevention for students. **Aims:** This research aims to analyze the students needed for the anemia prevention learning model. **Method:** This article used a qualitative descriptive method with a case study approach. The informants are 7 students, 1 health center teacher, and 1 vice principal. Data collection was conducted by in-depth interviews and FGD. Data were analyzed using content analysis methods. **Result:** The practice of taking iron supplements for Students is low, Eating patterns are only 2 times a day and they have difficulty eating, the informants didn't have the habit of physical activity at home and have unhealthy sleeping habits. Students need educational content about anemia and healthy eating patterns. Students like the P5 (Pancasila Student Profile Strengthening Project) Method. And the communicator is a teacher or other person who understands about anemia. **Conclusion:** Student behavior related to anemia prevention is not good. It is necessary to educate students about the prevention of anemia. The development of the learning model taken is the P5 Module with the theme of Anemia Prevention.

Keyword: anemia prevention, health promotion, Learning Model, P5 Module

INTRODUCTION

The sustainable development goals (SDGs) provide an integrated framework of targets and indicators, including the elimination of stunting, to support better development planning. Indonesia faces a significant challenge as it ranks fourth globally in terms of stunting prevalence, exacerbated by disparities across regions, gender, and socioeconomic status, further compounded by the ongoing COVID-19 pandemic. Understanding the interlinkages between the SDGs could direct this study to focus specifically on tackling a specific issue, including stunting (Komarulzaman *et al.*, 2023).

Stunting is a global issue that urgently needs to be resolved because it decreases the quality of people in the world, globally, 144 million people are stunted in 2020 (Tyler Vaivada, Nadia

Akseer, Selai Akseer, Ahalya Somaskandan, Marianne Stefopoulos, 2020). One in four children under the age of 5 is stunted (Haileyesus Ejigu, 2023). Stunting is an urgent global issue to be resolved as it impacts the quality of human resources in the future. (Fadmi *et al.*, 2023) Stunting is one of the problems of malnutrition. Child malnutrition is a global problem with few concerns over survival (World Health Organization, 2014).

Stunting in children has immediate and long-term impacts (Soliman *et al.*, 2021). According to estimates by UNICEF, WHO, and the World Bank, more than half of stunted children <5 years are reported to live in Asia (Haileyesus Ejigu, 2023). Indonesia is ranked fifth in the country with the highest stunting burden in the world (Titaley *et al.*, 2019). Based on the results of SSGI 2022, the prevalence of stunting

in Indonesia reached 21.6%, above the WHO target of 20%. In addition, the Indonesian government targets the stunting rate to be 14% by 2024 (Kementerian Kesehatan RI, 2023).

A large and growing body of literature has investigated various factors related to stunting. For instance, the malnutrition that contributes to stunting is not only related to a lack of family food security (SDG 2) but also the effects of poverty (SDG 1), poor health services (SDG 3), maternal awareness (SDG 4), and access to clean water and sanitation (SDG 6) (Agustina, Sartono and Notodiputro, 2021). Stunting is caused by quite complex, including the health characteristics of children under five, sociodemographic factors, and environmental factors (Oginawati *et al.*, 2023). Stunting reduction requires a strong commitment and political will from the government and an integrated (Atmarita *et al.*, 2015). One of the Government of Indonesia's top priorities is to reduce stunting with a multi-sectoral and coordinated approach at the national, regional, and community levels (Elvina Karyadi *et al.*, 2021). Child stunting prevention includes specific and sensitive nutrition intervention programs (Margatoh and Huriah, 2021). One of the nutrition-sensitive intervention programs is about adolescent health.

The nutritional status of adolescents is very important and becomes the entry point for improving the health of women and children. The nutrition and health of adolescent girls and pre-pregnant women require early preparation to prevent the birth of stunted children. One of the ways to prevent the birth of stunted children is to fulfill various micronutrients for adolescents (Renyot, Dary and Nugroho, 2023). The health problems for adolescents include anemia.

Anemia is characterized by a reduction in Hb concentration, RBC count, or packed-cell volume, and the subsequent functionality impairment of meeting oxygen demand in tissues (Shubham *et al.*, 2020). Anemia and malnutrition continue to be global health problems, especially among females in developing countries, including Indonesia. Anemia burden counts for 1.6 billion people or 25% of the population worldwide (Agustina *et al.*, 2021).

Meanwhile, 15% of adolescent girls worldwide suffer from anemia, with 6% in developed and 27% in developing countries. The prevalence of anemia according to Riskesdas, 2013 was 37.01% and in 2018 the prevalence of anemia increased to 48.09%. The prevalence of anemia in adolescents aged 15-24 years is 18.4%. Data from the Central Java Provincial Health Office in 2016 stated that the prevalence of iron nutrition anemia in adolescents was 22.8%. Anemia is a condition where hemoglobin and erythrocyte levels in the body are below normal (Fitriyani *et al.*, 2022).

The provision of blood supplement tablets (TTD) to students is one of the indicators of success in overcoming anemia. According to the 2018 Riskesdas data, 80.9% of adolescent girls received blood tablets at school, but only 1.4% of adolescent girls consumed blood tablets.

One of the groups prone to anemia is adolescent girls. This group has a ten times greater risk of developing anemia than adolescent boys for several reasons. First, adolescent girls experience a menstrual cycle every month. Secondly, the majority of adolescent girls have the wrong eating habits. This happens because adolescent girls tend to look slim to maintain their appearance. So that adolescent girls encourage themselves to diet and eat less. But the diet is not a balanced diet according to the body's needs. As a result, there is a lack of important substances such as iron. The impact for adolescents suffering from anemia is a decrease in learning concentration, a decrease in physical fitness, and growth disorders so that height and weight do not reach normal. In adolescent girls, if anemia is not handled properly, it can have an impact on adulthood later. The threats that occur are an increase in maternal mortality, babies born prematurely, low birth weight (LBW), and also stunting.

If the incidence of anemia in adolescent girls or students is not addressed immediately, it will have an impact in the future, namely students experiencing anemia when pregnant. The high prevalence of iron deficiency anemia among students has a major contribution to maternal mortality, premature births, low birth weight babies, and stunting. This will certainly have an impact on increasing the prevalence of stunting in

Indonesia. Therefore, it is necessary to develop a learning model for anemia prevention for students.

METHODS

Research Design

This research uses qualitative research methods with a case study approach. Data collection was carried out directly on respondents so that a description of the actual situation of the respondents was obtained. Data were collected through in-depth interviews and focus group discussions.

Ethical considerations

All informants in the study had signed a written informed consent form before any study-related procedure was performed. This research has passed the ethical review by the Health Research Ethics Commission, Faculty of Public Health, Diponegoro University with letter number: 513/EA/KEPK-FKM/2023.

Informants

The number of main informants was 7 people from each department in the vocational high school, student council organizer, and PMR using a purposive sampling technique. The inclusion criteria were tenth grade, had menstruated, and were willing to be informants. The exclusion criteria are those who have never received material about anemia specifically. Additional informants were 1 vice principal and 1 UKS coach. Credibility in this study uses source triangulation by comparing information from main informants and additional informants, as well as technical triangulation by conducting observations and documentation studies (Dewi Rokhmah, Iken Nafikadini, 2019).

Research Procedure

This research was conducted at "X" Vocational High School in Semarang, Central Java. The first stage was a focus group discussion followed by an in-depth interview. Focus group discussions and in-depth Interviews were conducted with 7 female students. The place used for focus group discussion and in-depth interviews in the school lobby so that it was far from other friends so that informants felt comfortable in telling stories.

Interviews were conducted after the informants gave their consent to become research informants. gives a standard time between 1-2 hours, based

on Utarini (Utarini, 2007). In this research, the FGD was conducted for 1 hour. The time needed for in-depth interviews with each informant took about 1-1.5 hours. Conversations during in-depth interviews were audio-recorded and each informant was given Rp.50,000 in exchange for the time already used for the interview. After all the main informants had conducted focus group discussions and in-depth interviews, the next step was to interview triangulation informants, namely the UKS coach and the vice principal.

Data Analysis

Recorded interview data was transcribed and coded and themes related to ideas about the condition or behavior of students related to health and analysis of learning media needs. Data analysis using content analysis

RESULT DAN DISCUSSION

Informants Characteristic

Informants consisted of 7 students, 1 health center teacher, and 1 vice principal. Students aged between 16-17 years old. The remaining demographic characteristics of the participants are shown in Tables 1 and 2.

Table 1. Demographic characteristics of main informants

Demographic characteristic	n (%)
Gender	
Female	7 (100)
Age	
16	3 (42)
17	4 (58)
Grade	
High school	7 (100)
Total	7 (100)

Table 2. Demographic characteristics of additional informants

Demographic characteristic	n (%)
Gender	
Female	1 (50)
Male	1 (50)
Age	
30-40	1 (50)
41-50	1 (50)
Institution	
High school	2 (100)
Job	
Vice Principal	1 (50)
Health centre teacher	1 (50)
Total	2 (100)

A. Analysis of the Condition of Students
a. Practice of Taking Iron Supplement

"...Not all, not all, just some. From school I get 1 strip for 1 month. but I never take it all, because I don't take it regularly. e... because it doesn't taste good"
(KK, Student)

The practice of taking iron supplements among students is still lacking. Most of the informants only took iron supplements once at school which were distributed by the health center. A small proportion of students took iron supplements during menstruation only and when they had low blood pressure. Students claimed that iron supplements distributed at school had a fishy taste. So most of them did not want to consume it. Meanwhile, according to students, iron supplements obtained from pharmacies such as Sangobion had better taste than those obtained from schools.

Informants mentioned that the barriers they had experienced when taking iron supplements were feeling nauseous, headache, bitterness, and fishy smell. Research studies have shown that iron deficiency is the most common micro-nutrient deficiency associated with anemia, while folate deficiency and Vitamin B12 deficiency are ranked as the second and third most prevalent micronutrient deficiencies associated with anemia (Ramachandran and Kalaivani, 2018).

Previous Research showed that Most respondents had low knowledge about anemia, attitudes, and intentions regarding iron supplements. This can happen due to various factors, such as lack of education/counseling, different distribution times for iron supplements at each school, and the method of implementing the program in schools that is not optimal (Silitonga *et al.*, 2023).

Iron is needed for the production of hemoglobin, which is an essential ingredient in red blood cells. Hemoglobin is very important, as it

carries oxygen from the lungs to the rest of the body. If a person doesn't have enough iron, they can develop anemia, which means they aren't making enough red blood cells to carry oxygen around their body. The effects are breathless, tired, and a lack of energy, the skin may become pale and may have palpitations (noticeable heartbeats) (The Blood Safety and Conservation Team, 2015).

Iron supplementation involves the oral administration of pharmaceutical iron compounds. Supplementation of iron can be practiced when immediate action is required for increasing the level of iron in the human body as orally administered haem iron easily enters into the bloodstream (Shubham *et al.*, 2020). Many factors influence adherence to taking iron supplements including knowledge, attitude, motivation, parental support, and teacher support. Based on research conducted by Nuradhiani, the most dominant determinant of adherence to taking iron supplements in Students is teacher support Good teacher support significantly increased their adherence to taking iron supplements 4.7 times greater than those who received less support from teachers (Nuradhiani, Briawan and Dwiriani, 2017).

b. Eating Patterns

"...I like junk food like fried chicken and greasy food, not often, rarely, at most once or twice a week. or once in a while, yes, it's okay, but if it's too much, it can cause inflammation, but when you want it, it's okay" (DY, Student).

All informants thought that it was okay to eat instant food as long as it was not in excessive portions (reasonable), instant food tasted good, and a substitute when hungry. despite knowing the dangers of instant food because it contains preservatives.

Students' nutritional needs need to be considered because in adolescence there is rapid growth and development. Unhealthy eating

habits will affect students' nutrition. Unhealthy foods such as fast food are consumed by students. At a time when everything is modern like now, teenagers want everything to be fast, including in choosing food. Fast food is also known to the public as junk food. Junk food is defined as food waste or food that does not have nutrients for the body. Eating junk food is not only in vain but can also damage health. (Pamelia, 2018) Therefore, students must adopt a healthy diet to build their bodies. The habit of consuming unhealthy food since adolescence will have a negative impact in the future (Hartini, 2020).

Nutritional deficiency anemia mainly results from a lack of iron, vitamin B12 & and a low vitamin C intake. Prevention can be done by consuming iron-rich food (such as red meat, poultry, and seafood), beans, dark green leafy vegetables, dried fruits, peas, and Food containing vitamin C that enhances iron absorption these are broccoli, tomatoes, oranges, lemon (Bhadra and Deb, 2020).

c. Exercise Habits

"Sports once a week in sports lessons, if the habit of sports outside school does not exist yet." (DA, Student).

All informants did sports at school once a week during sports lessons. On average, informants did not have the habit of exercising at home because they were lazy and preferred to sleep. Despite this, all of them thought that exercise was important for health and the immune system. A small proportion of informants have exercise habits at home, such as stretching and cycling.

To achieve good health standards, it is necessary to have a process of managing the surrounding environment and daily activities that are reflected in a healthy lifestyle. A healthy lifestyle is a community lifestyle that upholds health aspects such as managing cleanliness and environmental health, maintaining physical and psychological fitness, and providing adequate nutrition, to

achieve good health standards. Physical activity also plays an important role in preventing anemia.

d. Sleep Habits

"...I honestly sleep irregularly, sometimes at half past 10, sometimes at 10 o'clock, if I'm really tired, at 8 o'clock I'm already asleep, I immediately go to bed and wake up at dawn. Sometimes at 10 - set 2 just sleep. How yes, usually a lot of thoughts, the body is tired, the eyes are sleepy but the eyes are still fresh. Thinking a lot, school burden, home burden, joining student council, PMR, journalist, etc." (DA, Student)

On average, informants have unhealthy sleeping habits (7 hours/day), and some even sleep late into the early hours of the morning due to difficulty falling asleep and not fulfilling the recommended sleep time (8-9 hours). The reasons are doing school assignments, and playing on cellphones so that they forget to sleep.

Sleep is a basic human need that absolutely must be fulfilled by everyone. Everyone needs enough sleep to be able to carry out activities optimally in the future. Therefore, every human being must get maximum rest results to get good quality sleep. Most people, especially students who are the target audience, still ignore healthy sleep patterns and use sleeping hours that are not to their needs to fulfill their sleep quality. This is caused by external disturbances such as late-night work, urban lifestyle, using gadgets before bedtime, and lack of understanding of the impact of staying up too late (Putra *et al.*, 2017).

B. Analysis of Learning Method

a. Content Analysis

Based on the results of interviews with students related to health education content needs, some data were obtained. The categories of material needed by students regarding health in general are:

"e..material on how to manage good sleep time. Then, e.. what is it, for health such as anemia and drugs? I think mental health is also important. But the way the material is given is lighter, for example, given directions on how to relieve stress properly so as not to hurt yourself or self-harm" (DA, Student)

"...We need to explain a healthy lifestyle, because nowadays we have a lot of tasks, so we eat late and it's not healthy. The causes of irregular eating are sometimes late eating because of assignments, and lazy eating because they are not in the mood. I also don't like the menu, the food is also like that" (RA, Student)

"...Yes about junk food, soda drinks, diet" (DY, Student)

"...Maintaining food consumption, like being advised on good foods that should be consumed. because many people close their eyes about unhealthy foods" (TR, Student)

Based on the data above, it can be concluded that the material needed by students related to health varies, including sleep patterns or how to manage good sleep, eating patterns including eating healthy foods to the dangers or avoiding junk food. In addition, some students argue that material regarding mental health such as managing stress is also needed by students.

Based on the results of the interviews, the following are the categories of material needed by students regarding health, especially about anemia, which are:

"The definition of anemia, foods and drinks that should not be consumed and those that can be consumed, and those that support the prevention of anemia, and how we can avoid getting anemia" (RA, Student)

"...Need materials about anemia prevention, its causes, that's all" (MY, Student)

"...foods and drinks that should be eaten or not eaten during menstruation" (FD, Student)

"...symptoms of anemia and how to treat" (DY, Student)

"Habituation to take blood supplement tablets and eat healthy food" (TR, Student)

"...a good diet, or some kind of explanation about blood supplement tablets" (DA, Student)

Based on the data above, it can be concluded that the material about anemia needed by Students includes material about foods that can prevent anemia and can cause anemia, a good diet, taking blood supplement tablets, causes, and symptoms of anemia, and how to overcome anemia.

Based on the results of interviews with additional informants, no socialization at school focuses on preventing anemia and preventing stunting. The following are the results of interviews with additional informants:

"...In our curriculum, we have not included education about stunting, we have collaborated with the puskesmas to focus more on children's current health, not thinking about the long term. Even the blood supplement tablets are to maintain children's health at this time. So that they don't get anemia, to prevent them from getting weak during their period, and so on, like that. There has not been any socialization to think in the long term. There has also never been any socialization of stunting at the puskesmas. If there are any special activities to prevent stunting, there are none from the puskesmas, the most that we can participate in is when we want to give blood supplement tablets..." (AE, Vice Principal)

Based on these answers, the provision of education on the prevention of anemia and stunting has not been a special activity. Only a little information interlude when giving blood supplement tablets.

Previous research showed that Interventions around nutrition education have a positive impact on knowledge, attitude, and practice among school-age children in Ghana (Antwi *et al.*, 2020). Research conducted on adolescent girls in Jordan shows that nutrition education can improve knowledge, attitude, and practice toward anemia (Abu-Baker, Eyadat and Khamaiseh, 2021).

b. Learning Method Analysis

The results of the analysis of interviews in the field on the needs of educational / learning media development show that students want a good learning resource that combines theory and practice or is project-based and interestingly packaged. So that students also participate actively, not just passively listening to the material.

"...I prefer to practice, but sometimes I need materials because if I practice without materials, I sometimes get confused" (DA, student)

Based on the findings in the field, the relevant stakeholders (vice principal and health center teacher) suggested that a project-based learning media be developed.

Because it aims to be more powerful and more in touch with students. With the aim that students not only know but also realize. The project-based learning module is by creating a P5 module (Pancasila Student Profile Strengthening Project) which is included in the Sustainable Lifestyle theme (It is one of the themes of 8 other themes). The thing that needs to be considered is that the material described in the module is connected to the daily context so that they think far ahead. The material is made as contextual as possible to make it more relatable and easily

accepted by students. The module is a scheme or scenario for 5 days (adjusting the duration of the implementation of P5 in schools) that is equipped with teaching materials. The module also describes the practice/project/simulation that will be carried out by students. The stages of the P5 module are quite long, but if it is implemented it is a good thing and students are also enthusiastic and find it easier to understand the material presented because students not only get theory at the beginning but also practice or do simulations.

"...Suitable learning model? For our children, yes, the character ... I see from the character of the child that they prefer learning that is not monotonous in the classroom it seems. Maybe with project-based then activities in the field, children are invited out to be shown directly with a context that is by the theory, and they are more interested. This is evident from the enthusiasm of the children when we have P5 project activities" (AE, Vice Principal)

Students in this school like learning models that focus more on practice, so that students can more easily understand the context.

When the P5 program was implemented at school, students were very enthusiastic about it. For this reason, the suggestion from the school is that learning materials regarding anemia prevention or stunting prevention can be in the form of projects tailored to the P5 project with the theme of Sustainable Lifestyle.

Based on the results of interviews, informants or young women are also enthusiastic about participating in P5 lessons.

"P5 enthusiastically yes, because there are no other lessons besides this, and it teaches us to be creative and critical. Lessons are not only in the classroom but can be outdoors" (RA, Student)

Students mentioned that in P5 learning what they need is to be given media that is interesting and not boring.

"Ballance between material and field learning. The material can be through video or practice. If it's a video, it's an animated video. The maximum duration is 15-20 minutes. I like inspirational movies, if the duration is long, it's okay as long as it's not monotonous." (RA, Student)

"Yes, it is more suitable through practice than only through socialization, provided that the socialization method is only reading. It would be better if there was more interaction with the audience in the socialization, for example giving questions to the audience in a fun way" (DA, Student)

Some informants mentioned that they preferred the material to be delivered through audiovisual media such as animated videos.

"...Yes, it might be different, what if the video is the one that explains it, maybe it can take a long time, to explain it from start to finish, but indeed if what is on TikTok is just an outline, the difference between TikTok and YouTube is that the explanation is different, now it can be adjusted, where is it" (FD, Student)

Some informants mentioned that they like short videos like those in the TikTok application where the duration is not too long. Audiovisual media is a moving and dynamic medium that can be seen heard and delivered through electronic aids with the advantages of being easy to understand, more interesting, and involving all the five senses so that audiovisual delivery is more easily understood (Trifitriana, Fadilah and Mulawarman, 2014).

c. Communicator Analysis

Based on the results of in-depth interviews, most informants answered that people who can

provide education about anemia are people who understand anemia.

Even though their background is not a health worker, as long as the person can understand the material, they can still be a presenter.

"...who understands enough about anemia, who master the material... experienced people like doctors, teachers are also suitable. because in my opinion, we don't have to be healthy people to provide health information. the important thing is that we know what anemia is, how to deal with it, like that" (TR, student)

Based on the results of the interviews, if peers get material about anemia and then spread it to other friends, most informants argue that if it is a peer educator who provides the material, they do not agree, because they feel less valued and less listened to, besides that if the information is confidential, they are afraid of leaking it to other friends.

"...The reason is that peer educators are often underestimated and many do not listen" (KK, Student)

"...I don't think peer tutors are suitable, because my friends don't trust me even though I have received training" (MY, Student)

"Maybe if it's friend to friend, like 1 1, it's definitely like "ih you know this, this, and then the other one is telling this, this is the fee, prone to leakage, but not all" (TR, student)

Only a small number of informants thought it was fine if peers provided the materials.

"...Peers, you can. Just ordinary people who have knowledge or experience with anemia. It can be older siblings, parents, and teachers, even small children. The point is, as long as they know the definition, impact, and

prevention of anemia" (DA, Student)

Most informants thought that at school, the teacher was a more respected figure. They think that teachers who deliver material about anemia can also do so. As long as the teacher has been trained or given material about anemia so that they can convey it to students.

"...It is possible, but with the condition that the teacher has experience or knowledge on how to explain and give socialization in case of anemia" (DA, Student)

Based on the interview results, the informant prefers presenters with good public speaking, so that the informant can more easily understand the material.

"...Explaining in a good but cool way, if you listen to it, you won't get sleepy or bored. The public speaking must be good because the way the material is delivered is not good, the listener will be bored and not focused." (DA, Student)

Based on this, the speaker in any background, in delivering the material must be good so that the informant can easily understand the material well.

C. Summary of the Results of the Needs Assessment.

a. The content needed by students are:

- 1) Healthy lifestyle, including sleep patterns, exercise patterns, and mental health
- 2) Stunting prevention
- 3) Anemia prevention
- 4) Definition, causes, and effects of anemia
- 5) Importance of taking blood supplement tablets
- 6) Healthy diet
- 7) Unhealthy diet

b. The learning methods required are:

- 1) Not just theory, but also practice

- 2) Learning methods not only in the classroom but also outside the classroom
- 3) P5 learning methods with interesting activities
- 4) The material is delivered in the form of animated videos with a duration that is not too long/short, a maximum of 3-5 minutes
- 5) Informants also like media such as inspirational films that are not boring.

c. The material providers needed are:

- 1) People who understand the material about anemia, do not necessarily have a health background
- 2) In schools, teachers can be presenters, as long as they have received training or knowledge about anemia.
- 3) Presenters are not peers, because it is feared that they will be less respected and not listen to them.
- 4) Public Speaking of the speaker must be good so that it makes it easier for participants to understand the material presented.

CONCLUSION

The practice of taking iron supplements for Students is low. The average eating pattern of students is only 2 times a day and they have difficulty eating. Besides that, students prefer instant food to healthy food. On average, the informants didn't have the habit of physical activity at home and had unhealthy sleeping habits.

It is necessary to educate students about the prevention of anemia because Students will become future mothers who give birth to a healthy child and are not stunted. Based on these results, the development of the learning model taken is the P5 Module (Pancasila Student Profile Strengthening Project) with the theme of Anemia Prevention. The P5 module is prepared based on the results of the needs analysis and guidelines from the Ministry of Education and Culture. The results of the needs analysis are then applied in the P5 module by adjusting the template or format of the P5 module provisions.

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Need Assessments of Learning Model for Anemia Prevention Among Vocational High School Students

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ABSTRACT

Background: The sustainable development goals (SDGs) provide an integrated framework of targets and indicators, including the elimination of stunting. The nutritional status of adolescent girls is a strong determinant of the health, low birth weight, and stunting of their future offspring. The health problems for adolescents or students include anemia. If the incidence of anemia in students is not addressed immediately, it will have an impact in the future, namely on students experiencing anemia when they're pregnant in future. So, It is necessary to develop a learning model for anemia prevention for students. **Aims:** This research aims to analyze the students needed for the anemia prevention learning model. **Method:** This article used a qualitative descriptive method with a case study approach. The informants are 7 students, 1 health center teacher, and 1 vice principal. Data collection was conducted by in-depth interviews and FGD. Data were analyzed using content analysis methods. **Result:** The practice of taking iron supplements for Students is low, Eating patterns are only 2 times a day and they have difficulty eating, the informants didn't have the habit of physical activity at home and have unhealthy sleeping habits. Students need educational content about anemia and healthy eating patterns. Students like the P5 (Pancasila Student Profile Strengthening Project) Method. And the communicator is a teacher or other person who understands about anemia. **Conclusion:** Student behavior related to anemia prevention is not good. It is necessary to educate students about the prevention of anemia. The development of the learning model taken is the P5 Module with the theme of Anemia Prevention.

Keyword: anemia prevention, health promotion, Learning Model, P5 Module

INTRODUCTION

The sustainable development goals (SDGs) provide an integrated framework of targets and indicators, including the elimination of stunting, to support better development planning. Indonesia faces a significant challenge as it ranks fourth globally in terms of stunting prevalence, exacerbated by disparities across regions, gender, and socioeconomic status, further compounded by the ongoing COVID-19 pandemic. Understanding the interlinkages between the SDGs could direct this study to focus specifically on tackling a specific issue, including stunting (Komarulzaman *et al.*, 2023).

Stunting is a global issue that urgently needs to be resolved because it decreases the quality of people in the world, globally, 144 million people are stunted in 2020 (Tyler Vaivada, Nadia

Akseer, Selai Akseer, Ahalya Somaskandan, Marianne Stefopoulos, 2020). One in four children under the age of 5 is stunted (Haileyesus Ejigu, 2023). Stunting is an urgent global issue to be resolved as it impacts the quality of human resources in the future. (Fadmi *et al.*, 2023) Stunting is one of the problems of malnutrition. Child malnutrition is a global problem with few concerns over survival (World Health Organization, 2014).

Stunting in children has immediate and long-term impacts (Soliman *et al.*, 2021). According to estimates by UNICEF, WHO, and the World Bank, more than half of stunted children <5 years are reported to live in Asia (Haileyesus Ejigu, 2023). Indonesia is ranked fifth in the country with the highest stunting burden in the world (Titaley *et al.*, 2019). Based on the results of SSGI 2022, the prevalence of stunting

in Indonesia reached 21.6%, above the WHO target of 20%. In addition, the Indonesian government targets the stunting rate to be 14% by 2024 (Kementerian Kesehatan RI, 2023).

A large and growing body of literature has investigated various factors related to stunting. For instance, the malnutrition that contributes to stunting is not only related to a lack of family food security (SDG 2) but also the effects of poverty (SDG 1), poor health services (SDG 3), maternal awareness (SDG 4), and access to clean water and sanitation (SDG 6) (Agustina, Sartono and Notodiputro, 2021). Stunting is caused by quite complex, including the health characteristics of children under five, sociodemographic factors, and environmental factors (Oginawati *et al.*, 2023). Stunting reduction requires a strong commitment and political will from the government and an integrated (Atmarita *et al.*, 2015). One of the Government of Indonesia's top priorities is to reduce stunting with a multi-sectoral and coordinated approach at the national, regional, and community levels (Elvina Karyadi *et al.*, 2021). Child stunting prevention includes specific and sensitive nutrition intervention programs (Margatoh and Huriah, 2021). One of the nutrition-sensitive intervention programs is about adolescent health.

The nutritional status of adolescents is very important and becomes the entry point for improving the health of women and children. The nutrition and health of adolescent girls and pre-pregnant women require early preparation to prevent the birth of stunted children. One of the ways to prevent the birth of stunted children is to fulfill various micronutrients for adolescents (Renyot, Dary and Nugroho, 2023). The health problems for adolescents include anemia.

Anemia is characterized by a reduction in Hb concentration, RBC count, or packed-cell volume, and the subsequent functionality impairment of meeting oxygen demand in tissues (Shubham *et al.*, 2020). Anemia and malnutrition continue to be global health problems, especially among females in developing countries, including Indonesia. Anemia burden counts for 1.6 billion people or 25% of the population worldwide (Agustina *et al.*, 2021).

Meanwhile, 15% of adolescent girls worldwide suffer from anemia, with 6% in developed and 27% in developing countries. The prevalence of anemia according to Riskesdas, 2013 was 37.01% and in 2018 the prevalence of anemia increased to 48.09%. The prevalence of anemia in adolescents aged 15-24 years is 18.4%. Data from the Central Java Provincial Health Office in 2016 stated that the prevalence of iron nutrition anemia in adolescents was 22.8%. Anemia is a condition where hemoglobin and erythrocyte levels in the body are below normal (Fitriyani *et al.*, 2022).

The provision of blood supplement tablets (TTD) to students is one of the indicators of success in overcoming anemia. According to the 2018 Riskesdas data, 80.9% of adolescent girls received blood tablets at school, but only 1.4% of adolescent girls consumed blood tablets.

One of the groups prone to anemia is adolescent girls. This group has a ten times greater risk of developing anemia than adolescent boys for several reasons. First, adolescent girls experience a menstrual cycle every month. Secondly, the majority of adolescent girls have the wrong eating habits. This happens because adolescent girls tend to look slim to maintain their appearance. So that adolescent girls encourage themselves to diet and eat less. But the diet is not a balanced diet according to the body's needs. As a result, there is a lack of important substances such as iron. The impact for adolescents suffering from anemia is a decrease in learning concentration, a decrease in physical fitness, and growth disorders so that height and weight do not reach normal. In adolescent girls, if anemia is not handled properly, it can have an impact on adulthood later. The threats that occur are an increase in maternal mortality, babies born prematurely, low birth weight (LBW), and also stunting.

If the incidence of anemia in adolescent girls or students is not addressed immediately, it will have an impact in the future, namely students experiencing anemia when pregnant. The high prevalence of iron deficiency anemia among students has a major contribution to maternal mortality, premature births, low birth weight babies, and stunting. This will certainly have an impact on increasing the prevalence of stunting in

Indonesia. Therefore, it is necessary to develop a learning model for anemia prevention for students.

METHODS

Research Design

This research uses qualitative research methods with a case study approach. Data collection was carried out directly on respondents so that a description of the actual situation of the respondents was obtained. Data were collected through in-depth interviews and focus group discussions.

Ethical considerations

All informants in the study had signed a written informed consent form before any study-related procedure was performed. This research has passed the ethical review by the Health Research Ethics Commission, Faculty of Public Health, Diponegoro University with letter number: 513/EA/KEPK-FKM/2023.

Informants

The number of main informants was 7 people from each department in the vocational high school, student council organizer, and PMR using a purposive sampling technique. The inclusion criteria were tenth grade, had menstruated, and were willing to be informants. The exclusion criteria are those who have never received material about anemia specifically. Additional informants were 1 vice principal and 1 UKS coach. Credibility in this study uses source triangulation by comparing information from main informants and additional informants, as well as technical triangulation by conducting observations and documentation studies (Dewi Rokhmah, Iken Nafikadini, 2019).

Research Procedure

This research was conducted at "X" Vocational High School in Semarang, Central Java. The first stage was a focus group discussion followed by an in-depth interview. Focus group discussions and in-depth Interviews were conducted with 7 female students. The place used for focus group discussion and in-depth interviews in the school lobby so that it was far from other friends so that informants felt comfortable in telling stories.

Interviews were conducted after the informants gave their consent to become research informants. gives a standard time between 1-2 hours, based

on Utarini (Utarini, 2007). In this research, the FGD was conducted for 1 hour. The time needed for in-depth interviews with each informant took about 1-1.5 hours. Conversations during in-depth interviews were audio-recorded and each informant was given Rp.50,000 in exchange for the time already used for the interview. After all the main informants had conducted focus group discussions and in-depth interviews, the next step was to interview triangulation informants, namely the UKS coach and the vice principal.

Data Analysis

Recorded interview data was transcribed and coded and themes related to ideas about the condition or behavior of students related to health and analysis of learning media needs. Data analysis using content analysis

RESULT DAN DISCUSSION

Informants Characteristic

Informants consisted of 7 students, 1 health center teacher, and 1 vice principal. Students aged between 16-17 years old. The remaining demographic characteristics of the participants are shown in Tables 1 and 2.

Table 1. Demographic characteristics of main informants

Demographic characteristic	n (%)
Gender	
Female	7 (100)
Age	
16	3 (42)
17	4 (58)
Grade	
High school	7 (100)
Total	7 (100)

Table 2. Demographic characteristics of additional informants

Demographic characteristic	n (%)
Gender	
Female	1 (50)
Male	1 (50)
Age	
30-40	1 (50)
41-50	1 (50)
Institution	
High school	2 (100)
Job	
Vice Principal	1 (50)
Health centre teacher	1 (50)
Total	2 (100)

A. Analysis of the Condition of Students
a. Practice of Taking Iron Supplement

"...Not all, not all, just some. From school I get 1 strip for 1 month. but I never take it all, because I don't take it regularly. e... because it doesn't taste good"
(KK, Student)

The practice of taking iron supplements among students is still lacking. Most of the informants only took iron supplements once at school which were distributed by the health center. A small proportion of students took iron supplements during menstruation only and when they had low blood pressure. Students claimed that iron supplements distributed at school had a fishy taste. So most of them did not want to consume it. Meanwhile, according to students, iron supplements obtained from pharmacies such as Sangobion had better taste than those obtained from schools.

Informants mentioned that the barriers they had experienced when taking iron supplements were feeling nauseous, headache, bitterness, and fishy smell. Research studies have shown that iron deficiency is the most common micro-nutrient deficiency associated with anemia, while folate deficiency and Vitamin B12 deficiency are ranked as the second and third most prevalent micronutrient deficiencies associated with anemia (Ramachandran and Kalaivani, 2018).

Previous Research showed that Most respondents had low knowledge about anemia, attitudes, and intentions regarding iron supplements. This can happen due to various factors, such as lack of education/counseling, different distribution times for iron supplements at each school, and the method of implementing the program in schools that is not optimal (Silitonga *et al.*, 2023).

Iron is needed for the production of hemoglobin, which is an essential ingredient in red blood cells. Hemoglobin is very important, as it

carries oxygen from the lungs to the rest of the body. If a person doesn't have enough iron, they can develop anemia, which means they aren't making enough red blood cells to carry oxygen around their body. The effects are breathless, tired, and a lack of energy, the skin may become pale and may have palpitations (noticeable heartbeats) (The Blood Safety and Conservation Team, 2015).

Iron supplementation involves the oral administration of pharmaceutical iron compounds. Supplementation of iron can be practiced when immediate action is required for increasing the level of iron in the human body as orally administered haem iron easily enters into the bloodstream (Shubham *et al.*, 2020). Many factors influence adherence to taking iron supplements including knowledge, attitude, motivation, parental support, and teacher support. Based on research conducted by Nuradhiani, the most dominant determinant of adherence to taking iron supplements in Students is teacher support Good teacher support significantly increased their adherence to taking iron supplements 4.7 times greater than those who received less support from teachers (Nuradhiani, Briawan and Dwiriani, 2017).

b. Eating Patterns

"...I like junk food like fried chicken and greasy food, not often, rarely, at most once or twice a week. or once in a while, yes, it's okay, but if it's too much, it can cause inflammation, but when you want it, it's okay" (DY, Student).

All informants thought that it was okay to eat instant food as long as it was not in excessive portions (reasonable), instant food tasted good, and a substitute when hungry. despite knowing the dangers of instant food because it contains preservatives.

Students' nutritional needs need to be considered because in adolescence there is rapid growth and development. Unhealthy eating

habits will affect students' nutrition. Unhealthy foods such as fast food are consumed by students. At a time when everything is modern like now, teenagers want everything to be fast, including in choosing food. Fast food is also known to the public as junk food. Junk food is defined as food waste or food that does not have nutrients for the body. Eating junk food is not only in vain but can also damage health. (Pamelia, 2018) Therefore, students must adopt a healthy diet to build their bodies. The habit of consuming unhealthy food since adolescence will have a negative impact in the future (Hartini, 2020).

Nutritional deficiency anemia mainly results from a lack of iron, vitamin B12 & and a low vitamin C intake. Prevention can be done by consuming iron-rich food (such as red meat, poultry, and seafood), beans, dark green leafy vegetables, dried fruits, peas, and Food containing vitamin C that enhances iron absorption these are broccoli, tomatoes, oranges, lemon (Bhadra and Deb, 2020).

c. Exercise Habits

"Sports once a week in sports lessons, if the habit of sports outside school does not exist yet." (DA, Student).

All informants did sports at school once a week during sports lessons. On average, informants did not have the habit of exercising at home because they were lazy and preferred to sleep. Despite this, all of them thought that exercise was important for health and the immune system. A small proportion of informants have exercise habits at home, such as stretching and cycling.

To achieve good health standards, it is necessary to have a process of managing the surrounding environment and daily activities that are reflected in a healthy lifestyle. A healthy lifestyle is a community lifestyle that upholds health aspects such as managing cleanliness and environmental health, maintaining physical and psychological fitness, and providing adequate nutrition, to

achieve good health standards. Physical activity also plays an important role in preventing anemia.

d. Sleep Habits

"...I honestly sleep irregularly, sometimes at half past 10, sometimes at 10 o'clock, if I'm really tired, at 8 o'clock I'm already asleep, I immediately go to bed and wake up at dawn. Sometimes at 10 - set 2 just sleep. How yes, usually a lot of thoughts, the body is tired, the eyes are sleepy but the eyes are still fresh. Thinking a lot, school burden, home burden, joining student council, PMR, journalist, etc." (DA, Student)

On average, informants have unhealthy sleeping habits (7 hours/day), and some even sleep late into the early hours of the morning due to difficulty falling asleep and not fulfilling the recommended sleep time (8-9 hours). The reasons are doing school assignments, and playing on cellphones so that they forget to sleep.

Sleep is a basic human need that absolutely must be fulfilled by everyone. Everyone needs enough sleep to be able to carry out activities optimally in the future. Therefore, every human being must get maximum rest results to get good quality sleep. Most people, especially students who are the target audience, still ignore healthy sleep patterns and use sleeping hours that are not to their needs to fulfill their sleep quality. This is caused by external disturbances such as late-night work, urban lifestyle, using gadgets before bedtime, and lack of understanding of the impact of staying up too late (Putra *et al.*, 2017).

B. Analysis of Learning Method

a. Content Analysis

Based on the results of interviews with students related to health education content needs, some data were obtained. The categories of material needed by students regarding health in general are:

"e..material on how to manage good sleep time. Then, e.. what is it, for health such as anemia and drugs? I think mental health is also important. But the way the material is given is lighter, for example, given directions on how to relieve stress properly so as not to hurt yourself or self-harm" (DA, Student)

"...We need to explain a healthy lifestyle, because nowadays we have a lot of tasks, so we eat late and it's not healthy. The causes of irregular eating are sometimes late eating because of assignments, and lazy eating because they are not in the mood. I also don't like the menu, the food is also like that" (RA, Student)

"...Yes about junk food, soda drinks, diet" (DY, Student)

"...Maintaining food consumption, like being advised on good foods that should be consumed. because many people close their eyes about unhealthy foods" (TR, Student)

Based on the data above, it can be concluded that the material needed by students related to health varies, including sleep patterns or how to manage good sleep, eating patterns including eating healthy foods to the dangers or avoiding junk food. In addition, some students argue that material regarding mental health such as managing stress is also needed by students.

Based on the results of the interviews, the following are the categories of material needed by students regarding health, especially about anemia, which are:

"The definition of anemia, foods and drinks that should not be consumed and those that can be consumed, and those that support the prevention of anemia, and how we can avoid getting anemia" (RA, Student)

"...Need materials about anemia prevention, its causes, that's all" (MY, Student)

"...foods and drinks that should be eaten or not eaten during menstruation" (FD, Student)

"...symptoms of anemia and how to treat" (DY, Student)

"Habituation to take blood supplement tablets and eat healthy food" (TR, Student)

"...a good diet, or some kind of explanation about blood supplement tablets" (DA, Student)

Based on the data above, it can be concluded that the material about anemia needed by Students includes material about foods that can prevent anemia and can cause anemia, a good diet, taking blood supplement tablets, causes, and symptoms of anemia, and how to overcome anemia.

Based on the results of interviews with additional informants, no socialization at school focuses on preventing anemia and preventing stunting. The following are the results of interviews with additional informants:

"...In our curriculum, we have not included education about stunting, we have collaborated with the puskesmas to focus more on children's current health, not thinking about the long term. Even the blood supplement tablets are to maintain children's health at this time. So that they don't get anemia, to prevent them from getting weak during their period, and so on, like that. There has not been any socialization to think in the long term. There has also never been any socialization of stunting at the puskesmas. If there are any special activities to prevent stunting, there are none from the puskesmas, the most that we can participate in is when we want to give blood supplement tablets..." (AE, Vice Principal)

Based on these answers, the provision of education on the prevention of anemia and stunting has not been a special activity. Only a little information interlude when giving blood supplement tablets.

Previous research showed that Interventions around nutrition education have a positive impact on knowledge, attitude, and practice among school-age children in Ghana (Antwi *et al.*, 2020). Research conducted on adolescent girls in Jordan shows that nutrition education can improve knowledge, attitude, and practice toward anemia (Abu-Baker, Eyadat and Khamaiseh, 2021).

b. Learning Method Analysis

The results of the analysis of interviews in the field on the needs of educational / learning media development show that students want a good learning resource that combines theory and practice or is project-based and interestingly packaged. So that students also participate actively, not just passively listening to the material.

"...I prefer to practice, but sometimes I need materials because if I practice without materials, I sometimes get confused" (DA, student)

Based on the findings in the field, the relevant stakeholders (vice principal and health center teacher) suggested that a project-based learning media be developed.

Because it aims to be more powerful and more in touch with students. With the aim that students not only know but also realize. The project-based learning module is by creating a P5 module (Pancasila Student Profile Strengthening Project) which is included in the Sustainable Lifestyle theme (It is one of the themes of 8 other themes). The thing that needs to be considered is that the material described in the module is connected to the daily context so that they think far ahead. The material is made as contextual as possible to make it more relatable and easily

accepted by students. The module is a scheme or scenario for 5 days (adjusting the duration of the implementation of P5 in schools) that is equipped with teaching materials. The module also describes the practice/project/simulation that will be carried out by students. The stages of the P5 module are quite long, but if it is implemented it is a good thing and students are also enthusiastic and find it easier to understand the material presented because students not only get theory at the beginning but also practice or do simulations.

"...Suitable learning model? For our children, yes, the character ... I see from the character of the child that they prefer learning that is not monotonous in the classroom it seems. Maybe with project-based then activities in the field, children are invited out to be shown directly with a context that is by the theory, and they are more interested. This is evident from the enthusiasm of the children when we have P5 project activities" (AE, Vice Principal)

Students in this school like learning models that focus more on practice, so that students can more easily understand the context.

When the P5 program was implemented at school, students were very enthusiastic about it. For this reason, the suggestion from the school is that learning materials regarding anemia prevention or stunting prevention can be in the form of projects tailored to the P5 project with the theme of Sustainable Lifestyle.

Based on the results of interviews, informants or young women are also enthusiastic about participating in P5 lessons.

"P5 enthusiastically yes, because there are no other lessons besides this, and it teaches us to be creative and critical. Lessons are not only in the classroom but can be outdoors" (RA, Student)

Students mentioned that in P5 learning what they need is to be given media that is interesting and not boring.

"Ballance between material and field learning. The material can be through video or practice. If it's a video, it's an animated video. The maximum duration is 15-20 minutes. I like inspirational movies, if the duration is long, it's okay as long as it's not monotonous." (RA, Student)

"Yes, it is more suitable through practice than only through socialization, provided that the socialization method is only reading. It would be better if there was more interaction with the audience in the socialization, for example giving questions to the audience in a fun way" (DA, Student)

Some informants mentioned that they preferred the material to be delivered through audiovisual media such as animated videos.

"...Yes, it might be different, what if the video is the one that explains it, maybe it can take a long time, to explain it from start to finish, but indeed if what is on TikTok is just an outline, the difference between TikTok and YouTube is that the explanation is different, now it can be adjusted, where is it" (FD, Student)

Some informants mentioned that they like short videos like those in the TikTok application where the duration is not too long. Audiovisual media is a moving and dynamic medium that can be seen heard and delivered through electronic aids with the advantages of being easy to understand, more interesting, and involving all the five senses so that audiovisual delivery is more easily understood (Trifitriana, Fadilah and Mulawarman, 2014).

c. Communicator Analysis

Based on the results of in-depth interviews, most informants answered that people who can

provide education about anemia are people who understand anemia.

Even though their background is not a health worker, as long as the person can understand the material, they can still be a presenter.

"...who understands enough about anemia, who master the material... experienced people like doctors, teachers are also suitable. because in my opinion, we don't have to be healthy people to provide health information. the important thing is that we know what anemia is, how to deal with it, like that" (TR, student)

Based on the results of the interviews, if peers get material about anemia and then spread it to other friends, most informants argue that if it is a peer educator who provides the material, they do not agree, because they feel less valued and less listened to, besides that if the information is confidential, they are afraid of leaking it to other friends.

"...The reason is that peer educators are often underestimated and many do not listen" (KK, Student)

"...I don't think peer tutors are suitable, because my friends don't trust me even though I have received training" (MY, Student)

"Maybe if it's friend to friend, like 1 1, it's definitely like "ih you know this, this, and then the other one is telling this, this is the fee, prone to leakage, but not all" (TR, student)

Only a small number of informants thought it was fine if peers provided the materials.

"...Peers, you can. Just ordinary people who have knowledge or experience with anemia. It can be older siblings, parents, and teachers, even small children. The point is, as long as they know the definition, impact, and

prevention of anemia" (DA, Student)

Most informants thought that at school, the teacher was a more respected figure. They think that teachers who deliver material about anemia can also do so. As long as the teacher has been trained or given material about anemia so that they can convey it to students.

"...It is possible, but with the condition that the teacher has experience or knowledge on how to explain and give socialization in case of anemia" (DA, Student)

Based on the interview results, the informant prefers presenters with good public speaking, so that the informant can more easily understand the material.

"...Explaining in a good but cool way, if you listen to it, you won't get sleepy or bored. The public speaking must be good because the way the material is delivered is not good, the listener will be bored and not focused." (DA, Student)

Based on this, the speaker in any background, in delivering the material must be good so that the informant can easily understand the material well.

C. Summary of the Results of the Needs Assessment.

a. The content needed by students are:

- 1) Healthy lifestyle, including sleep patterns, exercise patterns, and mental health
- 2) Stunting prevention
- 3) Anemia prevention
- 4) Definition, causes, and effects of anemia
- 5) Importance of taking blood supplement tablets
- 6) Healthy diet
- 7) Unhealthy diet

b. The learning methods required are:

- 1) Not just theory, but also practice

- 2) Learning methods not only in the classroom but also outside the classroom
- 3) P5 learning methods with interesting activities
- 4) The material is delivered in the form of animated videos with a duration that is not too long/short, a maximum of 3-5 minutes
- 5) Informants also like media such as inspirational films that are not boring.

c. The material providers needed are:

- 1) People who understand the material about anemia, do not necessarily have a health background
- 2) In schools, teachers can be presenters, as long as they have received training or knowledge about anemia.
- 3) Presenters are not peers, because it is feared that they will be less respected and not listen to them.
- 4) Public Speaking of the speaker must be good so that it makes it easier for participants to understand the material presented.

CONCLUSION

The practice of taking iron supplements for Students is low. The average eating pattern of students is only 2 times a day and they have difficulty eating. Besides that, students prefer instant food to healthy food. On average, the informants didn't have the habit of physical activity at home and had unhealthy sleeping habits.

It is necessary to educate students about the prevention of anemia because Students will become future mothers who give birth to a healthy child and are not stunted. Based on these results, the development of the learning model taken is the P5 Module (Pancasila Student Profile Strengthening Project) with the theme of Anemia Prevention. The P5 module is prepared based on the results of the needs analysis and guidelines from the Ministry of Education and Culture. The results of the needs analysis are then applied in the P5 module by adjusting the template or format of the P5 module provisions.

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Starting Life with Hidden Wound: Bullying and Self-Reported Depression Symptoms among Early Adolescent in 3 Cities of Indonesia

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ABSTRACT

Background: Previous research revealed that bullying cause depression symptoms such as lack enthusiasm, anxious, being sensitive, and easily offended. **Objective:** This study aims to determine the relationship between bullying and self-reported depression in early adolescents using cross-sectional approach for Indonesia Global Early Adolescent Study data. **Method:** Depression symptom was collected using self-registered questionnaire about sadness, sleep disturbance, anxiety, and self-injury ideation from 4,684 students (2,207 boys and 2,477 girls). Logistic regressions were used to examine how bullying, and multilevel factors predict depression. Most adolescent aged 12-13 years old, living with complete parents, middle-up economic background, having hand-phone and using social media. **Results:** Adolescent reported experience at least 3 depression symptoms (60%), bullying (45%) and Adverse Childhood Experiences (ACEs; 70%). Result shows that boys (OR[CI];1.73[1.45,2.06]), having ≥ 5 ACEs (OR[CI];1.35[1.20,1.51]), living with relative (OR[CI];4.52[3.67,5.56]), spent more time with peers (OR[CI];1.52[1.33,1.73]), feeling unsafe (OR[CI];1.79[1.59,2.02]), having negative social-cohesion (OR[CI];1.50[1.34,1.67]) and high social-control (OR[CI];1.40[1.24,1.58]) are more likely to report depression. **Conclusion:** Multivariable analysis reveals significant association only on ACEs, time spent with peers, unsafe feeling, negative social-cohesion and high social-control. Bullying strongly predicts depression when adjusted by family and community variables only. Bullying prevention program should address other socialization agents such as peers, parents, teacher and community leader.

Keywords: Adolescent health, ACEs, Bullying, Depression

INTRODUCTION

Adolescence (ages 10-19 years) is one of the most critical periods of human development because health and well-being at this age affect the health trajectory with lifetime consequences (Blum *et al.*, 2017). In the initial period (10-14 years), adolescents experience dramatic transitions due to interrelated changes and brain development or cognitive abilities, body/puberty, and their social and sexual interactions, and may be able to affect their well-being throughout their lives (Blum *et al.*, 2017). At this time also began to emerge very large physical, cognitive, emotional, and social developments (Chandra-Mouli *et*

al., 2017). Physical, cognitive, emotional, and social changes are also accompanied by changes in their social roles and functions from children to adults (Basu *et al.*, 2017).

Adolescents also often experience various kinds of problems in the surrounding environment which will certainly have an impact on their health and are also related to mental (behavioral) and social (environmental) all of which influence each other. One of the problems that often occurs in adolescence is the phenomenon of abuse (bullying). Existing literature has shown that a significant proportion of adolescents between the ages of 12 and 18 years have experienced traditional bullying behaviors

from their peers (Elgar *et al.*, 2014; Modecki *et al.*, 2014), yet multiple reports have identified that traditional bullying victimization typically occurs among 30% to 40% of adolescents (Elgar *et al.*, 2014; Modecki *et al.*, 2014).

Bullying is defined as any aggressive behavior that is not desired by other youth/youth groups that involve an imbalance of power, both which occurs once or repeatedly (Grinshteyn and Yang, 2017). Bullying among adolescents is an important problem worldwide with serious immediate and lifelong consequences. Extant research has demonstrated that victims of bullying have elevated rates of school absenteeism (Hutzell and Payne, 2012; Juvonen *et al.*, 2011), lower academic achievement (Nakamoto and Schwartz, 2010; Copeland *et al.*, 2013), and a range of adverse mental health and physical health outcomes (Due *et al.*, 2007; Gini *et al.*, 2014; Fisher *et al.*, 2016). Bullying including physical aggression, verbal taunting and ridicule, and relational or social aggression has been a focus of research for decades.

The emergence of mental and behavioral problems has a relationship with their involvement in doing things related to self-harm ideation (Karanikola *et al.*, 2018). Victims of bullying in relation to mental health in individuals, can be viewed from psychological distress and depression as a negative effect on oneself. Based on WHO data (2012) globally, one of the main causes of death among adolescents is interpersonal violence to suicide. Depression and suicide have been recognized as one of the main causes of the loss of adolescent productive years among 10-19 years old (World Health Organization, 2012). Worldwide, the three main causes of Years Lived with Disability (YLDs) for children aged 10-24 years are neuropsychiatric disorders (45%), accidental injuries (12%), and infectious and parasitic diseases (10%) (Gore *et al.*, 2011).

Research relating to the experience of bullying and its impact on depression in early adolescents, is still quite limited, especially in developing countries. Though the study of this matter is very necessary because early adolescence period will determine the quality of life in the future. Therefore researchers interested in conducting further research related to

the relationship between victims of bullying and depression in 3 regions in Indonesia.

METHODS

Research Design

This is a cross-sectional design using Indonesia Global Early Adolescent Study (GEAS) baseline data in 3 regions, namely Bandar Lampung, Semarang and Denpasar. GEAS aims to explore gender norms and healthy sexuality in adolescents and evaluate the impact of comprehensive sexual education (CSE) program interventions in schools.

Population and Sample

In each region selected purposively 6 junior high schools (SMP) consisting of 3 intervention schools and 3 control schools. The GEAS participants were recruited from three cities with different sociocultural backgrounds namely Bandar Lampung (n = 1,414), Denpasar (n = 1,753), Semarang (n = 1,517). It aims to analyze the various local contexts that influence norms and behavior, identify how the context influences the implementation of CSE and also want to see the difference of cultural and religious influences (more Islamic conservative in Sumatra compared to Java, more open Hindu culture in Bali and the influence of globalization and tourism). Data was collected using tablets that filled in by teenagers.

There were 4,684 students (2,207 boys and 2,477 girls) who agreed to participate in GEAS and complete the interview. Student at intervention school received CSE known as "SETARA" namely the "Semangat Dunia Remaja" while students in control schools are selected based on characteristics similarity with the intervention schools. The SETARA (Spirit of the Adolescent's World) intervention was developed by Rutgers using the UNESCO International Technical Guidelines on Sexuality Education. The SETARA intervention is delivered to 7th and 8th grade students (over 2 years) using the SETARA modules and facilitated by pre-trained teacher facilitators. The SETARA module consists of 23 chapters organized sequentially, covering topics such as puberty, gender, decision-making, relationships, violence, mental health, and sexual and reproductive health. The SETARA curriculum uses interactive

methods such as group discussions, value clarification, role plays, essays, and exhibition activities. Students receiving SEmangaT duniA Remaja demonstrated significantly greater increase in competencies, including greater pregnancy knowledge, more gender equal attitudes, bullying prevention, and communication about sexual and reproductive health and rights, compared to controls (Pinandari *et al.*, 2023). Before collecting data from adolescents, field data collectors must ask parents for prior approval then collecting student assent to participate. The inclusion criteria in this study are 1) adolescent 7th grade students in selected schools 2) both of adolescents and their parents are willing to participate in this research.

Variable

Respondents were presented with several statements about their mental health and responded it with rated 5 (strongly agree), 4 (agree), 3 (normal), 2 (disagree), or 1 (strongly disagree) for each statement. Total scores were summarized and categorized into binary data, 0 for the median below and 1 for the median above. A higher score indicates a higher experience in reporting depression symptoms. Bullying is a physical or verbal experience of violence committed by peers and has been a victim of bullying in the past 6 months and is categorized as 1 (yes) 0 (no).

Another predictor for the individual level is gender, that is, the sex of the respondent biologically, and is categorized as 0 (male) and 1 (female). Age, is the age based on the last birthday given a score of 0 (10 years), 1 (11 years), 2 (12 years), 3 (13 years), or 4 (14 years). ACEs (Adverse Childhood Experience), explore violence experienced by adolescents in their childhood which categorized into 3 (> 5 or more ACEs experiences), 2 (3-4 times ACEs experience), 1 (1-2 times ACEs experience) and 0 (no experience). Time spent using social media, is how long teenagers use their time for social media and get a score of 2 (> = 2 hours / day), 1 (<2 hours / day), and 0 (not using social media).

Another predictor for the family level is parent-child relationship that is the closeness of adolescents with their parents and then categorized into 1 (yes), and 0 (no). Parent-child communication

that is communication between parent-child related to how often to communicate, what is often discussed and communicate related to general matters that are categorized into 1 (yes), and 0 (no). Parental awareness, is the level of concern of parents related to monitoring their children related to where they are, what their activities are and who their friends are and are categorized into 1 (yes), and 0 (no). The level of the family economy, is the level of economic condition of parents, and is categorized into a score of 4 (very rich), 3 (rich), 2 (middle), 1 (poor), and 0 (very poor). Family structure, is a statement about the lives of adolescents with whom they live and is categorized into 2 (grandfather / grandmother / others), 1 (only mother / father), or 0 (both parents).

At peer level socialization time, is the level of frequency of adolescents socializing with friends and is categorized into a score of 3 (very often / almost every day), 2 (often / 3-4 days a week), 1 (not too often / 1- 2 days a week), and 0 (never / never a week). While at neighborhood level information about unsafe feeling, which is felt by adolescents in their environment both at school, neighborhood, or peers, was categorized into 1 (yes), and 0 (no). Positive environmental perception, is the level of environmental perception about adolescent attitudes and is given a score of 1 (positive) and 0 (negative). Perceptions of social control, created by their perceptions about their neighbors will do if something happens in their environment and are given a score of 1 (high social control), and 0 (low social control).

Statistical Analysis

Descriptive statistics using cross-tabulations was performed to determine the distribution of data by looking at the proportions of each group in each predictor based on the dependent variable. The results are presented in the form of graphs and frequency tables. Inferential analysis using the Chi-square test was used in bivariable analysis while simple and multiple logistic regression tests were used to examine how various variables at the individual, family, peer and community levels predicted and influenced the relationship of bullying and depression. The magnitude of the relationship is measured using Odds Ratio

(OR). Don't know answers and missing responses were excluded from the analysis. All tests were use in STATA 15 and used 95% confidence intervals and significance $p < 0.05$.

RESULTS AND DISCUSSION

Results

Descriptive analysis (Table 1) showed that almost half of adolescents have experienced bullying (44.6%). The distribution of bullied experiences didn't differ much in the group of adolescents who reported higher depression symptoms and the reverse group. At the individual level, aggregation of depression according

to sex shows that male adolescents report more depression symptoms compared to adolescent girls (upper median 50.7% vs 49.3%). The majority of adolescent groups who reported more depression symptoms were 12 years age group (71%) compared to other age groups. In addition, adolescents who reported symptoms of greater depression were adolescents who had experienced ACEs, which was almost around (70%) compared to those who had never experienced ACEs. Adolescents who use social media more than 2 hours a day also tend to report greater symptoms of depression compared to adolescents who have never accessed social media (upper median 38% vs 5%).

Table 1. Frequency distribution of bullying and contextual variable based on depression symptoms

Independent variable	Depression					
	Below median (no)		Upper median (yes)		Total	
	N	%	N	%	n	%
<i>Individual variables</i>						
Bullying experience						
No	1248	55.1	1678	55.6	2926	55.4
Yes	1015	44.9	1342	44.4	2357	44.6
Type of Sex						
Boy	980	43.3	1227	50.7	2207	47.1
Girl	1283	56.7	1194	49.3	2477	52.9
Age						
10	2	0.1	1	0.0	3	0.1
11	133	5.9	122	5.0	255	5.4
12	1653	73.0	1722	71.1	3375	72.1
13	447	19.8	528	21.8	975	20.8
14	28	1.2	48	2.0	76	1.6
ACEs						
No Experiences	604	26.7	1017	33.7	1621	30.7
History of 1-2 ACEs	902	39.9	636	21.1	1538	29.1
History of 3-4 ACEs	508	22.4	643	21.3	1151	21.8
History of 5 or more ACEs	249	11.0	724	24.0	973	18.4
Time spend for social media						
Don't use social media	115	5.1	125	5.3	240	5.2
<2 hours/day	808	36.0	895	37.8	1703	36.9
>=2 hours/day	1321	58.9	1346	56.9	2667	57.9
<i>Family variables</i>						
Connectedness						
Yes	1469	64.9	1470	48.7	2939	55.6
No	794	35.1	1550	51.3	2344	44.4
Communication						
Yes	1163	51.4	1184	39.2	2347	44.4
No	1100	48.6	1836	60.8	2936	55.6
Awareness						
Yes	1426	63.0	1469	48.6	2895	54.8
No	837	37.0	1551	51.4	2388	45.2
Wealth index						
Very poor	427	19.5	560	22.7	987	21.2
Poor	399	18.2	516	20.9	915	19.6
Middle	436	19.9	473	19.2	909	19.5
Rich	515	23.5	527	21.4	1042	22.4
Very rich	413	18.9	391	15.8	804	17.3
Family structure						
Both parents	1985	87.8	2231	73.9	4216	79.8

Independent variable	Depression					
	Below median (no)		Upper median (yes)		Total	
	N	%	N	%	n	%
Mom/dad only	161	7.1	199	6.6	360	6.8
Grandparents/other	116	5.1	589	19.5	705	13.3
<i>Peer and neighborhood variables</i>						
Socialization time						
Never (no times per week)	204	9.3	187	7.9	391	8.6
Not very often (1 or 2 times a week)	1080	49.4	988	42.0	2068	45.6
Often (3-4 times a week)	226	10.3	241	10.2	467	10.3
Very often (nearly every day)	676	30.9	937	39.8	1613	35.5
Unsafe feeling						
Yes	986	45.3	1379	59.8	2365	52.7
No	1191	54.7	928	40.2	2119	47.3
Positive neighborhood perception						
Negative	938	41.4	1554	51.5	2492	47.2
Positive	1325	58.6	1466	48.5	2791	52.8
Perceive of social control						
Low social control	780	35.5	1011	43.6	1791	39.7
High social control	1415	64.5	1309	56.4	2724	60.3

At the family level, adolescents who do not have a close relationship with their parents report depression symptoms that are not much different from adolescents who have a good close relationship with their parents (upper median 51% vs. 49%). Adolescents who did not have good communication with their parents also reported symptoms of

depression greater than adolescents who had good communication with their parents (upper median 61% vs 39%). Adolescents who felt their parents did not care about their activities, whereabouts and who their friends were did not differ much reported depression symptoms compared to the opposite group (upper median 51% vs 49%).

Table 2: Analysis multivariable of bullying and depression

Independent variable	Unadjusted OR (CI)	Adjusted OR (CI)			
		Individual model	Family model	Community model	All model
Bullying					
No	1	1	1	1	1
Yes	0.98 [0.88,1.10]	1.08 [0.95,1.23]	1.35 [1.20,1.52]***	1.42 [1.25,1.61]***	1.09 [0.95,1.26]
Type of sex					
Boy	1.35 [1.20,1.51]***	1.18 [1.04,1.33]**			1.02 [0.89,1.17]
Girl	1	1			1
Age					
10	1	1			1
11	1.83 [0.16,20.5]	1.79 [0.16,20.2]			1.00 [0.058,17.2]
12	2.08 [0.19,23.0]	2.00 [0.18,22.3]			1.06 [0.062,18.1]
13	2.36 [0.21,26.1]	2.12 [0.19,23.7]			1.09 [0.064,18.5]
14	3.43 [0.30,39.5]	2.55 [0.22,29.8]			1.21 [0.068,21.7]
ACEs					
No Experiences	1	1			1
History of 1-2	0.42 [0.36,0.48]***	1.00 [0.85,1.18]			1.01 [0.84,1.22]
History of 3-4	0.75 [0.64,0.88]***	1.77 [1.48,2.12]***			1.78 [1.46,2.18]***
History of 5+	1.73 [1.45,2.06]***	3.90 [3.19,4.78]***			3.63 [2.90,4.55]***

Independent variable	Unadjusted OR (CI)	Adjusted OR (CI)			
		Individual model	Family model	Community model	All model
Connectedness					
Yes	1		1		1
No	1.95 [1.74,2.18]***		1.31 [1.16,1.48]***		1.05 [0.92,1.21]
Communication					
Yes	1		1		1
No	1.64 [1.47,1.83]***		1.14 [1.01,1.29]*		0.98 [0.86,1.12]
Awareness					
Yes	1		1		1
No	1.80 [1.61,2.01]***		1.19 [1.05,1.34]**		1.00 [0.87,1.16]
Family wealth index					
Very poor	1.39 [1.15,1.67]***		1.38 [1.14,1.66]***		1.15 [0.93,1.43]
Poor	1.37 [1.13,1.65]**		1.35 [1.11,1.64]**		1.16 [0.93,1.44]
Middle	1.15 [0.95,1.39]		1.16 [0.96,1.40]		1.05 [0.85,1.29]
Rich	1.08 [0.90,1.30]		1.07 [0.89,1.29]		0.97 [0.79,1.19]
Very rich	1		1		1
Family structure					
Both parents	1		1		1
Mom/dad only	1.10 [0.89,1.37]		1.05 [0.84,1.30]		1.00 [0.78,1.27]
Grandparents/other	4.52 [3.67,5.56]***		0.71 [0.45,1.12]		0.79 [0.47,1.32]
Socialization					
Never	1.00 [0.81,1.24]			0.92 [0.72,1.17]	1.00 [0.78,1.28]
Not very often (1-2 times/week)	1			1	1
Often (3-4 times/week)	1.17 [0.95,1.43]			1.19 [0.97,1.47]	1.22 [0.98,1.52]
Very often (nearly every day)	1.52 [1.33,1.73]***			1.42 [1.24,1.63]***	1.34 [1.15,1.55]***
Unsafe feeling					
Yes	1.79 [1.59,2.02]***			1.62 [1.43,1.85]***	1.40 [1.22,1.60]***
No	1			1	1
Social cohesion					
Negative	1.50 [1.34,1.67]***			0.91 [0.80,1.03]	0.85 [0.74,0.98]*
Positive	1			1	1
Social control					
Low social control	1.40 [1.24,1.58]***			1.40 [1.23,1.59]***	1.37 [1.20,1.57]***
High social control	1			1	1
Time spend for social media					
Don't use social media	1.07 [0.82,1.39]			1.04 [0.78,1.39]	0.93 [0.69,1.28]
<2 hours/day	1.09 [0.96,1.23]			1.07 [0.93,1.21]	1.06 [0.93,1.22]
>=2 hours/day	1			1	1
Pseudo R ²		0.053	0.014	0.032	0.070
AIC		6162.6	6366.0	5667.1	5280.4
df_m		9	10	9	26
Observations		4684	4655	4209	4055

Note: Exponentiated coefficients; 95% confidence intervals in brackets; Likelihood Ratio (LR) from Akaike; df_m= Degree of freedom of the model; Data source: Indonesia PRUV; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

At the level of peers, adolescents who often communicate with peers are not too different from teenagers who rarely and never socialize with peers in reporting depression symptoms (50% vs 50%). Adolescents who felt they were insecure both in the school environment and in the neighborhood also tended to report more depression symptoms than adolescents who felt safe in the school or residential environment (upper median 60% vs 40%). And adolescents who had high social control perceptions of the surrounding environment were found to be more depressed than those who had lower social perception of control (upper median 56.4% vs. 43.6%). In addition, adolescents who had low or high social cohesion had no difference in reporting depression symptoms (upper median 51.5% vs 48.5%).

Based on Table 2, bivariable analysis shows that bullying does not have a significant relationship with depression, but in a multivariable analysis that is, after inclusion of other variables, bullying is significantly related to depression at the family level (OR (CI) 1.35 [1.20,1.52]) and community (OR (CI) 1.42 [1.25,1.61]). This means that adolescents who have experience of bullying have a 1.35 times greater chance at the family level and have a 1.42 times greater chance at the community and peer level in reporting depression symptoms compared to teens who rarely have bullying experience but bullying has no significant relationship by reporting symptoms of depression at the individual level and on all models. In terms of unpleasant childhood experiences (ACEs) showed that the bivariable analysis (OR (CI) 1.73 [1.45,2.06]) and multivariate in all models (OR (CI) 3.63 [2.90,4.55]) adolescents who had experienced ACEs had significant relationship with depression and adolescents who have experienced ACEs > 5 times as likely 3.63 times more likely to experience depression than adolescents who have never experienced ACEs or have less experience. Poor closeness and communication with parents in bivariable or multivariable analyze at the family level also have a significant relationship in reporting symptoms of depression but

after including other variables in multivariable analysis in all models showed no significant relationship with depression. Concern and awareness of parents towards their children on bivariable analysis (OR (CI) 1.80 [1.61,2.01]) and multivariable at the family level (OR (CI) 1.19 [1.05,1.34]) also showed a significant relationship in reporting depression symptoms but after other variables included did not have a significant relationship in all models (OR (CI) 1.00 [0.87,1.16]). Adolescents who often feel unsafe and often socialize with their peers on bivariable or multivariable analyzes at the community level and all models show a significant relationship in reporting depression symptoms. In addition, adolescents who have low social cohesion and social control also in the bivariable and multivariable analysis show that there is a significant relationship in reporting symptoms of depression in adolescents.

Discussion

The results of this study are that there are 44.4% of respondents who have experienced victims of bullying. bullying has a relationship with depression at the family and community level (neighborhood and peers) but does not have a relationship on all models. This means that the chance of depression symptoms is higher in those who experience bullying, which is accompanied by low closeness, communication and caring from parents, plus the adolescents comes from economically disadvantaged families. In addition, high depression symptoms also have the opportunity to be found in adolescents who experience bullying as well as those who feel unsafe and who have a low perception of social control in their community. But with comprehensive sexual education (CSE) using the SETARA module, students are better able to know bullying prevention, maintaining mental health, and increasing knowledge related to gender roles compared to controls (Pinandari *et al.*, 2023). The results of this study are also in line with several similar studies in Indonesia. A study in high school adolescents in Banda Aceh

which states that there is a negative and significant correlation between bullying and mental health (Firsta and Zaujatul, 2017). This is because the act of bullying done by peers usually causes more pressure, insults, acts of physical abuse to victims of bullying which results in a feeling of discomfort from victims of bullying. Some other studies also report that bullying is related to individual mental health, including research that suggests that victims of bullying have mental health problems such as having high levels of depression (Due *et al.*, 2007; Gini *et al.*, 2014; Rittakerttu *et al.*, 2000).

Other research also showed victims of bullying had a 1.5 times greater chance of experiencing depression compared to adolescents who didn't experience bullying (Marchira *et al.* 2017). Other research conducted on students in grades 7 through 9 also shows the results that subjects who experience bullying are more likely to report symptoms of depression (Fleming and Jacobsen, 2010). The symptoms of depression such as the emergence of feelings of sadness and despair are increasing along with the increasing number of days when they experience bullying.

Adolescents who have experienced ACEs in a family environment are also significantly associated with depression (self-reported). This study shows that adolescents who have experienced > 5 times ACEs experience also have a 3.63 times greater chance of experiencing depression than other variables. This means that the more often adolescents get ACEs experience, it will cause stress to result in depression in adolescents. An unpleasant childhood experience can usually be obtained from older people and peers. Victims of ACEs are usually more prone to depression. One study found that ACEs can predict worsening mental health during one semester, in addition to the presence of stressors or current sources of stress as a mediator of the correlation between ACEs and mental health (Dewi, 2012). This study is also supported by previous studies which shows a significant correlation between recurrent ACEs and depression in the elderly group. All forms of harassment, repeated physical abuse and forced sexual relations are significantly correlated with depression late in life (Margaret *et al.*, 2016).

At the individual level, bullying is not related to depression, whereas ACEs variable is still associated with depression symptoms. But if the ACEs variable is eliminated as is done at the family and community level, it turns out that there is an immediate relationship between the depression and bullying variables. In addition, when the ACEs variable is re-included in the analysis in all models, the relationship between the two variables is lost again. Based on this, it can be concluded that there is a possibility that the ACEs variable is a potential confounding. This means that adolescents who have symptoms of depression, may not necessarily be associated with bullying incidents that he experienced, but most likely due to the bad experiences of childhood they experienced. Based on that, for further research, it is highly recommended to control the ACEs variable, if you want to test the pure influence of the experience of being a bullying victim for depression symptoms reported by adolescents.

Closeness and communication with parents is also significantly related to depression (self-reported) at the family level. This indicates that adolescents who do not have closeness and good communication with their parents are more vulnerable to depression than adolescents who have good closeness and communication with their parents. This shows that adolescents who do not get the attention of parents, for example, parents who have never said related to the condition of their children, will more easily get depressed. Research conducted on high school students in Yogyakarta in 2016 explained that the odds of teens experiencing depression were 3.7 times greater in adolescents who were not familiar with their parents compared to adolescents who were familiar with their parents (Emilda *et al.*, 2015). This is also supported by a study conducted in Semarang City in 2013 of vocational students, showing that there is a correlation between parenting (authoritarian, permissive, democratic and mixed) with the level of depression in adolescents (Safitri and Hidayati, 2013). This research is also supported by previous study which states that there is a very significant negative correlation between communication between mother and child with depression in adolescents

SMK 2 Depok, the better communication is done by mothers in children, the smaller the occurrence of depression in students, conversely the less the mother's communication to the child, the greater the occurrence of depression in students (Nora *et al.*, 2017).

Adolescents who have unsafe feelings while at school, as well as the neighborhood also have a statistically significant correlation with depression. This is because adolescent who do not have a good correlation with peers will be more prone to depression because they will feel anxious and threatened if they have insecure feelings wherever they are. Feelings of insecurity in adolescents arise as a result of reduced social support and unfulfilled needs received from peer environments. Adolescents who often spend time with peers are also statistically related to the level of depression in adolescents. This means that the more often teens interact with their peers, they have a greater chance of experiencing harassment from their peers. This is supported by previous study which states that the more frequent interactions with peers, the more vulnerable they become victims of bullying to cause depression in adolescents (Setyowati *et al.*, 2009).

Adolescents who have low social perception of cohesion and social control are also significantly associated with depression in adolescents. This is because if their neighborhood does not respond positively when adolescents are present or experience problems in their neighborhood, adolescents assume they have no one to protect them. This is what makes them depressed and even depressed. Adolescents who have a negative living environment are also likely to experience depression. This is supported by previous study which states family cohesion and social self-concept are significant moderators of the incidence of depression in children and adolescents. More specifically, better family support and peer correlation can weaken the correlation between depression and thoughts or suicidal thoughts. The lack of support from the neighborhood and family makes teens depressed and doesn't even have anyone to protect them (Apple *et al.*, 2009). Those findings again remind us regarding the importance of socialization of the

impact of bullying behavior, that could be started from the young adolescents.

Since this study used secondary data from GEAS-Indonesia survey, so there are some limitation especially in term of variables. For instance, this study was only able to analyze correlation bullying and depression symptoms, but not its real practices among adolescents, due there was no availability of that particular variable. This research can be used as input that there is a need for a bullying prevention program must address not only adolescents but also other socialization agents such as peers, parents, teachers and community leaders.

CONCLUSION

Around 44.4% of adolescents who have been victims of bullying admit to being depressed and statistically there is a relationship between victims of bullying and depression at the community and family level but not at all levels. In addition, depression is also caused by the experience of ACEs, often teenagers interact with peers, feel unsafe, and have low social and social control. The most related to the incidence of depression in adolescents (10-14 years) is the experience of ACEs (unpleasant childhood experiences) which can be obtained from peers or older people. Therefore, bullying prevention programs must address not only adolescents but also other socialization agents such as peers, parents, teachers and community leaders. A counseling program for early adolescents is needed because bullying, depression and ACEs are found among this age group.

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CONFLICT OF INTEREST

All Authors declare no conflict of interest

AUTHOR CONTRIBUTION

IAS: Conceptualization, Methodology, Data curation, statistical

analysis, writing - original draft. **AWP:** Conceptualization, Methodology, Data curation, analysis, writing - review & editing the draft. **SAW:** Conceptualization, review & editing the draft.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

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KIA-CHAT: A QnA Chatbot for Postnatal and Newborn Care

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ABSTRACT

Background: Postnatal care information is relatively less provided than information about prenatal or pregnancy. Several causes of this is the mothers already delivered the baby safely, and soon after the baby's birth, mothers will be busy taking care of the newborns. They frequently miss their postnatal meeting with doctors because of these reasons. **Objective:** Therefore, this article aims to develop a chatbot in which the knowledge is taken from Buku KIA and focus group discussion. **Method:** The targeted users of the KIA chatbot are postpartum mothers with live newborns. Rapid Application Development method is used to develop the KIA chatbot. The KIA chatbot is constructed using Google DialogFlow with Telegram-based messenger. **Results:** The chatbot evaluation follows the Chatbot Usability Questionnaire with an overall score is 84.23 out of 100. Sixty-nine respondents confess that the KIA chatbot is easy to use and the knowledge is easy to comprehend. But, since the chatbot provides the answer options, the users feel some limitations. One of the limitations is they are unable to type their questions to the chatbot; only type the numerical order of the answer options. **Conclusion:** However, this limitation also brings another advantage to the mothers who have no time to type because of busy taking care of the newborns.

Keywords: chatbot, health, maternal, postnatal, newborn

INTRODUCTION

During the COVID-19 pandemic, mobile applications that aim to maintain health thrived (Mbunge *et al.*, 2022). Finding reliable information during prenatal and postnatal periods is easy, however, given facts that much misinformation on the internet can cause confusion and bad decision-making (Montenegro *et al.*, 2022). Several emerging technologies for maternal, neonatal, and child health services have already been implemented in Africa (e.g., JamboMama, Mum&Baby). Those technologies lie in Blockchain, Artificial Intelligence, Big Data Analytics, IoT, Virtual Clinics, and Telemedicine (Batani & Maharaj, 2022).

However, a study showed that chatbot is a relevant tool for providing primary health services in the context of maternal health (Silveira *et al.*, 2023; Barreto *et al.*, 2023). Moreover, studies about the application of chatbots in maternal health show that chatbots can educate patients about specific purposes (i.e., fertility problems) (Maeda *et al.*, 2020). As long as the chatbot has clear language and shows comprehensive information, a chatbot can have a positive influence on pregnant women (Montenegro *et al.*, 2022; Mane *et al.*, 2023). Our preliminary research result shows that postpartum mothers only visit the doctor once out of four times, as per WHO standards (Vinarti *et al.*, 2022). This is because the postpartum mothers

usually don't have enough time to take care of themselves; they more focused to their newborn babies. Therefore, in this article, postpartum mothers are the targeted chatbot users, instead of pregnant mothers. This condition makes the knowledge contained in the chatbot should not limited to the mother's health, but also how to take care newborn babies (Muklason *et al.*, 2022; Wong *et al.*, 2021). A randomized control trial study shows that the use of a chatbot is acceptable to postpartum mothers aged 18 and above (Suharwardy *et al.*, 2023).

This article aims to develop a chatbot that can help postpartum mothers to maintain both the newborn's and mother's health. In order to supply valid and reliable information in this chatbot, knowledge from both practitioner and established document are needed. An architecture for a conversational agent, HoPE Model, also used this kind of information retrieval from pregnancy guideline book written in Portuguese (Montenegro & da Costa, 2022). In Indonesia, knowledge for (pregnant) mothers is also documented as a guideline book, Buku KIA (Kementrian Kesehatan RI, 2023). This book contains the needed information for mothers during their pregnancy, perinatal, and postpartum. Therefore, the chatbot adopt information and knowledge from this book.

METHODS

The KIA chatbot aims to accompany postpartum mothers with valid information and knowledge during their first years become a mother. The validity was judged by medical experts: midwife, medical doctor, or OB/GYN specialist. The chatbot used Rapid Application Development (RAD). In RAD, there are four main stages: Requirements, User Design, Construction, Evaluation. In the Requirements stage, there is only one type of users: postpartum mothers with live baby. Therefore, the requirements were gathered from 69 participants through Focus Group Discussion (FGD). All participants are either pregnant mothers or mothers with babies. The FGD was led by an expert in midwifery, an expert in knowledge modelling, and an expert in information systems. FGD was held in a health care

center (Puskesmas Paciran) in Lamongan city, East Java, Indonesia.

In the User Design stage, knowledge taken from Buku KIA is categorized into two urgency levels. User with high-level urgency will have direct and actionable information based on their current problem. Meanwhile, user with low-level urgency will have descriptive and nested information based on the depth of details they want to know.

In the Construction stage, Google DialogFlow is used to build this QnA-based chatbot. Google DialogFlow facilitate chatbot making by expressing dialog as an intent. There is generic intent pattern in Google DialogFlow: Welcoming - Main Content - Closing - Out-of-Scope Intent. In Welcoming and Closing intent, the default greeting and parting sentence are displayed. The urgency-based categorization gathered in previous FGD activity is constructed in Main Content intent. In the Out-of-Scope intent, an expert contact is attached to help mothers out of the problem.

In the Evaluation stage, a questionnaire is used to measure the usability of chatbot, Chatbot Usability Questionnaire (CUQ) (Holmes *et al.*, 2019). The CUQ contains sixteen questions that are scored using a five-point Likert scale. Odd questions represent positive questions, and vice versa. To make sure that the resulted chatbot meets the needs of the mothers, respondents for the CUQ are the same as FGD participants in Requirements stage.

RESULTS AND DISCUSSION

The result of FGD in this Requirements stage is mothers need different category based on urgency. Urgency here means that whether they are in a rush to get the answer, advice, consultation from the medical experts (high-level urgency). Or they just need to find relevant information at any time (low-level urgency).

From FGD activity, mothers usually categorized sickness as an urgent moment. Sickness here is divided into two parts: physical and emotional. This sickness covers both baby and the mother. Therefore, the actionable information will be arranged specifically to the body parts (for physical sickness). Also, the information is delivered in a step-by-step instruction, so the mothers

can implement the instruction carefully and correctly in order. Meanwhile, in their spare time, mothers sometimes learning about their baby development or their parturition period. This requirement will be categorized as less urgent. Hence, information about baby growth and development, immunization, and breastfeeding will be written in declarative form. However, some knowledge will be suitable for nested information like what-if cases. For example, how to store compressed breast milk based on the refrigerator type of the mothers. Some other information will be given with pictures, in order to have better understanding of the details instead of using narration. For example, baby ability to hold and tilt their head to right and left by stimulating them with red or bright object.

A Telegram-based chatbot is resulted in Construction Stage. Default intents are shown by Figure 1. In the Main Content intent (Figure 2 and Figure 3), there are two intent options: Learning (for low-level urgency) and Sickness (for high-level urgency). Nested information is also constructed; see Figure 4 for the example in the breastfeeding topic for storage of compressed milk.

After deployed in the Telegram messenger environment, the chatbot will have the same structure as the modelled intent. The KIA chatbot can be accessed in http://t.me/kia_ibu_chatbot. See Figure 5 and Figure 6 to see the greeting message and content of Sickness category.

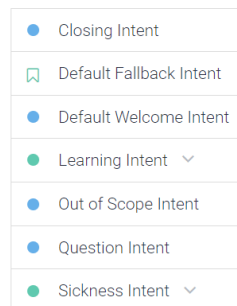


Figure 1. Default intent categorization in Google DialogFlow

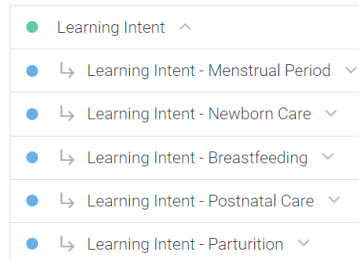


Figure 2. Learning intent categorization

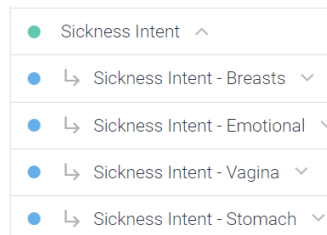


Figure 3. Sickness intent categorization

Based on the calculated results, the average overall CUQ score is 84.23/100. This value shows that the usability of the system is reliable.

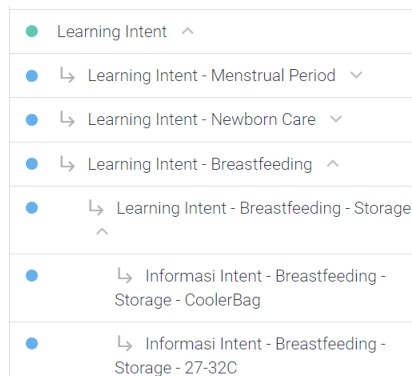


Figure 4. Nested information

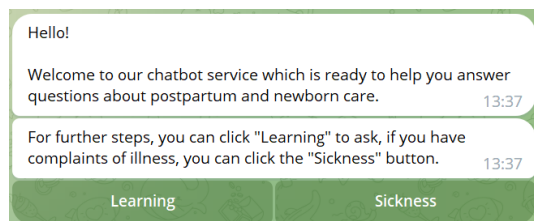


Figure 5. Greeting message in Welcoming intent

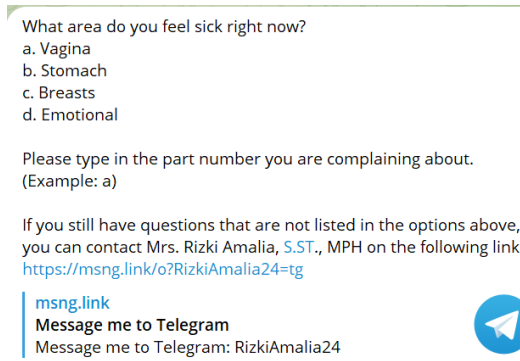


Figure 6. Content message in Sickness intent

This value passed the acceptability average score (68/100) (Larbi et al., 2022). In the CUQ evaluation, it was found that the chatbot had good evaluation result with average value greater than 4.5/5. Those are (1) Welcoming at the start (4.6/5), (2) Easy to navigate (4.6/5), (3) Chatbot responses are helpful, appropriate, and informative (4.6/5), (4) Very easy to use (4.7/5).

Participants confessed that using the chatbot was very easy because the flow and sentence of the questions led to the needed information (i.e., direct). So, participants could respond correctly to the chatbot, and the displayed knowledge is easy to understand. However, improvements are also needed on the chatbot in that it appears too robotic (2.8/5) and fails to recognize inputs that are not provided in the option list (1.8/5). Participants felt the chatbot was too robotic because the options are already provided. They are not required to type their own questions. However, the answer options are provided because of the other participants' requirements, since they are too busy taking care of their newborns, they are unable to type longer questions.

CONCLUSION

This article aims to develop and evaluate a chatbot that built based on a written knowledge and focus group discussion (i.e., Buku KIA). The chatbot will help postpartum mothers to seek information about themselves and newborns. In order to develop the chatbot, a rapid application development is used. There are two types of users in this chatbot: user with high-level urgency and user with low-level urgency. Therefore, information gathered from

knowledge book is arranged based on those two urgency levels. The chatbot is developed using Google DialogFlow and Telegram-based messenger. After developing the chatbot, an evaluation was conducted using chatbot usability questionnaire. The questionnaire results show that the KIA chatbot is easy to use and understand, meanwhile some improvements need to be made for questions that are out of scope. This limitation may lead to the chatbot further research that employs machine learning and natural language processing to recognize the typed questions.

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Internet Media Exposure to Premarital Sexual Behavior in Students at SMAN 1 Dringu, Probolinggo Regency 2023

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ABSTRACT

Background: Premarital sexual behavior carries the risk of experiencing unwanted pregnancy and acquiring sexually transmitted infections (STIs). Various factors, including internal factors such as individual characteristics and low knowledge of reproductive health and external factors such as exposure to internet media, influence premarital sexual behavior. **Objective:** The research aims to determine the relationship between internet media exposure and premarital sexual behavior among students at SMAN 1 Dringu, Probolinggo Regency, in 2023. **Method:** The research uses primary data, with 93 respondents as sample size. The sampling technique uses a proportional stratified random sampling technique. **Results:** The research results showed that 67.7% of respondents had engaged in premarital sexual behavior. **Conclusion:** Regarding the gender factor, knowledge of adolescent reproductive health, duration of internet use, access to entertainment content, and access to pornographic content have significant relationships with premarital sexual behavior. The type of access device, frequency of internet use, educational content, communication content, and buying and selling content in internet media use have no relationship with premarital sexual behavior.

Keywords: Premarital sexual behavior, Internet use, High school students

INTRODUCTION

Premarital sexual behavior is an act influenced by sexual desires without the presence of a legal marriage bonding. Premarital sexual behavior among students is a complex social problem and has a negative impact on the health, education, and welfare of teenagers. According to data from the National Population and Family Planning Agency (BKKBN), the prevalence of premarital sexual behavior among teenage students in Indonesia will be approximately 27.8% in 2022 (BKKBN, 2022). Premarital sexual behavior among teenage students can have an impact on various sustainable development goals (SDGs), including: 1) increasing teenagers' risk of sexually transmitted diseases, unwanted pregnancies, and abortion, 2) obstructing the academic process, and increasing the risk of school dropouts, 3) risk of sexual violence relations with adolescent girls.

In 2022, the third highest number of marriage dispensations in East Java Province is Probolinggo Regency (with 1,141 verdicts). Dringu District has the

third highest number of HIV and STI cases in Probolinggo Regency, with a total of 24 cases in 2022. Data obtained from the Dringu District Health Center, Probolinggo Regency, stated that there were 17 cases of premarital pregnancy, especially among teenagers in the Dringu District. A preliminary study conducted at SMAN 1 Dringu found that 95.06% of students from varied grades 10th, 11th, and 12th - accessed internet media every day, and 61.72% of students had accessed to videos, pictures, or writings with pornographic content. The preliminary study also found that 39.5% of respondents had engaged in premarital sexual behavior. As many as 9.6% testified that they had school friends who had intimate or sexual intercourse.

According to Hootsuite (2021) data, there are 26.23 million users internet users aged 13 - 18 years. As many as 99.26% of students and university students in Indonesia are internet media users. Exposure to internet media and pornographic content can affect the sexual behavior of high school students. Adolescents with moderate and intense

sexual behavior are primarily teenagers who frequently access the internet (Atiq & Winarti, 2019).

Sexual behavior in adolescents tends to be caused by the readiness or maturity of a person's reproductive organs. This phase is a golden period in a person's development process because when an adolescent has a desire to engage in sexual activity and is uncontrolled, it can lead to irresponsible sexual behavior. In general, premarital sexual behavior is carried out in several stages, starting with holding hands, then dry kissing or kissing without involving the mouth and tongue, wet kissing or usually kissing involving the mouth and tongue, hugging, inarms, or touching sensitive parts of the partner's body, petting, or touching on partner's genitals, whether wearing or without clothes, oral sex, and sexual intercourse.

Premarital sexual behavior determinants constitute elements that may contribute to deviant sexual conduct among adolescents prior to marriage. These determinants encompass both internal and external factors. Internally derived factors derive from within an individual and consist of variables such as education, knowledge, attitudes, and lifestyle. Externally factors, on the other hand, came from outside the individual and involve influences such as the role of educators, the impact of peer associations, and exposure to online media (Sebayang, 2018).

Individual characteristic is the character of each student, such as sex, age, and place of residence. In research by Herwanda *et al.* (2019), there was a significant relationship between sex and sexual behavior in adolescents. Research by Malisngorar (2020) states that there is a relationship between where teenagers or students live and premarital sexual behavior. The results of the research show that teenagers who live in boarding houses engage in more premarital sexual behavior than those who live with their parents and siblings (BPS, 2022; Herwanda, 2019).

Knowledge or understanding can influence a person's behavior. Knowledge about reproductive health in adolescents indirectly influences the way decisions are made on a teenager's sexual behavior. Based on research by Susanti (2021), there is a significant relationship between

sexual knowledge and behavior in adolescents. Adolescents with low sexual knowledge tend to engage in premarital sexual behavior (Susanti, 2021).

Erotica and pornography have the same characteristics, i.e., they focus on sexual behavior; however, erotica focuses not only on arousing desire but also on beauty or art in all parts. Pornography can take the form of illustrations, photos, writing, voices, sounds, cartoons, gestures, videos, or other messages that can be distributed through various communication media and sharing performances in public that violate decency norms. Exposure to pornographic content encourages children to become more aggressive towards adult things, such as imitating behavior in that content. Pornographic content also has an impact on several young couples who use the internet as a sexual medium, from online messages and telephone calls to video calls (Republik Indonesia, 2008).

Effective management of premarital sexual behavior among students may involve implementing supervision and restrictions on internet media usage and gadget utilization. This study seeks to investigate the impact of internet media on premarital sexual behavior among students, aiming to contribute to the body of knowledge in the realms of reproductive health and adolescent health pertaining to premarital sexual behavior. The findings of this research aspire to serve as valuable content for scholarly discourse and future investigations within this domain.

METHODS

In this research, the method applied is a quantitative method with observational approach - examines data related to the research subject without giving treatment or intervention to the subject. The approach to this research uses a cross-sectional with data collection was carried out from November 2022 to March 2023. The population in this study were students of SMAN 1 Dringu, Dringu District, Probolinggo Regency, with a total of 780 students. Sampling was taken using proportional stratified random sampling with a sample size of 93 respondents using inclusion and exclusion criteria as follows:

- a. Inclusion criteria

- 1) Participants willing to engage as respondents and communicate are eligible for inclusion in the study.
- b. Exclusion criteria
- 1) In occurrences of data collection, students who are indisposed due to illness or possess official dispensation are precluded from participation.
 - 2) Married students without a preceding circumstance of extramarital pregnancy.

The study employed the questionnaire method for data collection. The instruments used in this research have passed validity and reliability tests. The survey utilized closed-ended questions, and the researcher personally administered the questionnaires to the respondents, who subsequently returned the completed forms directly to the researcher. This research uses univariate and bivariate analysis techniques with a value of $\alpha=0.05$. The chi-square statistical test was used to ascertain the presence of a significant relationship between the independent and dependent variables. The research received ethical approval from the Health Research Ethics Commission (KEPK) at the Faculty of Dentistry, University of Jember, denoted by reference number 1354/UN25.8/KEPK/DL/2023.

RESULTS AND DISCUSSION

The premarital sexual behavior is divided into two categories: yes and no.

Table 1. Premarital Sexual Behavior SMAN 1 Dringu Students

Premarital sexual behavior	Yes		No	
	n	%	n	%
Holding hand	56	60,2	37	39,8
Inarms	49	52,7	44	47,3
Hugging	31	33,3	62	66,7
Kissing (not on lips, mouth, and tongue)	16	17,2	77	82,8
Sexual fantasy	23	24,7	70	75,3
Masturbation	26	28	67	72
Kissing on lips, mouth, and tongue	14	15,1	79	84,9
Necking	12	12,9	81	87,1
Touch intimate organs and genitals	8	8,6	85	91,4
Petting	4	4,3	89	95,7
Intercourse	3	3,2	90	96,8

Table 1 shows that the three predominant sexual behaviors are

holding hands (60.2%), inarms (52.7%), and hugging (33.3%). The least frequently reported premarital sexual behaviors are touching intimate organs (8.6%), petting (4.3%), and intercourse (3.2%).

Table 2. Individual Characteristics of SMAN 1 Dringu Students

Individual Characteristics	Total (n)	%
Sex		
Male	40	43
Female	53	57
Total	93	100
Place of residence		
Stay with parents/sibling	93	100
Dorm	-	-
Boarding school	-	-
Total	93	100

Table 2 reveals a notable predominance of female student respondents compared to male students. The percentage of female respondents is 14% higher than male respondents. Furthermore, the research findings indicate that all 93 participants acknowledged residing with their parents during the preceding three months.

Table 3. Knowledge of Adolescent Reproductive Health SMAN 1 Dringu Students

Question	Incorrect		Correct	
	n	%	n	%
Reproductive health definition	15	16,1	78	83,9
Puberty definition	47	50,5	46	49,5
Boys physical change on puberty	13	14	80	86
Girls physical change on puberty	31	33,3	62	66,7
Puberty characteristics on boys	20	21,5	73	78,5
Puberty characteristics on girls	21	22,6	72	77,4
Menstrual cycle	55	59,1	38	40,9
Knowledge of male reproductive organs	64	68,8	29	31,2
Fertilization process	67	72	26	28
Petting causes pregnancy	42	45,2	51	54,8
Pregnancy can occur even with just one sexual intercourse	44	47,3	49	52,7
Contraception is permanent	49	52,7	44	47,3

Types of contraceptive methods	24	25,8	69	74,2
Use of condoms	28	30,1	65	69,9
Definition of STIs	25	26,9	68	73,1
STIs can increase the risk of HIV	27	29	66	71
Definition of HIV/AIDS	32	34,4	61	65,6
HIV is transmitted when kissing	61	65,6	32	34,4

Table 3 shows 80% of respondents answered correctly regarding adolescent reproductive health knowledge on boys physical changes during puberty. The least knowledge of adolescent reproductive health among students is knowledge about the fertilization process, with only 28% answering correctly. Regarding the knowledge that HIV can be transmitted through kissing, most students still answered incorrectly, 65.6%.

Table 4. Internet use (Devices, Usage frequency, and Duration) SMAN 1 Dringu Students

Internet use	Total (n)	%
Devices		
Computer/personal laptop	-	-
Mobile phone/tablet	67	72
Both	26	28
Total	93	100
Usage frequency		
Frequent (12-20 times)	16	17,2
Infrequent (2-11 times)	77	80,8
Total	93	100
Duration		
Long (>7,5 hrs)	63	67,7
Short (<7,5 hrs)	30	32,3
Total	93	100

From Table 4, the majority of respondents accessed internet media

using cellphones/tablets, 67 respondents (72%). The frequency of internet media usage among most respondents is in the "infrequent" category or 2-11 times per day for 77 respondents (82.8%). Most internet media usage duration is in the "long" category or more than 7.5 hours a day (67.7%).

Table 5. Use of Internet Media Content SMAN 1 Dringu Students

Media content	Total (n)	%
Education		
Infrequent	18	19,4
Frequent	75	80,6
Total	93	100
Communication		
Infrequent	8	8,6
Frequent	85	91,4
Total	93	100
Online shopping		
Infrequent	55	59,1
Frequent	38	40,9
Total	93	100
Entertainment		
Infrequent	15	16,1
Frequent	78	83,9
Total	93	100
Pornography		
Accessed	46	49,5
Never accessed	47	50,5
Total	93	100

The results obtained based on Table 5 show that educational, communication, and entertainment content is frequently accessed. Online shopping content is an "infrequent" accessed category (49.5%). In the past month, respondents who had never accessed pornographic content (50.5%) were slightly larger than respondents who had accessed pornographic content.

Table 6. The Relationship between Individual Characteristics and Premarital Sexual Behavior among Students at SMAN 1 Dringu

Individual Characteristics	Premarital Sexual Behavior				p-value	OR (95% CI)
	Yes		No			
	n	%	n	%		
Sex						
Male	35	37,6	5	5,4	0,001*	6,25 (2,12-18,43)
Female	28	30,1	25	26,9		
Total	63	67,7	30	32,3		
Place of residence						
Stay with parents/sibling	63	67,7	30	32,3	-	-
Total	63	67,7	30	32,3		

Note: *Sig ≤ α (0,05)

Table 6 shows that 67.7% of respondents in the last three months have

engaged in premarital sexual behavior. More male respondents engaged in

premarital sexual behavior (37.6%) compared to female respondents (30.1%). Sex is related to premarital sexual behavior; male respondents are 6.25 times more at risk of premarital sexual behavior compared to female respondents. The factor where the respondents live is entirely with their parents, therefore bivariate tests cannot be carried out.

Sex influences a person's sexual behavior, and male respondents are more

likely to engage in premarital sexual behavior than female respondents. The findings aligned with Herwandar *et al.* (2019), there is a correlation between gender and sexual behavior in adolescents. In those research, however, there is a difference, specifically that female tend to have more riskier sexual behavior when compared to male (Rahayu *et al.*, 2020).

Table 7. The Relationship between Reproductive Health Knowledge and Premarital Sexual Behavior among Students at SMAN 1 Dringu

Reproductive Health Knowledge	Premarital Sexual Behavior				p-value	OR (95% CI)
	Yes		No			
	n	%	n	%		
Insufficient	28	30,1	6	6,5	0,04*	3,2 (1,15-8,9)
Sufficient	35	37,6	24	25,8		
Total	63	67,7	30	32,3		

Note: *Sig $\leq \alpha$ (0,05)

Table 7 indicates that 35 respondents (37.6%) with had sufficient adolescent reproductive health knowledge involve in premarital sexual behavior in the last three months. There is a relationship between adolescent reproductive health knowledge and premarital sexual behavior among students at SMAN 1 Dringu, Probolinggo

Regency. Respondents with insufficient knowledge are 3.2 times riskier of premarital sexual behavior compared to respondents with sufficient knowledge. These findings aligned with Susanti *et al.* (2021) that reproductive health knowledge influences sexual behavior in adolescents.

Table 8. The Relationship between Internet use (Devices, Usage frequency, and Duration) on Premarital Sexual Behavior of Students at SMAN 1 Dringu

Internet use	Premarital Sexual Behavior				p-value	OR (95% CI)
	Yes		No			
	n	%	n	%		
Devices						
Mobile phone/tablet	42	45,1	25	26,9	0,154	0,4 (0,134-1,19)
Both	21	22,6	5	5,5		
Total	63	67,7	30	32,3		
Usage frequency						
Frequent (12-20 times)	12	12,9	4	4,3	0,698	1,529 (0,45-5,21)
Infrequent (2-11 times)	51	54,8	26	28		
Total	63	67,7	30	32,3		
Duration						
Long (>7,5 hrs)	53	57	10	10,7	0,000*	10,6 (3,84-29,29)
Short (<7,5 hrs)	10	10,7	20	21,6		
Total	63	67,7	30	32,3		

Note : *Sig $\leq \alpha$ (0,05)

Table 8 shows that there is no relationship between devices and usage frequency to premarital sexual behavior among students, Probolinggo Regency. Respondents with both laptop/computer and smartphone/tablet access only had 5.4% on premarital sexual behavior. There is a relationship between the duration of

internet use and premarital sexual behavior among students. Respondents with a long duration of internet use (more than 7.5 hours) had a 10.6 times risk of engaging in premarital sexual behavior compared to respondents with a short duration of internet use. Research from Samura *et al.* (2019) stated that there is

an influence of duration in using internet media on premarital sexual behavior. Respondents with a long duration of internet media use had a 5.2 times risk of engaging in premarital sexual behavior compared to those with a short duration

category. This research, however, is not in line with Uleng *et al.* (2022), which states that the duration of a person's access to internet does not influence sexual behavior (Samura *et al.*, 2019; Uleng *et al.*, 2022).

Table 9. The Relationship between Media Content and Premarital Sexual Behavior of Students at SMAN 1 Dringu

Media content	Premarital Sexual Behavior				p-value	OR (95% CI)
	Yes		No			
	n	%	n	%		
Education						
Infrequent	14	15	4	4,3	0,463	0,538 (0,161-1,8)
Frequent	49	52,7	26	28		
Total	63	67,7	30	32,3		
Communication						
Infrequent	6	6,4	2	2,2	1,000	0,68 (0,13-3,58)
Frequent	57	61,3	28	30,1		
Total	63	67,7	30	32,3		
Online shopping						
Infrequent	35	36,4	20	21,5	0,428	1,6 (0,626-3,96)
Frequent	28	29,1	10	10,7		
Total	63	67,7	30	32,3		
Entertainment						
Frequent	58	62,3	20	21,5	0,005*	5,8 (1,77-19,02)
Infrequent	5	5,4	10	10,7		
Total	63	67,7	30	32,3		
Pornography						
Accessed	44	47,3	2	2,2	0,000*	32,42 (7,01-150,05)
Never accessed	19	20,4	28	30,1		
Total	63	67,7	30	32,3		

Note: *Sig $\leq \alpha$ (0,05)

Table 9 shows that most respondents who frequently accessed educational, communication, and entertainment content have higher premarital sexual behavior. Based on bivariate analysis, it was found that there was no relationship between education, communication, online shop content, and premarital sexual behavior among students at SMAN 1 Dringu, Probolinggo Regency. The research results are in line with Fitriana *et al.* (2020) that there is no influence between the use of internet media access devices and premarital sexual behavior. This result also has similarities with research conducted by Uleng *et al.* (2022), which states that internet devices do not influence premarital sexual behavior. Smartphones are the most devices used by respondents (Uleng *et al.*, 2022; Fitriana *et al.*, 2020).

Access to entertainment content is related to premarital sexual behavior among students. Respondents who frequently accessed entertainment content have a 5.8 times risk of engaging

in premarital sexual behavior compared to respondents who rarely use entertainment content. The existence of a relationship between the use of internet entertainment content on premarital sexual behavior among students is in line with research by Ihsan, *et al.* (2021) that there is an influence of entertainment content in the use of internet media on premarital sexual behavior. Research is also in line with Nuraeni, *et al.* (2021) who stated that a person's use of entertainment content on internet media influences sexual behavior. In this study, students who accessed entertainment content had 2,75 times more influence on sexual behavior (Ihsan *et al.*, 2021; Nuraeni *et al.*, 2021).

There is a relationship between access to pornographic content and premarital sexual behavior among students at SMAN 1 Dringu, Probolinggo Regency. Respondents with more frequent access to pornographic content have a 32.42 times risk of engaging in premarital sexual behavior compared to respondents

with infrequent access to pornographic content.

This research also in line with research by Pradita (2019) that there is a relationship of pornographic content on premarital sexual behavior. The results of this study found that users with access to pornographic content are 25.95 times more at risk of committing premarital sexual behavior compared to those who do not access pornographic content. This research is also in line with research by Winarti and Anggraeni that there is an influence of exposure to pornographic content on premarital sexual behavior. Respondents with more exposure to pornographic content were more likely to engage in premarital sexual behavior (Anggraeni & Winarti 2021; Pradita, 2019).

CONCLUSION

Based on the research results acquired, it was concluded that most of the students at SMAN 1 Dringu have engaged in premarital sexual behavior in the form of holding hands. The individual characteristics of the student respondents at SMAN 1 Dringu, Probolinggo Regency are primarily female, and all respondents live with their parents. SMAN 1 Dringu students have sufficient reproductive health knowledge, with high knowledge regarding physical changes in boys during puberty.

The most used devices to access the internet is smartphones or tablets, with infrequent internet usage and the duration of internet use mainly in the long category (more than 7.5 hours per day). The most frequently accessed content is educational, communication, and entertainment content. The sex of the respondent has a relationship with premarital sexual behavior among students, with male students having a greater risk than female students. Knowledge of reproductive health among students has a relationship with premarital sexual behavior. Students with insufficient knowledge have a higher risk of premarital sexual behavior. On internet use - devices, frequency of use, educational content, communication content, and online shopping content are not related to premarital sexual behavior. In contrast, access to entertainment content and duration of internet use are

related to premarital sexual behavior among students of SMAN 1 Dringu, Probolinggo Regency.

Restrictions on access to internet content need to be implemented in the school environment, with regular checks of students gadgets. The family plays a pivotal role in averting premarital sexual behavior in students.

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The Effectiveness of Mobile Health Utilization to Prevent Non-Communicable Diseases at the Group of Majelis Taklim

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ABSTRACT

Background: Mobile health application is a technological innovation that has proven effective use for the prevention and management of NCDs in other countries. However, there has been no test on the use of mobile health applications that have been launched in Indonesia, including the Halodoc application. The majlis taklim group is a target group in increasing community empowerment in the family order. **Objective:** This study was to examine Halodoc application in preventing noncommunicable diseases. **Methods:** The population is the member of the majlis taklim who was active in the last three months. The sample was respondents who were identified as having knowledge and bad behavior in NCD prevention efforts, 45 people. Descriptive analysis on respondents' characteristics and level of knowledge. While analytical analysis consists of dependent T tests to determine the difference in effectiveness before and after utilizing the application, the next test is the CBAM-Stage of Concern test, which is to assess respondents' perceptions through the level of respondents' concern for halodoc innovation. **Results:** Univariate analysis found that most respondents were poorly educated, namely 35 respondents (78%), as IRT 30 respondents (67%), family history of NCD disease 30 respondents (67%), and history of NCD disease in themselves 10 respondents (22%). The level of knowledge on the pretest was low at 23 respondents (51%), and the knowledge on the posttest was mostly high at 31 respondents (69%). **Conclusion:** The result of the dependent T test obtained a value of 0.000 means that statistically there is a significant difference in knowledge before and after the use of Halodoc for the prevention and management of NCDs. The test results with the Stage of Use Concern Questionnaire (SoC) analysis, obtained information on the percentage of respondents' perception of the highest acceptance of innovation before being given the Halodoc intervention (pretest) at the personal level, which is 60%. However, after utilizing Halodoc, most respondents' perceptions were at the level of unconcern, which was 81%.

Keyword: Non-communicable Diseases, Mobile Health, Halodoc, Majelis Taklim, Behavior

INTRODUCTION

One of the contributors to the incidence of death in the world is non-communicable diseases (NCDs). Indonesia is one of the largest developing countries contributing NCDs. The Global Status Report on Non-Communicable Diseases states that NCD risk factors include lack of physical activity, an unbalanced diet that has an impact on increasing blood pressure, blood sugar and blood fats (Kurniasih *et al.*, 2022). Therefore, sustainable Development Goal (SDG) 3 includes target 3.4 to reduce premature NCD mortality by one-third by 2030.

According to Riskesdas, there was an increase in the prevalence of non-communicable diseases such as the prevalence of hypertension increased from 25.8% to 34.1%, stroke increased from 7% to 10%, cancer increased from 1.4% to 1.8%, and diabetes increased from 6.9% to 8.5% (Kemenkes, 2013; 2018). The increase in NCD cases will significantly increase the burden on the community and on the government, due to the large cost and high need for technology for handling, the Ministry of Health since 2015 has developed a structured program for NCD prevention and control which includes health promotion efforts, namely

prevention of risk factors and disease management (Kemenkes, 2015). However, there is a gap between the prevention and control of NCDs, namely interventions carried out not optimally in unhealthy diet programs, obesity, and high blood pressure as well as risk factor control policies that have not targeted early age (Wahidin. M, 2022). In addition, other risk behavioral factors such as smoking behavior, not consuming vegetables and fruits and drinking alcohol are the causes of the increasing prevalence of NCDs.

NCD prevention and control strategies have been implemented to reduce the prevalence and mortality of NCDs. Globally, the World Health Organization (WHO) focuses on reducing the number of deaths from NCDs by 25% by 2025 and the target focus is on risk factors such as tobacco use, unhealthy diet, lack of physical activity, alcohol consumption, and excessive salt use (Aljunid, 2012). In line with this strategy, the prevention and control of NCDs in Indonesia through community empowerment approaches and health education and counseling efforts are interventions that are often applied to several community groups, both implemented by the government through puskesmas, academics, and non-governmental organizations (NGOs) that care about health.

Digital transformation in the health sector currently provides convenience in health services, one of which is through telephone and smartphones, better known as mobile health (M Health), which is one of the systems or applications on three smartphone devices for health purposes that utilize wireless networks. Several literature studies globally describe health education with an online system, namely mobile health, which can be applied to efforts to prevent and manage NCDs, including self-management through mobile health in cancer patients (Bagriacık & Vural, 2022). The results of other studies state that mobile health applications are effective in improving the quality of life of cancer patients both physically, cognitively, and socially (Macdonald *et al.*, 2020).

Other NCD diseases that apply the m Health application are prevention of diabetes complications, researchers explained that the application is effective in controlling blood sugar and adherence

to treatment, and patients feel comfortable using the application (Lee *et al.*, 2020; Yang *et al.*, 2020). The literature review of the effectiveness of the application of m mobile in Indonesia is only limited to literature reviews of mobile health applications applied in other countries, including studies on the effectiveness of m mobile for the management of cancer, diabetes, hypertension, and obesity (A.L BP, 2021; Asih & Rahman, 2021; Andriyana *et al.*, 2023; Lisna. S, 2023).

Studies on the effectiveness of mobile health applications implemented and used by people in Indonesia are still minimal, especially in efforts to prevent NCDs. Some applications in Indonesia that are used as digital health services that can be accessed by the public include HaloDoc, Alodokter, GoodDokter, SehatQ, ProSehat, YesDok and KlikDokter (Setiaji, 2012; Handayani *et al.*, 2012). Halodoc is an application that has been tested using ISO 25010: 2011 where the test results on users of the application show good values in each standard, namely an average value of 4 out of a maximum value of 5, and these results show that the application has good software quality (Arga *et al.*, 2021). However, it has never been evaluated how effective the use of mobile health is on NCD prevention efforts.

Based on data from the Pekanbaru City health office in 2021, from the estimated number of hypertension risks in residents over 15 years old, only 2.0% get health services. Similarly, from the estimated group at risk of diabetes, only 10.1% get health services (Dinkes Pekanbaru, 2021). This information shows that management efforts are still not optimal for NCD risk groups. Thus, an intervention strategy is needed that requires community independence to participate in NCD prevention.

The use of information technology is one of the efforts to change people's behavior, including increasing knowledge and attitudes about the risks and mitigation of NCDs. Mobile Health Application is one of the innovations that is increasingly being developed by the Ministry of Health which is designed to be used by the community. However, in the literature search, there has been no study on the effectiveness of mobile health

applications that have been implemented in Indonesia.

METHODS

The population are 95 women of majlis taklim who have been active in the last three months. Data collection in this study consists of two stages. The sample was women who met the following criteria: 1) able to operate an android phone and willing to download the Halodoc application 2) had a low level of knowledge and poor NCD prevention 3) were willing to follow the research to completion. The instrument used is a questionnaire adopted in previous studies. The samples that met these criteria were 45 people. Data collection tools in the form of questionnaire sheets containing questions about NCD knowledge and preventive measures Effectiveness assessment on mobile health applications is carried out with two types of tests, namely first independent *t test* to determine the difference in effectiveness of knowledge before and after using the application. Univariate analysis to determine the frequency distribution of the variables studied. Bivariate analysis

uses independent t-tests to determine differences in effectiveness.

Second, the effectiveness of the application was tested using CBAM-Stage of Concern, which is to assess respondents' perceptions through the level of respondents' concern for mobile health innovations. The effectiveness test instrument adopted from the Concerns Based Adoption Model (CBAM) (Gorge *et al.*, 2006) aims to identify various 8 levels of individuals in receiving an innovation in classroom learning but can be applied to other fields including online health education. This model can assist the community and health educators in developing health promotion implementation strategies. This model provides an opportunity for researchers to develop a profile, challenges of change, thus reducing the obstacles that occur. Measurement of attention level by adopting the CBAM model, specifically The Stages of Concern Questionnaire (SoCQ).

The questionnaire is translated and validated through a professional proofreader. Each stage consists of five questions that have been arranged randomly according to the topic of each stage as follows:

Table 1. Perception/Concern of Innovation

Stage of Concern	Perception/Concern
Self	<i>Unconcerned</i> 0. (indifference to the innovation)
	<i>Informational</i> 1. (looking for information related to the innovation)
	<i>Personal</i> 2. (awareness and interest in using such innovations that have a good impact on individuals)
Task	<i>Management</i> 3. (Individuals focus on processes and tasks in the use of innovation i.e. efficiency, organization, management, and schedule)
Impact	<i>Consequence</i> 4. (This focus will have an impact on other users)
	<i>Collaboration</i> 5. (coordination of efforts already made to others to expand innovation)
	<i>Refocusing</i> 6. (have ideas and ways to make this innovation better)

After obtaining the filling results, a calculation is carried out by looking at the standard percentile value in the SoC to see the stage value of each respondent. The tested data and analysis results show that Cronbach's alpha is 0.967 for all items with a corrected item total correlation value for all items >.361.

Descriptive statistics with a central tendency are used to measure mean, standard deviation, and percentage (Gorge *et al.*, 2006).

RESULTS AND DISCUSSION

Univariate Analysis

Table 2. Frequency distribution of univariate analysis of respondent characteristics and level of knowledge before and after halodoc intervention

No	Characteristic	Measurement results	F	%
1	Education	Low	35	78
		Tall	10	22



2	Occupation	Housewife	30	67
		Teacher	5	11
		Pension	10	22
3	History of PTM in yourself	None	35	78
		Exist	10	22
4	Family history of NCDs	None	15	33
		Exist	30	67
5	Pre-Test Knowledge	Low	23	51
		Tall	22	49
6	Post Test Knowledge	Low	14	31
		Tall	31	69
Total			45	100

Univariate analysis found that the majority of respondents' characteristics include low education which is 35 respondents (78%), IRT work which is 30 respondents (67%), history of NCD disease (Diabetes, Hypertension, Heart, Stroke, Asthma, Cancer, and Cholesterol) in the majority family there is NCD disease which is 30 respondents (67%), and history of NCD disease (Diabetes, Hypertension, Heart, Stroke, Asthma, Cancer, and Cholesterol) in themselves the majority there is NCD disease which is 10 respondents (22%). While the variable of pretest knowledge with a low category is 23 respondents (51%), and posttest knowledge with a high category is 31 respondents.

Dependent T Test Analysis

The results of the analysis of respondents' knowledge level before and after the intervention of implementing the Halodoc Health application can be seen in table 2. The analysis with the Dependent T Test can be seen as follows:

Table 3. Dependent T Test Interpretation Differences in Respondents' Knowledge Level Before and After Halodoc Utilization Intervention

Knowledge	Mean	SD	Pvalue
Pretest	55,67	14,629	0,000
Posttest	78,24	14,427	

Based on Table 2, it is known that the provision of mobile health about NCD prevention increased respondents' knowledge from 55.67 to 78.24. The dependent T test result obtained a value of 0.000 means that statistically there is a significant difference in pretest and posttest knowledge with the use of Halodoc for the prevention and management of NCDs.

According to Susanti *et al.*, 2023, in people with hypertension (NCD), lack of knowledge and low education are problems related to the importance of using *mobile health smartphone* applications (blood pressure trackers) in managing healthy lifestyles such as routine control, activity (exercise), diet, taking medication. Education is one of the factors that influence knowledge, in addition to providing information and economics. Education is an effort to develop one's personality and abilities.

People who have higher education will be more widely knowledge, but someone who is less educated does not mean low knowledge, the provision of information can be obtained both from formal and non-formal education that can have a short-term influence to produce changes and increase knowledge.

It states that low levels of education will be followed by a decrease in health degrees due to lack of knowledge. Knowledge is very close to education, so someone who has higher education will have wider knowledge (Susanti *et al.*, 2023).

According to Natoatmodjo's theory (2018) which states that knowledge is needed to produce a certain behavior when facing a certain situation. Knowledge or cognitive is a very important domain for the formation of behavior and behavior based on knowledge will be more lasting than behavior that is not based on knowledge (Notoadmodjo, 2018).

Based on the facts and theories above, researchers can conclude that respondents have good knowledge because they have previously received information related to NCDs by health extension officers. However, respondents do not know how to use the Mobile Health

application. Before providing NCD prevention information through mobile health, pre-test knowledge results were obtained at 55.67 and post-test at 78.24, meaning that statistically there was a significant difference in pretest and post-test knowledge after the intervention of using Halodoc as NCD prevention information.

Analisis CBAM-SoC

The questionnaire on the stages of concern for the use of innovations on the CBAM Stage of Concern allows researchers to measure the picture of respondents' concern for the mobile health innovations developed. In this study, the innovation analyzed is the Halodoc application which contains the features needed as a solution to health-seeking behavior against complaints and diseases experienced by the community.

Table 4. Halodoc mMobile Pretest and Postest Frequency Distribution using CBAM-SoC

Stage	Pretest (%)	Postest (%)	
Self	Unconcerned	40	81
	Information	57	72
	Personal	60	74
Task	Management	31	39
	Consequence	43	18
Impact	Collaboration	34	20
	Refocusing	31	27

The test results using the Stage of Use Concern Questionnaire (SoC) analysis on 45 respondents, obtained information on the percentage of respondents' perception of the highest acceptance of innovation before being given the Halodoc intervention (pretest) at the personal level, which was 60%. Most respondents care about Halodoc's innovation. Respondents wanted to know how the use of these innovations affects health, who is involved in the innovation, and what efforts they will make while utilizing this innovation. However, after utilizing Halodoc, most respondents' perceptions were at the level of unconcern, which was 81%. This level of unconcern shows that respondents are less concerned and prefer other innovations as solutions for promotive and preventive efforts against non-communicable diseases (NCDs). Respondents' perceptions are also still low at Task (Management) and Impact

(Consequence, Collaboration and Refocusing) levels. At the level: 1) Management is an individual who has not focused on his role in managing the application such as carrying out his duties as a halodoc user such as choosing a doctor and scheduling consultations. At this level perception is only 39%. 2) Level consequence is the respondent's focus on the impact of innovation so that it becomes a consideration to utilize innovation permanently. At this level, the lowest percentage is 18%. 3) The level of collaboration is still the low perception of respondents to coordinate and cooperate with others, both family and community. At this level it is only 20%. 4) Level Refocusing is that respondents have not maximally looked for ways and alternatives so that the halodoc application can be better utilized. At this level it is still 27%.

In other studies, Halodoc is effectively utilized by the community such as Nuralifah's research in 2018, that users who have a positive attitude towards the halodoc application will take advantage of the application and feel the benefits after using it (Mangkunegara et al., 2018). Furthermore, the benefits felt by respondents correlate with respondents' satisfaction with the halodoc application, such as the findings of Putu Aditya in 2021 stated that respondents were satisfied with the halodoc application which helped them get medicine without queuing and waiting at the hospital (Putra. Putu Aditya, 2022). However, in this study there was a decrease in the level of perception of the innovation. The gap in percentile values in pretest and posttest can be seen in figure 1 below:

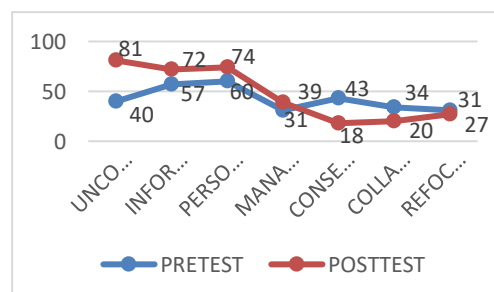


Figure 1. Pretest and Posttest Graphs of Innovation Utilization Through CBAM SoC Percentile Analysis

Before being given the intervention, respondents seemed

enthusiastic about Halodoc's innovation. This is because the majority of respondents have a history of non-communicable diseases both in themselves and in the family, so curiosity is very High with the perception that with the Halodoc innovation, it makes it easier for them to get health services that are not limited to place and time, meaning that wherever they are at any time, individuals can get services such as free information about diseases and health complaints, online doctor consultations (paid), drug purchase and delivery services, health insurance services other than BPJS, and other features. After utilizing halodoc innovation, most respondents have reconsidered to use halodoc again.

Although there are still respondents who continue to use and are interested in disseminating the innovation again to their families and others. According to the observations of researchers in the field, some of the obstacles to the use of these innovations include the existence of paid services at halodoc. Such as doctor consultation services. Respondents felt that so far consultation services to primary clinics and referral hospitals were free of charge (free) because of BPJS health insurance coverage. Respondents also lack the skills to utilize existing features, observations in the field look respondent still not yet independent to follow the stages of using the application, respondents are still assisted by the research team. This is in accordance with the research of Lutfi Indra Hakim (2021) said that the obstacle for (Irfan L *et al.*, 2021) new users is the length of time logged in using the application and the menu display is still general, so it is a difficulty for respondents to search for topics about non-infectious diseases (Masriadi, 2019)

This is contrary to the results of Nuralifah's research in 2018 which concluded that respondents tend to believe in continuing to adopt the halodoc application because most respondents at productive age who depend on their daily routines use the application on the gadget, including for their health needs. In addition to being a necessity, these respondents believe that doctors who are members of Halodoc are doctors registered with the Indonesian Medical Association (IDI) and the Indonesian

Medical Council (KKI) (Mangkunegara *et al.*, 2018).

Another study that contradicts this research is Putu Aditya's research in 2021, which found respondents remained loyal to using the halodoc application (Putra *et al.*, 2022). The researcher analyzed the loyalty of these respondents because in addition to feeling the benefits of ease in taking drugs and doctor's appointments, the research site collaborated with the halodoc application so that patients were facilitated to take advantage of the application. Based on the literature review, respondents in the study, the members of majlis taklim, were able to increase their perception in utilizing halodoc mobile health which has been statistically proven to be effective in increasing knowledge.

Thus, it is necessary to test the collaboration of the halodoc application and other applications for collaboration with primary and referral health service facilities in Pekanbaru so that by facilitation, the community will use the application so that the government's goal to achieve a healthy community with promotive and preventive efforts on NCD disease independently is achieved.

CONCLUSION

Univariate analysis found that the characteristics of respondents included low education at 35 respondents (78%), work as a housewife at 30 respondents (67%), history of NCD disease in the majority family of 30 respondents (67%), and history of NCD disease in themselves the majority of 10 respondents (22%). The variable of pretest knowledge with a low category was 23 respondents (51%), and posttest knowledge with a high category was 31 respondents (69%).

The average value of respondents before getting the intervention was 55.67 and after the intervention 78.24 after the dependent T test obtained a value of 0.000, meaning that statistically there was a significant difference in pretest and posttest knowledge with the use of Halodoc for the prevention and management of NCDs.

The test results using the *Stage of Use Concern Questionnaire* (SoC) analysis, obtained information on the percentage of respondents' perception of the highest acceptance of innovation before being

given the Halodoc intervention (pretest) at the personal level, which is 60%. After utilizing Halodoc, most respondents' perceptions were at the level of *unconcern*, which was 81%.

The Halodoc mobile health application in this study was only effective in increasing respondents' knowledge, but it did not increase respondents' perceptions at a good level of acceptance of innovation.

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Increasing Reproductive Health Knowledge of Indonesian Female Migrant Workers Through Case Study Learning Method

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ABSTRACT

Background: Reproduction health in migrant workers is complicated and difficult to handle. Health education is one of the methods to increase the knowledge about health reproduction. **Objective:** The study aimed to analyze the knowledge of migrant workers related to reproductive health through case study learning method. **Methods:** The study is an intervention research. Total respondents were 135 participants. The intervention was conducted in 3 groups of female migrant workers. The intervention given was related to reproductive health with 4 meetings in the first group, 8 meetings in the second group and 12 meetings in the third group. Group 2 and 3 used case study as learning method. The measurement of knowledge of the three groups was through pre-test and post-test. The statistical test used ANOVA to determine differences between intervention groups and T Test to determine the difference between pre-test and post-test scores. **Results:** There were significant differences in pre-test and post-test scores in all groups and there was significant difference in post-test scores in groups 1 and 3 of $p=0.001$. **Conclusion:** Health education given to migrant workers is proven to be able to increase the level of knowledge related to reproductive health. The group that received case study as learning method and more number of meeting, had a better level of knowledge.

Keyword: Case study, health education, migrant worker, knowledge, reproduction health

INTRODUCTION

As much as 67% of Indonesia migrant workers are young women and more than 90% of them are working in informal sector such as domestic work. Due to the characteristic of the job, they might face several problem including unpaid work, physical and mental abuse, harassment, exploitation in work, dissatisfaction, disagreement with the employer, illness, and the risk to face death penalty (Henry & Adams, 2018; Ilo, 2019; Winarso *et al.*, 2021). A number of factors were recognized as factors that contributed to the sexual harassment including individual factor, relationships, working place, and the related policy. Sexual harassment tends to occur in young female migrant workers, low skills and knowledge, and poor language in host countries (Pitoyo, 2016). Lack of knowledge and victims who do not dare to

report make sexual harassment become more difficult to handle (Henry & Adams, 2018). In addition to sexual harassment, female migrant workers are also at high risk of unwanted pregnancy and unsafe abortion due to promiscuity (T. D. H. Tran *et al.*, 2018). Unwanted pregnancy is closely related to low knowledge about contraception and the use of unreliable contraception (Ullah, 2010). Woman often experience problems due to a lack of attention to health insurance in the host countries (Loganathan *et al.*, 2019, 2020), as a result they often experience undesired pregnancies and reproductive tract infections (Le *et al.*, 2018; Thein & Thepthien, 2020). Until now, that issue still the major problem due to the low knowledge of reproduction health (Tangmunkongvorakul *et al.*, 2017). Therefore, migrant workers require urgent information regarding reproductive health.

Reproductive health is related to physical health, not only the absence of infirmity, but it is also necessary to pay attention to social and mental well-being. Achieving complete mental health requires an overall understanding of the processes and functions of the reproductive system. People can have a healthy reproduction if he has the ability and freedom to carry out all reproductive processes safely and comfortably (Glasier *et al.*, 2006; WHO, 2022). Reproductive health is a central part of general health and plays an important role in the development of a population. Reproductive health problems in women often occur due to unsafe both abortion and motherhood processes (Patra, 2016; Sisson, 2015), they also related to the process of spreading the virus (Borges *et al.*, 2018).

Focusing on potential problems related to reproduction health, adequate debriefing will be able to minimize the impacts that may occur. Therefore, reproduction health education could be considered as a method to improve migrant worker knowledge (Nasution *et*

al., 2019). Provision of reproductive health materials that are prepared in the form of a good curriculum, adequate learning modules, as well as training that is suitable for the educational and psychosocial conditions of migrant workers will provide significant benefits in supporting the achievement of holistic welfare.

Based on the fact that female migrant workers have various disadvantages that effect their quality of reproductive health, this study aims to analyze the level of knowledge of migrant workers that related to reproductive health through health education.

METHODS

The study design was intervention research by giving health education as intervention toward three groups. Participants from the three groups were Indonesian female migrant workers recruited from the community of migrant worker and migrant worker training company. Allocation of the participants will be explained at the flow chart below.

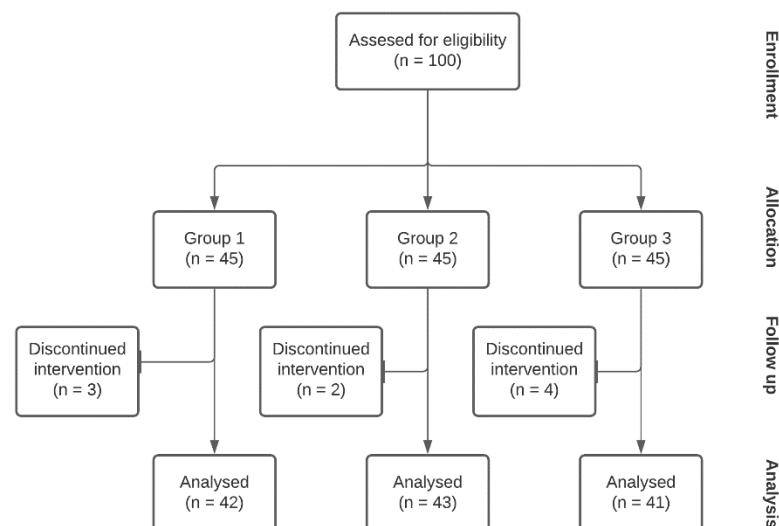


Figure 1. Flow chart study procedure

Study design

The number of participants from each group was decided by the researchers with several consideration. The minimum number of the participants from each group are at least 30 people in order to have normal distribution among participants. Considering drop out and the

financial ability, researchers decided to have 135 participants then distributed to three groups equally, 45 participants each group.

To avoid any bias, all the participants were women age above 18 years old, in a good condition both mental and physical health, and follow all the

research program from the start to finish. Participants who did not participate in at least one meeting, did not fill pre-test and post-test, and loss to follow up were excluded from analysis. At the end of intervention process, the first group consisted of 42 participants, the second group consisted of 43 participants, and the third group consisted of 41 participants. Participants did not attend the intervention meeting due to illness, family members being sick, not providing explanations, and having to work unexpectedly.

The research already obtains ethical clearance from Committee of Ethical research from School of Medicine Universitas Airlangga Surabaya, Indonesia. All participants received the informed consent and willing to enroll in this study.

The health education intervention

The intervention was providing health education about reproductive health. In addition, to avoid any bias from intervention, researchers trained three people as trainer who will train the participants about health reproduction. Training to trainer was conducted by making guideline book for trainer, preparing presentation material, uniforming perception from material, and presentation practice. Training objective on trainers are to ensure that the knowledge gained by participants will be the same.

The number of meeting given to each group are different. The first group received 4 meetings, the second group received 8 meetings, and the third group received 12 meetings. Each meeting session is given for 2 hours. At the beginning of the session, participants were asked to do a pre-test, then the material would be given by a trainer who had been trained, followed by a discussion and question and answer session. At the end, after the discussion session, time was given to do the post-test. Material given during meeting session are reproductive organs and contraception, menstruation, fertility period, pregnancy and abortion, sex education and sexual harassment, human sexuality, vaginal discharge and sexually transmitted infections, legal basis and spirituality related to migrant workers. There were significant variances in learning methods among the groups, with group 1 only using seminar and question

and answer methods, whereas groups 2 and 3 employed case study learning methods.

Measurement of the knowledge in the three groups was done 4 times with pre-test and post-test. The first questionnaire (pre-test and post-test 1) contained 22 questions about sexual violence and sexual harassment. The second questionnaire (pre-test and post-test 2) contained 30 questions about pregnancy and premarital pregnancy. The third questionnaire (pre-test and post-test 3) contained 17 questions about sexually transmitted infections and contraception. The fourth questionnaire (pre-test and post-test 4) contained 31 questions about the sexuality of married couples, myths and spirituality. In each group, the pre test is given before each session starts, and the post test is given after the session ends. The expected outcome of the intervention is an increasing knowledge of the participants determined by the significant increase in pre-test and post-test score.

Data analysis

Statistical analysis was carried out using descriptive analysis to describe the knowledge of female migrant workers before and after the intervention. The difference test between intervention groups was carried out using ANOVA. The statistical test of increasing knowledge was carried out by using a different test between pre-test and post-test. The difference test before and after intervention (pre-test and post-test) scores was carried out using T-test with $\alpha = 0,05$.

RESULTS

In this study, the level of knowledge was measured 4 times (4 pre-tests and 4 post-tests). The following are the results of the pre-tests and post-tests measurement on female migrant workers.

1. Characteristic of respondents by age

Table 1 showed the age of respondents in Group 1, 2 and 3. The majority of respondents in Group 1, 2 and 3 were at range 20-25 years old.

Table 1. Characteristic of respondents by age

Age (years)	Group 1	Group 2	Group 3
	n (%)	n (%)	n (%)
20-25	27 (64.2)	29 (67.4)	22 (53.7)
26-30	8 (19.0)	9 (20.9)	12 (29.3)
31-40	7 (16.7)	5 (11.6)	7 (17.1)
Total	45 (100)	43(100)	41(100)

2. Analysis of Pre-test and Post-test on Female Migrant Workers

Table 2 showed that group 3 had the highest average score in pre test 1 (16.22) and post test (17.39). The p-value of T-test showed that there was a significant difference between the pre-test and post-test average score in group 1 and group 3. So it can be concluded that after the intervention, the knowledge about sexual harassment and sexual violence are increasing.

The second knowledge measurement (pre test and post test 2) were about pregnancy and premarital pregnancy. Having score range 0-30. Table 2 showed that group 3 had the

highest average score in pre-test (23.68) and post-test (25.78) than other groups. P-value of t-test showed that there was a significant difference between the pre-test and post-test average score in all groups.

The third knowledge measurement (pre-test and post-test 3) have a score range 0-17. Table 2 showed that group 3 had the highest average score in pre-test (10.98) and post-test (12.20). P-value of t-test showed that there was significant difference between the pre-test and post-test average score in group 1 and group 3.

The fourth knowledge measurement (pre-test and post-test 4) have score range 0-31. Table 2 showed that group 3 had the highest average score in pre-test (23.61) and post-test (25.05). P-value of t-test showed that there was a significant difference between the pre-test and post-test score in all groups.

In general, in pre and post test 2 and 4 our data show significant results (pvalue<0,05) in all groups after providing health reproduction education.

Table 2. The analysis of pre-test and post-test score

Group	Measurement	Min	Max	Mean	Std. Deviation	p-value
Pre-test and Post-test 1						
Group 1	Pre test 1	7	20	14.55	2.923	0.006*
	Post test 1	7	20	15.64	2.418	
Group 2	Pre test 1	8	21	15.81	3.010	0.522
	Post test 1	5	20	16.07	3.127	
Group 3	Pre test 1	7	22	16.22	3.320	0.004*
	Post test 1	6	20	17.39	3.485	
Pre-test and Post-test 2						
Group 1	Pre test 2	11	30	23.05	4.196	0.001*
	Post test 2	19	29	24.88	2.973	
Group 2	Pre test 2	9	29	23.40	4.204	0.001*
	Post test 2	14	29	25.33	3.604	
Group 3	Pre test 2	13	28	23.68	3.416	0.001*
	Post test 2	17	29	25.78	2.632	
Pre-test and Post-test 3						
Group 1	Pre test 3	3	14	9.81	2.422	0.001*
	Post test 3	7	14	10.73	1.932	
Group 2	Pre test 3	3	14	10.37	2.430	0.246
	Post test 3	3	16	10.67	2.784	
Group 3	Pre test 3	5	16	10.98	2.230	0.002*

Group	Measurement	Min	Max	Mean	Std. Deviation	p-value
	Post test 3	4	15	12.20	2.239	
Pre-test and Post-test						
Group 1	Pre test 4	13	29	21.40	3.755	0.001*
	Post test 4	14	30	23.24	3.740	
Group 2	Pre test 4	6	30	22.79	5.294	0.009*
	Post test 4	11	30	24.44	3.990	
Group 3	Pre test 4	15	30	23.61	3.917	0.030*
	Post test 4	17	31	25.05	3.457	

Note: * Significantly different

3. Analysis of difference test in pre-test and post-test total scores between groups

Table 3 showed the analysis of difference test in pre and post-test total scores between groups. The results of the

analysis of the difference test showed that there were significant differences between groups in pre-test ($p = 0.001$) between group 1 and 3, and in post-test ($p = 0.010$) between group 1 and 3.

Table 1. The result of the analysis of difference test in total score of pre-test and post-test

p-value			
Pre-test			
	Group 1	Group 2	Group 3
Group 1	-	0.069	0.010*
Group 2	0.069	-	0.395
Group 3	0.010*	0.395	-
Post-test			
	Group 1	Group 2	Group 3
Group 1	-	0.072	0.001*
Group 2	0.072	-	0.068
Group 3	0.001*	0.068	-

Note: * Significantly different

DISCUSSION

In the current study, we discovered that group 3, which had a higher number of sessions (12 meetings) and a greater case study learning approach, was a more effective learning method than groups 1 and 2 in improving migrant workers' reproductive health knowledge. This study carried out 4 measurements consisting of 4 pre-tests and 4 post-tests. The results of the research showed that level of knowledge between groups about reproductive health among migrant workers are significantly different. This shows that health education provided through research interventions can provide information about sexual problems in female migrant workers.

In general, migrant workers are young women, from rural areas, with low education, economically disadvantaged, while abroad most of them work in the domestic sector such as housemaids (Giri *et al.*, 2012; Ullah, 2010; Winarso *et al.*, 2021). Workers also have the potential to experience various problems, especially those related to reproductive health, sexual violence (sexual harassment), sexually transmitted infections and contraception, sexuality of married couples, myths and spirituality.

There are several changes of behavior among migrant workers due to different norms and values from their place of origin. The migrant workers could feel isolated and anxious because they were far from home and family for a long

time. Lack of familial support such as family and spouse for along time could affect their sexual behavior. Several factors could increase the risk the infection of HIV among migrant worker such as the demanding work, poor living conditions, limited access to healthcare and health information (Tiruneh *et al.*, 2015).

Migrant workers mostly are young unmarried women, this has a significant effect on knowledge about sexuality and reproductive health (Giri *et al.*, 2012). Through health education interventions that are given in proper stages and structured, they will be able to change knowledge as well as empower and increase the self-esteem of female migrant workers (Lu *et al.*, 2012).

Sexual harassment is a problem that occurs in all countries, sectors, types of work around the world. Sexual violence experienced by female migrant workers leaves trauma and prolonged stress (Rifai *et al.*, 2019; B. X. Tran *et al.*, 2019). Migrant workers often experience several difficulties in the host country such as harassment and exploitation that could worsen health status, limited health insurance and legal rights to health care (Hargreaves *et al.*, 2019). In addition, the risk behavior of migrant workers including sexual behavior also become problem that can happen along side with mental health problem such as anxiety, depression, and problem in self-care (Mucci *et al.*, 2019).

However, the victims of sexual harassment and sexual violence unlikely to report because of several factors (Jewkes & Dartnall, 2016). Sexual harassment is a widespread problem but under-reported because the normalize of sexual harassment, victim blaming, difficulties of evidence, and fear of reprisal from co-workers, supervisor, family, employer. The lack of awareness and lack of reporting mechanism making sexual harassment become more difficult to handle (Henry & Adams, 2018).

Tran *et al* (2017) stated that young female migrant workers are at high risk for unintended pregnancy and unsafe abortion due to promiscuity. Unmarried female migrant workers are even more at risk to having premarital sex. Lack of knowledge and skills to avoid risk behaviors such as unsafe sex, and unable to acquire information on reproductive health services are factors that affecting

the behavior (T. D. H. Tran *et al.*, 2018). Premarital sex is the factors that put unmarried migrant workers vulnerable to unwanted premarital pregnancies, dangerous abortions, sexually transmitted infections and HIV/AIDS (Henry & Adams, 2018; Tang *et al.*, 2011).

Ulah (2016) in his research conducted toward 336 female domestic helpers in Hong Kong stated that 97% of female domestic helpers had premarital sex and 36% had experienced pregnancies. A number 61% of female domestic helpers who experienced pregnancies stated that it was premarital unwanted pregnancies. Unwanted pregnancies could results in unsafe abortion which lead to more complicated reproductive health problems such as maternal injury and death (Hussain, 2013; Ullah, 2010). Abortion are often seen as the only option because female migrant worker who pregnant can not work legally and have to face deportation (Loganathan *et al.*, 2020). The data from research by Ulah (2016) showed that Indonesia has a higher percentage of abortion because of under pressure, implication of becoming pregnant while working, and stigma from Indonesian culture. As for who wanted the pregnancies, they have to persuade their boyfriend to marry them (Ullah, 2010).

The high number of unwanted pregnancies shows that migrant workers have very little knowledge about contraception. Unwanted pregnancies are closely related to low knowledge about contraception and the use of unreliable contraceptlion such as using condoms carelessly, pills did not work, and mistakes in counting safe periods. Coitus interruptus was not an adequate method to prevent pregnancy and unable to protect against sexual transmitted disease. As much as 37% of unwanted pregnancies were caused by contraceptive failure (Asnong *et al.*, 2018; Ullah, 2010).

Migrant workers mostly come from families with low education and poor socioeconomic status, one of the options to get more money and pleasure they do work as sex workers (Chipamaunga *et al.*, 2010). Generally, the majority of sex worker are from broken families and poor socio-economic status that they have to take responsibility of financial burden (Giri *et al.*, 2012).

The lack of social support due to new social environment, has been

associated with risk-taking behavior (Khan *et al.*, 2009). In addition, new living environment can create many problems in physical and mental health among migrant workers (Wang & Muessig, 2017). Unsafe sexual behavior related to physical and mental health problem among migrant workers can lead to psychosocial and cognitive disorders and lowering a person's capacity to avoid risk behavior (Khan *et al.*, 2009). Previous research has stated that psychosocial and cognitive disorders in migrant workers can occur due to the presence of commercial sex workers among migrants (Denavas, 1988). Most of the migrant workers are married and have to be separated from their husbands for a long time (Wang & Muessig, 2017).

Therefore, due to complicated problems the migrant workers have to face, empowering migrant workers through increasing knowledge related to reproductive health is an important step in preventing and overcoming various problems that may be faced. Intervention could be done through community-based health-related intervention or personal (face-to-face) intervention (Baumeister *et al.*, 2019). Knowledge of reproductive health including sexual harassment, sexual violence, pregnancy, premarital or unwanted pregnancy, sexually transmitted infections, contraception, sexuality of married couples, myths, and spirituality. Empowerment is very necessary because generally migrant workers have poor health literacy (Kosiyaporn *et al.*, 2020). Health literacy is the beginning of empowerment. Health literacy is the ability that a person has to access, understand, appraise, and apply health information to make health-related decisions (Sørensen *et al.*, 2012).

The results showed that overall the training participants experienced an increase in knowledge related to reproductive health after receiving interventions in the form of providing reproductive health materials. Cusack *et al.* (2018) mention that educational interventions can increase a person's understanding of a field of knowledge including reproductive health (Cusack *et al.*, 2018).

The results showed that overall the training participants who received 12 meetings had a better score. The method of providing information affects a person's

knowledge, attitudes, and behavior in dealing with problems including health problems (He *et al.*, 2016; Lee & Wu, 2014). Providing more detailed and complete information will affect the level of participants' understanding of the information.

CONCLUSION

Health education given to migrant workers is proven to be able to increase the level of knowledge related to reproductive health. The group that received more detailed knowledge had a better level of knowledge. This knowledge increase is useful for preventing and overcoming problems related to reproductive health that may be faced by migrant workers.

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How Can Adolescents Get Mental Health Services Without the Availability of Professionals? A Lesson Learned from Rural Primary Health Care

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ABSTRACT

Background: The existence of a 'treatment gap' is indicated by the high frequency of individuals with mental health disorders and the low number of individuals obtaining formal treatment. It refers to the prevalence of mental problems and the proportion of people who are treated or the percentage of people who need but do not receive treatment. **Objective:** The study is aimed to determine the utilisation of mental health services (MHS). **Methods:** This study is qualitative, using a case study approach. The primary informants were six mental health workers and youth health program holders from three Primary Health Care (PHC) with the most significant number of mental health cases. Meanwhile, five youths receiving or actively undergoing treatment at the PHC served as supporting or triangulation informants. An in-depth interview guide is used in the instrument. **Results:** Health insurance, waiting time and duration of services, and accessibility to services play a supportive role in MHS utilization, while family and health worker support, facilities, and infrastructure do not. Adolescent and family ignorance, the presence of community stigma, the availability of human and financial resources, and health promotion media are all barriers to the utilization of MHS. **Conclusion:** The PHC in the Kulon Progo area is responsible for acquiring human resources, fostering collaboration across sectors, and creating health promotion media to fulfil its obligations.

Keyword: adolescents, health system access, human resources, mental health, treatment gap

INTRODUCTION

The global and national prevalence of mental health is considerable, yet less than 10% of individuals in lower-middle-income nations obtain professional care (Novianty, 2017). Approximately 12.5% of the population suffers from an adverse mental health condition, whereas a significant majority of about 71% do not have access to MHS. Indeed, on a global scale, there is a substantial need for mental health services. However, the provision of treatment is insufficient (WHO, 2022). Mental health continues to pose a considerable health concern globally, especially within Indonesia (Kemensos RI, 2020). According to the 2018 Basic Health Research findings, over

19 million individuals above the age of 15 encountered emotional and mental problems, while over 12 million individuals above the age of 15 suffered depression. Two years ago, the annual suicide data indicated a total of 1,800 individuals, which can be equivalently expressed as an average of five suicides per day. At 47% of individuals who die by suicide belong to the age group of 10-39 years, encompassing both teenagers and those in their productive years (Ministry of Health Republic of Indonesia, 2021). The condition is nearly identical to that in the Special Region of Yogyakarta (DIY).

Based on data from the Yogyakarta Provincial Health Office in 2021, the mental health status of adolescents aged 10 - 19 years was reported with a

diagnosis of phobic anxiety disorder (123 people), mixed anxiety and depression disorder (443 people), depressive disorder (recurrent) (261 people), anxiety disorders drug abuse (34 people), insomnia (317 people), suicide attempts (32 people), and personality and behavioural disorders (246 people) (Health Office of The Special Region of Yogyakarta, 2021). In 2018, Kulon Progo was the district with the highest mental disorder prevalence, namely Kulon Progo (Kulon Progo Regency Government, 2019). Half of all mental disorders begin at the age of 14 years; they are usually preceded by non-specific psychosocial disorders that have the potential to develop into major mental disorders and constitute 45% of the global burden of disease in the age range 0-25 years (Colizzi, Lasalvia and Ruggeri, 2020). Adolescents' poor mental health can occur for several reasons, such as a lack of knowledge or awareness about mental health among health professionals or stigma that prevents them from seeking help (Meisyalla, 2022). The preference to solve problems alone and being too embarrassed are obstacles that cause reduced intentions to seek treatment (Ebert *et al.*, 2019). Lack of perception of perceived need is a barrier to health service utilization (Horwitz *et al.*, 2020).

Preliminary studies report that no primary health care (PHC) in the Kulon Progo Regency area have MHS or professional psychologists. Each PHC only has health services for adolescents with human resource (HR) competencies that are not suitable for handling mental health cases, especially adolescent. This fact shows a gap between the need and availability of MHS in the Kulon Progo area. Such conditions do not support achieving the third point of the Sustainable Development Goals (SDGs), namely ensuring a healthy life and improving the welfare of the entire population of all ages. The third goal of the SDGs includes increasing access to the health system, including mental health in the adolescent age group (United Nation, 2022). Adolescents, as the age group most in need of these services, are becoming increasingly reluctant to seek help (Aguirre Velasco *et al.*, 2020). Also, around 80% of youth with mental health needs do not receive professional help,

and the remainder often receive inadequate care (Schleidera *et al.*, 2020).

Providing effective services for adolescents and young adults with mental health issues has long been inadequate (Abba Aji *et al.*, 2019). Availability of services and human resources (HR), as well as structural factors such as costs, transportation and waiting times, are barriers to seeking help (Aguirre Velasco *et al.*, 2020). The need for more quality human resources is one of the challenges and obstacles in providing health services. Moreover, the availability of psychologists and psychiatrists has not yet reached WHO standards for mental health service processes (Wijaya, 2019). The lack of qualified health workers in the field of mental health is an obstacle to the maximum implementation of Minimum Service Standards for mental health in PHC (Monika, 2021). A lack of understanding about how to access services is the most prominent barrier to seeking help among adolescents (Byrow *et al.*, 2020).

The finding of a high prevalence of individuals with mental disorders and the minimal number of individuals receiving formal treatment indicates the existence of a 'treatment gap'. The treatment gap refers to the prevalence of mental disorders and the proportion of individuals treated, or in other words, the percentage of individuals who require treatment but do not receive treatment. External obstacles can be one of the causes of this high gap. This can be seen from the fact that access covering geographic areas, transportation and costs to mental health services is not well distributed (Harvey and Gumpert, 2015). This concept is explained in Andersen's theory regarding the use of health services.

According to Andersen's theory, the utilisation of health services is influenced by three factors: predisposing factors, support factors, and need factors. Predisposing factors include demographics, social structure, and health beliefs. Meanwhile, support factors are obtained from family and community support. Need factors include individual perceptions and evaluations of the health services accessed (Andersen, 1995). Based on this theory, adolescents' use of health services at the PHC in the Kulon Progo Regency area can be studied.

METHODS

Study Design and Participant

This study is a qualitative that employs a phenomenological approach to provide a detailed description of the implementation of MHS in the Kulon Progo, particularly focusing on the absence of professional staff at the PHC level. The investigation was conducted at the three health centers with the greatest prevalence of adolescent mental health cases. The primary sources for this study consisted of individuals enrolled in the mental health program and the Youth Care Health Program at the PHC, with a total of six participants. Moreover, the supporting informants, also known as triangulants, consisted of five youngsters aged between 17 and 24 years. The selected youths were those who had previously or were presently undergoing treatment for mental health concerns. The selection of all informants was done using purposive procedures.

Procedure

Primary data was collected through in-depth interviews with all informants with an average duration of 45 minutes. In-depth interviews with the primary informants were conducted at their respective PHC. However, data collection with supporting informants was carried out using home visits with the leading informant facilitator.

The instrument is an in-depth interview guide that refers to Andersen's theory, including using MHS, predisposing factors, reinforcing factors, and need factors. The predisposing factors that are the focus of this study are demographic characteristics (sex and age), social structure (level of education and employment), and knowledge about adolescent mental health. Meanwhile, reinforcing factors include family support (income, knowledge, and health insurance) and provider support (availability of health facilities and personnel, waiting time for services, and accessibility). Then, the needs factors studied in this research are the subject's perception of adolescent mental health disorders and the evaluation of mental health status in adolescents. Validation of data was carried out using the source triangulation method. Triangulation informants are teenagers who have or are currently accessing, mental health

services at the PHC selected as the research location.

Ethical Clearance

The Research Ethics Committee of Universitas Ahmad Dahlan has approved this research protocol on Number 012207090. Submission of the protocol is carried out before primary data collection. The study is an anonymous and voluntary survey, and all information from informants is confidential.

RESULTS AND DISCUSSION

“No Health Without Mental Health” is a slogan which means that a healthy state cannot be achieved without a healthy mental state. Even though mental health does not directly cause death, it has an impact on a person's productivity (Widodo, 2021). To foster a society that is both physically and mentally well, the PHC, a community health center at the primary level, offers a range of MHS that are readily accessible to the community. The objective of this study is to assess the usage of MHS among teenagers at the Kulon Progo District Health Center. The teenage population at PHC has not yet achieved optimal utilization of MHS due to several factors. Andersen's hypothesis suggests that certain elements, such as demographic traits (gender, age), social structure (degree of education, occupation), and knowledge, can influence individuals' inclination to utilize health care. Predisposing traits are crucial factors. (Zeng *et al.*, 2019).

Characteristics of an Informant

This study involves two categories of informants: primary informants and supporting informants, sometimes known as triangle informants. The primary informant is the individual responsible for both holding and executing the mental health programme. Another primary source of information is an individual who holds a Youth Care Health Programme. Out of the six main sources of information, five have educational backgrounds that qualify them as Youth Care Health Programme holders with midwife competency, while the last informant has nurse competency education and is a mental health programme holder. The duration of service varies significantly, with a

minimum requirement of three years and a maximum limit of 26 years (Table 1).

Table 1. Characteristics of a Primary Informant

Informant Code	Age (years)	Sex	Level of Education	Length of Work in PHC (years)	Position	PHC Name
IU 01	30	Female	Diploma 3	4	Ners and Coordinator of Mental Health Programme	PHC A
IU 02	29	Female	Diploma 3	3	Ners and Coordinator of Mental Health Programme	PHC B
IU 03	56	Male	Diploma 3	12	Coordinator of Mental Health Programme	PHC C
IU 04	47	Female	Diploma 3	14	Midwifery and Coordinator of Youth Care Health Programme	PHC A
IU 05	38	Female	Diploma 4	9	Midwifery and Coordinator of Youth Care Health Programme	PHC B
IU 06	47	Female	Diploma 3	26	Midwifery and Coordinator of Youth Care Health Programme	PHC C

The informants were five teens who were either presently getting or had previously received mental health treatment at the PHC. These informants had a supportive or triangulated role in the study. The informants' ages ranged from 18 to 22, with the youngest being 18 and the oldest being 22. Elementary

school represents the lowest tier of education, while high school graduation signifies the greatest level. Out of the five informants, two are not employed at that location. The remaining informants are students, and all of them reside with their parents. (Table 2).

Table 2. Characteristics of an Triangulant Informant

Informant Code	Age (years)	Sex	Level of Education	Occupation	Residence Status	PHC Name
IT 01	21	Male	Senior High School	Unemployment	With parents	PHC A
IT 02	19	Male	Elementary School	Unemployment	With parents	PHC A
IT 03	18	Female	Senior High School	Student	With parents	PHC B
IT 04	18	Female	Senior High School	Student	With parents	PHC B
IT 05	22	Female	Senior High School	Student	With parents	PHC C

The findings indicate that the demographic profile of teenagers seeking MHS at PHC primarily consists of female individuals aged between 18 and 22 years. Females exhibit markedly elevated rates of sadness, anxiety, and stress. (Gurvich *et al.*, 2021; Syafitri, Falasifah and Hakim, 2021). The predominant mental health issue observed in teenagers during the previous year is emotional problems, including depression and stress, resulting in social disengagement. There is a general deficiency in the ability to handle

issues related to adolescence, and not all individuals between the ages of 16 and 24 possess sufficient or suitable ways for managing stress and challenges (Hellström and Beckman, 2021). Study indicates that as time progresses, adolescents develop a familiarity with challenging circumstances, so rendering them more manageable in the long run (Stapley *et al.*, 2023) and reduces symptoms of mental disorders (Rodrigues, Morouço and Santos, 2023). Conversely, it was elucidated that certain ailments, such as

mental health conditions, are intricately linked to the societal framework, contingent upon an individual's aptitude in coping with the affliction (Conrad and Barker, 2010).

Studies suggest that social structure can influence patterns of health service use (Notoatmodjo, 2014). Adolescents seeking MHS are students who are currently unemployed. Contrary to other studies, there is no correlation found between work and the utilisation of health care (Z. A. Basith and Prameswari, 2020). Nevertheless, there are also findings that assert that those with upper secondary to higher education levels tend to utilise health services more frequently. Highly educated persons prioritise their health and are more inclined to seek medical treatment, while those with lower levels of education typically only utilise health facilities when they are severely ill (Raghupathi and Raghupathi, 2020; Mardiana, Chotimah and Dwimawati, 2021).

Utilization of MHS

The investigation was conducted at PHC facilities, albeit these facilities were not specifically targeted towards teenagers. Users can access various types of Mental Health Services (MHS), including the examination and treatment of mental health disorders, mental health education, home visits for individuals with mental disorders, screening for mental and emotional disorders, the Strengths and Difficulties Questionnaire (SDQ), and mental health consultation or counselling, as well as referrals to secondary or tertiary mental health service facilities.

"There is no difference for teenagers" (IU 02)

"The earliest access is just a consultation at counselling with us. There is a filling in of the SDQ questionnaire form" (IU 01)

According to the statistics on teenage visits to MHS in the last year, it can be concluded that the number of visits is relatively low compared to the number of identified cases. Specifically, the report indicated that there were seven teenage visits at Puskesmas A, ten visits at Puskesmas B, and seven visits at Puskesmas C. Subsequently, the informant

elucidated the diverse scenarios and circumstances that transpired in the field pertaining to the frequency of teenage visits to mental health services. Initially, there exists a prevailing negative perception among the general public toward mental health issues and those who experience them. Consequently, individuals tend to isolate themselves and restrict their utilization of MHS. Furthermore, it is worth noting that the prevailing condition among the youth seeking MHS at the research site was moderate to severe mental health issues. They required recommendations from the PHC. Additionally, it has been shown that adolescents afflicted with modest mental health illnesses exhibit a tendency to discontinue their therapy prematurely, prior to its completion. Furthermore, there is an absence of familial social support during the course of treatment, particularly in terms of consistent adherence to medicine. This disease is precipitated by adverse familial and self-perceptions, wherein the individual harbors a belief that their ailment is not improving despite consistent pharmaceutical usage over a specific duration. Furthermore, the lack of qualified mental health professionals, namely psychologists, has resulted in a significant increase in the number of individuals discontinuing their treatment.

The main informant said that not all teenagers who come for MHS need to be referred; some only need behaviour change therapy with a psychologist. However, the absence of a psychologist requires referral to a secondary or tertiary health facility. Some of them do not continue to the referred service facilities for various reasons, from personal and social to economic factors. Field findings report that several administrative fees are charged to obtain MHS at secondary or tertiary health service facilities. Fifth, there is no coverage target in implementing mental health services.

"Talking about mental disorders, it is probably a shame, sis, so what is the stigma like? You are ashamed if it is known to the public" (IU 03)

"For teenagers, it is more because the people who come are already deep. Yes, the condition is sick; it's

not that they just had the first symptoms or felt different just coming here, isn't it... so it is because they were caught when there was already a complaint" (IU 01)

"The patient is having a hard time, so what do we want to do to force it? We are also having a hard time; for example, if we drop the medicine, we do not necessarily take the medicine like that, so we also support the family; sometimes, they continue to talk like that with the mental disorders patient. Patients who have been told to take medication but their condition does not improve like that, so they end up giving up medication and mostly quitting medication" (IU 02)

"The problem is that after we find cases like this, not all of them go to a mental specialist; usually, they only need counselling or a psychiatrist, which we do not have in Kulon Progo. Even if there is one at the Regional Public Hospital, it is also paid; you cannot use the Health insurance facilities from the government. That is it. 300 thousand per meeting. Yes, it is not bad that if they have to control it again, they have to prepare this money, heh, what is more, these are teenagers, in this area, not everyone is financially capable" (IU 01)

"Specifically regarding mental health, I think it is lacking, sis. "Because here, trained nurses for mental health are still limited to only one person, we do not have a psychologist either" (IU 02)

"There is no target, sis" (IU 03)

This study discovered the presence of social disapproval towards persons or families who have relatives with mental health conditions. Families with a member who has a mental health illness often exhibit an attitude of secrecy and isolation by not openly discussing their health condition. This scenario presents significant challenges for service providers in implementing health interventions and may induce non-adherence to medication. The stigma

represents the most crucial obstacle in comparison to other barriers when it comes to seeking assistance (Boardman, Kidd and Said, 2021; Dewi, 2021) therefore rendering the acquisition of social support challenging (Kaligis *et al.*, 2021). Concurrently, these attributes of teenagers significantly impact their motivation to seek MHS. Nevertheless, 20% of the endorsing informants expressed a requirement for this service. The predominant mental problems observed among teenagers in the previous year were emotional disorders, depression, stress, and detachment from the environment.

"It is uncommon for individuals to proactively take action on their own accord. There are very few, sister." (IU 02)

"I desire that access because I feel it is necessary"(IT 04)

"They are experiencing emotional disturbances." Perhaps it is depression. Indeed, we have come across two instances of it on many occasions. Typically, that is the situation" (IU 02)

Predisposing Factors

The findings indicate that the variable of predisposing factors is associated with knowledge. The level of understanding among adolescents regarding mental health issues and their ability to obtain MHS is still relatively insufficient. The absence of expertise poses a barrier to assisting informants in accessing treatment. Furthermore, a deficiency in adeptly handling diverse issues has a direct influence on the process of making decisions.

According to the primary source, teenagers are more likely to address their difficulties based on their capabilities due to a lack of knowledge about mental health concerns and the availability of mental health treatments at PHC. Frequently, the choices made by adolescents have an impact on their overall well-being, particularly when it comes to difficulties in obtaining healthcare services and receiving appropriate treatment despite the presence of indicators and manifestations of mental health conditions.

Consequently, according to one of the primary sources, teenagers require support.

"No, not truly. They need more comprehension of the issue" (IU 04)

"If factors contribute to issues, individuals may also experience confusion regarding where to investigate and what actions to take. Consequently, they may find themselves uncertain and unsure about how to proceed, resulting in the resolution of many matters through individual efforts" (IU 02)

"Regarding mental health, it appears insufficient upon closer examination. While one may understand what needs to be done by reading about it, implementing those actions proves to be quite challenging" (IU 05)

"Frequently, individuals must not only conquer it but also comprehend that it poses a challenge for them." Conquering it necessitates aid as well" (IU 04)

Knowledge is crucial in shaping an individual's decision-making process regarding their health (Zajacova and Lawrence, 2018; Zi. A. Basith and Prameswari, 2020). Knowledge can also serve as a barrier for individuals seeking access to health services (Anisah, 2020; Grace, Tandra and Mary, 2020). The study revealed that all participants exhibited a dearth of information, encompassing both understanding of mental health and familiarity with mental health treatments in primary healthcare settings. This lack of comprehension adversely affects teenagers' abilities to address problems and make informed decisions regarding their health, including seeking treatment and other related actions. More information is needed to include more than just youth but also extends to parents or families. According to the findings from interviews with essential sources, it was indicated that there was also a lack of sufficient awareness within families addressing mental health matters. Family and community perceptions regarding mental health issues and services are still limited

to people with mental disorders or crazy people and are considered a disgrace. Studies show that families who have good knowledge about mental health and mental health posts and have family members with mental health disorders have a greater chance of utilizing health services compared to families who have low knowledge about mental health and mental health posts. The primary consequence of a deficiency in knowledge and unfavourable perceptions is the development of stigma and prejudice within society.

Reinforcing Factors

The findings indicate that social support is the primary determinant in facilitating adolescents' access to MHS. The identified forms of social support included emotional, instrumental, and informational help from family members and service providers. Five of the six primary sources indicated that the patient's family showed high support throughout treatment. The support is provided by the act of following and assisting patients in accessing services, ensuring regular medication intake, and encouraging their participation in mental health educational programs.

"The parents are generally supportive. So, if a parent knows that they need treatment, they will get it; they want to get medicine for their child for routine control, yes. Take medication regularly, never be late, and take good care of it so it does not recur" (IU 01)

Additional support is acquired from health service providers through convenient health funding, infrastructure, and service flow. Adolescents employ social health insurance facilities from the government to obtain services. All corroborating sources verified that the existing facilities and infrastructure were sufficient. Similar concerns were expressed regarding the service flow, encompassing the registration procedure, completion of the health insurance facilities from the government form, screening, queue length, counselling duration, and the distance between the PHC and the patient's residence. The PHC has disseminated information about the distribution of MHS, strategically placing

it in inaccessible locations for public perusal. Nevertheless, there has been no implementation of targeted efforts to provide mental health treatments specifically to adolescents or schools. Meanwhile, the duration varies from five to ten minutes, except for counselling sessions tailored to the individual patient's requirements and issues.

"So far no one has paid, sis; there are those who do not have guarantees to use health insurance from the government still, it is still free" (IU 01)

"The facilities are good, sis. The facilities are quite adequate, such as distance, waiting time, duration of counselling, and it is free" (IT 01, IT 02, IT 04)

"Not yet; we continue to convey that we have mental counselling and so on, right?" (IU 01)

"Well, if you wait, it will not be too long, sis. Approximately 10 minutes" (IT 04)

"Oh, yesterday because we also listened, right? So it took longer than the other patients. I needed counselling yesterday for two hours. Almost two hours from 10 am to 12 am, just listening to stories." (IU 01)

The study found at least three types of social support: emotional support, instrumental or concrete support, and information support that adolescents received from family and health workers. Sarafino explained that *emotional support* expresses empathy, care and attention from family or other related parties. Meanwhile, instrumental support means direct assistance in the form of services from family and friends or the provision of facilities and infrastructure that support individuals in achieving better health. Then, information support, namely providing advice, suggestions, and feedback, can play a role in taking action as a solution to the problems being faced by the individual (Sarafino Edward P, 2006). Study indicates that while there is still a perceived lack of awareness about mental health concerns, individuals

nevertheless offer emotional, instrumental, and informational support to those who provide help. The family supports teenagers through consistent transportation and accompaniment to obtain necessary treatments, conducting frequent check-ups and administering medication, and encouraging participation in mental health education programs. Family involvement in the lives of teenagers is a contributing element that impacts their utilization of MHS. The involvement and assistance of healthcare practitioners are crucial, alongside the participation and support of family members (Coombs, Campbell and Caringi, 2022). Adolescents recognize ease of health financing, infrastructure and easy flow of services as supporting factors for health service providers (Dassah *et al.*, 2018).

Health insurance facilitates from the government the acquisition of health care by teens, hence enhancing their access to such services (Djunawan, 2019; Oktarianita, Sartika and Wati, 2021; Prihartanti, Parinduri and Arsyati, 2021). All participants in this study utilized health insurance to access MHS. In addition to health financing, service providers also support facilities and infrastructural issues, which patients also consider. The study includes assessing service waiting time, counselling duration, and the distance between the house and the PHC as facilities and infrastructure support components. All informants unanimously reported no issues with this matter, indicating that the waiting time for services was satisfactory or prompt, the duration of counselling was tailored to the patient's specific needs and concerns, and the distance to the PHC remained easily accessible. The study indicates that the duration of waiting time, the efficiency of service, and the perceived ease of access for patients are significant considerations when deciding to utilize healthcare services and evaluating patient contentment (Arifa, 2018; Zi. A. Basith and Prameswari, 2020; Usman, Basri and Mansur, 2021). Another criterion to consider is the range of amenities provided in healthcare facilities. The availability of comprehensive service facilities at the PHC directly influences the utilization of its health services. Conversely, the need for more health

service facilities at the PHC leads to fewer individuals seeking its health services (Tunnizha *et al.*, 2023). All interviewees unanimously affirmed that the MHS facilities were sufficient, mirroring the findings from interviews on facilities and infrastructure. Conversely, MHS providers reported that the facilities and infrastructure, such as human resources, counselling rooms, and health promotion media, needed to meet the required standards. Despite the insufficient facilities and infrastructure, service providers can still utilise these insights to enhance the experience of those using their services.

Need Factors

The findings elucidate that in addition to the necessity of human resources, mental health services at the Kulon Progo Regional Health Centre necessitate collaboration among health programs, financial backing, and health promotion media.

"I prefer collaborating, such as participating in Youth Programme" (IU 01)

"Yes, we have a restricted budget for the community, sister, so we only select a small number of cadres, specifically those who distribute information to the community" (IU 02)

"What can be accessed is limited to leaflets, sister" (IU 03)"

The lack of sufficient funds has led to the nonexistence of mental health outreach and education initiatives within the community and the creation of creative media for health promotion. Service providers have developed a solution through cross-program collaboration, such as partnering with the Youth program and deploying health cadres. Consequently, the sole source of information about mental health treatments is limited to Health cadres and booklets available at the PHC. Currently, digital needs to be more motion-based, but there is a lack of media specifically designed for teenagers. Furthermore, some community health clinics do not possess any health promotion media.

This study reveals that the resources available for MHS at PHC are

well below the established level. A prime illustration is the absence of proficient mental health practitioners or psychologists. None of the Kulon Progo Regency's health centres have psychologists, which poses a significant challenge in delivering MHS. Nurses or midwives who lack sufficient educational backgrounds are often the implementers or holders of mental health programs. Despite receiving specialized training in mental health, the primary informants continue to fulfil their responsibilities as nurses or midwives, leading to a dual workload. Ensuring the availability of skilled and competent personnel is a significant obstacle in delivering healthcare services (Sophiarany *et al.*, 2021). Another study asserts that the execution of mental health initiatives at PHC is impeded, primarily due to the lack of mental health specialists and the dual burden, resulting in inadequate and inefficient treatment delivery (Hasanah, 2021; Subekti, 2021). MHS providers require competent health human resources to administer services effectively. The presence of skilled and high-quality human resources is crucial for successfully implementing a health system, as it directly contributes to attaining health development objectives (Prilly, Sari and Aprilia, 2020).

Mental health providers require competent human resources to administer their services effectively. The presence of skilled and high-quality human resources is crucial for successfully implementing a health system, as it directly contributes to attaining health development objectives (Hasanah, 2021). Many patients need more access to health services due to insufficient awareness of the availability of these services, including the various programs and types of health care offered. (Aptindika, Dewanto and Sulakosno, 2019; Al-Shorbaji, 2021). As the rate of reported mental health problems and illnesses continues to increase, health leaders need to recognize the changes necessary to modernize mental health systems to improve mental health outcomes through efficient value-based solutions, as well as to advocate for financial investment and share best practices (Moroz, Moroz and D'Angelo, 2020).

CONCLUSION

The use of MHS by teenagers in the Kulon Progo District Health Center is influenced by knowledge factors, community stigma regarding mental health issues and access to services, availability of human resources and financial resources, as well as health promotion media. Support from family and health workers, facilities and infrastructure, and ease of flow of services and facilities support teenagers in utilizing health services. Cross-program and cross-sectoral collaboration, as well as advocacy to policyholders regarding the provision of professional human and financial resources, is very necessary to support the optimization of mental health services in Kulon Progo Regency.

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Premarital Screening: A Catalyst for Achieving Good Health and Well-Being

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ABSTRACT

Background: Premarital screening is a comprehensive examination that must be done before marriage, which includes examinations of reproductive organs, genetic diseases, infectious diseases, and blood-borne infections. The screening aims to avoid the risk of long-term diseases for couples and their descendants. This screening can also prevent maternal and infant mortality, birth defects, and stunting because risk factors can be detected and addressed early in the mother and baby-to-be. Despite its importance, premarital screening behavior is not culturally embedded. **Objective:** This study aimed to determine factors associated with premarital screening behavior. **Methods:** This research uses systematic review as its design from Google Scholar and Scopus databases that discuss the determinants of premarital screening behavior with quantitative methods. Articles were collected with the keywords "premarital" and "screening" published within the last five years, from 2018 to 2023. **Results:** The researchers discovered 1,151 articles. 10 articles fulfilled the criteria and objective of this study and were further reviewed. Older age, female, higher education level, consanguineous relationship between parents, history of genetic diseases, good knowledge and positive attitude, and the establishment of government regulations are factors associated with premarital screening behavior. **Conclusion:** Health promotion may be expanded to raise public awareness of the necessity of premarital health screening. It is also intended that future researchers would investigate premarital health screening behavior using various research approaches, such as cross-sectional or qualitative research.

Keywords: premarital; screening; marriage; SDGs

INTRODUCTION

In 2021, the World Health Organization (WHO) reported that approximately 40,618 children are born with thalassemia every year globally, with around 62.8% of these children requiring blood transfusions in their lifetime (WHO, 2021). WHO has identified 11 countries in the sub-region with a high prevalence of thalassemia, including Indonesia in the Southeast Asia region, where the prevalence of carriers ranges from 3% to 20%, and more than 2,500 children are born with thalassemia each year (WHO, 2021). In 2021, an estimated 258,347 people with thalassemia in Indonesia will receive blood transfusions on an ongoing basis during their lifetime (BPJS Kesehatan, 2021).

According to data from Badan Penyelenggara Jaminan Sosial (BPJS),

catastrophic or high-cost diseases will be the top health financing in Indonesia in 2021 (about IDR 90.33 trillion). This is an increase of 25-31% of the total health financing since 2014. The catastrophic diseases listed in order of healthcare financing incurred are heart disease, cancer, stroke, kidney failure, thalassemia, hemophilia, leukemia, and liver cirrhosis (BPJS Kesehatan, 2021). Of the eight diseases, thalassemia and hemophilia are caused solely by a genetic factor inherited from parents (Al-Kindi *et al.*, 2019).

Marriage is an important stage in the life of many people and is usually considered to be a major milestone in their lives. From a health perspective, the union of two people in marriage requires additional attention, particularly about their health status and medical history. One of the preventive measures that can

be taken to avert many health problems that can result from marriage is premarital screening (Suresh *et al.*, 2023). Seven years closer to the 2030 Sustainable Development Goals (SDGs), which aim to ensure universal access to sexual and reproductive health care services, including for family planning, information and education, and integration of reproductive health into national strategies and programs, one area of concern is premarital screening behavior (United Nations, 2023).

Premarital screening involves the testing of couples planning to get married for common genetic disorders, including thalassemia, hemophilia, and sickle cell anemia, as well as infectious diseases, including hepatitis B, hepatitis C, and HIV/AIDS (Alhosain, 2018). It can help reduce the risk of maternal and infant mortality and birth defects (Al-Balushi & Al-Hinai, 2018). Through early detection in expectant mothers, premarital screening can prevent the birth of stunted babies (Shojaiefar *et al.*, 2021). In addition, it can reduce the spread of the above-mentioned diseases, thereby reducing the financial burden of their treatment, both individually and on the health burden of the country (Natarajan & Joseph, 2021). Premarital screening can also serve as a tool for healthcare professionals to educate couples and provide them with the knowledge they need to build healthy families and produce high-quality offspring (AlOtaiby *et al.*, 2023).

Premarital screening has become a mandatory program in some countries and is now a prerequisite for marriage (Al-Shroby *et al.*, 2021). In Saudi Arabia, for example, the program is becoming increasingly popular and accepted by couples to ensure a disease-free life and healthy offspring (Alhousseini *et al.*, 2023). The program has been implemented in Indonesia as well (Kemenkes RI, 2019). The success of the program depends on the involvement of various parties related to marriage, including the Ministry of Health, BKKBN, Ministry of Religious Affairs, and Puskesmas. However, the program was found to be sub-optimally implemented (Fitriani, 2020). Although several policies support the implementation of the program, there are currently no specific guidelines that regulate the implementation of health

check-ups for prospective marital individuals. Due to the lack of information and knowledge, the majority of individuals do not undergo a health check-up before their marriage (BKKBN, 2020). Despite its importance, getting screened before marriage is still not widely practiced in Indonesia. If all couples were aware of the benefits of premarital screening, there could be prevention of many long-term health problems for both partners and their future children (Saffi & Howard, 2015). Therefore, it is essential to investigate the determinants related to the conduct of premarital screening as an input for reproductive health programs and preventive measures for public health concerns.

METHODS

Research articles using quantitative methods published between 2018 and 2023 were selected for further examination using a cross-sectional approach. This is a systematic review that is a comprehensive analysis of different search engines for scientific articles. The researchers used 'premarital' AND 'screening' in English and Bahasa Indonesia as keywords to search for articles on Google Scholar and Scopus databases. Articles were selected based on their title, abstract, year of research, and methods. Furthermore, the selection of articles was carried out by adjusting the inclusion and exclusion criteria that had previously been established. The exclusion criteria were as follows: (1) publication in non-accredited journals and (2) articles written in languages other than English or Indonesian. Inclusion criteria for the study were (1) quantitative research using primary data, (2) research findings on determinants affecting premarital screening behavior, (3) research published within the last 5 years (2018-2023), and (4) full-text accessibility.

A total of 1,151 articles were retrieved using several search engines. After filtering the titles and abstracts, 30 articles were obtained. Based on the year and inclusion criteria, 19 articles that met all criteria were selected. Finally, 10 articles that most comprehensively addressed determinants of premarital screening were analyzed.

Figure 1 presents the PRISMA framework, adapted from Tricco *et al.* (2018), which serves as a selection guide

for the articles to be reviewed in this study.

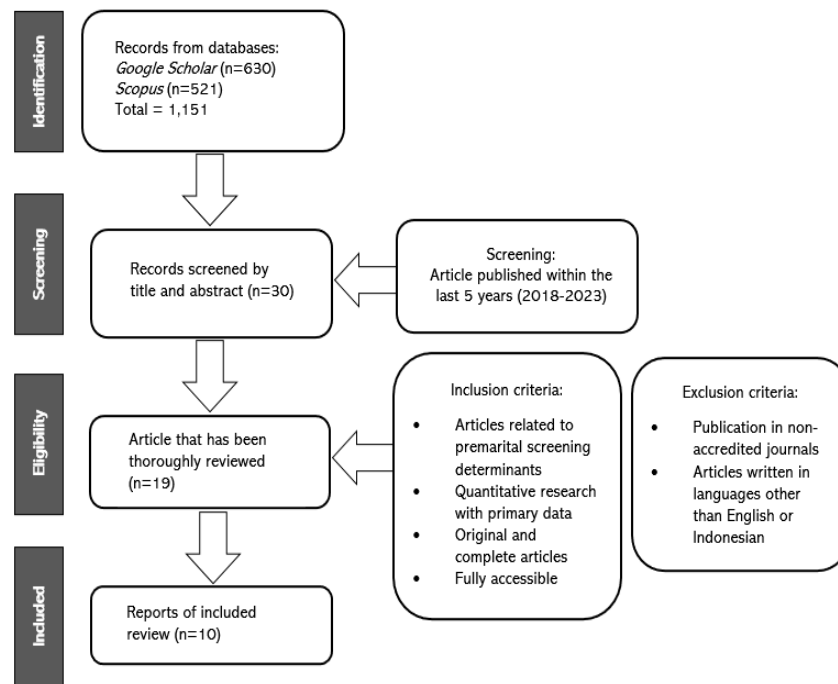


Figure 1. PRISMA Flowchart

RESULTS

Analysis of the ten articles that met the study criteria resulted in 7 determinants associated with premarital screening behavior: age, sex, education

level, parental endogamous marriage, history of genetic diseases, knowledge and attitude, and government regulations. Table 1 provides additional details of the articles.

Table 1. Article Review of the Findings Determinants of Premarital Screening Behavior

No	Author	Title	Participants, Sample Size	Methods	Results
1	Rahma M. Al-Kindi, Saraswathi Kannekanti, Jansi Natarajan, Lina Shakman, Zeinab Al-Azri, Naifain I. Al-Kalbani (2019)	Awareness and Attitude Towards the Premarital Screening Programme Among High School Students in Muscat, Oman	1,541 high school seniors from 10 public schools	A study using questionnaires to collect quantitative data	Endogamous marriage in parents, family history of genetic disease, and being female were all significantly associated with premarital health screening behavior (p=0.018, 0.001, and 0.016, respectively)

No	Author	Title	Participants, Sample Size	Methods	Results
2	Mokhtar abdo Almoliky, Heba Abdulrhman, Showqi Hasan Safe, Malak Galal, Heba Abdu, Basma Towfiq, Shatha Abdullah, Mohammed Waleed, Mujeeb A. Sultan (2022)	Knowledge and attitude of Engaged and Recently Married Couples Toward Premarital Screening: A Cross-Sectional Study	189 participants	A study using questionnaires to collect quantitative data	Premarital screening behavior is associated with being a woman, having good knowledge about genetic diseases, and displaying positive attitudes toward the consequences of health screening
3	Syed Sameer Aga, Yara Abdulaziz Alghamdi, Amal Abdullah Alghamdi, Muhammad Anwar Khan (2021)	Knowledge, Awareness, and Attitude of Medical Students Concerning Genetics and Premarital Screening	302 medical students	A study using questionnaires to collect quantitative data	Higher levels of education, higher costs of health screening, the presence of consanguineous relationships between parents, enacted government regulations, and gender have been found to influence premarital screening behavior
4	Ali Alkalbani, Maryam Alharrasi, Susan Achura, Ammar Al Badi, Amjad Al Rumhi, Khalid Alqassabi, Raya Almamari, Omar Alomari (2022)	Factors Affecting the Willingness to Undertake Premarital Screening Test Among Prospective Marital Individuals	400 students between the ages of 20 and 30 from various departments at a state university	A study using questionnaires to collect quantitative data	Female ($p=0.016$), being married ($p=0.009$), and having a parental relationship ($p=0.007$) were significantly correlated with the adoption of premarital screening behavior
5	Walid A. Al-Shroby, Suha M. Sulimani, Sultana A. Alhurishi, Maram E. Bin Dayel, Nora A. Alsanie, Najla J. Alhraiwil (2021)	Awareness of Premarital Screening and Genetic Counseling among Saudis and its Association with Sociodemographic Factors: a National Study	6,263 participants were randomly selected from 20 regions utilizing the stratification method	A study using questionnaires to collect quantitative data	Women who are over 18 years old, have a bachelor's degree or higher education, are married, and earn a high income are more likely to undergo premarital screening

No	Author	Title	Participants, Sample Size	Methods	Results
6	Shahad AlOtaiby, Abdulhadi Alqahtani, Ruba Saleh, Abeer Mazyad, Abdulrazaq Albohigan, Emad Kutbi (2023)	Comprehension of premarital screening and genetic disorders among the population of Riyadh	A random sample of 652 participants aged 16-60 was selected from the general population	A study using questionnaires to collect quantitative data	Premarital screening behavior is associated with women, college graduates, and the presence of government regulations
7	Abdulbari Bener, Mariam Al-Mulla, Angus Clarke (2018)	Premarital Screening and Genetic Counseling Program: Studies from an Endogamous Population	873 participants aged 18-40 years from primary healthcare facilities	A study using questionnaires to collect quantitative data	The main factors associated with premarital screening are older age, higher level of education, awareness of genetic diseases, parental approval of marrying a relative, high-income level, employment status, and strong relationship with partner
8	Safia M. Binshihon, Manal O. Alsulami, Wed M. Alogaibi, Asmaa H. Mohammedsaleh, Hayfa N. Mandourah, Bushra S. Albaity, Mohamad H. Qari (2018)	Knowledge and attitude toward hemoglobinopathies premarital screening program among the unmarried population in Western Saudi Arabia	1,039 single individuals in the general population	A study using questionnaires to collect quantitative data	University graduates or those with a higher level of education ($p=0.001$), individuals over the age of 25 ($p=0.005$), and those with a family history of genetic disease ($p=0.001$) were found to be more likely to undergo premarital screening.
9	Zaid Altaany, Omar F. Khabour, Karem H. Alzoubi, Almuthanna K. Alkaraki, Ghaith Al-Taani (2021)	The Perception of Premarital Genetic Screening within Young Jordanian Individuals	432 participants over the age of 18 were surveyed at shopping centers or universities	A study using questionnaires to collect quantitative data	Female gender, higher education, government mandates, and history of genetic conditions affect health screening attitudes before marriage

No	Author	Title	Participants, Sample Size	Methods	Results
10	Maha Ali, Norelhouda Elshabory, Hanan Elzeblawy Hassan, Nehad Zahra, Hayam Alrefai (2018)	Perception about Premarital Screening and Genetic Counseling Among Males And Females Nursing Students	203 students in the third year of nursing program	A study using questionnaires to collect quantitative data	Females ($p=0.005$), those with consanguineous parental relationships ($p=0.019$), and those with a personal ($p=0.001$) or family ($p=0.035$) history of genetic disease were associated with premarital screening behaviors

DISCUSSION

Age

As we age, our decision-making process typically becomes more mature, which can have an impact on our behavior, particularly health-related behaviors. This suggests that older individuals tend to consider more factors when conducting premarital screening, as demonstrated by the findings of Oluwole *et al.* (2022) with a significance level of $p < 0.001$. This finding is also supported by the research of Zedan Zaien *et al.* (2022). Multiple regression analysis shows that age is significantly correlated with the practice of premarital health screening ($p=0.007$). The study in Saudi Arabia shows that those who are over 20 years of age are more likely to undergo premarital health screening as compared to the younger respondents (Zedan Zaien *et al.*, 2022).

Sex

Sex significantly influences the decision to get screened before marriage. A study on university students in Qatar shows that women have a significantly higher level of knowledge about premarital health screening than men ($p<0.01$) (Al-Shafai *et al.*, 2022). On the contrary, indicating possible differences in cultural attitudes towards premarital screening, another study from the same year conducted by Alkalbani *et al.* (2022) shows that men in Oman have a stronger desire to undergo premarital health screening than women.

Educational Level

Formal education is defined as the process by which educators deliver material to achieve educational objectives to change behavior (Notoatmodjo, 2007). Research suggests a positive relationship between higher education and better health behaviors. Aga *et al.* (2021) found that students in their third year of college had higher rates of agreement with premarital health screening compared to students in their first year ($p<0.001$). In addition, studies conducted in Saudi Arabia further demonstrate that an individual's level of education plays a critical role in their decision to undergo premarital health screening ($p=0.019$) (Zedan Zaien *et al.*, 2022).

Parental Endogamous Marriage

According to the Indonesian Dictionary, endogamy is the practice of marrying within one's social group, including relatives (KBBI, 2023). Such marriages typically take place between cousins on either the paternal or maternal side. Parents who are related to each other tend to be a factor in determining the premarital screening behavior of their children. This is because genetic disorders, such as sickle cell anemia, thalassemia, epilepsy, and hemophilia, are typically around 20 times more prevalent in populations where cousins marry. Therefore, premarital screening measures are often implemented to minimize the risk of hereditary diseases (Bener *et al.*, 2019). However, research conducted by Gosadi *et al.* (2021)

indicates that consanguineous couples are reluctant to undergo premarital screening for several reasons. One of these reasons is the belief that marriage is a predetermined destiny, and they are willing to accept all the risks associated with having children without conducting a premarital health examination (Gosadi *et al.*, 2021).

History of Genetic Diseases

One of the factors associated with premarital screening behavior is a personal or family history of genetic disease. This is supported by the results of the research conducted by Al-Shafai *et al.* (2022), which shows that individuals or family members who have a history of genetic diseases are more likely to choose to undergo premarital health screening. This is possible because they have been previously exposed to information or are more interested in studying the disease because of its impact on themselves and their families, both now and for their future offspring (Al-Shafai *et al.*, 2022).

Knowledge and Attitude

Premarital screening behavior can be influenced by good knowledge and positive attitudes toward premarital screening programs. Individuals who possess these qualities are more likely ($p < 0.001$) to choose premarital screening before marriage (Bindhani *et al.*, 2020). This is corroborated by evidence indicating that even though premarital screening is compulsory in Qatar, some couples who lack awareness about the program do not undergo screening before getting married (Al-Shafai *et al.*, 2022).

Government Regulations

The implementation of government policies requiring health screening as a prerequisite for the submission of marriage documents is associated with premarital screening behavior. Studies conducted in Nigeria suggest that the development of policies can improve the access of the community to screening programs and increase the behavior of premarital screening (Oluwole *et al.*, 2022). Research conducted in India indicates that governmental regulations enhance public acceptance, leading individuals to undergo health inspections before marriage (Bindhani *et al.*, 2020).

CONCLUSION

The study found several factors influencing premarital screening behavior, including age, sex, education level, parental endogamous marriage, history of genetic diseases, knowledge and attitude, and government regulations. This systematic review is valuable for the development of premarital screening programs in Indonesia to prevent the broader public health burden, including genetic disorders, sexually transmitted diseases, and the risk of infant disability and death. Furthermore, increased education and promotion by health workers could enhance public awareness of the importance of health checks before marriage. Premarital screening behavior warrants further investigation using other research methods, including cross-sectional approaches to measure the most dominant factors influencing premarital screening behavior and qualitative research methods to explore the reasons for reluctance to undertake premarital screening. Future researchers may find these approaches valuable in gaining a more comprehensive understanding of this topic.

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Health Literacy by Telehealth Apps to Decrease Breast Cancer Diagnosed

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ABSTRACT

Background: Health literacy always being one of the health promotion ways to support the SDGs program in creating the better life for people surroundings. Health literacy try to make accessible information for positive impact in stimulating people awareness about disease especially in malignant such as breast cancer. Breast cancer still being on the first place of cancer's rank with high number of affected people. The digitalization in health literacy offers the service like online consultation, suggested daily diet, suggested time duration to do physical activities based on personal data of the user, and others. **Objective:** This study was to evaluate the application of technology being used in health literacy to decrease the number of breast cancer diagnosed around the world. **Methods:** This literature review databases were searched using online journal from Google Scholar, PubMed, ScienceDirect, online article, and WHO newsletter. This study focuses on the development of telehealth using in health literacy for malignant. **Results:** The digitalization in health literacy for promoting SDGs program to reduce the number people affected by breast cancer help people surroundings accessing their health personal data and to remind the suggested schedule to do medical checkup for malignant and suggested daily lifestyles. So that the target to support SDGs health promotion way in people awareness about cancer can be reached effectively. **Conclusion:** Telehealth using in the digitalization of health literacy give positive impact in stimulating people awareness about breast cancer, which lead to the decreasing number of people affected by breast cancer around the world.

Keyword: Telehealth, Health literacy, Breast cancer, Health service, Online facilities

INTRODUCTION

In industrial revolutionary era 5.0, medicine cannot be separated from the digitalization of technology. There are so many innovations has been developed especially in promoting SDGs. One of innovations that being developed to support the mission of SDGs is Telehealth application by using health literacy principle in stimulating people awareness about health lifestyle. Health problem that still cannot be solved properly was about malignant. Breast cancer as one of malignant problems is being stated on the first rank of cancer that affected people around the world. Globally, during 2023 BC in female is predicted there will be 297.790 new cases and 43.170 death caused (*Kanker Tiroid - Fakta Statistik Kanker*, n.d.). In Indonesia, based on Globocan Data in 2020, the prevalence

number of BC has been accumulated for 68.858 cases which are mean (16,6%) from 396.914 new cases number (*Kanker Payudara Paling Banyak Di Indonesia, Kemenkes Targetkan Pemerataan Layanan Kesehatan - Sehat Negeriku*, n.d.). BC is a kind of cancer which is minimum hope to be clear out totally. Because of that, we must minimize the probability being affected with BC by aware to SDGs mission especially in SDGs 3 which is focused on good health and well-being.

Online health services that being developed with Telehealth application will be helpful to early preventive way onto BC diagnosed. Telehealth that will be used for people surroundings related to health literacy which influence people about their knowledge of BC. So that, our hope is to facilitate the true information about BC and serving other added facility like online consultation with

professionalism health assistant, suggested daily diet, suggested duration, and kind of physical activities, and including video exercising especially focused on breast massage. Better level of health literacy will increase the survival rate so that life in this world create a better living future.

Individual awareness really influences the usage of health literacy principle in prevention many diseases around us. Not only individual awareness that influent people's intention in using Telehealth, but also the governmental policies in promoting SDGs which we can see right now there are so many SDGs Ambassador competition to raise up people awareness in health. SDGs Ambassador can be specialized on their majority, for example one SDGs Ambassador to promote BC awareness, the other one to promote technology application in health literacy.

Most of all BC prevention can be done by breast self-examination, so the using of Telehealth is important to support people's knowledge about BC information and data. BC as a multifactorial cancer, so Telehealth that will be used can add personal data space by using informed consent. The personal data space can be filled with personal history which includes age at diagnosis of BC previous breast biopsies and treatment of other cancer with use of radiations. Family history includes history of ovarian cancers and BCs in first degree relatives (Akram *et al.*, 2017). The effectiveness of Telehealth apps has been examined, six months after implementation of a telehealth-based educational intervention administered by a physician, BC awareness was drastically improved (Mehmet Celal Kizilkaya, 2023).

METHODS

This study was early focuses on SDGs 3 because SDGs3 is the most reliable theme with the topics of journal publication which is "Health Promotion for SDGs". Then, we searched about World Health Organization perspective onto SDGs promotion for better living future by searching the WHO conference from WHO newsletter website which explain about health promotion and preventive way. After, analyzing the conference about SDGs promotion, we

focused the health education method by health literacy to raise citizen's awareness onto breast cancer. Health literacy that we choose as our method being mixed with technology digitalization application because we live among the industrial revolutionary era 5.0. To support our idea, we do journal review from Google Scholar, PubMed, and ScienceDirect. We also do article review from online browser to support the credible data about daily diet and calories in preventing BC diagnosed. We choose BC because we focused on the highest prevalence number of cancer affected people based on online article from National Cancer Institute and from Indonesian data.

All of references that we searched have been limited on last 10 years and categorized as free full text. All references that we search are being focused as our keyword which are consist of SDGs 3, WHO conference, Telehealth, Breast cancer, health literacy, online health services. Mixed keywords like "Effectiveness of Telehealth", "Telehealth related to Breast Cancer", "Kinds of Breast Massage Therapy" also being used. All references are sited using Mendeley apps.

To fulfill this literature review in results and discussion part which are showing the layout of Telehealth apps, we used Canva Edu to design our Telehealth apps layout. The comparison before and after Telehealth application to support effectiveness of Telehealth apps is cited from previous study references. The specific data collection of our literature review is consisting of two systematic reviews, one cross-sectional survey and feasibility study, one annual review, four original articles, one randomized control trial, one systematic review and meta-analysis, and seven online website articles. The reference that using WHO conference specifically in health literacy because one of important health promotion method is by educating people surroundings.

RESULTS AND DISCUSSION

The classification level in health literacy gives different impact on social behavior to support SDGs mission. There are three levels that can be applied, which may look like these:

a) Functional Health Literacy

It describes basic-level skills that are sufficient for individuals to obtain relevant health information (for example, on health risks and on how to use the health system) and to apply that knowledge to a range of prescribed activities (*Understanding and Responding to Health Literacy as a Social Determinant of Health*. Annu. Rev. Public Health).

b) Interactive Health Literacy

It describes more advanced literacy skills that enable individuals to extract health information and derive meaning from different forms of communication; to apply new information to changing circumstances; and to engage in interactions with others to extend the information available and make decisions (*Understanding and Responding to Health Literacy as a Social Determinant of Health*. Annu. Rev. Public Health). The use of Telehealth application can be categorized on these levels.

c) Critical Health Literacy

It describes the most advanced literacy skills that can be applied to critically analysed information from a wide range of sources and information relating to a greater range of health determinants (*Understanding and Responding to Health Literacy as a Social Determinant of Health*. Annu. Rev. Public Health).

Some of the main related cases that may inhibit the interest of people surrounding to use Telehealth apps is the availability of adequate signal and the price for Telehealth's facility fee. But, the Communication and Information Ministry of Indonesia has facilitated the internet stall in region with limited access of internet. Due to achievable fee, the Telehealth apps providers can make cooperate with other healthcare service company. Especially, in celebrating the International Breast Cancer Day on October 19th, all of Telehealth apps can offer a special discount for services' fee. To maximize the Telehealth output in increasing health promotion of SDGs due to health literacy, Telehealth providers can supply daily reminder to breast self-examine during the celebrate month of International Breast Cancer Day. The supporting other development technologies can be applied too, multi-level interventions may be necessary,

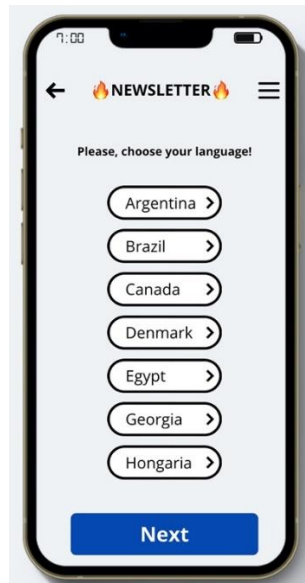
including structural-level interventions to promote technology and telehealth access (e.g., universal, free phone, and broadband Internet access) (M. Ertl, et al., 2023).

Telehealth apps that will be applied to prevent breast cancer diagnosis focused on serving the features such as newsletter about breast cancer cases, online consultation with professionalism health assistant, suggested daily diet, suggested duration and kind of physical activities, and including video exercising especially focused on breast massage therapy. The supporting variable to maximize the work of Telehealth apps is by providing space for the users to fill their personal data include history of breast cancer diagnosis if being affected or from their family history. Telehealth's providers must be training first before launch this application because there will be informed consent that will be made as agreement between providers and the users. The personal data as supportive variable important because it can accumulate the progress of user's health literacy in BC awareness. The more impactful progress of users being shown, the higher Telehealth apps rate. Telehealth apps tried to make easier communication one - on - one system between health professional assistant and users. Some women may feel shy to visit health professional assistant by offline to consult about their breast, so the availability of Telehealth can be the alternative way to keep women around the world self - examining their breast regularly with health professional assistant explanation. The specific way in Telehealth's work is being Provided in-person and virtually by Health Insurance Portability and Accountability Act compliant and encrypted telehealth conferencing (Myers *et al.*, 2020). So, the credibility of information being shared by Telehealth apps is proven.

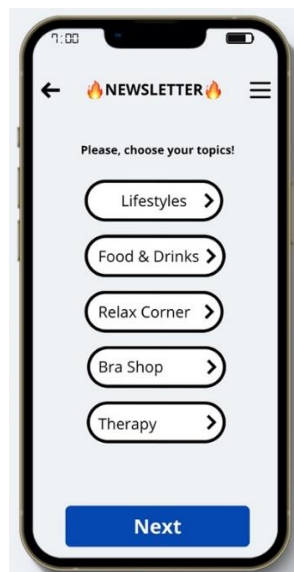
Newsletter about Breast Cancer

Telehealth apps can be cooperated with other GO or NGO to show the newest development medicine cases about breast cancer to the user. This feature can be made more attractive by showing the checklist filter that can be filled directly by the user based on their interest specialize topics. The cooperation with editor job and design graphic designer is

important to conduct attractive layout in showing newsletter so that the user intention to read the newsletter about BC will increase as the increasing way to promote health literacy.



Picture 1. Language of Telehealth Based on Every Individual Country



Picture 2. Types of Newsletters being offered by Telehealth Apps

The option that being showed consist of lifestyles, food and drinks, relax corner, bra shop, and therapy. Lifestyles really influence the probability of someone being affected by some disease. Food and drinks that contain high fat will increase the risk factor of BC diagnosed. Relax corner on this Telehealth app contain newsletter about tips and tricks to maintain stress relieve in women's

daily life. Bra shop in this newsletter offers many online shop article that specialize selling bra. The last one is therapy feature where the newsletter serves the user about all ways especially in conventional or traditional ways that not really complicated in prevention BC diagnosed.

Online Consultation with Professionalism Health Assistant

There will be cooperate system between Telehealth operator and GO or NGO to coordinate the available schedule for health assistant in doing consultation with the user by online meeting. The consultation space will be only showed one hour before the consultation session. Health professional assistants include oncologist, psychiatrist, and nutritionist. Those three specialties will support the increasing of health literacy for the users in BC early prevention which is supporting the SDGs 3.



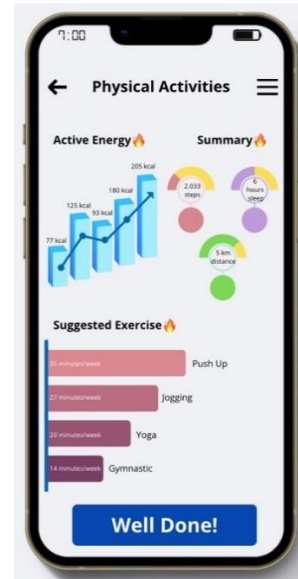
Picture 3. Consultation Session of Telehealth Apps

Suggested Daily Diet

Giving adequate recommendations food and drinks for the users in prevention the breast cancer diagnosed, this program will cooperate with nutritionists. In this facility, the personal data that has been fulfilled by the users with informed consent will be shared to the nutritionist so that the recommendations menu by nutritionist can adapt with user's personal conditions like age and daily work.



Picture 4. Recommendations Food and Drinks for Telehealth Apps' users



Picture 6. Summary of Health Exercise of Telehealth Apps' users

Suggested Duration and Kind of Physical Activities

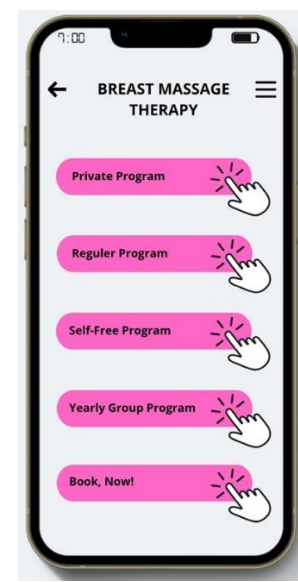
This feature will include the user calories that being burned because one of risk factor in breast cancer diagnosed is obesity. This part will cooperate with physicians. The duration will follow the user's needs, for example if the user fills the capacity of weekly exercise for three times, the physician will also try to set the schedule for three times in one week with enough target calories burning.

Breast Massage Therapy

This facility is offering many programs that relate to every individually needs. Different program may offer different fee and facility. This feature also giving user facility to consult with official contact if the users are being confused to choose what program may be suitable with them. This massage therapy willingness to reduce the stress level of women so that it will decrease the probability of women being affected by breast cancer.



Picture 5. Recommendations Physical Activities



Picture 7. Breast Massage Therapy Services being offered by Telehealth Apps

The role of health literacy in promoting SDGs has been utilized in health care systems, disease prevention, and health promotion to maintain and enhance life quality. Health literacy also contributes to the sharing of responsibilities between healthcare providers and those receiving care, as well as to a greater mutual understanding between both parties during the communication process (View of Media

Health Literacy on Prevention of Noncommunicable Diseases in Adolescents, n.d.). The output and input comparison in using Telehealth apps has showed significant increasing awareness from people surroundings. Because of that, Telehealth apps estimated effective enough as an appropriate way in health promotion for SDGs3 by health literacy method.

Table 1. The Comparison in Telehealth Intervention (Mehmet Celal Kizilkaya, 2023)

	Baseline (%)			Follow-up (%)			p-value
	Yes	No	Don't Know	Yes	No	Don't Know	
Lump or thickening in the breast	10	8	82	86	5	9	<0.0001
Lump or thickening under the armpit	10	8	82	86	5	9	<0.0001
Bleeding or discharge from the nipple	5	8	87	86	3	11	<0.0001
Pulling in of the nipple	7	7	86	81	5	14	<0.0001
Change in the position of the nipple	7	8	85	77	7	14	<0.0001
Rash on or around the nipple	10	6	84	83	7	10	<0.0001
Redness of the breast skin	12	6	82	81	6	13	<0.0001
Change in the size of the breast or nipple	10	7	83	86	6	8	<0.0001
Change in the shape of the breast or nipple	10	7	83	85	7	8	<0.0001
Pain in one of the breasts or armpit	11	0	89	90	3	7	<0.0001
Dimpling of the breast skin	0	10	90	86	7	7	<0.0001

This table displays the responses of participants regarding awareness of various signs of BC at baseline and at 6 months follow up (n = 100). BC, breast cancer.

Table 2: Participant awareness of warning signs of BC.

From that table above, the people knowledge about breast cancer has significantly increased. The increasing that knowledges give better promotion to SDGs 3 mission. If the Telehealth apps can be applied and promoted wisely, all people around the world will be care to each other to always support the healthy daily lifestyle. One people knowledge that being shared to each other can raise up the awareness of breast cancer diagnosed. Individual intention to study directly about breast cancer can maximize the health literacy way as SDGs promoting way. Health policies in digitalization health services must be developed again to build a better health promotion for SDGs.

CONCLUSIONS

This study aims to inform about the potential health literacy method in SDGs health promotion. The Telehealth application in health literacy method has significant role to raise up people awareness in prevention the breast cancer diagnosed. Cooperate with GO and NGO also being suggested to develop the facility that being offered in Telehealth

apps. The individual awareness contributes big impact in decreasing the number of new breast cancer cases. Hopefully, all information and data that being shared in Telehealth apps can play an effective way in promoting SDGs by health literacy principle. The usage of Telehealth apps helps people access to information about health perspective easier. So, the target of SDGs 3 in creating good health and well-being can be achieved well by health literacy using Telehealth apps. Considering the beneficial output of Telehealth application on SDGs promotion to reduce the prevalence number of new cases in BC, health literacy in Telehealth apps is recommended to be developed again to stimulate better awareness on citizens about BC.

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Factors in Rejecting Covid-19 Vaccine in Indonesia: A Systematic Review

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ABSTRACT

Background: The primary approach to mitigating the Covid-19 epidemic is the implementation of community-wide vaccination initiatives. Nevertheless, a significant obstacle is the widespread refusal to accept the administration of the Covid-19 vaccination. **Objective:** This study aims to ascertain the determinants behind vaccination hesitancy towards the Covid-19 vaccine in Indonesia. **Methods:** The research methodology used in this work involves a systematic review approach, specifically using a literature study technique. The literature review used the Google Scholar, Neliti, and Garuda Jurnal databases, focusing on publications published between 2020 and 2021. The literature study search included inclusion criteria encompassing studies involving human subjects, open access availability, and publication in national journals. **Results:** 38 related publications were identified by the keywords. There were 9 studies subjected to analysis in the final process. **Conclusion:** The rejection of vaccines in Indonesia can be attributed to various factors, including the prevalence of COVID-19 hoaxes and conspiracies, the level of public knowledge, attitudes, and perceptions towards vaccines, doubts and concerns regarding their efficacy, potential side effects, safety, and compliance with halal standards, as well as the influence of individuals in close relationships.

Keywords: Covid-19 Vaccine, Indonesian, Vaccine Refusal

INTRODUCTION

In December 2019, the world again faced a problem that shocked society: the Covid-19 pandemic. As a result of this incident, almost all aspects of life experienced worrying changes. This incident began in Wuhan, China, in early 2020 (Ciotti *et al.*, 2020). The virus was once believed to have originated in the Huanan seafood wholesale market, which was famous for trading many live animal species. Furthermore, there are allegations that this viral pathogen has the potential to spread quickly to many regions in China (Dong *et al.*, 2020). Between 31 December and 3 January 2020, there was a significant spike in case documentation, as seen in the total reporting of 44 cases (Susilo *et al.*, 2020). On 11 March 2020, the World Health Organization (WHO) officially declared the COVID-19 outbreak a global pandemic, marking its peak status until the end of 2019 (Ciotti *et al.*, 2020). After being

declared a global pandemic, Covid-19 cases increased rapidly and spread to several countries. Based on data from the Ministry of Health of the Republic of Indonesia in 2020, the cumulative total of confirmed cases was 414,179 cases, and 18,440 deaths were reported on 25 March. These cases were recorded in 192 countries/territories, resulting in a Case Fatality Rate (CFR) of 4.4%. The initial transmission of COVID-19 in Indonesia occurred on 2 March 2020, with indications that the infection came from an Indonesian resident who had direct contact with a foreign national (Nalini, 2021).

The government has made various efforts to respond to the COVID-19 pandemic, one of which is by implementing a 14-days lockdown in Indonesia after confirmation of the existence of the virus in the country (Yunus & Rezki, 2020). This action was carried out according to the provisions of Law Number 6 of 2018 concerning Health

Quarantine. This law regulates the implementation of Health Quarantine at entry points and in certain areas. It includes implementing disease surveillance activities and assessing public health risk factors related to means of transportation, individuals, commodities, and/or the surrounding environment. It includes implementing health quarantine measures in response to a public health emergency. Apart from the steps mentioned above, the follow-up policy is the implementation of Large-Scale Social Restrictions or in Indonesian called *Pembatasan Sosial Berskala Besar* (PSBB) and the Implementation of Community Policy Restrictions or in Indonesian called *Pemberlakuan Pembatasan Kebijakan Masyarakat* (PKKM). In addition to the policies mentioned above, there are proposals to enforce mandatory health standards across communities, often called the 5M initiative. The five key steps, often referred to as the 5Ms, include the following practices: hand hygiene through regular hand washing, adherence to physical distancing guidelines, use of masks, restricted movement when engaging in essential activities and avoiding gatherings or crowded places (Irwan *et al.*, 2021). However, this approach is widely recognized as inadequate in mitigating the impact of the Covid-19 epidemic. The government is currently implementing a Covid-19 vaccine campaign.

Vaccination is a very successful approach to preventing infectious diseases (Farina, 2021). Vaccination is a universal preventive measure that can be given to all age groups, from babies to the elderly. Vaccines function by introducing weakened or inactivated bacterial or viral antigens, which then cause an immune response in the human body. This stimulation is intended to signal the body to recognize foreign objects that enter the body to carry out its natural mechanism, namely recognizing, generating, and remembering the foreign object. So, in the future, when the bacteria or virus enters the body, the body will be able to fight back well because antibodies have been formed as immunity (Andriadi *et al.*, 2021). From 2010 to 2015, WHO stated that vaccination prevented nearly 10 million deaths worldwide. Vaccination can

prevent pneumonia, diarrhea, whooping cough, measles, and polio. (WHO, 2015).

METHODS

The research methodology used in this study involves a Systematic Literature Review (SLR). The main goal of this approach is to systematically find, examine, and assess relevant literature to answer a predetermined research question (Fitriani & Putra, 2022). Research includes many sequential steps, including formulation of research questions, exploration of existing research literature, establishment of criteria for including and excluding research material, selection of relevant research literature, presentation and analysis of data, and derivation of findings.

Researchers conducted a comprehensive literature review using the Google Scholar, Neliti, and Garuda Journal databases, focusing on research published between 2020 and 2021, due to the fact that Covid-19 was on the rise since 2020 until 2021 and vaccination was mandatory at that time. The keywords used were "Indonesia Covid 19 Vaccine Acceptance", "Indonesia Covid 19 Vaccine Receipt", "Vaccine Acceptance," "Coronavac Indonesia Acceptance," "Astrazeneca Indonesia Acceptance," "Pfizer Indonesia Acceptance", "Moderna Indonesia Acceptance", "Sinovac Indonesia Acceptance", "Vaccine Covid 19 Indonesia Refusal", "Coronavac Indonesia Rejection", "Astrazeneca Indonesia Rejection", "Pfizer Indonesia Rejection," "Moderna Indonesia Rejection," "Sinovac Indonesia Rejection," "Covid 19 Vaccine Indonesia Rejection", "Covid 19 Vaccine Acceptance", and "Covid 19 Vaccine Rejection".

The literature search used specific inclusion criteria, which included research involving human subjects, open-access availability, and publication in national journals. The literature is then obtained and undergoes a selection and analysis process guided by previously established inclusion and exclusion criteria. Data was obtained through keywords, namely from a total of 38 publications. These articles were then selected according to predetermined inclusion criteria, resulting in 14 selected articles. A total of nine papers were evaluated in this study.

Next, the researcher continued to document the paper in tabular format. Next, the researcher thoroughly examined and analyzed the publication, emphasizing the sections related to the research findings. After the research reached its culmination, the researcher conducted a comparative analysis of the results obtained from many scientific

journals and then formulated a conclusive statement. Conducting literature searches and selecting articles will be carried out using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) technique. The findings of this research are shown in the following search results.

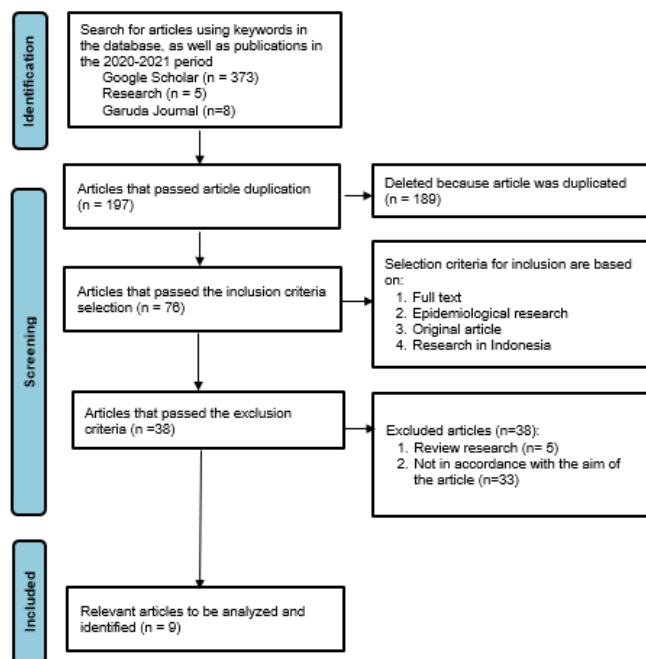


Figure 1. Literature search results using PRISMA method

RESULTS AND DISCUSSION

Based on the findings, researchers found 9 studies about factors of public

refusal of Covid-19 vaccination. The findings are summarized in Table 1.

Table 1. Literature Review Matrix of Factors of Covid-19 Vaccine Refusal

Author, Year	Title	Number of Respondents	Data Collection Method	Data Analysis Method	Result
Wirawan <i>et al.</i> , 2021	Conspiracy beliefs and trust as determinants of COVID-19 vaccine acceptance in Bali, Indonesia: Cross-sectional study	779 respondents	The survey was conducted using Google Forms. The survey was distributed through social media platforms including Facebook, Instagram, WhatsApp, and Twitter, using URLs and pamphlets.	The study design employs a cross-sectional approach with a binomial logistic test.	Trust in vaccine conspiracies is associated with low vaccine acceptance, with an odds ratio (OR) of 0.3 (95% CI = 0.20-0.54). The vaccine conspiracies include: 1. Covid-19 is a man-made disease. 2. Covid-19 is a biological weapon. 3. Covid-19 is

- caused by 5G signals.
4. Covid-19 is only equivalent to the common flu.
5. Covid-19 is a means to coerce people into getting vaccinated.
6. Bill Gates financed the Covid-19 conspiracy.
7. Covid-19 is not as deadly as it appears.
8. The media deliberately exaggerates the dangers of Covid-19.
9. The government intentionally exaggerates the dangers of Covid-19.
10. The Covid-19 vaccine and its treatment have been discovered but concealed.
11. Health workers receive financial benefits from the Covid-19 pandemic.
12. The government utilizes the Covid-19 pandemic as one of its sources of power.

Susilawaty <i>et al.</i> , 2021	Attitude, Risk Perception, and Public Acceptance against Coronavirus Disease 2019 Vaccination in Indonesia	225 respondents	The survey was conducted using Google Forms. The survey was carried out through various social media platforms, including Facebook, WeChat, Instagram,	The study design employed a cross-sectional approach with descriptive analysis testing.	The findings revealed that the reasons respondents disagreed with the Covid-19 vaccination program included a lack of awareness regarding the effectiveness of the vaccine (1.6%), concerns
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			WhatsApp, Twitter, Messenger, and/or websites, as well as the official accounts of several organizations and other media.		about potential side effects (1.6%), and uncertainty about the vaccine's safety (5.1%).
Sutriyawan & Hidayatulloh, 2021	Factors Related to Public Acceptance of the Covid-19 Vaccine	159 respondents	Online surveys conducted using questionnaires.	Study design using a cross-sectional approach with a chi-square test.	The results show that vaccine acceptance is still quite high (54.1%) compared to respondents who are willing. This is attributed to the knowledge, attitudes, and perceptions of the respondents.
Putri <i>et al.</i> , 2021	Public Concern Regarding Covid-19 Vaccination	399 respondents	Online surveys conducted through WhatsApp.	Study design using a cross-sectional approach with a chi-square test.	There is a significant relationship between vaccine availability and anxiety ($p = 0.000$).
Puspasari & Achadi, 2021	Health Belief Model Approach to Analyzing the Acceptance of Covid-19 Vaccination in Indonesia	472 respondents	Online surveys	Study design using a cross-sectional approach with a chi-square test.	There are several factors in vaccine acceptance, including: <ol style="list-style-type: none"> 1. Perception of vulnerability, namely that COVID-19 causes serious complications, fear of contracting it, and the belief that one will become seriously ill if infected with COVID-19. 2. Perception of barriers, such as concerns about the effectiveness of the vaccine, ability to afford it, potential side effects, and its compliance with halal standards.

Azim <i>et al.</i> , 2021	Public Acceptance of the Covid-19 Vaccine Based on the Health Belief Model Theory in Poasia Subdistrict, Kendar City	110 respondents	Data collection through offline questionnaire distribution.	The study design employed a cross-sectional approach with chi-square test and logistic regression.	The majority of respondents (57.3%) rejected the Covid-19 vaccine. Factors associated with vaccine acceptance include knowledge ($p = 0.000$). Additionally, perceptions of safety ($p = 0.000$), benefits ($p = 0.006$), and barriers ($p = 0.000$) are also related to Covid-19 vaccine acceptance.
Nurhayani <i>et al.</i> , 2021	Case Study Analysis of Refusal Towards Health Workers to Distribute Covid-19 Vaccine in the Working Environment of Munyang Kute Radelong Regional General Hospital, Bener Meriah Regency in 2021.	3 informants	Interview	Qualitative	Some of the reasons for the rejection of vaccines are as follows: <ol style="list-style-type: none"> 1. Lack of confidence in the vaccine given to healthcare workers due to its low efficacy and being a product from China. 2. Doubts about its halal status as there is no halal certificate from MUI.
Arumsari <i>et al.</i> , 2021	Overview of Covid-19 Vaccine Acceptance in Semarang City	200 respondents	Online Google form questionnaire, distributed for one month.	Quantitative descriptive study with a cross-sectional design.	The rejection response to the COVID-19 vaccine is indicated in the respondents' answers as follows: <ol style="list-style-type: none"> 1. 54.1% of respondents reject the safety of the COVID-19 vaccine. 2. 59.5% of respondents believe that the vaccine has no impact on suppressing the spread of the Corona Virus.

3. 42.6% of respondents doubt the effectiveness of the COVID-19 vaccine.
4. 50% of respondents doubt the halal status of the vaccine.
5. 58.1% of respondents agree/believe that humans do not need vaccines.
6. 52.0% of respondents state that they agree that the Corona Virus will disappear if humans completely surrender to God.
7. 47.3% of respondents agree that the spread of the Virus can only be suppressed by taking 3M precautions; 48.0% of respondents agree that COVID-19 can be cured with Indonesian herbs/rhizomes
8. 51.4% of respondents agree that the COVID-19 pandemic is a product of propaganda, and so on
9. 57.4% of respondents doubt if the government can handle the COVID-19 pandemic well.

Woisiri & Hutapea, 2021	Overview of 24 subjects Community Resistance to the Covid-19 Vaccine in	In-depth interview	Qualitative	Some of the reasons for public rejection of the Covid-19 vaccine include: limited
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the Kampong Doyo Baru Area, Jayapura Regency	knowledge about vaccines, misinformation about the Covid- 19 vaccine, and family restrictions on vaccination.
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Covid-19 Hoaxes and Conspiracies

The Coronavirus, scientifically called SARS-CoV-2 and colloquially known as COVID-19, is a new type of virus that triggered a global pandemic, significantly impacting the global health crisis. It is considered a deadly virus because it attacks the human respiratory system. Apart from the dangerous virus, the situation is also worsening due to the many hoaxes circulating about Covid-19, which are spreading on social media (Priastuty *et al.*, 2020). In this research, the results showed that one of the factors for refusing vaccination was the existence of hoaxes regarding Covid-19, including regarding vaccination. Research shows that people are reluctant to vaccinate against COVID-19 because hoaxes are circulating (Carrity Virginia Woisiri & Hutapea, 2021).

Other studies show that belief in vaccine conspiracies is associated with low vaccine acceptance in society (Wirawan *et al.*, 2021). Among these hoaxes and conspiracies, such as COVID-19 is a disease deliberately created by humans to force vaccinations for specific interests, the media is exaggerating the dangers of COVID-19 to the point that the government is considered to be using the COVID-19 pandemic as one form of power or something else. According to research conducted in 2020, evidence suggests an increase in the spread of fake news towards the end of the year. This hoax news is said to be more dangerous than the virus itself because it causes people to become anxious and reluctant to vaccinate. Even though this vaccination is a solution to the pandemic problem, in the end, hoaxes become an obstacle to the smooth running of vaccination.

Knowledge, Attitudes, and Public Perceptions of Vaccines

The acquisition of knowledge has a vital role in developing attitudes. The use of knowledge can be a catalyst for behavior change, especially in the context of administering the Covid-19 vaccine. Based on research conducted in Doyo Baru

Village, Jayapura Regency, it was discovered that 6 of the total 24 participants had a high level of knowledge. It can be seen from their understanding of the benefits of the COVID-19 vaccine, including its ability to increase body immunity and provide personal protection (Woisiri & Hutapea, 2021). In line with research findings, the data shows that participants have a high understanding of COVID-19 vaccination, where 93.7% of respondents fall into the "excellent" category regarding their knowledge. Understanding of the program, objectives, and benefits associated with effective COVID-19 vaccination may vary based on age and job category (Putri *et al.*, 2021). Individuals who have less information have been shown to have a higher likelihood of not receiving COVID-19 vaccination (Azim *et al.*, 2021). Common factors contributing to limited public understanding of COVID-19 vaccination are primarily rooted in public skepticism regarding its safety and efficacy.

Respondents' sentiments towards COVID-19 vaccination show variability. Many participants expressed reluctance to get the COVID-19 vaccine due to their observations of individuals in their social circle experiencing adverse health impacts, including death, after vaccination (Carrity Virginia Woisiri & Hutapea, 2021). Based on previous findings, there is a correlation between perceptions of vulnerability/seriousness and acceptance of COVID-19 vaccination. This phenomenon may be caused by survey participants' reduced awareness of their vulnerability to non-vaccination (Azim *et al.*, 2021). This phenomenon may be caused by the reluctance of individuals who consider themselves sensitive or susceptible to COVID-19 to undergo vaccination due to a lack of knowledge about the potential risks associated with the disease. Respondents' perception of low susceptibility to COVID-19 transmission was caused by their lack of understanding about the virus, even

though COVID-19 spreads quickly to individuals without discrimination.

Doubts and Concerns regarding the Efficacy, Side Effects, Safety, and Halalness of Vaccines

Uncertainty and worry are standard when facing new experiences. The research findings show that six studies have identified several elements that raise doubts and concerns regarding the effectiveness, potential side effects, safety, and compliance with halal standards of the COVID-19 vaccine. These factors include worrying about side effects, not being sure it is safe, feeling anxious, worrying about the cost of the vaccine, and worrying about the halalness of the vaccine. The research was conducted using an online survey method of respondents who refused the vaccine program because they were worried about the efficacy and effects caused by the vaccine (Susilawaty *et al.*, 2021). Additionally, in previous studies that used online survey methodology and adopted a health belief modeling framework, participants expressed concerns regarding vaccination efficacy, potential financial implications, possible adverse effects, and vaccine compliance with *Halal* standards (Puspasari & Achadi, 2021).

People's concerns about new things are very natural. There is a need for delivery and outreach to the public, especially ordinary people who need help understanding the new products provided. Apart from that, respondents were also unsure about the COVID-19 vaccine, which was considered to have low efficacy and was a Chinese product, and doubted the halal status of the MUI (Nurhayani *et al.*, 2021). It is coupled with research on different populations, namely in the city of Semarang, that most respondents agree that vaccines are unsafe, doubt their effectiveness, and doubt the halalness of vaccines (Arumsari *et al.*, 2021). The halalness of vaccines is a challenge to prove because the majority of Indonesian people are Muslims, and one of the conditions for using any product is that it must be tested and certified halal. Meanwhile, research conducted using an online survey method via WhatsApp showed results regarding anxiety regarding vaccine availability (Putri *et al.*, 2021).

Influence of Close People

Individuals generally listen to input and imitate those closest to them (Wartini & Riyanti, 2018). These characteristics can lead individuals to make bad decisions if they are not wise in determining their role models. Moreover, Indonesian people like to provide invalid information (hoaxes), including COVID-19 vaccination education (Pranesti & Arifin, 2019). Vaccination, a preventive measure for the spread of Covid-19, faces many challenges in its realization. It was motivated by the public's distrust regarding the effectiveness of the COVID-19 vaccine (Woisiri & Hutapea, 2021). This distrust continues to spread through people closest to it until it becomes a community and an action against vaccination (Astuti *et al.*, 2021). People feel anxious, afraid, and depressed and do not believe in the certainty of the vaccination's effectiveness (Andriadi *et al.*, 2021).

The lack of education and teaching regarding COVID-19 vaccination is one of the factors driving the rejection of serial vaccinations by people closest to them. This form of rejection through attachment to those closest to you is found in the Papuan people, who are known to be strongly influenced by culture and those closest to them (Woisiri & Hutapea, 2021). It aligns with the theory that individual subjectivity focuses on a person's judgments and assumptions in supporting actions (Saraswati & Kiswara, 2013). Other research states that the influence of those closest to the family is enormous in contributing to an individual deciding what action to take (Dewi, 2020). All of these are essential points in the community's refusal to vaccinate due to the support of family and those closest to them through the implementation of the Theory of Reasoned Action, which states that a person's subjectivity is a determinant of a person's desire to act based on the beliefs they have which originate from the approval and experience of other individuals (Yzer, 2013).

CONCLUSION

Based on the results of the study, it can be concluded that vaccine rejection factors in Indonesia are influenced by the existence of COVID-19 hoaxes and conspiracies, public knowledge, attitudes

and perceptions of vaccines, doubts and concerns regarding the efficacy, side effects, safety and *Halal* of vaccines, as well as the influence of people closest to them. The advice given is the government is expected provide education and socialization on Covid-19 vaccination to the public so that they can understand the importance of vaccination in preventing Covid-19 and for them to not be influenced by unnecessary information regarding Covid-19 vaccination.

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Cultural Impact on Adolescent Behavior Advancing Health, Gender: A Scoping Review

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ABSTRACT

Background: Sexual and reproductive health is critical to the 2030 Sustainable Development Goals (SDGs). Various factors contribute to premarital sexual behaviour among adolescents, with culture being a pervasive influence in many countries. Adolescents in mountain communities are particularly vulnerable to engaging in premarital sexual behaviour. **Objective:** This review aims to explore research findings related to the cultural factors influencing premarital sexual behaviour among adolescents in general and specifically in mountain communities, contributing to the achievement of the SDGs. **Methodology:** This study employs a scoping review methodology. Search terms used in the articles include MeSH terms ["Adolescent" or "Teen"], ["Cultural impact" or "Cultural Role"], ["Premarital sex" or "Premarital sexual intercourses"], and ["Highland Communities" or "Mountain Communities"]. Databases utilised for article search include Science Direct, Proquest, and PubMed. Five journals published between 2019 and 2023 that meet the inclusion criteria were selected. **Results:** This review synthesises findings from 5 articles, narrowed down from an initial pool of 10,923 articles. All selected papers employ quantitative methods and originate from Ethiopia (3 articles), Nepal, and Tanzania. **Conclusion:** The review highlights the social, economic, and environmental influences on mountain communities, emphasising the cultural roles of alcohol consumption, social norms (customs), and family culture in shaping premarital sexual behaviour among adolescents. Education on the consequences of adolescent sexual behaviour is crucial, especially in cultures that tolerate such behaviours.

Keywords: Cultural Role, Sexual Behaviour, Adolescents, Scoping Review

INTRODUCTION

One of the targets to be achieved in SDGs In 2015, the United Nations replaced the Millennium Development Goals (MDGs) with the Sustainable Development Goals (SDGs) as the new development agenda until 2030. Sexual and reproductive health were initially omitted from the MDGs but were later included following joint advocacy by women's health activists (Newman *et al.*, 2014). Unlike the MDGs, criticised for their reductionist approach to women's health, evident in their narrow goal and target coverage, the SDGs were embraced as an opportunity to achieve a broader healthcare agenda emerging from United Nations conferences in the 1990s (Razavi, 2016).

Adolescent reproductive health and sexual behaviour play a central role in

achieving the SDGs, particularly within Goal 3, which targets health and well-being, and Goal 5, which emphasises gender equality (Alisjahbana and Murniningtyas, 2018). Adolescent sexual and reproductive health is closely tied to the practice of child marriage. Globally, the incidence of child marriage continues to decline. One in every five women aged 20 to 24 marries as a child, compared to nearly one in four a decade ago. This decline is primarily influenced by progress in India, despite having the highest number of child brides globally. Progress is also observed in Bangladesh, Ethiopia, Maldives, and Rwanda (UNICEF, 2021). Although there have been advancements in certain regions, progress has stalled in others. West and Central Africa, known for having the highest prevalence of child marriage, have not achieved significant

progress over the past 25 years (UNICEF, 2023).

This year marks more than halfway towards the deadline for the Sustainable Development Goals (SDGs), and in the context of eliminating child marriage, we face substantial challenges. Despite some positive global progress, it is not occurring quickly enough to achieve the goal of ending child marriage by 2030. At the current rate of progress, an additional 300 years would be required to put an end to child marriage. India alone contributes to one-third of the global number of child brides. Approximately 45 percent of child brides are in South Asia, with sub-Saharan Africa contributing 20 percent, East Asia and the Pacific at 15 percent, and Latin America and the Caribbean at 9 percent (UNICEF, 2023).

The culture or customs of a region, religion, and beliefs can influence the age of marriage. In various developing countries, including Indonesia, there are regions with customs that require young girls to marry older men, leading to many teenage girls getting married. While marrying men may be considered mature, the negative consequences extend to various aspects for young women who are still minors (Rofika and Hariastuti, 2020).

Negative impacts of early marriage are also found in Nepal, where the primary cause of school dropout among children is early marriage (Sekine and Hodgkin, 2017). As for the adverse effects of early marriage on sexual and reproductive health, they manifest after the married couple engages in sexual relations at a young age. Adolescent sexual behaviour is not confined to post-marriage scenarios; premarital sexual behaviour among adolescents also has adverse effects on health (Achen *et al.*, 2021).

A study conducted in Uganda revealed that local culture plays a significant role in premarital sexual behaviour, particularly among adolescent girls in vulnerable communities, with a focus on the pastoralist community in this research (Achen *et al.*, 2021). Adolescents in mountain communities also constitute a vulnerable group engaging in early sexual behaviours. Mountainous regions allow for cultural and geographical isolation, intensifying the influence of local culture compared to lowland communities. Research in Thailand found that culture

has a substantial impact on adolescent sexual practices (Aurpibul *et al.*, 2016).

Therefore, this scoping review aims to provide an overview of the role of culture in premarital sexual behaviour among adolescents in general and in mountain communities, contributing to the achievement of the Sustainable Development Goals (SDGs). This research aims to contribute to a deeper understanding of the cultural influences on premarital sexual behaviour among adolescents and to offer insights for professionals, as well as for future research and interventions.

METHODS

This research employs a scoping review method to explore research findings related to the role of culture in premarital sexual behaviour among adolescents and mountain communities for the achievement of SDGs. The scoping review methodology involves five key steps: (1) Identifying research questions, (2) Identifying relevant studies, (3) Selecting appropriate studies, (4) Organizing and recording collected data, and (5) Summarizing findings and drawing conclusions.

2.1. Identifying Research Questions

In the first step, two research questions related to the role of culture in adolescent sexual behaviour and mountain communities were identified for this scoping review. Articles were selected and searched to address these questions.

2.2. Identifying Relevant Studies

In this step, a systematic search was conducted on three electronic databases - Science Direct, ProQuest, and PubMed - to identify potentially relevant analyses. The search was conducted from November 23 to 24, 2023. The keywords used for this search included MeSH terms ["Adolescent" or "Teen"], ["Cultural impact" or "Cultural Role"], ["Premarital sex" or "Premarital sexual intercourse"], and ["Highland Communities" or "Mountain Communities"].

2.3. Selecting Appropriate Studies The third step involves selecting suitable studies.

Journal articles that complied with the following inclusion criteria

were considered: (1) studies published between 2019 and 2023, (2) original research articles, (3) articles with free access, and (4) studies published in journals. Studies that did not meet these criteria were excluded from consideration—the next phase involves organising the collected data.

2.4. Organizing and Recording Collected Data

Titles and abstracts of articles that met the inclusion criteria were then extracted. A comprehensive evaluation included the title, abstract, research objectives, research methodology, and study findings.

2.5. Summarizing Findings and Drawing Conclusions

The final stage involves presenting the main findings from the reviewed literature and formulating conclusions. This stage includes summarising key findings, organising

them into logical categories, drawing conclusions related to research questions, highlighting research limitations and gaps, discussing practical implications, and providing recommendations for future research. This is a crucial phase in the scoping review as it synthesises the collected information and contributes to a deeper understanding of the reviewed topic. The researchers identified seven relevant articles selected for this scoping review.

Relevant studies were found using search strings and keywords in three online databases: ScienceDirect, ProQuest, and PubMed. To refine the search string, Boolean OR and AND operators were utilised. Table 1 shows the search string and keywords used.

Table 1. Search string/keyword

Database	Search string/keyword
ScienceDirect	["Cultural impact" OR "Cultural Role"] AND ["Premarital sex" OR "Premarital sexual intercourses"] AND ["Adolescent" OR "Teen"] AND ["Highland Communities" OR "Mountain Communities"]
ProQuest	(Cultural impact OR Cultural Role) AND (Premarital sex OR Premarital sexual intercourses) AND (Adolescent OR Teen) AND (Highland Communities OR Mountain Communities)
Pubmed	["Cultural impact" OR "Cultural Role"] AND ["Premarital sex" OR "Premarital sexual intercourses"] AND ["Adolescent" OR "Teen"] AND ["Highland Communities" OR "Mountain Communities"]

RESULTS AND DISCUSSION

The search yielded 10,923 articles based on predefined keywords, comprising 5,036 from Science Direct, 5,820 from ProQuest, and 67 from PubMed. These articles underwent a systematic screening process. In the initial screening, articles published within the last five years were retained, excluding 8,937 articles. Subsequent screening involved the removal of 836 inaccessible articles, 703 non-journal articles, 110 review articles, and one duplicate, leaving 336 articles eligible for further assessment.

During the subsequent screening of titles and abstracts, 326 articles were excluded due to their limited relevance to the research topic. Additionally, five

additional articles were excluded because their content did not align with the research questions. Therefore, only five articles met the criteria for the research and the posed research questions. All five articles shared a quantitative research design.

Regarding the geographical focus of the research, one article was conducted in Asia, specifically in Nepal (Roxburgh *et al.*, 2021), while the remaining four articles were conducted in Africa, specifically in Tanzania (Marah *et al.*, 2023) and Ethiopia (Belay *et al.*, 2020; Mengistu *et al.*, 2022; Toru *et al.*, 2022). The search and literature selection process is visually represented in Figure 1. A summary of the five articles is presented in Table 2.

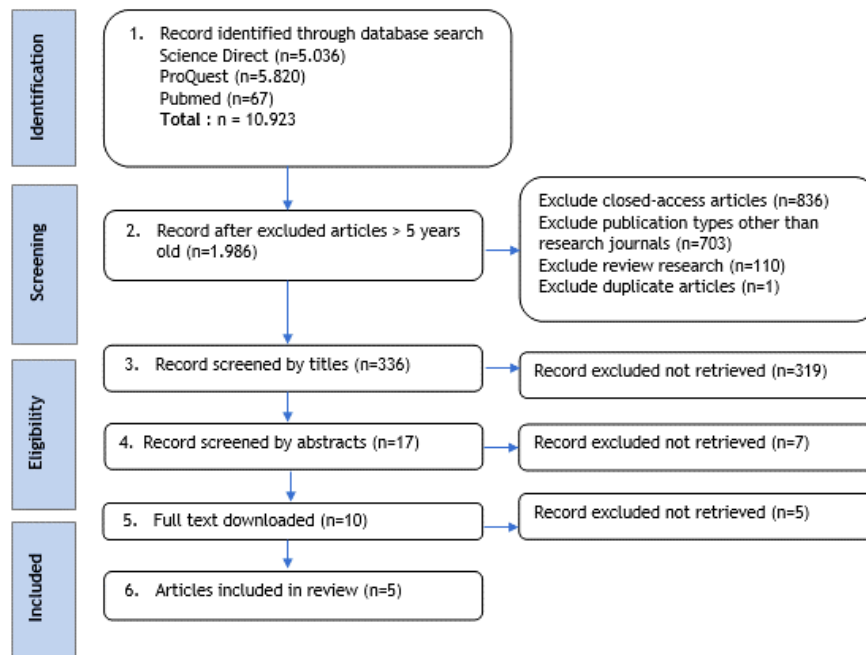


Figure 1. Flow diagram of scoping review

Table 1. Literature matric of accepted articles

No	(Author., Year of publication)	Purpose	Sample	Result
1.	(Roxburgh et al., 2021)	To investigate the impact of various stress triggers on mountain communities.	Social, economic and environmental data are obtained from rural communities, especially mountain communities.	The results showed that mountain communities' social, economic, and environmental changes occur rapidly.
2.	(Mengistu et al., 2022)	To determine the factors of premarital sexual behaviour among students of social science streams in Ethiopia	Data was obtained by 414 students from the Department of Accounting and Finance, Department of Economics, Department of Management, and Department of Marketing.	Student majors, living arrangements, sexual health education, and alcohol consumption culture influence premarital sexual practices among students.
3.	(Marah et al., 2023)	To compare experiences of parental violence in childhood and sexual permissiveness in adolescence between adolescents raised by multiple parents and adolescents raised by single parents.	Data were obtained from 1037 students from different backgrounds (single-parent and multiple-parent families).	A significant and positive correlation was found between parental violence and sexual permissiveness. There were also significant average differences in experiences of parental violence and sexual permissiveness between adolescents from different family types. In addition, the average sexual permissiveness in men is higher than adolescent girls of the same family type.
4.	(Belay et al., 2020)	To assess unwanted pregnancies and related factors among	Data was obtained from filling out questionnaires by 389	In this study, the prevalence of unwanted pregnancies is relatively high among

	unmarried female students at Bahir Dar University, North West Ethiopia.	unmarried students.	unmarried female University students. Unwanted pregnancy is determined by the source of money, field of study and age of first having sexual intercourse.
5. (Toru <i>et al.</i> , 2022)	To assess parent-adolescent communication on sexual and reproductive health issues and related factors among high school and preparatory students in Arekit, southwestern Ethiopia.	A total of 522 participants were involved in this study. Study participants were selected using a multistage sampling procedure. First, children were divided into strata by grade (9-12).	Based on the findings of this study, although parents are aware of adolescent and even teen-friendly sexual and reproductive health services, adolescents and parents do not generally communicate about sexual and reproductive health issues.

3.1. Sexual Behaviour in Mountain Communities

3.1.1. Social Change

Social change in mountain communities can change rapidly (Roxburgh *et al.*, 2021). Shifts in values or norms, such as views of social norms about adolescent sexual behaviour, can affect adolescent premarital sexual behaviour. Social views on dating culture are also very influential in adolescent premarital sexual behaviour. A study found that dating styles follow trends and can change following existing cultural cultures. Teenagers who do not follow the trending dating style will be considered crummy (Putri, 2016).

3.1.2. Economic Changes

Economic changes, such as increases or decreases in income, can create stresses or opportunities that can affect sexual behaviour. Economic uncertainty can trigger early marriage decisions or finding alternative sources of income, which in turn can affect sexual dynamics within society –in a study suggested that when the economic level of adolescents is very high, adolescents become accustomed to living luxuriously and enjoying everything quickly without restrictions from parents will result in adolescents likely to rebel. This rebellion can be a search for things that interest him. If adolescents have become antisocial and have a terrible environment, the possibility of engaging in premarital sexual behaviour is very high (Yani *et al.*, 2020).

3.2. The Role of Culture in Adolescent Premarital Sexual Behaviour

3.2.1. Drinking Culture

Adolescents who are being affected by alcohol cannot think long and control their behaviour, especially in this case, sexual behaviour. Premarital sexual behaviour of adolescents has a greater possibility if the teenager consumes alcohol (Putra, Cahyo and Widagdo, 2018). Research in Thailand has found that the culture of drinking alcohol is closely related to adolescent premarital sexual behaviour. Alcohol consumption allows people to more easily violate existing social and traditional norms (Aurpibul *et al.*, 2016).

3.2.2. Social Norms (Customs and Traditions)

The research conducted in rural areas of Uganda involves customary bridal capture, which allows for the possibility of premarital sexual engagement. Within their community, premarital sexual behaviour is perceived as acceptable. Marriage is the primary objective, as viewed by this community, making premarital sexual behaviour considered permissible and even seen as a form of engagement (Achen *et al.*, 2021). Social norms in Indonesia broadly do not endorse premarital sexual behaviour. Nevertheless, in certain regions, there remains a degree of acceptance towards premarital sexual behaviour, and this practice persists within society (Wahyuningsih *et al.*, 2019).

3.2.3. Family Culture

Family culture proved to be one of the most influential factors in adolescent premarital sexual behaviour. Adolescent attitudes towards premarital

sexual behaviour are shaped by family culture. Family cultures that reject premarital sex are less likely to engage in premarital sexual relations. Conversely, families that are more permissive to premarital sexual behaviour have a higher likelihood for adolescents in those families to engage in premarital sexual behaviour (Putri, 2016). The best information a teenager needs is sexual information that comes from the family. The correct information will have a positive impact because adolescents can avoid sexual behaviour if they understand the long-term impact that occurs due to premarital sexual behaviour (Fauzia and Taufik, 2022).

Families who communicate about sexual behaviour can also minimise the occurrence of premarital sexual behaviour in adolescents (Rusmilawaty *et al.*, 2016). In reality, parent-child communication about sexual behaviour is rare because it is associated with taboo terms. Shame about talking about sexual problems and parents' concern that information about sexual problems will be a way for adolescents to learn and practice sexual behaviour results in the absence of communication of sexual problems in the family (Isaksen *et al.*, 2020).

CONCLUSION

Sexual and reproductive health is one of the Sustainable Development Goals (SDGs). Various cultural roles lead to adolescent premarital sexual behaviour. Social changes, including shifts in values and norms, can affect views on adolescent sexual behaviour. Economic changes, such as increases or decreases in income, can create pressures or opportunities that affect sexual behaviour. Culture also plays an important role, as does the drinking culture associated with adolescent premarital sexual behaviour. Social norms, such as customs in rural areas of Uganda that allow sex engagement, also play a role in shaping society's view of premarital sexual behaviour. Family culture proved to be a critical factor in shaping adolescent attitudes towards premarital sex, with family communication considered an essential element in minimising premarital sexual behaviour. However, this communication is often hampered by stigma and parental

concern about talking about sexual issues with their children. As necessary information, family communication can minimise the occurrence of premarital sexual behaviour in adolescents.

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A Systematic Review of the Impact of COVID-19 on Children's Outcomes

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ABSTRACT

Background: The COVID-19 pandemic has had an impact on the health of children. Nurses and healthcare professionals should know the latest information regarding the impact of Covid-19 on children. **Objective:** This literature review aims to identify the impact of COVID-19 on children's outcomes. **Method:** This literature study uses the narrative review method. CINAHL, PubMed, Proquest, Science Direct, and Google Scholar were used to conduct the literature search. The keywords used are "Children" AND "Coronavirus Disease 2019" OR "COVID-19" AND "Impact" OR "Effect". The articles used were subjected to critical assessment. Seven quantitative research articles were reviewed in this literature study. **Results:** This study shows that the COVID-19 pandemic has impacted children's health and education. In terms of health, COVID-19 causes changes in physical activity to more sedentary behavior, delayed immunization, a negative impact on the mental health of children and adolescents, and children with special needs health. In the education aspect, COVID-19 has brought about a transformation in the field. **Conclusion:** The ongoing COVID-19 pandemic makes assessing the short- and long-term effects on children difficult. The need to conduct further research will benefit nurses and healthcare professionals in providing appropriate nursing services to children and families.

Keyword: Children, coronavirus disease-2019 (COVID-19), effect, impact

INTRODUCTION

Severe Acute Respiratory Syndrome-Corona Virus-2 (SARS-CoV-2) appeared in Wuhan on December 31, 2019. The World Health Organization (WHO) (2020) refers to the disease caused by SARS-CoV-2 as Coronavirus Disease-2019 (COVID-19). World Health Organization data show that the number of cases outside China has increased 13-fold, and the number of affected countries has tripled in the two weeks since COVID-19 was discovered. On March 11, 2020, there were more than 118,000 cases in 114 countries, and 4,291 people died as a result of the Covid-19 disease outbreak. WHO has been monitoring the outbreak around the clock and is deeply concerned by the alarming rate of spread. The World Health Organization stated that Covid-19 could be classified as a

pandemic (World Health Organization, 2020).

Global political, financial, and technical resources have been mobilized to combat the COVID-19 pandemic (Khetrapal & Bhatia, 2020). The pandemic's impact is affecting all aspects of human life and slowing all developmental activities, including the achievement of the Sustainable Development Goals (SDGs), particularly the third (ensuring healthy lives and promoting well-being for all ages) and fourth (quality education) goals. Overcrowding in hospitals and health facilities due to COVID-19 makes it difficult for other patients with acute or chronic illnesses to receive standard care (Habibi & Pratama, 2021). In addition to combating the COVID-19 pandemic, national authorities must plan for challenges related to the health of their

population. Priority should be given to critical areas that address the needs of vulnerable groups, including children and others with special needs (Khetrapal & Bhatia, 2020). Public health activities are equally important in protecting communities' health, keeping them engaged in disease prevention, and leading healthy and productive lives. Any sudden disruption in the seamless delivery of health services, whether caused by man or natural disaster, has the potential to impact the majority of essential services severely. The COVID-19 pandemic has significantly impacted ongoing health programs, curative services, and SDG 3 achievement (Khetrapal & Bhatia, 2020).

The COVID-19 pandemic has had an impact on the health of children. Beginning with limiting patient admissions to hospitals and general health services unrelated to the COVID-19 emergency, becoming a part of the pandemic management strategy will have additional pandemic consequences on children who require routine care (Pasca *et al.*, 2020). According to the findings of a study conducted by Papadopoulos and Custovic (2020), pediatric asthma clinics are one of the healthcare services that the COVID-19 pandemic has significantly impacted. Other consequences include limiting the number of new patients and the number of patients monitored. Furthermore, the strategy of closing schools to prevent the spread means that children with disabilities, particularly cerebral palsy, do not have access to school or therapy (Ashikkali, Carroll, & Johnson, 2020).

According to Liu *et al.* (2020), the COVID-19 pandemic had a psychological impact on children subjected to quarantine at home to slow the spread of COVID-19. Children quarantined at home with their parents will experience stress due to the abrupt change in activity, but it will likely pass more quickly. Children who have been separated from their parents because they have been infected or are suspected of being infected with COVID-19 are quarantined in local hospitals, and children who have parents who are unable to work or who still have to work outside the home require special care. These children may be more vulnerable to mental health problems due to an increased risk of infection, as well as sadness and fear caused by the loss or separation of a parent. According to Go *et*

al. (2020), as the pandemic continues, it is critical to support children in dealing with the grief of separation and the problems associated with parents not working or loss of household income.

The COVID-19 pandemic has also impacted achieving SDG 4, which is quality education, particularly for children. Education is a critical foundation for achieving the other SDGs. Achieving the seventeen SDG goals without adequate knowledge and expertise is difficult (Lekagul *et al.*, 2022). According to SDG 2030, there are seven targets to achieve to ensure inclusive, equal-quality education that supports lifelong learning opportunities for all (International Council of Nurses, 2017). Unfortunately, the COVID-19 pandemic emerged in 2020, posing a significant challenge to the government's ability to meet its targets. COVID-19 has an impact on the global closure of children's schools.

According to data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO), 130 countries closed schools in 2021, either nationally, regionally, or locally, as part of policies to slow the spread of COVID-19 (United Nations Educational, Scientific and Cultural Organization, 2021). Although the current school closure differs from school holidays, learning continues digitally. School closures are likely to exacerbate learning gaps for children from low-income families who cannot afford computers and cell phones with reliable internet connections.

Meanwhile, children from wealthy families may be able to continue their education without interruption. Aside from that, children may face psychological stress because they are unable to interact directly with their classmates at school. As a result, if nothing is done, the current health crisis may escalate into a social crisis with long-term consequences for children (Van Lancker & Parolin, 2020). According to research conducted by Lu *et al.* (2020), research must continue to discover other impacts experienced by children to provide evidence-based care for children.

Public health activities are an equally important arm of the health system in protecting the health of communities and keeping them engaged in preventing diseases and leading healthy

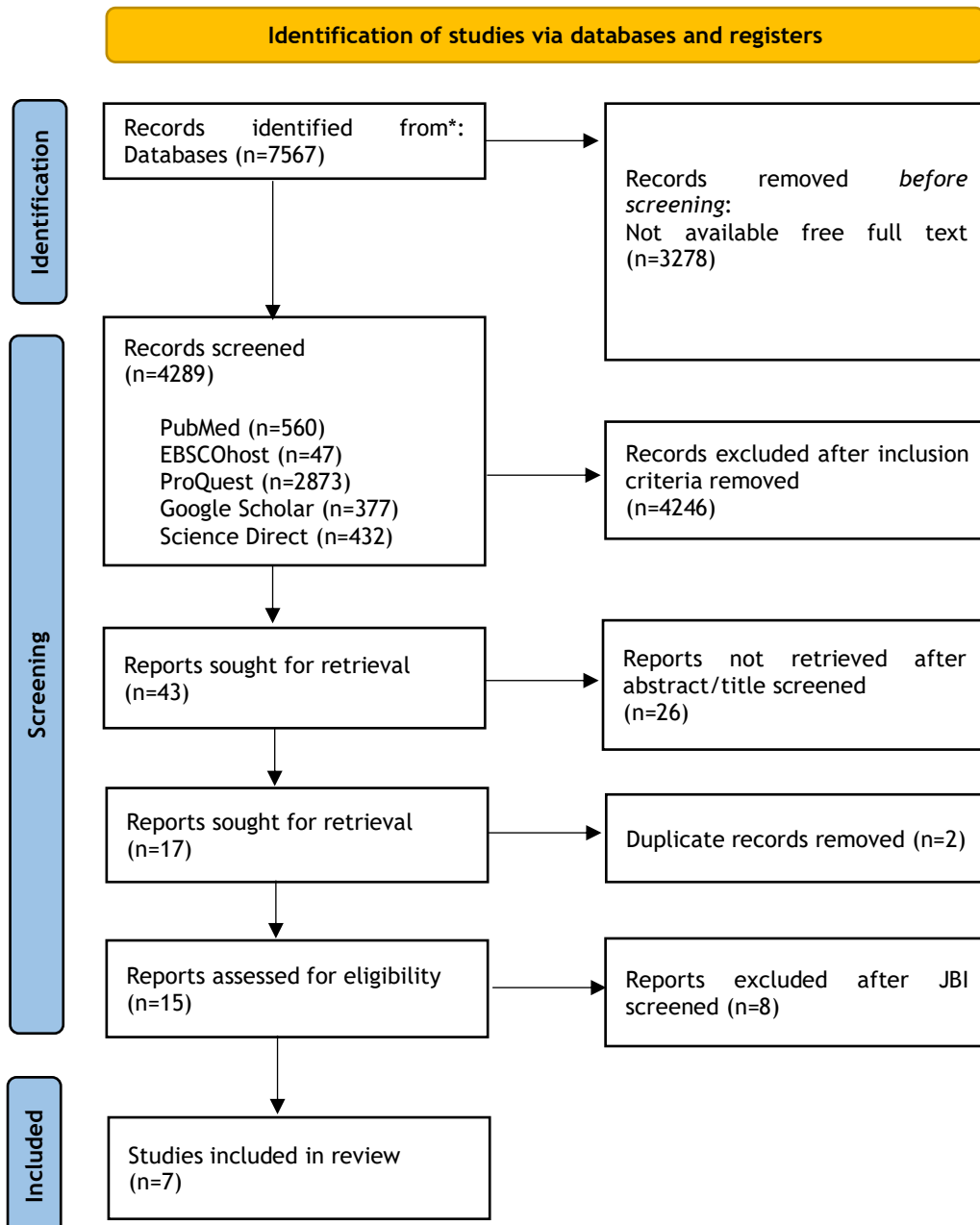
and productive lives (American Public Health Association, 2013). Any sudden man-made or natural disaster-induced disruption in the seamless delivery of health services has the potential to impact most essential services severely. The COVID-19 pandemic has severely impacted the ongoing health programs, curative services, children's education, and achievements of SDG 3 and SDG 4. Nursing can also contribute to SDG research and policies, strengthening its position as an active voice and developing a prominent role in achieving the goals (Edmonds *et al.*, 2020).

Nurses and the Nursing profession have opportunities to contribute more meaningfully to the SDGs (Costa *et al.*, 2023). Public health nurses who work with individuals and families do so in the context of a population focus—applying a systems perspective to factors that impact health, such as preventing the negative impact of pandemic conditions in achieving SDGs 3 and 4, particularly among children. Nurses can provide appropriate nursing care to children in pandemic situations. Nurses can work with other health professionals to promote adequate support systems for children and families during the pandemic (Peck, 2020). This systematic review aimed to identify the impact of COVID-19 on children's outcomes. This systematic review will benefit the field by providing evidence for the effect of the COVID-19 pandemic on children's health, allowing

nurses and health workers to mitigate and provide appropriate interventions for children and families.

METHODS

This literature review employed the narrative review method. This study followed Gopalakrishnan and Ganeshkumar's (2013) steps: identifying research questions, reviewing the literature, sifting studies to select relevant ones, assessing the quality of investigations, identifying outcome measures for each, and summarizing and reporting results. The literature search used several databases, including CINAHL, PubMed, Proquest, Science Direct, and Google Scholar. The keywords used are ("Children") AND ("Coronavirus Disease 2019" OR "COVID-19") AND ("Impact" OR "Effect"). The inclusion criteria were that the article discussed the impact of COVID-19 on children, that it was published within the last three years (2019-2022), that the participants were children aged 0-18 years, that it was written in Indonesian and English, and that the full text was available. Meanwhile, books, news, encyclopedias, and review articles that do not meet the inclusion criteria are excluded from this literature study. The articles that were used were assessed critically. This literature review found seven articles that met the criteria. Scheme 1 depicts the stages of the literature search.



Scheme 1. Stage of Narrative Review

RESULTS

The search gathered a total of 7567 articles. After filtering the article's availability, 4289 articles remained. Furthermore, after screening for title,

abstract, and duplicate, 15 articles remained. The remaining articles were evaluated using the JBI Critical Appraisal Tool, and seven articles were included in this study after assessing the whole article.

Table 1. The primary feature of the included studies

Author, Years	Country	Aim	Study Design	Sample Characteristic	Intervention	Outcomes	Tools	Measurement time	Results
(Alsuhaibani & Alaqeel, 2020)	Saudi Arabia	This study aimed to identify the prevalence of delayed immunization during the COVID-19 pandemic in the Qassim region of Saudi Arabia.	Cross-sectional Study	Parents who had a child under two years old from March 1 to June 30, 2020 (n = 749)	Participants were asked to complete a questionnaire and recorded on a 5-point Likert Scale from "strongly disagree" to "strongly agree."	Prevalence and reasons for delays in childhood vaccination	Self-administered questionnaire	- May 1 - June 30, 2020 - Two steps validation	About 73.2% of participants had an appointment scheduled for vaccination during the COVID-19 pandemic, and 23.4% reported a delay of more than one month. The most common reason for delayed vaccination was fear of being infected by COVID-19 (60.9%). In conclusion, COVID-19 affected childhood immunization in Saudi Arabia.
(Colizzi et al., 2020)	Italy	To investigate the impact of the COVID-19 pandemic on ASD individuals and to narrative characterize their needs.	Online Parent Survey	Parents and guardians of individuals with ASD diagnosis (n = 527)	Parents and guardians of individuals with an ASD diagnosis were asked by healthcare professionals affiliated with Veneto Autism Spectrum Disorder Regional Centre to fill out an online survey	Psychosocial and behavioral impact of the emergency outbreak, predictors of emergency outbreak negative impact on well-being, and needs to deal with the emergency	Self-administered questionnaire	April 6 - April 20, 2020	The COVID-19 emergency resulted in a challenging period for 93.9% of families, increased difficulties in managing daily activities, especially free time (78.1%) and structured activities (75.7%), and, respectively, 35.5% and 41.5% of children presenting with more intense and more frequent behavior problems. Behavior problems predating the COVID-19 outbreak predicted a higher risk of more intense (odds ratio (OR) = 2.16, 95% confidence interval (CI) 1.42-3.29) and more frequent (OR = 1.67, 95% CI 1.13-2.48) disruptive behavior. Even though ASD children were receiving different types of support, also requiring specialist (19.1%) or emergency (1.5%) interventions in a relatively low proportion of cases, several needs emerged, including receiving more healthcare support (47.4%),

Author, Years	Country	Aim	Study Design	Sample Characteristic	Intervention	Outcomes	Tools	Measurement time	Results
(Kagadkar <i>et al.</i> , 2020)	Bangladesh	To explore the impact of COVID-19 on the mental health during lockdown in Bangladesh	Cross-sectional Study	Parents having children aged 5 to 15 years in Bangladesh after completing 30 days of lockdown (n = 384)	The data was collected using an online questionnaire; a Google form link was sent to parents.	Mental health-related information of the child.	Revised Child Anxiety and Depression Scale (RCADS) and Generalized Anxiety Disorder (GAD)	April 25 to May 9, 2020	especially in-home support (29.9%), as well as interventions to tackle a potentially disruptive quarantine (16.8%) Children were classified into four groups where 43% of the children had subthreshold mental disturbances (mean Major Depressive Disorder (MDD)-10; 2.8), 30.5% had mild (mean MDD-10; 8.9), 19.3% suffered greatly (mean MDD-10; 15.9), and 7.2% of child suffered from severe disturbances (mean MDD-10; 25.2). The higher percentage of mental health disturbances in children with a higher education level of parents, relatives infected by COVID-19 (yes), parents still need to go to the workplace (yes), and parents with abnormal behavior but lower than their counterparts.
(Duan <i>et al.</i> , 2020b)	China	To demonstrate the psychological effects on children and adolescents associated with the epidemic.	Cross-sectional Study	Children aged 7 to 18 years (n = 3613)	Questionnaire Star was used with the help of the education bureau to distribute the questionnaire to teachers.	Psychological aspects of children and adolescents	- Questionnaire Star website - Spence Child Anxiety Scale (SCAS) - The Child Depression Inventory - Short Version of	April 25 - May 16, 2020: The survey was conducted twice within 6 - 12 months, with 20 minutes each session.	The anxiety levels of children and adolescents were (23.87 ± 15.79) and (29.27 ± 19.79), respectively. 22.28% of respondents were suffering from depressive symptoms. Seven significant factors are associated with increased levels of anxiety, including females, residents in urban regions, and emotion-focused coping styles. Nine factors related to increased levels of depression, such as smartphone addiction (OR 1.411, 95% CI 1.099-1.180), Internet addiction (OR 1.844, 95% CI 1.209-2.811), and

Author, Years	Country	Aim	Study Design	Sample Characteristic	Intervention	Outcomes	Tools	Measurement time	Results
							Smartphone Addiction Scale (SV-SAS) - Internet Addiction Scale - Coping Style Scale		residence in Hubei province (OR 3.107, 95% CI 1.252-7.708). Two additional factors associated with decreased levels of depressive symptoms: hours spent on the Internet per day before the epidemic (OR 0.652, 95% CI 0.609-0.697) and a tendency to apply problem-focused coping style (OR 0.937, 95% CI 0.923-0.951).
(Dunton <i>et al.</i> , 2020)	United States of America	To examine the effects of the COVID-19 pandemic on physical activity and sedentary behavior in children.	Prospective Survey Design	18 years old or older, able to speak English, live in the USA, is a parent or legal guardian of a child between the ages 5-13, greater than or equal to 50% of the child's custody resides with the parent or legal guardian, and planned parental custody for the next 12 months	Parents completed a measure of their child's previous day. Physical activity was created to capture non-school-based activities frequently occurring during COVID-19, modeled upon the structure and format of last-day physical activity measures used in youth.	Physical Activity and sedentary behavior in children	The Youth Compendium of Physical Activities	Once (after questionnaire)	From parent reports, children (N = 211) (53% female, 13% Hispanic, Mage = 8.73 [SD = 2.58] years) represented 35 states and the District of Columbia. The most common physical activities during the early COVID-19 period were free play/unstructured activity (e.g., running around, tag) (90% of children) and going for a walk (55% of children). Children engaged in about 90 minutes of school-related sitting and over 8 hours of leisure-related sitting daily. Parents of older children (ages 9-13) vs. younger children (ages 5-8) perceived more significant decreases in physical activity and greater increases in sedentary behavior from the pre- to early-COVID-19.
(Moore <i>et al.</i> , 2020)	Canada	To examine the immediate	Cross-sectional	Canadian parents of children aged 5-11 years old and	The participants were asked to	Health behavior in children and	Online questionnaire	Twice (before and after)	Only 4.8% (2.8% girls, 6.5% boys) of children and 0.6% (0.8% girls, 0.5% boys) of youth met combined

Author, Years	Country	Aim	Study Design	Sample Characteristic	Intervention	Outcomes	Tools	Measurement time	Results
		impact of the COVID-19 pandemic on movement and play behavior in children and youth.	Study	youth aged 12-17 years old (n = 1472)	compare their child's behavior before and during the COVID-19 outbreak.	youth		survey)	movement behavior guidelines during COVID-19 restrictions. Children and youth had lower physical activity levels, less outside time, higher sedentary behavior (including leisure screen time), and more sleep during the outbreak. Parental encouragement and support, parental engagement in PA, and family dog ownership were positively associated with healthy movement behaviors.
(Zhao <i>et al.</i> , 2020)	China	To assess the effects of COVID-19 and prepare for an educational approach.	Not mentioned	Teacher, parents, and students of grades 1-9 (n = 2010)	The survey about home-schooling-related questions was delivered separately to students, teachers, and parents.	Interest, interaction in class, feelings, physical discomfort, screen time, outdoor activity time, sleeping time, and schooling time preference	Online questionnaire	7 - 13 March 2020	We found that 76% of the respondents thought the homeschooling style was acceptable. However, teachers were concerned that students' interests, focus, and academic performance would decline. Sixty-nine percent of the parents reported their children had more than 3 hours of daily screen time, and 82% of students had less than 2 hours of daily outdoor activity. Ninety-five percent of the parents were concerned about their children's eyesight. Additionally, 17.6% of the students were suspected to have emotional or behavioral problems according to the parent-rated Strengths and Difficulties Questionnaire (SDQ) results. The Self-Rating Anxiety Scale (SAS) results of parents and teachers showed higher levels of anxiety than usual.

Characteristics of Studies

According to Table 1, most studies were conducted in Asia and America. There are four studies from Asia, including China (two), Bangladesh (one), and Saudi Arabia (one). America is represented by two articles: one from the United States and one from Canada. Meanwhile, one article from Europe, specifically Italy, is available. This study divided participants into three groups: parents, children, and teachers. All seven articles involve parents or guardians as participants, three include children, and one involves teachers. The participants' ages ranged from 7 to 40 years. The number of participants in the study ranged between 384 and 3613, with the article written by Kagadkar *et al.* (2020) having the fewest participants and the article written by Duan *et al.* (2020) having the most. Table 1 shows the characteristics of the included studies.

Impact for children

The impact of the COVID-19 pandemic has been discussed in 7 studies. The included studies consist of 5 cross-sectional studies (Moore *et al.*, 2020; Alsuhaibani and Alaqeel, 2020; Duan *et al.*, 2020; Yeasmin *et al.*, 2020; Zhao *et al.*, 2020); one prospective study (Dunton, Do, & Wang, 2020) and one survey study (Colizzi *et al.*, 2020). COVID-19 has a broad impact on children, including aspects of health and education. Table 1 shows that the impact of COVID-19 on children includes the impact of COVID-19 on their health and education.

DISCUSSION

The Impact of COVID-19 on Children's Health

Physical Activity and Sedentary Behavior

Moore *et al.* (2020) discovered that children and adolescents became less active after the COVID-19 pandemic, playing outside less frequently, engaging in more sedentary activities, engaging in more recreational screen-based activities, and sleeping more during the initial Covid virus pandemic compared to before the pandemic. Adolescents (12-17 years) are less active than children (5-11 years), and girls are less active than boys. According to research conducted in the United States by Dunton, Do, and Wang (2020), younger children (aged 5-8) are more

likely to engage in free play/activities. Children spent the most time watching television/videos/films, sitting while directly gathering with friends or family, doing school-related work, and playing computer or video games at the start of COVID-19. Surprisingly, on assessment days (weekdays and weekends combined), school-related sedentary time, which includes school-related video calls and doing school-related work, accounted for only about 90 minutes. Sitting for leisure activities, on the other hand, accounted for more than 8 hours of sitting time on the assessment day (Dunton, Do & Wang, 2020).

Overall, the two studies show that during the early period of COVID-19, children spent their unstructured free time doing sedentary rather than physical activity. During the COVID-19 pandemic, sedentary behavior may worsen, putting children at greater risk of health problems due to less physical activity and unhealthy weight gain due to school closures. According to Storz (2020), childhood obesity can be caused by sedentary or passive behavior, increased screen time, poor eating patterns, and irregular sleep.

Immunization

According to Alsuhaibani and Alaqeel (2020), the COVID-19 pandemic has impacted the timeliness of child immunization in Saudi Arabia's Qassim region. A two-week delay in vaccination was reported by 47.8% of parents. Significant delays of more than one month occurred in 23.4% of cases. However, 52.2% of parents said that scheduled vaccines were administered on time or within two weeks of the due date, and 73% of parents are aware of the Department of Health's immunization recommendations. Fear of contracting COVID-19 was cited as the primary reason for parents postponing vaccination, followed by time constraints (11.6%) and scheduling difficulties (9.2%). Other reasons given by parents included vaccination season travel, vaccine shortages, or clinic closures (6.7%). Because they were afraid of contracting COVID-19, 36.6% of parents preferred to vaccinate their children at home, 35.1% in primary healthcare facilities dedicated solely to vaccination, and only 17.8% said they would continue to receive future vaccinations (Alsuhaibani & Alaqeel 2020).

Mental Health

The government has implemented disease control measures such as school closures, social distancing, and home quarantine in response to the COVID-19 pandemic. Children and adolescents are physically isolated from peers, teachers, extended family, and community networks for extended periods, which may have an impact on their mental health (Loades *et al.*, 2020). Yeasmin *et al.* (2020) conducted a study in Bangladesh to examine the impact of mental health on children's depression, anxiety, and sleep disorder scores, which are divided into four categories (sub-threshold disorders, mild, moderate, and severe disorders). According to the study's findings, the majority of children's mental health disorders, 43%, are below the threshold. It should be noted, however, that 30.5% of children had mild disorders, 19.3% had moderate disorders, and 7.2% had severe disorders.

Yeasmin *et al.* (2020) discovered that the higher the parents' education, the number of parents who still work, and the risk of losing their jobs, the higher the scores for children's depression, anxiety, and sleep disorders. Even during the Bangladesh lockdown, educated parents, particularly government officials, are hard at work. As a result, parents cannot schedule time to communicate with their children based on their specific needs. Children who live in cities are also more likely to suffer from mental health issues than children who live in rural areas. According to Anwar *et al.* (2020), this could be due to stricter city regulations forcing children to stay home.

Meanwhile, children in rural areas can move around and play with their peers more freely. Yeasmin *et al.* (2020) discovered that 35.7% of the children's parents had bachelor's degrees in the severe disorders group. Furthermore, children from urban families had a higher total score for depression, anxiety, and sleep disorders (63.3%). Meanwhile, the score for depression, anxiety, and sleep disorders in rural areas was 36.7% (Yeasmin *et al.*, 2020). Children and adolescents, according to Singh *et al.* (2020), will suffer more mental health consequences during the pandemic and lockdown than adults. (Duan *et al.*, 2020a) Duan *et al.* (2020) discovered that 22.28% of the children had scores above

the threshold for clinical depression symptoms (19 or higher). Furthermore, Duan *et al.* (2020) investigated respondents' current anxiety situation based on coping styles by gender and age variables, and the results revealed that teenagers' anxiety levels were significantly higher than children's ($p=0.01$).

Children with Special Needs's Health

Children with disabilities are more vulnerable to the pandemic's negative mental health consequences because they may lack an understanding of the reasons for pandemic-related changes, such as disruptions in routines and school closures (Aishworiya & Kang, 2020). According to the findings of a study conducted in Italy by Colizzi *et al.* (2020), behavioral problems were reported more intensely and frequently in children with Autism Spectrum Disorder (ASD) than before the pandemic. Emergency contact with a pediatric neuropsychiatrist was required in 19.1% of cases due to behavioral issues, while access to the hospital due to accident and emergency occurred in 1.5% of cases. Parents reported having difficulty managing their children's eating (23%), autonomy (31%), free time (78.1%), and structured activities (75.7%). Many parents reported that all activities were more complicated than before the pandemic.

During the pandemic, 27.7% of parents with children with ASD received support from the local health service, with the majority reporting both direct (70.1%, e.g., calls, video calls) and indirect (84%; e.g., messages, texts, homework) support, as well as support from schools and private therapists (73.3%). Only 2.2% of parents found each type of support beneficial during an ongoing emergency (Colizzi *et al.*, 2020). Among the 527 parents who participated in the study, 77% reported at least one need that could assist parents of children with ASD in dealing with ongoing emergencies. Home healthcare support was the most frequently reported need (29.9%), followed by center-based healthcare support (10.4%), easing quarantine restrictions (9.7%), ending lockdown (7.1%), and healthcare support in hospitals (7.1%) (Colizzi *et al.*, 2020).

The Impact of COVID-19 on Children's Education

The COVID-19 pandemic has also impacted education globally, with school closures aimed at reducing COVID-19 spread. According to a UNICEF report from April 2020, 188 countries were implementing national closures, and more than 1 billion children were at risk of being left behind due to school closures. Many countries have implemented distance education programs or online homeschooling to keep the world's children learning. However, transitioning from a traditional educational environment to distance and virtual learning will take time (Fitri *et al.*, 2020). The rapid transformation has created several obstacles and challenges (Adnan & Anwar, 2020). According to Duan *et al.* (2020), respondents reported that the pandemic impacted their learning and graduation. It could be caused by a long absence from a structured school setting, disrupting routines, boredom, and a lack of innovative ideas for engaging in various academic and extracurricular activities (Singh *et al.*, 2020).

According to Zhao *et al.* (2020), in China, 55.6% of students were interested in a homeschooling learning style at the start of the pandemic. However, only 37.7% of them could actively interact with teachers and classmates during online classes. In contrast to the questionnaire results, 74.3% of teachers felt they could interact with their students during online courses. However, the percentages decrease with the student's grade level, with 80.5%, 76.3%, and 60.4% in grades 1-3, 4-6, and 7-9, respectively. Furthermore, 35.2% of teachers believe this homeschooling style will increase their students' interest in learning; however, this percentage decreases with the student's grade level. Parents thought there was insufficient interaction during online classes. A total of 77.4% of parents believed that their children focused on learning during online courses, and this percentage increased as students progressed in grade.

Online class monitoring is considered necessary by 50% of parents (Zhao *et al.*, 2020). Homeschooling can make it difficult for parents to keep track of their children. Parents are compelled to homeschool their children to ensure the continuity of their children's

education. It is an additional burden for them, who are already dealing with issues like working from home or being out of work due to the pandemic and household chores. Many parents do not have the time or educational qualifications to assist their children with tasks that their teachers previously handled. It is likely to cause parental frustration, fatigue, and disruptions in their children's academic activities, resulting in stress for both parents and children (Mahapatra & Sharma, 2020). According to Zhao *et al.* (2020), classroom-based schools are preferred by 83.5% of students over homeschooling, and 95.6% of parents prefer classroom-based schools as well (Zhao *et al.*, 2020). Although online learning has been shown to assist in maintaining children's health during the COVID-19 pandemic, it is not as effective as traditional learning (Adnan & Anwar, 2020).

Implication for Nursing

The study implies a fundamental basis for health professionals, particularly nurses, to anticipate the impact of COVID-19 on the health and education sectors, especially on vulnerable populations such as children. Public health nurses are on the front line of the public health crisis the world now knows as the COVID-19 pandemic. Nurses also play a role with other health professionals to achieve the goal of SDG 3, which is focused on ensuring that everyone has good health and well-being. Public health nurses can work inter-discipline within communities to help prevent the adverse effects of COVID-19 on the child population. In their role as public health nurses, nurses can apply their clinical knowledge and expertise by mitigating and anticipating the impact of COVID-19 on children's health, emphasizing primary prevention, and implementing interventions in the form of nursing care at all levels—individuals, families, and communities—to maintain children's health and welfare. This systematic review is expected to describe the impact of COVID-19 on children, serving as a foundation for future research or practice to develop anticipatory assessments of the pandemic's impact on children's health and education. Hopefully, this study will help policymakers develop guidelines for assessing and intervening against the

pandemic's negative impact on children's health and education.

CONCLUSION

Our study highlights that COVID-19 negatively impacts children. There are several effects on health, including changes in physical activity to more sedentary behavior, delayed immunization, mental health, and the health of disabled children. COVID-19 has caused changes in the delivery learning process and various obstacles in the education sector. Therefore, it is necessary to develop further studies to develop interventions to anticipate the negative impact of the pandemic on the child population, especially in the health and education aspects. Other studies are also required to determine the extent to which the COVID-19 pandemic has impacted the achievement of SDGs 3 and 4.

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Determinant of Early Marriage Adolescent to Risk Giving Birth Child in Case of Stunting

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ABSTRACT

Background: Early marriage by adolescents aged less than 16 years can affect the reproductive health readiness of mothers or prospective mothers in giving birth to children with low birth weight potential and risk of stunting. **Method:** The method used for systematic article review was obtained from 5 databases with 15 relevant articles screened using the PRISMA method. **Results:** The results of the data obtained are that economic status is very influential on the incidence of stunting, this is due to poor fulfillment of toddler nutrition, lack of education of parents of toddlers, and lack of information and access to good health services. **Conclusion:** Educational background, economic status, cultural background and environment are the strongest factors that can encourage early marriage for adolescents with the majority living in less developed areas.

Keyword: Adolescent, early marriage, low birth weight, stunting

INTRODUCTION

Cultural, ethnic, racial, and religious diversity throughout the world can be a factor causing stunting, especially in developing countries such as Indonesia, India, Africa, and others. The factors of stunting itself are very diverse, namely in addition to having to pay attention to improvements in diet, parenting, as well as improving sanitation and access to clean water, people who have many educational, cultural, and economic backgrounds can also be factors that can support high and low stunting cases (Pranata *et al.*, 2021; Safitri *et al.*, 2022; and Zihui *et al.*, 2020). The incidence of stunting toddlers can be one of the imbalanced factors in population growth, therefore the importance of controlling the number of quality population growth by paying attention to the growth and development of toddlers as potential successors of the nation (WHO, 2018; and Salam *et al.*, 2020).

Stunting is a chronic malnutrition problem caused by lack of nutritional intake for a long time, resulting in

impaired growth in children, namely the child's height is lower or shorter (dwarf) than his age standard (Quamme and Per, 2022; and Tamirat *et al.*, 2020). One of the cases and handling of stunting is a national development priority which is one of the Output Indicators in the National Action Plan for Food and Nutrition in 2021 - 2024. In realizing fair welfare, community equality is needed, namely not seeing and distinguishing from a gender perspective in providing or being given education (Santhya *et al.*, 2008). Men and women play a very important role in the process of solving the incidence of stunting toddlers. Men who will become husbands need an educational background on health and nutrition issues in order to become a standby husband and participate in providing support to mothers or prospective mothers for child growth and development (Elwani and Firman, 2020; and Kartika, 2015).

In an effort to reduce the incidence of stunting, apart from a gender equalization approach, it must also be with the right target, namely young

people or adolescents (Manoarfa, 2020). Adolescents are one of the potential targets in reducing the incidence of stunting in toddlers because adolescents are the forerunners of the nation's successors who must be considered and educated about reproductive health to find out preventive actions from the incidence of stunting and reduce the high rate of early marriage in the world (Elwani and Firman, 2020; and Prakash *et al.*, 2021). The number of cases of underage marriage in the world can reduce the quality of children's health in terms of growth, development, and nutritional intake so that the decline in the quality of health of children under five can cause suboptimal growth and stunting (UNICEF, 2020). So this study aims to determine the dominant factors in various countries that encourage young marriage in adolescents aged <15 years and determine the factors of toddlers growing with the incidence of stunting in young parents.

METHODS

The method used in the preparation of systematic review articles using PRISMA with a database of research articles for

2020-2022 from Scopus, ScienceDirect, SAGEPUB, PubMed, and PLOSONE. Article screening is done with the help of convidence.org website application. Article screening is done manually by the author through titles and abstracts, exclude criteria such as completeness and eligibility of full text articles, then continued with full text screening of articles using the help of the Mendeley application as a whole, namely disqualified articles that are not in English as a whole, review articles, articles not using quantitative methods, article outcomes that are not in accordance with the topic, and article incompleteness. The results of the article screening obtained 15 relevant articles consisting of 7 articles about stunting, 5 articles about adolescents, and 3 articles about early marriage. Article searches in 5 databases using the keywords "Early Marriage", "Adolescent", "Health Reproduction", "Stunting", and "Baby Birth Low Rate". The PRISMA diagram from the systematic review of this article is in Figure 1. The PRISMA method is carried out to facilitate the preparation of systematic review articles to make it more structured and easier to obtain relevant research articles.

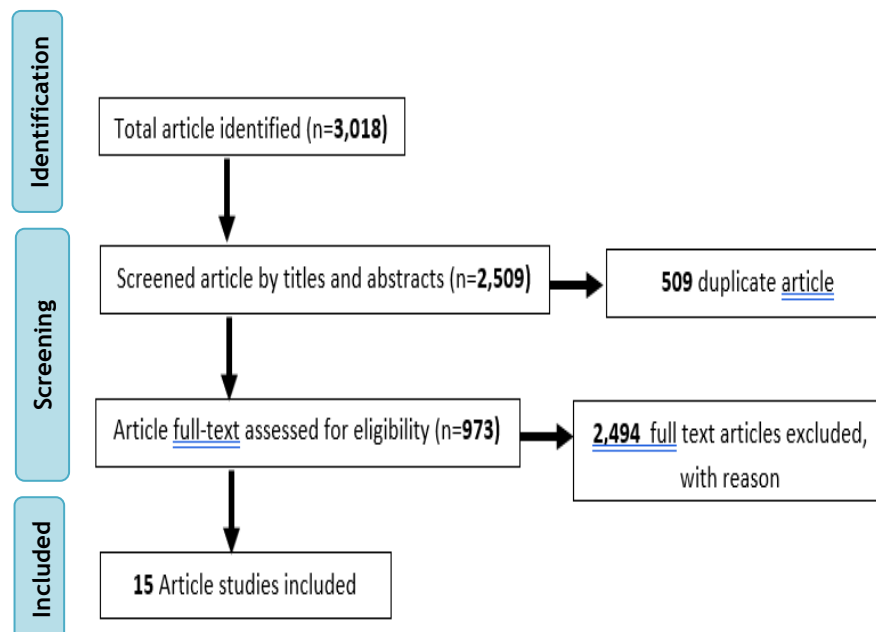


Figure 1. PRISMA diagram of systematical database search review

RESULTS AND DISCUSSION

The results of research on marriage at the young age of <16 years who will

then become parents at an early age will cause someone to have less skills in caring for their children, in contrast to people who have toddlers in adulthood (Santhya

et al., 2008; and Santhya, 2011). Therefore, toddlers born from early marriage have a higher risk of developmental delays compared to toddlers born to parents who are not married early. Getting married at a young age while still a teenager will have a negative impact on his children. Based on the findings of the article, it is stated that the factors causing growth delay in

toddlers are maternal health history (age), economic status, and lack of nutritional fulfillment. In **Table 1** there is an article with research findings that mentions the unpreparedness of reproductive organs in adolescents so that it can result in babies born with low body weight (Pangaribuan *et al.*, 2020; and Santhya *et al.*, 2008).

Table 1. Systematical review research article database.

Author	Year	Heading	Location	Study Type	Research Design	Participant Sample	Research Focus	Findings
Tamirat, K.S., Tesema, G.A., and Zemeru, T.T.	2020	Determinants of maternal high-risk fertility behaviors and its correlation with child stunting and anemia in the East Africa region: A pooled analysis of nine East African countries	East African	Regression model	Quantitative	31,873 mothers	Children, stunting	Social and economic conditions can affect a woman's medical history. Mothers aged <18 years have a child birth interval with an increased incidence of stunting and anemia in children.
Zhihui, L., Kim, R., Vollmer, S., and Subramanian, V.	2019-2020	Factors Associated With Child Stunting, Wasting, and Underweight in 35 Low- and Middle-Income Countries	Cambridge, Massachusetts, USA	Cross-sectional study	Quantitative	299,353 children aged 12-59 months	Children, stunting	Socioeconomic status of the household and The nutritional status of parents is The main factor associated with malnutrition cases in most countries. Environmental conditions, health behavior, prevalence of disease, and Maternal reproductive care is often associated

								with the incidence of stunting in children.
Mulu, N., Mohammed, B., Woldie, H., and Kegnie, S.	2021- 2022	Determinants of stunting and wasting in street children in Northwest Ethiopia: A community-based study	Gondar, Bahir Dar, Northwest Ethiopia	Cross-sectional study	Quantitative	422 children aged 5-18	Children, stunting	Stunting is one of the critical problems in street children. Based on age, diet, illicit drug use is also a significant cause that can cause stunting and fulfillment of children's nutritional status.
Quamme, S.H., and Per, O.I.	2022	Prevalence of child stunting in Sub-Saharan Africa and its Risk factors	Sahara Africa	Cross-sectional study	Quantitative	43 regions	Children, stunting	The incidence of stunting occurs in children aged >1 years with a low proportion of birth weight, shorter pregnancy time intervals (premature), low maternal education, low economy, and environmental factors.
Mtongwa, R.H., Festo, C., and Ester, E.	2021	A comparative analysis of determinants of low birth weight and stunting among under Five Children of Adolescent and Non-adolescent mothers using 2015/16	Zanzibar and Tanzania	Cross-sectional study	Quantitative	13,266 mothers with children <5 years	Children, Stunting, Adolescent	Stunting in children is caused by birth weight, gender, and age of toddlers. Mothers with a more mature age than adolescents have less risk of giving birth to children with low body weight compared to mothers who are teenagers.

		Tanzania Demographic and Health Survey (TDHS)						
Safitri, H.O., Fauzinyas, R., Indarwati, R., Efendi, F., and Lisa, M.	2022	Determinant factors of low birth weight in Indonesia : Findings from the 2017 Indonesian demographic and health survey	Indonesia	Cross-sectional study	Quantitative	14,239 respondents	Stunting, Children birth	Women who have a low level of education (uneducated or only completed primary school) are at greater risk have a BBLR baby compared to a highly educated woman (university level).
Guthold, R., Moller, A.B., Adebayo, E., <i>et al</i>	2021	Priority Areas for Adolescent Health Measurement	Switzerland	Cross-sectional study	Quantitative	148 countries; teenagers 18-29 years	Adolescent, Health reproduction	Mental health, adolescent weight, sexual life and proportion, lifestyle, HIV / AIDS, self-harm, and various other diseases both infectious and non-communicable can affect adolescent health.
Salam, R.A., Das, J.K., Lassi, Z.S., and Zulfiqar, A.B.	2020	Adolescent Health and Well-Being: Background and Methodology	Sub-Saharan Africa	Cross-sectional study	Quantitative	10% young man; 15% young women 15-24 years old	Adolescent, Health reproduction	Sexual/reproductive health interventions , nutritional fulfillment, immunization , Mental health, substance abuse, and accidents/injuries can affect the health status of adolescents and their environment.
Rokicki, S.	2021	Impact of family	Sub-Saharan	Quasi-experi	Quantitative	Women aged	Adolescent,	Pregnancy in early

		law reform on adolescent reproductive health in Ethiopia: A quasi-experimental study	Africa	mental Study		15-24 years	Health reproduction	mothers or adolescents can be a factor in the death of newborns or babies born with low body weight at the birth of their first child.
Pranata, A.K., Wahyudi, A.S., Handoyo, L., and Ferry, E.	2021	Determinants of birthplace among middle-to lower-class women in Indonesia : A study using the Indonesian Demographic and Health Survey	Indonesia	Quasi-experimental Study	Quantitative	49,627 females aged 15-49 years	Adolescent, Health reproduction, Health Education	The birthplace preference of lower-middle-class women in Indonesia correlates with several Factors include the woman's age, education level, husband's employment status, perception access to health facilities, number of children, and adequate housing.
Aychiluhm, S.B., Tesema, A.K., and Abay, W.T.	2021	Early Marriage and Its Determinants among Married Reproductive Age Group Women in Amhara Regional State, Ethiopia: A Multilevel Analysis	Amhara, Ethiopia	Multilevel Analysis Study	Quantitative	2,887 married women	Adolescent, Health reproduction, Early Marriage	The prevalence of early marriage in rural areas tends to be high, therefore the government has an important role to make policies by paying attention to education and women's power in deciding the time of marriage in order to reduce early marriage.
Li, C., Cheng, W., and Hui, S.	2021	Early marriage and maternal	Sub-Saharan Africa	Cross-sectional study	Quantitative	6,222 females aged 15-18	Early Marriage, Maternal	Getting married before the age of 15-16

lifestyle where in adolescence generally do a lot of activities and wide associations so that not a few cases of teenagers who get married due to juvenile delinquency factors and poor lifestyles. The next background that is dominant with the incidence of child marriage is cultural factors. Each country and region has its own culture towards marrying off their

sons and daughters. Cultural background is a strong factor because an area that is still thick in customs is more common that children who have entered the age of 12 years and over can be married off to reduce the family's economic burden and help increase family income (Santhya, 2022; and GSDRC, 2011).

Table 2. Factors affecting teen marriage <15 years

Determinant Group	Sub-Determinants	Information
Gender	Male Woman	Fewer males are married <15 years. The majority of women are married <15 years.
Age of Married	<16 years old 16-24 years	Often called <i>child marriage</i> , it has a higher percentage in <i>South Asia, Sub-Saharan Africa</i> and especially Indonesia It is often called <i>early marriage</i> , and has a greater percentage of adolescents in <i>South Asia, Sub-Saharan Africa</i> and especially Indonesia
Education	Elementary School Junior High School Senior High School Bachelor	Many married women with primary school education backgrounds More men and women married with junior high school education The majority of early marriages are carried out by couples with high school education Couples with higher education usually tend to marry once they are ready
Culture	Environment	Culture is the dominant factor in some countries and regions for <i>early marriage</i>
Life Style	Nutrients	The importance of meeting good nutrition 4 healthy 5 perfect from an early age
	Sanitation	Clean and healthy living habits can improve the degree of health of adolescents
	Smoking, Alcohol	Habits that become a tendency for adolescent boys and some adolescent girls
	Juvenile Delinquency	Juvenile delinquency habits are often carried out by both male and female adolescents
Socio-economic	Low Income	Families with lower income backgrounds are more likely to marry off children at an early age

**Source: UNICEF child marriage factsheet data for 2016, 2019, 2020, 2022 and

*Results of several article findings that the author reviewed

3.1 Risk of Young Pregnancy Giving Birth to BBLR

Early pregnancy in adolescence can make it possible to give birth to premature babies or give birth to babies with a low birth weight greater due to the unpreparedness of the reproductive organs of the mother-to-be. Unplanned teenage pregnancies or teenage pregnancies from early marriage are more common in people with economically disadvantaged backgrounds (Santhya *et al.*, 2008). Young mothers who are still teenagers tend to have less experience in parenting due to lack of educational background (Pangaribuan *et al.*, 2020; and Arthur *et al.*, 2018). Research reveals that most stunting incidents occur within the first 2 years of a child's life. The

initial period of malnutrition in children is during fetal development caused by malnourished mothers. Therefore, maternal nutrition during pregnancy plays an important role in the growth and survival of the child (Pangaribuan *et al.*, 2020). Some research suggests that women who have a low level of education (uneducated or only completed primary school) are at a greater risk of having a BBLR baby than women who are highly educated (have attended university). This is because adolescent girls with highly educated backgrounds prefer to complete their education and have a good career as a household provision (Arthur *et al.*, 2018). The findings of the study are in line with studies in Ethiopia and Cambodia, where the results showed that

related to education, the lower the mother's education level the higher the risk of giving birth to a BBLR baby (Safitri *et al.*, 2022).

3.2 Lifestyle Factors to Adolescent Health

Another factor that can trigger stunting in children with mothers aged <16 years is the lifestyle of each individual and their environment. Lifestyle and environment such as smoking, drug consumption, and alcohol use are also significant health concerns among adolescents. The habit of starting a new lifestyle such as alcohol consumption and smoking is an unhealthy activity commonly done by teenagers who start smoking before the age of 20 years. Teenagers begin to develop these bad habits throughout life after they become addicted. Drug abuse is one of the contributing factors to unemployment, poor health, accidents, suicide, and mental illness. These things are one factor in the majority of adolescent lifestyles (Manoarfa, 2020). So that with the unhealthy in this lifestyle, it is hoped that adolescents can pay more attention to themselves and their mental readiness before becoming parents even better. Being a parent, giving birth, and parenting at a young age is not as easy as expected, so the importance of a *well-educated parent background* is very important for adolescents around the world (Salam *et al.*, 2020).

A good educational background can encourage adolescents to be more careful in sorting out the environment and associations and decide to follow the prevailing culture or not. Good education can encourage individuals to have better incomes, thereby increasing self-awareness and caring for their own health (GSDRC, 2011). Increasing self-awareness of the health of adolescents <15 years can reduce the incidence of underage marriage (Haikiki *et al.*, 2020) and reduce the incidence of toddlers born with low body weight where low birth weight can potentially disrupt the toddler growth and development process which can eventually lead to the incidence of stunting toddlers (PUSKAPA, 2020; and Marshan *et al.*, 2020).

CONCLUSION

The majority of factors that cause early marriage are cultural and environmental background, educational background, economic status, and lifestyle. Early marriage under the age of 15 can be risky for expectant mothers who are pregnant and at the time of giving birth to their children. In addition to cultural background, lack of education on reproductive health in adolescents is one of the causes of the high number of adolescents who have married early. Pregnancy at an early age can increase the chances of a baby being born at risk with low body weight. The birth of a baby with low body weight can inhibit the growth and development of toddlers and cause stunting if parenting, adequate nutrition, and sanitation are not provided properly by parents. Further research is expected to discuss more deeply the factors causing early marriage in adolescents in terms of support for local health services to better know the development of the influence of the environment around the place where adolescents live.

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Risk Factors Associated with Scabies Occurring in Islamic Boarding Schools: Literature Review

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ABSTRACT

Background: Islamic boarding schools in Indonesia, in particular, have classic health problems. Some diseases that are common in Islamic boarding schools are scabies, shortness of breath, fever, fainting, cough and cold with influenza, gastritis/ulcer, and so on. And the most common health problem in Islamic boarding schools is scabies. It seems that students who live in boarding schools are "obliged" to experience an itchy disease characterized by symptoms of *mruntus* (pustules), redness, and itching. There is a saying that being a boarding school student is not valid if you don't suffer from itchy skin. Scabies and hut children's diseases are the same. Personal health, knowledge, teacher and peer support are some of the causes. **Objective:** The purpose of this literature review was to identify some risk factors for scabies in Indonesian Islamic boarding schools. **Method:** The research was conducted using relevant literature databases, such as google scholar, SageJournal and PubMed. The keyword used for this literature review was "scabies in Islamic boarding schools". The literature search was limited from 2013 - 2022. There were 11 articles that were relevant and related to scabies that occurred in boarding schools. **Results:** The results of the 11 articles showed that personal hygiene has a lot to do with and even influences the incidence of scabies in some boarding schools. **Conclusion:** So improving the personal hygiene of students is one of the important factors in preventing the incidence of scabies in Islamic boarding schools.

Keywords: Boarding School, Personal Hygiene, Scabies

INTRODUCTION

In 2017, WHO categorized scabies, and other ectoparasitic diseases as neglected tropical diseases (NTDs), in response to requests from several member states and recommendations from the Technical Advisory Group for NTDs. WHO's 2030 global targets for scabies are therefore: member states include scabies treatment in the universal health coverage package of services, and conduct mass treatment interventions in endemic areas, areas with a prevalence of 10% or more. By 2020, WHO estimates that the current prevalence of scabies ranges from 0.2% to 71% and affects more than 200 million people every day (WHO, 2023). Meanwhile, the prevalence of scabies in Indonesia is 4.60-12.95%, ranking third out of twelve skin diseases in Indonesia (Mayrona *et al.*, 2018).

Age, gender, level of hygiene, use of shared personal items, housing density,

level of education and knowledge about scabies, as well as local culture and socioeconomics are risk factors for the incidence of scabies (Trasia, 2021). Research conducted by Yunita *et al* found that there was a relationship between the number of scabies cases in the Lubuk Buaya Health Center working area in Padang City with personal hygiene factors, room occupancy density, and room ventilation area (Yunita *et al.*, 2015). Some of the variables associated with scabies cases above can be categorized into personal factors, factors originating from scabies sufferers such as: age, gender, level of cleanliness or personal hygiene, level of knowledge, and environmental factors such as: occupancy density, room ventilation area.

Personal hygiene is an effort to maintain a healthy life, including hygiene in activities and social life. In addition, personal hygiene is also referred to as self-care to maintain physical and mental

health. One way to prevent disease is to maintain hygiene. Several factors influence personal hygiene, one of which is knowledge and attitude towards personal hygiene. This is also in line with Patmawati and Sumardi's research, which found that there is a relationship between the knowledge of students and their attitudes towards personal hygiene (Patmawati & Sumardi, 2020). Many studies have shown that personal hygiene is associated with the incidence of scabies.

Knowledge can help a person avoid diseases, especially infectious diseases. Students with low knowledge have a high prevalence of scabies, while low prevalence occurs in students with high knowledge ((Hilma & Ghazali, 2014)). So increasing student of boarding schools knowledge about scabies is one of the solutions to reduce scabies cases.

In addition to personal factors that play a role in the incidence of scabies, environmental factors are also related to this disease. Navylasari *et al.*'s research shows that the social environment is related to the incidence of scabies in students, namely peer and teacher support (Navylasari *et al.*, 2022). The physical environment plays an important role in the incidence of scabies, such as humidity, ventilation and overcrowding (Handari & Yamin, 2018), and in another study showed that natural lighting and room temperature were also associated with the incidence of scabies (Ibadurrahmi *et al.*, 2016).

METHODS

This study used the literature review method. This study used various relevant database literature search sources, such as Google Scholar, SageJournal, and PubMed. In this literature review, the keyword used was "scabies in islamic boarding schools". The literature search was limited by the inclusion criteria:

1. The research was conducted between 2013 and 2022,
2. Research results published in SINTA 3 indexed journals or above, and
3. The results of the research specifically discuss the factors associated with scabies.

The study was only conducted in Islamic boarding schools in Indonesia.

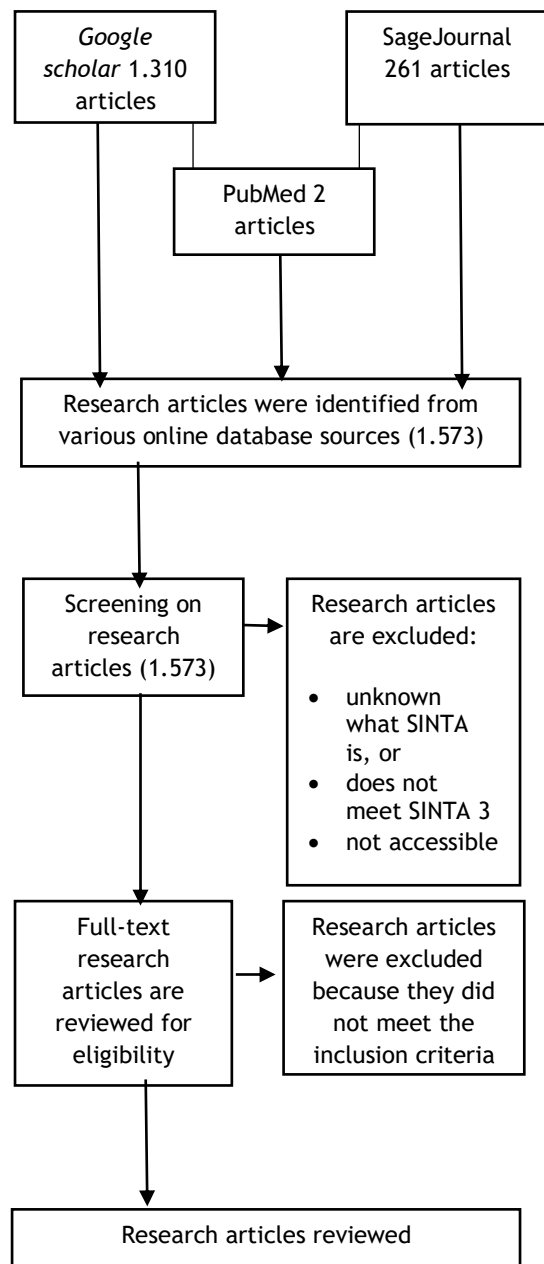


Figure 1. Flowchart of Article Selection

RESULTS

Search results through online databases found 1310 articles in Google Scholar, 2 articles in PubMed, and 261 SageJournal articles. Next, articles were selected based on title, year of publication, and full text, and 10 articles were selected based on inclusion and exclusion criteria

Based on the literature review, 10 journal articles studied various variables that contribute to scabies cases in Islamic boarding schools. Figure 1 is the result of

journal identification using systematic review. The online journal database review found 1,310 articles from Google Scholar, 2 articles from PubMed, and 261 articles from SageJournal. All of them were excluded because they did not meet the requirements for inclusion. The requirements that were not met included: the journal did not meet SINTA 1, 2 and 3, or it was not known which SINTA, the article was not accessible, and the article was not specific to scabies. In addition, the eleven articles discussed had

complete text, were appropriate, and relevant to this study.

Table 1 is the result of a literature review that shows the characteristics of articles that are eligible for systematic review. Personal hygiene (cleanliness of clothing, cleanliness of towels, cleanliness of skin, cleanliness of hands and nails, cleanliness of bedding), knowledge, attitude, support from ustadz and peer students, and other factors were the subjects of the study from 2013-2022.

Table 1. Results of Literature Review

N o	Researcher and Year of Publication	Source	Place of Research	Research Sample	Study Design	Results	Determinants of Scabies
1	Laurensia Nofti Navylasari, <i>et al</i> (2022)	ULUL ALBAB: Jurnal Ilmiah Multidisiplin Vol. 1, No. 2 Januari 2022	Islamic Boarding School Darul Ulum Takeran Magetan	41 respondents	Observational Survey with cross sectional approach	Bivariate test shows there is a significant effect of independent variables, namely: personal hygiene practices (p-value = 0.003 / less), knowledge (p-value = 0.039 / good), teacher (ustadz / ustadzah) support (p-value = 0.010 / less), peer support (p-value = 0.001), on the dependent variable, namely the incidence of scabies. Factors that contribute to the students' efforts to avoid the transmission of scabies are: application	Personal hygiene, knowledge, teacher (ustadz) and peer support

						of personal hygiene, student knowledge, support from teacher (ustadz and ustadzah), and peer support. Personal hygiene is lacking because they often exchange clothes, lend each other towels, rarely clean the room, and rarely wash bed sheets. Bathing with unclean water no more than twice a day.	
2	Suci Ihtiarings, <i>et al</i> (2019)	BALABA: Jurnal Litbang Pengendalian Penyakit Bersumber Binatang Banjarnegara Vol. 15, No. 1 Juni 2019: 83-90	Islamic Boarding School Annawati Berjan Gebang Purworejo Jawa Tengah	161 respondents	Observational Analytic with case control design	Factors associated with the transmission of scabies (p=0.000) were environmental hygiene (p=0.000; OR=9.490), contact with patients (p=0.040; OR=2.912), gender (p=0.000; OR=5.083), and age of students. Environmental cleanliness is the most dominant variable that affects the transmission of scabies. Patient contact is in the form of	Environmental hygiene, contact, gender, age

						exchanging clothes, towels, toiletries and bedding. And this is related to personal hygiene	
3.	Kholilah Samosir <i>et al</i> (2020)	Jurnal Ilmu Kesehatan Masyarakat Vol. 9	Islamic Boarding School Madani Unggulan Bintan	106 respondents	Observational analytic with cross sectional design	There is a relationship between personal hygiene and the incidence of scabies. The results of multivariate analysis show that students with poor individual hygiene have a higher risk of experiencing scabies than students with good individual hygiene	Personal hygiene
4.	Tisna Sedy Pratama <i>et al</i> (2017)	MEDISAINS: Jurnal Ilmiah Ilmu-Ilmu Kesehatan Vol. 15	Islamic Boarding School Miftahul Huda Rawalo Banyumas	26 respondents	Observational analytic with cross sectional design	Scabies was most common in females (62.9%) and highest in people aged 13 years (33.3%). Scabies was most commonly suffered by respondents with moderate knowledge (74.1%). For the attitude variable, most of the scabies was suffered by respondents with a good attitude (59.3%). For the personal hygiene	Personal hygiene, knowledge, attitude, habits

						variable, most of the scabies was suffered by respondents with moderate (63%) and poor (48.1%) personal habits	
5.	Siti Riptifah Tri Handari <i>et al</i> (2018)	Jurnal Kedokteran dan Kesehatan Vol. 14	Islamic Boarding School an Nur Ciseeng Bogor	75 respondents	Descriptive analytic with cross sectional design	Personal variables ($p = 0.0005$), humidity ($p = 0.002$), ventilation ($p = 0.015$), and occupancy density ($p = 0.008$) are all factors associated with the incidence of scabies.	Personal hygiene, humidity, ventilation, occupancy density
6.	Dwi Atin Faidah <i>et al</i> (2022)	Medsains Vol. 8 No. 1 Juni 2022	Islamic Boarding School Raudlatul Mubtadiin Kubang Wanayasa Banjarnegara	83 respondents	Observational with cross sectional design	Most of the students were 13 years old (26.5%), had MTs education (60.2%), and the majority were female (63.1%). The proportion of personal hygiene students in the poor category was 68.7% or 57 people, and the proportion of students who had scabies was 71.1%.	Personal hygiene, age, gender, education
7.	Hilma UD, Ghazali L, (2014)	Jurnal Kedokteran dan Kesehatan Indonesia Vol. 6 No. 3 September-Desember	Islamic Boarding School Mlangi Nogotirto Gamping Sleman Yogyakarta	53 respondents	Observational with cross sectional design	There was no significant correlation between the level of hygiene and occupancy density with the incidence of	Knowledge, frequency of contact

						scabies, but there was a significant correlation between the level of knowledge and frequency of indirect contact with the incidence of scabies	
8.	Hasna Ibadurrahmi, <i>et al</i> (2016)	Jurnal Profesi Medika Vol. 10 No. 1 Januari - Juni	Islamic Boarding School Qotrun Nada Cipayung Depok	258 respondents and 30 rooms	Observational Analytical with Cross sectional design	There is a correlation between the knowledge, attitudes, behavior of students, the density of occupants, air humidity, natural lighting, temperature and ventilation of the students' rooms to cases of scabies disease. The behavior of students and the density of occupants in the students' rooms are the most influential factors on the incidence of scabies disease	Knowledge, attitude, behavior of students, occupant density, air humidity, natural lighting, room temperature and ventilation
9	Berta Afriani, (2017)	Aisyah: Jurnal Ilmu Kesehatan Vol. 1	Islamic Boarding School Al Falah Bandung Agung OKU	51 respondents	Analytical Survey with Cross sectional design	The study showed a significant relationship between personal hygiene and socioeconomic status with the incidence of Scabies at	Personal hygiene, status economy

						Al-Falah Islamic Boarding School.	
10	Dwi Setyowati, Wahyuni (2014)	GASTER Vol. 11 No. 2 Februari	Islamic Boarding School Al Muayyad Surakarta	208 respondents	Analytic survey with cross sectional approach	Female student with good knowledge were 155 (74.5%) and supported by good prevention behavior against scabies as many as 167 (80.3%). There is a correlation between knowledge and prevention behavior of scabies. This is evident from the results of the analysis obtained the value of χ^2 count (61.165) $>$ χ^2 table (3.841).	Knowledge
11	Nur Muafidah <i>et al</i> (2016)	Journal of Health Science and Prevention Vol 1 (1) April 2017	Islamic Boarding School Al Falah Putera Liang Anggan	127 respondents	Observational analytic with cross sectional design	Of the 127 students, 59 students have poor personal hygiene conditions with the category of scabies 53 students (89.8%). While the remaining 68 students have good personal hygiene with the category of scabies 23 students (33.8%). There is a significant relationship between personal	Personal hygiene

hygiene and the incidence of scabies in students with a p-value = 0.000. Where many students pay less attention to the hygiene conditions of hands and nails, hair, clothing and skin, resulting in a high incidence of scabies.

Of the 11 articles selected and presented in table 1, the factor or determinant of personal hygiene is the most related and influential factor to scabies disease in Islamic boarding schools in Indonesia with 7 articles. 1 article calls it a behavioral factor, where behavior here tends to individual hygiene behavior or personal hygiene. Next is the knowledge of students about scabies with 5 articles.

Several determinants followed, namely: contact factor and frequency of contact with patients with 2 articles, gender with 2 articles, age factor with 2 articles, attitude with 2 articles, humidity with 2 articles, ventilation with 2 articles, residential density with 2 articles, support from clergy and peers with 1 article, environmental hygiene with 1 article, habits with 1 article, natural lighting with 1 article, temperature with 1 article, and socio-economic with 1 article.

DISCUSSIONS

Based on a literature review of 11 selected articles, there are factors associated with the incidence of scabies in Islamic boarding schools in Indonesia. One variable that is most associated with scabies is personal hygiene which is contained in 7 articles, or it can be said that 8 articles, because the behavioral factors in question lean towards individual hygiene behavior. The second factor that appears the most is knowledge

with 5 articles and this shows that these 2 determinants have a lot to do with the incidence of scabies in islamic boarding schools in Indonesia.

Other factors such as attitude, as well as some environmental factors also play a role in causing scabies. These variables can be categorized into two major groups: personal variables and environmental variables.

Related to personal variables include:

Knowledge

There are 5 articles that show if knowledge is related to the incidence of scabies. Like the results of research by Navylasari *et al*, the knowledge of students has an influence on the occurrence of scabies with a p value = 0.039 / either (Navylasari *et al.*, 2022). Pratama *et al's* research also showed that the incidence of scabies occurred in students with a moderate level of knowledge as much as 74.1% ((Pratama *et al.*, 2017)). Hilma's research also corroborates this where knowledge has a relationship with the occurrence of scabies with p = 0.038 (Hilma & Ghazali, 2014). Even Setyowati's research identified a relationship between knowledge and scabies, where the OR reached 17.075, meaning that female student who have good knowledge have a chance to prevent scabies 17 times greater than female student with poor knowledge (Setyowati & Wahyuni, 2014). This is as said by Notoatmodjo that a

person must understand what the meaning or benefits of the behavior are for himself or his family before adopting it, including knowledge about the causes of the disease, symptoms or signs, how the disease spreads, and so on (Soekidjo, 2012).

Attitude

There are 2 articles that show that attitude affects the incidence of scabies. The results of the analysis show that attitude affects the occurrence of scabies in students with a p value of 0.017 ($p < 0.05$). In the article, it is stated that if students have a poor attitude, more will suffer from scabies with a percentage of up to 61.5% (Ibadurrahmi *et al.*, 2016). Also in a study conducted by Pratama which showed that the incidence of scabies was common among students with poor attitudes, where almost half or 48.2% had a poor attitude (Pratama *et al.*, 2017). This is also as said by Notoatmodjo that the indicators for attitude are the same as knowledge, namely:

- Attitude towards illness and disease,
- Attitude towards maintenance and healthy living, and
- Attitude towards environmental health.

The next process of assessing or acting on a stimulus or health object after someone knows it (Soekidjo, 2012).

Age and Gender

Age and gender are associated with the transmission of scabies as mentioned in 2 articles. In Suci Ihtiringtyas' study, it was mentioned that gender and age had a correlation with the transmission of scabies ($p=0.000$, $OR=5.083$) (Ihtiringtyas *et al.*, 2019). Likewise, the results of research by Faidah *et al* showed that students affected by scabies were mostly 13 years old (26.5%) and most students were female (63.1%) (Faidah & Saputro, 2022). Children are more affected by scabies due to lower immunity compared to adults, less hygiene and more frequent play with other children. Likewise with gender, scabies can affect both men and women, but men are more often affected by scabies. This is because men pay less attention to individual hygiene when compared to women (Trasia, 2021).

Personal Hygiene

Personal hygiene is the factor that

has the most correlation with the occurrence of scabies in Islamic boarding schools. There are 8 articles that mention if personal hygiene is related to the occurrence of scabies in Islamic boarding schools. Among them are Faidah *et al*, that the results of cross tabulation between personal hygiene categories and the occurrence of scabies obtained the results that personal hygiene less (42%) will have the highest prevalence when made in comparison with the category of good personal hygiene (28.8%). The proportion of personal hygiene students in the poor category was 68.7% or 57 people, and the proportion of students who had scabies was 71.1% (Faidah & Saputro, 2022). Handari *et al's* research also shows the same thing, that there is a significant correlation between personal hygiene and scabies at $p=0.0005$ with p value <0.05 , and $OR=9.773$, which means that male student and female student with good personal hygiene have a chance of not getting scabies 9.773 times when compared to male student and female student with less personal hygiene. A total of 43 people (79.6%) respondents who experienced scabies personal hygiene less (Handari & Yamin, 2018). Samosir's research showed that the group with poor personal hygiene, there were 32% who experienced scabies, and 7.1% in the good personal hygiene group who experienced scabies. The statistical test results show that $p(0.003) < \alpha$, meaning that there is a correlation between personal hygiene and the incidence of scabies. There is a PR value of 4.48 (95% CI: 1.604-12.513), which means that respondents who have poor personal hygiene are at risk of developing scabies 4.5 times higher when compared to people who have good personal hygiene (Samosir *et al.*, 2020). Pratama's research also showed that most of the scabies occurred in students with poor personal hygiene (63%) (Pratama *et al.*, 2017). Afriani's research also shows in detail the correlation between personal hygiene practices and the incidence of scabies, such as: analysis of the correlation between bathing practices and the incidence of scabies obtained p value 0.006 (<0.05), it can be concluded that there is a significant relationship between bathing practices and the incidence of scabies, and the correlation between the practice of exchanging clothes and towels obtained p value

0.004, it can be concluded that there is a significant correlation between the practice of exchanging clothes and towels with the incidence of scabies skin disease (Afriani, 2017). Finally, Navylasari's research also showed the same thing, where there was a significant influence between independent variables, including personal hygiene practices (p value = 0.003) with the incidence of scabies (Navylasari *et al.*, 2022).

Research specifically examining the correlation between personal hygiene and scabies was conducted by Muafidah in 2016, and showed the results that there were 68 students who had poor personal hygiene, and of these, 53 students (89.8%) were affected by scabies. And the X^2 test results show that there is a significant correlation between personal hygiene and scabies in students, with p value = 0.000 (Muafidah & Santoso, 2017). This means that personal hygiene is related and even influences the incidence of scabies.

Some key indicators of individual hygiene associated with scabies include skin hygiene such as shared use of soap, bathing with unclean water, shared use of towels and not drying towels. Hair hygiene includes intensity of hair washing, rinsing hair with unclean water and shared use of combs. Nail and hand hygiene which includes: washing hands not with soap and running water, scratching the body when nails and hands are dirty, and leaving nails long. Clothing hygiene includes rarely changing clothes, stacking dirty clothes, and borrowing clothes from each other. And bed hygiene includes the intensity of cleaning the bed, drying the mattress more than 2 weeks, and never changing pillowcases and bed linen (Muafidah & Santoso, 2017).

The factors that relate and influence the incidence of scabies related to environmental factors include:

Social Environment

There is 1 article that explains that the support of teacher (p value = 0.010) and peer support (p value = 0.001) correlate with the incidence of scabies (Navylasari *et al.*, 2022). This happens because the role of teacher is very important to foster awareness to carry out personal hygiene to prevent the transmission of scabies in students, which can be done through providing information about the importance of

maintaining personal hygiene. The support of teacher and even the boarding school leaders can be in the form of implementing rules that support clean and healthy living behavior. Even with peer support, where their presence is needed to provide information and provide support to prevent scabies.

Physical Environment

There are 3 articles that show there are factors that correlate with the occurrence of scabies. 2 articles mentioned in detail and 1 article mentioned in general terms.

Ihtiarintyas' research in 2019 showed that a clean environment is one of the factors correlated with the incidence of scabies, with $p=0.000$, and is the most important factor affecting the transmission of scabies. In this study, the clean environment was only divided into healthy and unhealthy (Ihtiarintyas *et al.*, 2019).

Handari's 2017 study details the environmental conditions in question, namely: occupancy density, ventilation and humidity. All of these are factors that correlate with the incidence of scabies (Handari & Yamin, 2018). Even Ibadurrahmi's research in 2016 strengthened this research with additional factors of temperature and natural lighting. It was found that there was a 0.851 times greater risk of scabies in room temperatures that did not meet health requirements, inversely proportional to the room temperature of students who met health requirements. Likewise with natural lighting, that natural lighting affects the occurrence of scabies with a p value of 0.029. In addition, the air humidity in rooms that do not meet health requirements is quite high for students who suffer from scabies, with a percentage of 68.4 percent (Ibadurrahmi *et al.*, 2016). Occupancy density is a major risk factor for scabies, especially in communities that live in high density (Trasia, 2021).

Environmental hygiene issues are important to consider in controlling scabies. One of the WHO recommendations in the prevention of scabies is to clean and vacuum or sweep the room after the infected person is treated (WHO, 2023).

According to Lawrence Green in the PRECEDE and PROCEED theory, it is stated

that quality of life is strongly influenced by one's health. And health is influenced by one of them behavior, and there are 3 factors that influence a person's behavior, namely: predisposing factors, enabling factors and reinforcing factors (Glanz *et al.*, 2015). If described with this theory, these factors can affect the incidence of scabies. Predisposing factors include knowledge, attitudes, habits, personal hygiene, age, gender, education and frequency of contact. The enabling factors include environmental hygiene, humidity, ventilation, occupancy density. The reinforcing factors are the support of teacher (ustadz) and peers.

As if according to Albert Bandura, it can be explained that healthy behavior that can prevent scabies in Islamic boarding schools can be influenced by personal factors and environmental factors. And these three factors are very influential with one another (Glanz *et al.*, 2015). The occurrence of scabies can be influenced by personal factors consisting of student knowledge, attitudes and lack of personal hygiene practices. Social environmental factors are also influential such as peer support and boarding school leaders. However, it can also be influenced by environmental factors such as humidity, occupancy density, room ventilation, temperature and others.

CONCLUSION

The results of this literature review can be the basis for determining appropriate interventions to prevent the incidence of scabies in Islamic boarding schools, so that the prevalence of scabies in Islamic boarding schools can be reduced. The results show that there are several factors that correlate and influence scabies, namely individual hygiene or personal hygiene, knowledge, attitude, age, gender, contact, environmental cleanliness, humidity, ventilation, occupancy density, attitude. So it is necessary to coordinate and cooperate between the government and Islamic boarding schools to improve the quality of life of students by preventing the incidence of scabies in Islamic boarding schools.

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Group 1st of Non-pharmacological Therapy that Most Effective to Increase Hemoglobin in Pregnancy

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ABSTRACT

Background: Anemia of pregnancy is still a global problem. The prevalence rate of anemia in pregnancy in developed countries at 14% and in developing countries at 51%, in Asian countries at 33.3%, Brunei Darussalam at 28.0%, Thailand at 30%, the Philippines at 32.3%, Malaysia at 26.6%, Singapore at 28.5%, and Vietnam at 23.5%. The prevalence of anemia in pregnant women in Indonesia in the 1st trimester at 3.8%, the 2nd trimester at 13.6% and the 3rd trimester at 24.8% Indonesian women die every year due to pregnancy and childbirth, while in East Java at 40%. The cause of anemia during pregnancy is nutritional deficiencies, especially lack of iron, folate, and vitamins. Purpose: to determine the level of effectiveness of non pharmacology therapy to increase hemoglobin in pregnancy. **Methods:** Systematic review using PRISMA and PICO methods. The population of this study is all international journals and accredited national journals sinta 1-6 totaling 87 articles. The sample is 23 articles that are appropriate with the inclusion criteria. The data collection is conducted by searching research articles in the database which including Google, GoogleScholar, Research Gate, NCBI, Science Direct, SAGE, Elsevier, and Sinta. Analysis is use thematic analysis. **Results:** The 1st group of non pharmacology therapy can increase hemoglobin levels, namely yellow pumpkin seeds, papaya fruit, papaya leaf juice, an avocado juice, red spinach juice, sweet potato leaf decoction, red guava, roselle tea, fried catfish, green bean juice, boiled chicken eggs, soy milk, honey, 2nd group, namely moringa leaf extract, chickpeas, dates, Dutch eggplant juice, ambon bananas, 3rd group, namely katuk leaf, beets, acupuncture points SP3, LR3, KI3, red seaweed, red dragon fruit. **The conclusion:** The most effective non pharmacology therapy for increasing hemoglobin in pregnancy is non pharmacology therapy in 1st group.

Keyword: Hemoglobin, Non pharmacology Therapy, Pregnancy

INTRODUCTION

The 3rd goal of sustainable development goals guarantees a healthy life and promote well-being for everyone in all ages. The target set by Indonesia is to reduce the Neonatal Mortality Rate to 12 per 1,000 live births, one of which is through the prevention of anemia in pregnant women (Brodjonegoro, 2017).

Anemia is a condition of the number of red blood cells less than the physiological requirement of the body and is referred to as "potensial dancer to mother and child". Therefore, anemia requires serious attention from all relevant parties (Desi Maria and Devi, 2019). Hb level is a measure of respiratory

pigment in red blood granules, the amount of Hb is about 15 grams per 100 ml of blood (Lathifah and Susilawati, 2019).

Anemia case in developed countries have a prevalence of 14% and developing countries by 51%. According to World Health Organization (WHO) that the prevalence of anemia in pregnancy is higher, which is 41.6% (RH *et al.*, 2017). The case of anemia in pregnancy in Asian countries namely Myanmar (33.3%), Thailand (30%), Malaysia (26.6%), Philippines (32.3%), Brunei Darussalam (28.0%), Vietnam (23.5%), Singapore (28.5%) (Dondi and Putri, 2019). Cases of pregnancy anemia in Indonesia was 3.8% in the 1st trimester, 13.6% in the 2nd

trimester, 24.8% in the 3rd trimester (Safitri, 2019); in East Java by 40%, Gempol District there are 227 pregnant women and 96 mothers with anemia (PWS KIA Pasuruan District Health Office) (Susiyanti and Virgia, 2022).

The cause of pregnancy anemia that often occurs in developing countries is nutritional deficiencies, especially lack of iron minerals, folate, and vitamins, vitamin A deficiency. It can also cause anemia (Hidayati and Roviatus, 2021). The impact is a growth disorder in body cells and brain cells, resulting in a lack of oxygen transferred to body cells and to the brain during pregnancy, childbirth, puerperium, ante partum bleeding (APB), postpartum haemorrhagia (PPH) (Handayani and Sugiarsih, 2020). Iron deficiency can also reduce immunity, decreased productivity, easy infection, postpartum bleeding, premature childbirth and infection during or after childbirth (Mustikasari and Effendy, 2022). The impact on babies includes intrauterine growth retardation (IUGR), low birth weight (LBW), and easily exposed infection (Pratiwi, 2021).

Preventive measures for anemia in pregnancy can be done pharmacology and non pharmacology. Pharmacology therapy is known to have many side effects, while non-pharmacological therapy is known to have relatively small side effects and almost no side effects. They are acupressure, acupuncture, giving fruits or in the form of fruit juice such as spinach juice, papaya, moringa leaves, green bean juice, katuk leaf tea, dates, ambon bananas, tomatoes, giving side dishes such as anchovies, chicken eggs and catfish (Utami, 2019), (Ningrum and Setiawandari, 2022); (Febriyanti, Nurfa'ida and Syaifudin, 2022); (Jannah and Puspaningtyas, 2018).

The purpose was to determine the level of effectiveness of non pharmacology therapies to increase hemoglobin levels in pregnancy.

METHODS

The design of this study is a systematic review. The population of this study is all international journals and national journals indexed by Sinta that examine non pharmacology therapies to increase hemoglobin levels in pregnancy with a limit of 2015-2022 totaling 63

articles. Sampling is use purposive sampling. The sample of this study is some reputable international journal articles and accredited national journals sinta 1-6 a total of 23 articles. Inclusion criteria are full text English articles that related to non pharmacology therapy to increase hemoglobin levels of pregnant women and full text proceedings that have been published and at least have E-ISSN. Exclusion criteria are articles that only abstracts; articles not published in reputable international journals/ national journals that accredited by Sinta 1-6. Data collection techniques at the preparation stage are access the informational needed. Additionally, researchers look for journals or research articles in the English Database, including Google, GoogleScholar, Research Gate, NCBI, Science Direct, SAGE, Elsevier, Sinta with search keywords, namely the effectiveness of non pharmacology methods (spinach, tomatoes, decoction of yellow pumpkin seeds, papaya leaves, moringa leaf, green bean juice, katuk leaf, guava juice, rosella leaves, dates, chicken eggs, long bean stew, honey, ambon bananas, anchovy nuggets, fried catfish cakes, acupressure, and acupuncture) with hemoglobin levels, pregnant women, and check the quality of Journals. For international journal is checked through Scimago JR and for national journal which it is checked by Sinta portal and use the PICO technique. The data collection techniques in the implementation stage is an article that have been collected are read and checked for suitability with the research topic and research objectives and reduced by PRISMA techniques and analysis using thematic, then interpreted. This research has been conducted an ethical approval at PGRI Adi Buana University Surabaya with number: 046-KEPK.

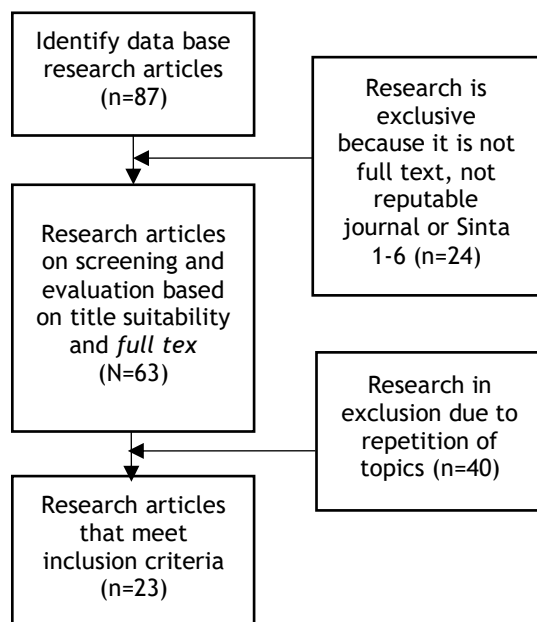


Figure 1. PRISMA Flow Diagram

RESULTS AND DISCUSSION

The results of a systematic review of the effectiveness of non pharmacology therapy to increase hemoglobin (Hb) levels in pregnancy shows that have 23 non pharmacology therapy that can increase hemoglobin levels of pregnant

Research conducted in 2016 showed women grouped into 3 groups ranging from the most effective (the p value between 0.000-0.001), effective (the p value between 0.002-0.01) and quite effective (the p value between 0.02-0.04). Non pharmacology therapy is an option in an effort to increase hemoglobin levels in pregnant women are the most effective and include 1st group , namely yellow pumpkin seeds, papaya fruit, papaya leaf juice, an avocado juice, red spinach juice, sweet potato leaf decoction, red guava, roselle tea, fried catfish, green bean juice, boiled chicken eggs, soy milk, honey.

Non pharmacology therapy in 2nd group includes moringa leaf extract, chickpeas, dates, Dutch eggplant juice, ambon banana; while non pharmacology therapy in 3rd group is katuk leaf, beets, acupuncture points SP3, LR3, KI3, red seaweed, red dragon fruit.

Non pharmacology Therapy in 1st Group as an Effort to Increase Hemoglobin Levels of Pregnant Women

Non pharmacology therapy in 1st

group is very effective and most rapidly increases Hb levels of pregnant women.

Anemia is one of the most common disorders in pregnancy, including Fe deficiency, acute bleeding, which is often related to each other. Anemia in pregnancy is a condition of hemoglobin levels at <11g/dL in the 1st and 3rd trimesters, and <10.5g/dL in the 2nd trimester. Hemoglobin is a red pigment oxygen-rich protein rich in erythrocytes.

Hb levels in pregnant women can decrease due to the hemodilution process. Hemodilution in pregnancy is an increase in the volume of plasma in the blood. The hemodilution occurs from the second trimester until the end trimester (32-36 weeks) will reduce Hb levels. Therefore, pregnant women need to consume Fe tablets and non pharmacology therapy that help increase Hb levels. The function of iron is form the placenta and red blood cells by 200-300%. Red blood cells are needed to carry more oxygen to the fetus. Meanwhile, during childbirth, an additional 300-350 mg of Fe is needed due to blood loss (Simatupang, 2021).

The need for Fe (iron) during pregnancy is average 800 mg namely 300 mg needed for the fetus, and the placenta; and 500 mg that use to increase the mother's hemoglobin. So, the more often a woman has pregnancy and childbirth, the more iron will be lost.

Efforts to prevent of anemia in pregnant women are routine hemoglobin level checks at least 2 times, namely in the first trimester and the third trimester, give Fe tablets to mothers, namely 90 tablets during pregnancy (equivalent to 800 mg Fe) as one of the strategies to participate in the success of government programs in overcoming pregnancy anemia, as well as efforts that should have low side effects and even no side effects. One of them is the provision of non pharmacology therapy through the support of adequate and adequate nutritional status of pregnant women will be able to give birth to healthy babies, have good growth and appropriate development and reduce the risk of morbidity in infants. In general, nutritional interventions for pregnant women can be provided supplementation, namely Fe, folic acid,

Magnesium, Vitamin D, and zinc (Zn) which have an impact on pregnancy outcomes.

Non pharmacology therapy in 1st group at 1st order (very effective) in the form of yellow pumpkin seed biscuits can increase of hemoglobin, ferritin, CRP levels, reduce low birth weight (LBW) incidence, and stunting in the toddler. Yellow pumpkin seeds are a good source of phytoestrogens and exert estrogenic. The composition of the nutritional value of yellow pumpkin seeds per 100 gram includes carbohydrates 10.71 gram, energy 559 kcal, protein 30.23 gram, total fat 49.05 gram, cholesterol 0 mg, fiber 6 gram, folic acid 58 ug, niacin 4.8 mg, iron 8.8 mg, vitamin A 16 IU, thiamin 0.272 mg, vitamin B2 0.15 mg, vitamin B5 0.75 mg, vitamin B6 0.14 mg, vitamin C 0.272 mg, vitamin E 35.1 mg, sodium minerals 7.0 mg, potassium 809.0 mg, phosphorus 1232 mg, cobalt minerals 1.43 mg, magnesium 592 mg, manganese 4.54 mg, zinc 7.8 mg, and selenium 9.40 ug. Solid phytochemicals including betacarotenoids 9 µg, beta-cryptoxanthin 1 µg, and lutein zeaxanthin 74 µg. Yellow pumpkin seeds are rich in oil and protein. It has more nutrition for health. Yellow pumpkin seed extract contains lignans and flavones (Musaidah *et al.*, 2021).

The 2nd non pharmacology therapy in 1st group is papaya fruit (*Carica Papaya L*). Giving papaya fruit at a dose of 110 grams daily for 14 days combined with taking Fe tablets. California papaya was chosen because it has good quality, red and sweet proven to increase hematocrit (ht) and Hb pregnant women. Papaya has composition, namely vitamin C (78 mg/ 100 grams of papaya) and Fe (iron), but the content of vitamin C itself can help increase the absorption of iron in the body. The role of vitamin C in the Fe absorption process is to reduce Ferric iron (Fe 3 +) to Ferro (Fe 2 +) in the intestinal so that iron is easily absorbed by the body (Eliagita *et al.*, 2017).

In addition, non pharmacology therapy in 1st group at 3rd order is papaya leaf juice (*Carica Papaya L*). The best concentration of papaya leaf juice that most effectively increases Hb levels of pregnant women is the consumption of 75% papaya leaf juice (5.25x10⁶ / mm³) consumed for 14 days. The content of Fe and vitamin C in papaya leaf juice can increase the number of

erythrocytes of anemic wistar rats. Furthermore, the content of vitamin A can affect the formation of hemoglobin and very good for maintaining the health of epithelial tissue including the endothelium in blood vessels. The presence of adequate vitamin A in the body in pregnancy will increase the Hb value (Hamidah, Anggereini and Nurjanah, 2017).

The 4th non pharmacology therapy in 1st group is an avocado juice (*Persea Americana Mill*). Avocado is a fruit that rich in vitamin A, 180 IU/ 100 grams and Fe. Vitamin A is needed in several important processes of the body such as metabolism, hematopoiesis, erythropoiesis, regulation of sexual differentiation, plays a role in the immune system including the formation of erythrocytes, to synthesize proteins that will impact the growth of bone cells. The formation of Hb in the blood requires three basic ingredients, namely Fe, folic acid, and vitamin C. Avocado contains vitamin C nutrients, namely 13mg/ 100 gram, Fe 1 mg/ 100 gram and vitamin A 146 IU/ 100 gram. This study is in line with study that conducted by Feriyal which also says that there is an effect of giving avocados for 14 days to increase Hb (Utari, Setyaningsih and Suwondo, 2020).

The 5th non pharmacology therapy in 1st group is red spinach juice (*Amaranthus Tricolor*). In every 100 grams of red spinach, is there energy 41.2 kcal, 6.3 grams of carbohydrate, 2.2 grams of protein, 0.8 grams of fat, 520 mg of Ca, 2.2 grams of fiber, 62 mg of vitamin C, and 7 mg of Fe and several other vitamins. The main type of carotenoid in red spinach is beta carotene. Whereas the other active substance is chlorophyll (Simatupang, 2021).

The red spinachs contained flavonoids i.e lutein and quercetin. It is powerful antioxidants that can trap superoxide free radicals and limit the oxidation of lowdensity lypo protein (LDL) cholesterol. Any two types of spinach, namely green spinach and red spinach. Both of them are rich in vitamin C, but red spinach contain more Fe and green spinach contain rich in vitamin A. Therefore, consumption red spinach juice every day can be used as an alternative therapy to prevent anemia in

pregnancy (Simatupang, 2021).

The 6th non pharmacology therapy in 1st group is a decoction of sweet potato leaves (*Ipomoea Batatas*). One of them that can increase hemoglobin which it is vegetables. It is sweet potato leaves. A decoction of sweet potato leaves contains vitamins and minerals that needed by the human body. Minerals such as Ca, F, Fe, Na and K are abundant in sweet potato leaves, in each decoction of 100 grams of sweet potato leaves contains 117 mg of Ca, 1.8 mg of Fe, 3.5 mg of carotene, 7.2 mg of vitamin C, 1.6 mg of vitamin E and vitamin K 0.5 mg, vitamin B, and beta-carotene. The role of vitamin C is to accelerate the absorption of Fe in the body or intestine, so that anemia can be resolved and Fe minerals are needed to carry oxygen throughout the body (Awatiszahro and Sabda, 2021).

The 7th non pharmacology therapy in 1st group is red guava (*Psidium Guajava L.*). Consumption of red guava juice at a dose of 250 ml every day for 2 weeks is proven to increase hemoglobin quickly (Olii *et al.*, 2022). Each 100 mg guava contains 49 calories, 0.9 gram protein, 0.3 gram fat, 12.2 gram carbohydrates, vitamin A 25 IU, vitamin B1 0.05 mg, 14 mg calcium, 28 mg phosphorus, 1.1 mg iron, and 86 gram water. Red guava is also high in vitamin C (300-400 mg). Vitamin C can increase 4 times the absorption of non-heme Fe and by 400 mg vitamin C will increase 50% Fe absorption (Olii *et al.*, 2022).

The 8th non pharmacology therapy in 1st group is roselle extract (*Hibiscus Sabdrariffah*). The experimental group that giving rosella extract at a dose of 115.2 mg/ kg body weight/ day for 10 days and combination with Fe tablets consumed in midnight; while the control group was given Fe tablets only. Every 100 grams of dried rosella extract contains 260-280 mg of vitamin C, vitamins D and vitamin B2. Vitamin C content in dried rosella extract is 2.5 times higher than guava, 3 times higher than black grapes, 9 times higher than oranges, 10 times higher than star fruit. In addition, it contains high Ca (486 mg/ 100 grams), Mg and omega-3, vitamins A, Fe, potassium (K), beta carotene and essential fatty acids (Nisa, Soejoenoes and Wahyuni, 2017).

The 9th non pharmacology therapy

in 1st group is catfish. This study was conducted on pregnant women in the third trimester before and after giving fried catfish cake. Fried catfish cake gave during the 3rd trimester of pregnancy is proven to increase Hb levels. Changes in the 3rd trimester of pregnancy are in the form of increased basal metabolism, appetite is quite good, and usually the mother always feels hungry. This is due to the rapid growth of the fetus. Therefore, various possibilities can occur including anemia in pregnancy. In 100 gram of catfish contains high protein, omega 3 fatty acids, F, vitamin B12 (Suryani *et al.*, 2021).

The 10th non pharmacology therapy in 1st group is green bean juice (*Phaseolus Radiatus L.*). Consumption of green beans at a dose of 100 mg and Fe 1x1 supplements for 20 days obtained average Hb levels in the experimental group was 12.1588 gram/ dL. Green beans are a type of legume with a high Fe content, especially in embryos and seed shells. The nutritional composition is beneficial for pregnancy to produce erythrocytes and prevention of anemia. It contains phytochemicals which help the hematopoiesis process, other nutritional elements, namely Ca, phosphorus (F), Fe, Na, and Kalium. It has beneficial for pregnant women. The green beans content of Fe per 100 grams is 6.7 mg (Hidayati and Roviatusun, 2021).

The 11th non pharmacology therapy in 1st group is the provision of boiled chicken eggs. The content in 1 chicken egg is good energy for the body in pregnant women. Either boiled, half-cooked or scrambled can increase the number of erythrocytes. Nutritional elements in 1 boiled chicken egg contain 154 k.cal of energy, protein 12.2 gram, carbohydrate 0 gram, fat 0 gram, Ca 54 mg, Phosphorus 0 mg, and Fe 2.7 mg. Fe can increase hemoglobin in malnourished on pregnant women, while protein is a substance responsible for building muscles, body tissues, bone tissue which is also very important for fetal growth and development (Rofiah and Mawarti, 2022).

The 12th non pharmacology therapy in 1st group is soy milk. The results showed a significant result in hemoglobin levels after being given homemade soy milk for 3 months

(Farisni, Fitriani and Yarmaliza, 2019). Soybeans rank 3rd in Fe content after meat and cereals at 8.8 mg. To get good soy milk and suitable for human consumption, its manufacture has several requirements needed, namely free from soy smell and taste, antitrypsin-free, and has good colloidal stability. Homemade soy milk added honey can help meet the nutritional needs of pregnant women, especially the needs of Fe and protein to prevent anemia. Both soy milk and honey contain 8.8 mg and 0.9% Fe, respectively. Honey added to homemade soy milk is a sugar substitute because honey is healthier. In addition, honey is also a source of vitamins and minerals. It is very easily digested by the most sensitive stomach, making it suitable for consumption by pregnant women (Farisni, Fitriani and Yarmaliza, 2019).

Furthermore, the 13th non pharmacology therapy in 1st group is honey. As explained earlier that honey has many benefits and good nutritional content. Giving honey for 15 days/ 100 ml can increase hemoglobin levels in pregnant women. The nutritional content of honey can provide benefits and provide beneficial effects from different antioxidants, especially vitamins C and E, which are found in various models of healing diseases in mice and humans using active antioxidants (Hotima *et al.*, 2022).

CONCLUSION

There are 23 non pharmacology therapies that can increase hemoglobin in pregnant women grouped into 3 groups ranging from the most effective, effective, and quite effective. Non pharmacology therapy in the 1st group that the most effective, namely yellow pumpkin seeds, papaya fruit, papaya leaf juice, an avocado juice, red spinach juice, sweet potato leaf decoction, red guava, roselle tea, fried catfish, green bean juice, boiled chicken eggs, soy milk, honey.

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