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# The Effect of Counseling About Implants Contraception Using Flip Chart Media on The Anxiety Level of Prospective Acceptors

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**A B S T R A C T**

The contraceptive method that dominates the choices of couples of childbearing age (PUS) in the city of Surabaya in 2022 is the Non-Long-Term Contraceptive Method (Non-MKJP) compared to the Long-Term Contraceptive Method (MKJP). The low number of acceptors of contraceptive implants is due to the anxiety level of potential acceptors. This research aimed to determine the effect of implant contraceptive counselling using flip charts on the anxiety level of potential acceptors. This research is pre-experimental design research. We used a purposive sampling technique to select the sample, which included 15 respondents. The independent variable was counselling on contraceptive implants using flip chart media, while the dependent variable was anxiety of potential acceptors. Data collection used the Hamilton Anxiety Rating Scale (HARS) questionnaire. The Wilcoxon Signed Ranks Test was used to analyse the presence of influence with a significance value of <0.05. The results of the study showed that the anxiety level of prospective acceptors before being given intervention, the majority (73.3%) of respondents had a mild level of anxiety after being given the intervention, with almost all (93.3%) of respondents having no anxiety. From the results of the analysis, the result was 0.001, which means <0.05, so it can be concluded that there is an influence of implant contraceptive counselling using flip chart media on the anxiety level of potential acceptors. Based on the description above, it can be concluded that there is an influence of implant contraceptive counselling using flip chart media on the anxiety level of prospective acceptors.

## INTRODUCTION

The use of contraceptives in the city of Surabaya in 2022 will reach 77.28%. This number has decreased compared to contraceptive users in 2021, reaching 78.61%. The contraceptive method that dominates the choices of couples of childbearing ages (PUS) is the Non-Long-Term Contraceptive Method (Non-MKJP), namely injections (62.45%), compared to the Long-Term Contraceptive Method (MKJP), namely implants (4.12%). Based on the 2022 Surabaya City Health Profile, MKJP implant acceptors in the Balongsari Community Health Centre area were 7.74%. This number is lower compared to non-MKJP injection acceptors (48.96%) (Dinas Kesehatan Kota Surabaya, 2022). Based on a preliminary study conducted by researchers at the Balongsari Health Centre, Surabaya City Region, it was found that women of childbearing age (WUS) who conducted interviews with midwives found that most of the reasons prospective acceptors did not want to use implants were because they were afraid of the installation process, worried about side effects and lacked knowledge about implants. Previously, the counselling method that had been applied at the Balongsari Community Health Centre to clients was counselling alone without any media. The low level of knowledge of prospective implant contraceptive acceptors at the Balongsari Health Centre in the Surabaya City Region made researchers want to conduct



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this research. The novelty of this research is the combination of several variables, and the development of media used for counselling. In Rasyid's research, it was found that counselling before implant installation greatly influenced the anxiety level of prospective implant acceptors, including differences in anxiety levels before and after providing information about contraceptive implants. Conveying information through counselling will make the dissemination of information more efficient. Delivery of information with counselling can be done through print and electronic media. Print media that is easy to use is flip chart media. This medium is widely used because it is relatively easy to make and easy for counsellors to understand (Rasyid, 2019). In line with Ni Made Wacikadewi's research (2021), flip chart media is more effective and has an influence on the knowledge provided before and after counselling (Wacikadewi Ni Made, 2021). The formulation of this research is, "Is there an influence of contraceptive implant counselling using flip chart media on the anxiety level of potential acceptors?" Based on the description above, the researcher wants to research "The Effect of Implant Contraceptive Counselling Using Flip Chart Media on the Anxiety Level of Prospective Acceptors" at the Balongsari Community Health Centre, Surabaya City Region.

## METHOD

The research design used one group pretest posttest to determine the effect of implant contraceptive counselling using flip chart media on the anxiety level of prospective acceptors by giving a pretest first using the Hamilton Anxiety Rating Scale (HARS) questionnaire to determine the anxiety level of prospective acceptors before being given intervention and providing Thet-test uses the Hamilton Anxiety Rating Scale (HARS) questionnaire to determine the anxiety level of potential acceptors after being given the intervention. The population in this study is based on the 2022 Surabaya City Health Profile; the number of active family planning participants for implant contraception is 358 people, and the sample is 15 respondents who are prospective implant acceptors (Dinas Kesehatan Kota Surabaya, 2022). The sampling technique in this research is purposive sampling, where the purposive sampling technique is a technique for determining samples with certain considerations according to the researcher, namely potential new implant acceptors. In this study, to measure the dependent variable, researchers used a collection technique, namely a questionnaire. The questionnaire uses the Hamilton Anxiety Rating Scale (HARS), which consists of 14 symptom groups. There may be more than 1 (one) answer in each number. Each number value (score) from the 14 groups of symptoms is added up, and from the results of this addition, a person's degree of anxiety can be determined. Data analysis used SPSS IBM Statistics Version 27 with the Wilcoxon Signed Rank Test. This research uses flip chart media, namely a board that has legs where the sheets can be clamped. A flip chart is also a collection of summaries, diagrams, images and tables that can be opened and replaced according to the topic you want to display. The advantage of this

flip chart is that it does not require electricity, is economical, and provides concise and practical information. This media is also suitable for use indoors, is easy to carry anywhere, and is useful for reminding presenters and media users of the message they want to convey (Wacikadewi Ni Made, 2021).

## RESULT

General Data

1. Characteristics of Respondents Based on Age

The respondents in this study were 15 prospective implant contraceptive device acceptors at the Balongsari Community Health Center in March – April 2024. Based on age characteristics, the respondents were divided into 25 years, 30 years, and 35 years, as presented in Table 1.

Table 1. Frequency Distribution of Respondent Characteristics in Research on the Effect of Implant Contraceptive Counseling Using Flip Chart Media on the Anxiety Level of Prospective Acceptors.

| Usia | Frekuensi | Frekuensi (%) |
|---|---|---|
| | N | % |
| 25 – 29 years | 6 | 40 |
| 30 – 34 years | 5 | 33,3 |
| 35 years | 4 | 26,7 |
| Total | 15 | 100 |

Table 1 shows that the age of respondents at the Balongsari Community Health Center is almost half (40%) of the respondents aged 25 - 29 years.

2. Characteristics of Respondents Based on Education Level

Based on the level of education, the characteristics of respondents are divided into three, namely primary education, secondary education, and higher education, which can be seen in Table 2 below.

Table 2. Frequency Distribution of Respondent Characteristics in Research on the Effect of Implant Contraceptive Counseling Using Flip Chart Media on the Anxiety Level of Prospective Acceptors.

| Education Level | Frekuensi | Frekuensi (%) |
|---|---|---|
| | N | % |
| Primary Education (SD, SMP) | 6 | 40 |
| Secondary Education (SMA, SMK) | 6 | 40 |
| Higher Education (Diploma, S1, S2) | 3 | 20 |
| Total | 15 | 100 |

Based on Table 2, it shows that the education level of respondents at the Balongsari Community Health Center is almost half (40%) of the respondents who have primary and secondary education.

Custom Data

1. Identify the anxiety level of prospective acceptors before and after counseling for implant contraception using flip charts.


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Table 3. Frequency Distribution of Anxiety Levels of Prospective Acceptors Before and After Being Given Counseling on Implant Contraception Using Flip Chart Media.

| Anxiety Level | Before Counseling | | After Counseling | |
|---|---|---|---|---|
| | N | % | N | % |
| No anxiety | 0 | 0 | 14 | 93,3 |
| Mild anxiety | 11 | 73,3 | 1 | 6,7 |
| Moderate anxiety | 4 | 26,7 | 0 | 0 |
| Severe anxiety | 0 | 0 | 0 | 0 |
| Very severe anxiety / panic | 0 | 0 | 0 | 0 |
| Total | 15 | 100 | 15 | 100 |

Based on Table 3, many prospective acceptors (73.3%) of respondents had a mild level of anxiety before being given implant contraceptive counseling using flip chart media. Then, after being given the intervention, almost all (93.3%) of the respondents had no anxiety.

2. The Effect of Implant Contraceptive Device Counseling Using Flip Chart Media on the Anxiety Level of Prospective Acceptors

Table 4. Analysis of the Effect of Implant Contraceptive Counseling Using Flip Chart Media on the Anxiety Level of Prospective Acceptors.

| | n | Mean | Minimum value | Maksimum value | Standar Deviasi | *p-value* |
|---|---|---|---|---|---|---|
| Before counseling | 15 | 2,26 | 2.00 | 3.00 | 0,457 | 0,001 |
| After counseling | 15 | 1,06 | 1.00 | 2.00 | 0,258 | |

Based on table 4 Showing the results of the Wilcoxon Sign Rank Test test, the level of anxiety of prospective acceptors before and after being given implant contraceptive counseling using flip chart media, the results showed a significance value of <0.05, namely 0.001, which means HI was accepted and there was an influence of implant contraceptive counseling using flip chart media on the level anxiety of potential acceptors.

## DISCUSSION

Anxiety Levels of Prospective Acceptors Before and After Being Given Counseling on Implant Contraception Using Flip Chart Media.

Based on the research results, before being given intervention in the form of implant contraceptive counselling using flip chart media, the majority (73.3%) of respondents had a mild level of anxiety. Then, after being given the intervention, almost all (93.3%) of the respondents had no anxiety. According to Setiani's research, one action to reduce anxiety levels is to prepare the client mentally. One of the ways that mental preparation can be done is through health education. The ability to listen actively to both verbal and nonverbal messages is essential to building a trusting relationship with the patient and family. Health education before the procedure can help clients and families identify perceived concerns (Setiani et al., 2021). In line with the research results, Rafa explained that effective contraceptive counselling can


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increase the use of contraceptive implants. Through effective counselling, mothers will have a better understanding of implantable contraceptives so that they can increase coverage among mothers who receive implantable contraceptives. Counselling that is carried out effectively can increase the understanding of prospective acceptors, which in turn can reduce feelings of anxiety and fear and reduce the level of anxiety of prospective acceptors (Widaryanti et al., 2021). Supported by Maftuha's research, contraceptive counselling influences contraceptive decision-making. Providing timely advice and using ABPK media to provide confidence and ease in receiving information so that, ultimately, mothers can use family planning according to their wishes and needs. Providing systematic and complete counselling regarding advantages, benefits, and time periods will give postpartum mothers insight into choosing the right type of contraception according to their needs (Maftuha et al., 2022). Anxiety is a feeling of fear that is unclear and not supported by circumstances. When anxious, a person feels anxious/afraid/afraid that a disaster will occur, even though he does not understand why these threatening feelings can arise (NNT Ariwangi, 2020).

Based on age at the Balongsari Community Health Centre, it shows that almost half (40%) of the respondents are aged 25 - 29 years. This is in accordance with the factors that influence anxiety levels, namely intrinsic factors, one of which is age, where anxiety disorders often occur in women between the ages of 21 and 45 years (Wijayanti et al., 2022). In the researcher's opinion, basically, this research is in accordance with the theory, namely that contraceptive implant counselling using flip chart media influences the anxiety level of potential acceptors. Flip chart media is easy to use, economical, concise, and practical so that it can make it easier for potential acceptors to receive information, gain a good understanding, and reduce the anxiety level of potential acceptors (Wacikadewi Ni Made, 2021). Through contraceptive tool counselling using flipchart media, it can also make it easier for midwives and health workers to provide counselling. Because, so far, the counselling carried out at the Balongsari Community Health Centre has only been in the form of ordinary counselling without accompanying media, so that the knowledge and understanding of prospective implant acceptors is less of a cause for fear and anxiety about side effects as the reason.

The Effect of Implant Contraceptive Counseling Using Flip Chart Media on the Anxiety Level of Prospective Acceptors.

The research results show that there is an influence of providing implant contraceptive counselling using flip chart media on the anxiety level of prospective acceptors at the Balongsari Community Health Centre. The results of statistical tests on the level of anxiety of prospective acceptors before and after being given counselling for implant contraceptives using flip chart media using the Wilcoxon Sign Rank Test showed that there was an influence of counselling for implant contraceptives using flip chart media on the anxiety level of prospective acceptors at the Balongsari Community Health Centre. According to


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Rasyid's research, counselling before implant installation greatly influences the anxiety level of prospective implant recipients, including differences in anxiety levels before and after providing information about contraceptive implants. Efficient delivery of information through counselling will make the dissemination of information more efficient in the form of attractive flip charts, helping mothers participate more in asking questions and be able to understand what their needs are (Rasyid, 2019). In line with Rika Wita's research, there is a difference between being given counselling and not being given counselling. This is because through counselling, acceptors can see the problem more clearly and choose their own solution based on the information they have previously received. In the end, the acceptor can determine the choice of contraceptive method according to his wishes and not regret his decision later. So, acceptors will use contraception for a longer period (Sandi, 2018). Supported by Retnani's research, the low number of acceptors of contraceptive implants is caused by the anxiety level of potential acceptors. There is an influence of therapeutic communication on anxiety levels, so it is very important to provide complete information about contraceptive implants so that acceptors can use them without feeling anxious (Retnani, 2021). Counselling is providing support to people who are experiencing problems through counselling provided by counsellors and guiding them towards solutions to the issues they are experiencing (Daulay et al., 2022). Counselling is an ongoing process that is integrated into all aspects of health services, including family planning counselling. This information is not provided just once but at the time the service is provided (Maftuha et al., 2022).

Based on the level of education in extrinsic factors that influence the anxiety level of prospective acceptors at the Balongsari Community Health Centre, almost half (40%) of the respondents have primary and secondary education levels where education generally helps change the thinking patterns, behaviour and decision-making of prospective implant acceptors (Wijayanti et al., 2022). According to the researchers, after being given intervention in the form of counselling on contraceptive implants using flip chart media, the anxiety level of potential acceptors decreased. This shows that providing intervention in the form of contraceptive implant counselling using flip chart media can influence the anxiety level of prospective acceptors. The level of anxiety of prospective acceptors can influence the understanding of prospective acceptors, which can cause feelings of fear, anxiety, and panic about contraceptive implants. Thus, contraceptive implant counselling using flip charts can contribute to reducing anxiety levels and increasing implant acceptors.

## CONCLUSION

The following can be inferred from the research findings and the discussion in the previous chapter about how implant contraceptive counselling using flip chart media affects prospective acceptors' anxiety levels at the Balongsari Community Health Centre: It can be concluded that potential acceptors' anxiety levels


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prior to receiving intervention in the form of implant contraceptive counselling using flip chart media. Most of those surveyed experienced minor anxiety. Nearly all the responders reported feeling less anxious after receiving the intervention. Furthermore, the Balongsari Community Health Centre's flip chart-based counselling for contraceptive implants affects potential acceptors' anxiety levels.

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# The Correlation between Breakfast Habits and Nutritional Status in School-Age Children at Adiarsa Barat 1 Elementary School

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**A B S T R A C T**

The health and development of school-aged children are greatly influenced by their breakfast habits, which provide essential energy and nutrients for daily activities. However, many children often skip breakfast, which can affect their nutritional status. This research is an observational study with a cross-sectional approach conducted at Adiarsa Barat Elementary School 1. The subjects were 66 sixth-grade students selected through purposive sampling. Breakfast habits data were collected using a questionnaire, while nutritional status was measured based on height and weight. The correlation between breakfast habits and nutritional status was analysed using the Spearman Rho test with SPSS version 25.0. About 60.6% of respondents had breakfast 1-3 times a week, while 39.4% had breakfast 4-7 times a week. Most respondents (69.7%) had a normal nutritional status, with 3.0% experiencing malnutrition and 12.1% being obese. The analysis results showed a significant correlation between breakfast habits and nutritional status (p value = 0.000) with a correlation coefficient of -0.568. There is a significant correlation between breakfast habits and nutritional status in schoolchildren, although the negative direction of the correlation suggests that other influencing factors may be present.

## INTRODUCTION

The health and development of children at primary school age is key in shaping a healthy and productive future generation. One crucial component of child development is adequate nutrition, which has a significant impact on their intelligence and daily productivity. In school-age children, several nutritional problems such as protein deficiency, iron deficiency, iodine deficiency, and overnutrition are common. A factor that can help overcome nutritional problems in school-age children is to familiarise them with a healthy breakfast (Munawaroh, Muftiana, and Dwirahayu, 2020).

Breakfast, as one of the main meals, plays a role in providing energy and nutrients needed for physical and cognitive activities throughout the day (Syahroni et al., 2021). Breakfast has various significant benefits for children. A regular breakfast can improve concentration, strengthen memory, and enhance learning ability. Children who regularly eat breakfast generally have better academic performance compared to children who skip (Surijati, Hapsari, and Rubai, 2021). In addition, breakfast also plays a role in maintaining a healthy weight. Children who do not eat breakfast tend to consume high-calorie foods during the day and night, which can increase the risk of obesity.

Good breakfast habits depend not only on the child themselves but also on the role of parents and the family environment. Parents have a key role in providing a healthy breakfast and educating children on the importance of breakfast. In addition, support from schools, such as providing healthy breakfast



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programmes, can also help improve children's breakfast habits. Many studies have shown the importance of breakfast, but more studies specific to local contexts, such as Indonesia, are needed. This is important because cultural, social and economic factors can influence children's eating habits and nutritional status (Mardihani and Husain, 2021).

Based on surveys, there are still many elementary school-aged children who often skip breakfast. The reasons often cited include lack of time in the morning, lack of appetite in the morning, and lack of awareness of the importance of breakfast for health (Yuwanti, Mulyaningrum and Susanti, 2021). This irregular breakfast can have a negative impact on children's nutritional status. Nutritional status is an important indicator that reflects the state of children's health. Good nutritional status indicates that the child is getting adequate and balanced nutrient intake, which is necessary for optimal growth and development. Conversely, poor nutritional status can lead to various health problems, such as malnutrition, anaemia, and growth disorders (Ufiyah Ramlah, 2021). Nutritional status is also an important parameter in assessing the health of the body, which is determined by the balance between intake and expenditure of nutrients. These nutrients are obtained from food and drinks consumed. When there is a balance between the amount of nutrients entering the body and the nutrients released or used by the body, nutritional status will be in an optimal or normal condition (Anugraheni and Mulyana, 2019).

Data from various surveys shows that the prevalence of malnutrition, including stunting, wasting, and underweight, is still quite high. In addition, the problem of childhood obesity is also on the rise (Rahma et al., 2024). According to Basic Health Research data in 2018, the prevalence of nutritional status in children aged 5-12 years, as measured by body mass index by age, showed that 2.4% of them were categorised as very thin, 6.8% as underweight, 10.8% as overweight, and 9.2% as obese. In West Java province, the prevalence of nutritional status of children aged 5-12 years includes 1.9% very underweight, 5.2% underweight, 11.7% obese, and 19.6% obese, placing West Java at the 12th highest after DKI Jakarta (Depkes RI, 2018).

This study aims to identify the relationship between breakfast habits and the nutritional status of school children. Through this deeper understanding of breakfast habits, it is hoped that appropriate recommendations can be made to improve children's breakfast habits and nutritional status, which in turn can support their health and academic achievement.

## METHOD

This study is an observational study using a cross-sectional approach. This study was conducted in April involving students in grades VI A and VI B at SD Negeri Adiarsa Barat 1 Karawang. The population in this study were all grade VI students, totalling 93 people. The inclusion criteria in this study were students who were present and willing to follow the research flow, and the exclusion criteria were students who

were not present when the study was conducted. The sampling technique used in this study was purposive sampling technique with inclusion criteria totalling 66 people in Juding, 33 girls and 33 boys. To find out breakfast habits in school-age children, researchers distributed questionnaires in the form of breakfast habits that had been tested for reliability to 66 respondents with an Alpha Cronbach's value of 0.792. This value is quite high and acceptable because it is greater than the correlation coefficient of 0.300 (Dahlan S, 2014). While nutritional status is obtained through measurement of height and weight. To determine the relationship between breakfast habits and nutritional status in schoolchildren, bivariate tests were carried out with the help of the SPSS version 25.0 application, and statistical tests were analysed using the Spearman Rho test.

## RESULT

Table 1. Respondent Characteristics

| No | Variables | Total | % |
|---|---|---|---|
| 1 | Gender | | |
| | Male | 33 | 50 |
| | Female | 33 | 50 |
| 2 | Age | | |
| | 11 Years | 6 | 9,1 |
| | 12 Years | 50 | 75,8 |
| | 13 Years | 8 | 12,1 |
| | 15 Years | 1 | 1,5 |
| | 16 Years | 1 | 1,5 |
| 3 | Nutritional Status | | |
| | Malnutrition | 2 | 3,0 |
| | Undernourished | 4 | 6,1 |
| | Normal | 46 | 69,7 |
| | Overweight | 6 | 9,1 |
| | Obesity | 8 | 12,1 |
| 4 | Breakfasr Frequency | | |
| | 1-3 times a week | 40 | 60,6 |
| | 4-7 times a week | 26 | 39,4 |
| 5 | Breakfast Habits | | |
| | Always | 26 | 39,4 |
| | Sometimes | 40 | 60,6 |
| 6 | Breakfast Time | | |
| | Before leaving for school | 50 | 75,8 |
| | Before entering the class | 10 | 15,2 |
| | During the first break | 6 | 9,1 |
| 7 | Breakfast Location | | |
| | Home | 50 | 75,8 |
| | School | 16 | 24,2 |
| 8 | How to get breakfast | | |
| | Prepared by mom | 45 | 68,2 |
| | Buy outside | 6 | 9,1 |
| | School canteen | 15 | 22,7 |

Based on Table 1, the age of respondents ranged from 11 to 16 years old; the average age of respondents was 12 years old, with a balanced gender proportion between males (50.0%) and females (50.0%). A total of 26 respondents (39.4%) had the habit of always having breakfast, and 40 respondents (60.6%) had the


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habit of sometimes having breakfast. Most of the respondents' nutritional status was normal; as many as 46 respondents (69.7%) were normal, while the minority were malnourished as many as 2 respondents (3.0%) were malnourished. There were 40 respondents (60.6%) who had breakfast 1-3 times a week, which was categorised as sometimes having breakfast. Meanwhile, 26 respondents (39.4%) had breakfast 4-7 times a week, which was categorised as always having breakfast. A total of 50 respondents (75.8%) chose breakfast before leaving for school, 10 respondents (15.2%) chose breakfast before entering class, and 6 respondents (9.1%) chose breakfast during the first break. A total of 50 respondents (75.8%) had breakfast at home. Meanwhile, 16 respondents (24.2%) had breakfast at school. A total of 45 respondents (68.2%) had breakfast prepared by their mothers, 6 respondents (9.1%) had breakfast bought outside, and 15 respondents (22.7%) had breakfast at the school canteen.

Table 2. Correlation between Breakfast Habits and Nutritional Status

| No | Variables | Correlations |
|---|---|---|
| 1 | Breakfast Habits | |
| | Correlation Coefficient | -0,568 |
| | *p-value* | 0,000 |
| 2 | Nutrition Status | |
| | Correlation Coefficient | -0,568 |
| | *p-value* | 0,000 |

Based on Table 2, it is known that the breakfast habit variable is related to the nutritional status variable with a p-value of 0.000.

## DISCUSSION

The elementary school period is a period that drains a lot of energy because it must be active and is a period of growth and development of the body that requires adequate nutritional intake both in quality and quantity. Breakfast is important for elementary school children so that their nutritional needs are met (Munawaroh, Muftiana, and Dwirahayu, 2020). The study showed that out of 66 respondents, 40 children (60.6%) sometimes had breakfast, while 26 children (39.4%) had breakfast. Respondents who sometimes have breakfast usually have 1-3 breakfasts a week. Breakfast is strongly associated with mental health because breakfast provides positive benefits for the brain that can make it smarter and more sensitive and increase concentration. The habit of eating breakfast has a positive influence on the body's ability to perform activities. Most of the respondents' nutritional status was normal, namely 46 respondents (69.7%), while 2 respondents (39%) were malnourished. In this study, nutritional status assessment was carried out using the BMI z-score according to age.

The results showed that 40 respondents (60.6%) sometimes had breakfast. This can be one of the factors causing nutritional problems in elementary school children. The results of the Spearman's rho test obtained a p-value of 0.000 means that there is a relationship between breakfast habits and the nutritional status of


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school-age children at SDN Adiarsa Barat 1 Karawang. This is in accordance with the research of Amalia & Adriani in 2019, which found that there is a relationship between breakfast habits and the nutritional status of students at SMP Negeri 5 Banyuwangi, with a p-value of 0.049 (Amalia & Adriani, 2019).

## CONCLUSION

Based on the results of research conducted at SD Negeri Adiarsa Barat 1 Karawang, it can be concluded that there is a significant relationship between breakfast habits and nutritional status in school-age children, as indicated by a p-value of 0.000. The measured relationship showed a correlation coefficient of -0.568, indicating a strong relationship. However, the direction of this relationship is negative, meaning that an increase in breakfast habits tends to be followed by a decrease in nutritional status, or vice versa. This result suggests that although the relationship between the two variables is strong, it is possible that other factors influence the relationship so that the direction of the relationship is not unidirectional. Suggestions for future research are expected to use more detailed research instruments related to breakfast composition and the use of more comprehensive nutritional status assessment methods.

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# The Effect of Short Education Movies (SEM) on the Level of Knowledge of Adolescents in Preventing Bullying

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**A B S T R A C T**

Bullying is a negative behaviour that uses power to hurt individuals or groups verbally, physically or psychologically until the victim feels traumatised, pressured and helpless. This can occur due to a lack of knowledge among teenagers regarding bullying behaviour. This research aims to determine the effect of Short Education Movies (SEM) on the level of knowledge of teenagers in preventing bullying. This research uses pre-experimental techniques with a one-group pre-test/post-test design approach. The research sample was 36 teenagers taken based on inclusion and exclusion criteria using a sampling technique, namely purposive sampling. The results of the analysis obtained through the Wilcoxon signed-rank test on the pre-test and post-test on the knowledge variable are p=0.000 with a significance standard of p<0.05, which means there is an influence of the Short Education Movie (SEM) on the level of knowledge of teenagers in preventing bullying. Based on the results of this research, it is hoped that health workers, especially community nurses, can use short films as a health education medium to increase knowledge about bullying in teenagers.

## INTRODUCTION

During adolescence, there are usually many deviant social behaviours, one of which is bullying. Bullying behaviour is a social behaviour that violates the rules by using power to hurt individuals or groups either verbally, physically, or psychologically until the victim of bullying feels traumatised, depressed, and helpless. Examples of bullying behaviour include calling friend's stupid, cursing friends, teasing, hitting friends, saying rude things, pinching friends, or calling friends by their parents' names. According to the perpetrators of bullying, the actions they have done are normal. Bullies tend to feel satisfaction when they see victims of bullying crying, feeling afraid, and not confident. Meanwhile, teenagers who are involved as victims of bullying will feel disappointment, shame, and even hurt towards the perpetrators of bullying (Seto, 2022).

Based on statistical reports from the United Nations Children's Fund (2020), as many as 150 million students (12-15 years old) worldwide have reported experiencing bullying from their peers in the school environment. Incidents of bullying in Indonesia, based on data from the Indonesian Child Protection Commission (KPAI) in 2023, there were 271 cases of physical and psychological violence and bullying in the period January-September 2023 (KPAI, 2023). In 2022, in East Java Province, a total of 36 cases of bullying in schools were reported to the East Java Child Protection Agency (LPA) (Alifia, 2023). This shows that many teenagers still do not understand how to prevent bullying from happening to themselves or their peers.



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Factors that can trigger bullying incidents in teenagers include family environment, school environment, peers, surrounding environment, print media and television broadcasts (Zakiyah, Humaedi and Santoso, 2019). Another factor that can cause bullying is the level of knowledge. According to Andriati & Anissa (2020), one of the factors that can determine an individual's behaviour is the level of knowledge of the individual. A high level of knowledge is expected to create good actions from an individual to avoid bullying. The impact felt by victims of bullying can appear in all lines of life, both physical, social and psychological. Physical impacts occur if there is bullying, including physical violence, which can be in the form of bruises, wounds, or infections that can occur throughout the victim's body. Social impacts can be seen through poor ability to adapt in the social environment, such as being afraid to socialise with peers or being afraid to go to school. While psychological impacts that often arise include mental disorders such as feelings of lack of self-confidence, feelings of pressure, or feelings of uselessness that can lead to depression and feelings of wanting to commit suicide.

One of the things that can be done to prevent bullying is by providing education. The provision of education that is carried out can utilise various types of educational delivery media, for example, Short Education Movie (SEM). SEM is one of the media that has not been widely applied in providing education. Short Education Movie (SEM) can combine the senses of hearing, sight and skills in increasing the level of knowledge in adolescents. Short Education Movie (SEM) is also able to involve the senses of hearing and sight faster so that it can easily enter memory compared to media that can only be seen or heard. The purpose of this study was to determine the effect of Short Education Movies (SEMs) on the level of adolescent knowledge in preventing bullying.

## METHOD

This research method approach. The study began with an initial survey in November 2023, and data collection was carried out in February 2024 at MTs Muhammadiyah 29 Gedangan. The population in this study was all adolescents at MTs Muhammadiyah 29 Gedangan, totalling 64 adolescents. The sample of this study was 36 adolescents who were selected based on inclusion and exclusion criteria, and the sampling technique was purposive sampling. In the independent variable, the researcher used an instrument, namely SAP, by providing Short Education Movie (SEM) media with the title "Peace Cart", which was taken from the Smart Character YouTube channel of the Ministry of Education and Culture of the Republic of Indonesia. Meanwhile, the dependent variable used a questionnaire sheet that had gone through validity and reliability tests, with the results of the validity test r count> r table and the instrument reliability test value of 0.779, which means that the instrument is valid and reliable. The steps for data processing include editing, coding, scoring, and tabulating. Furthermore, the data was analysed using the Wilcoxon signed-rank test using SPSS.


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## RESULT

Table 1. Distribution of characteristics of adolescents at MTs Muhammadiyah 29 Gedangan

| No | Criteria | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Age | | |
| | 12 years old | 7 | 19,4 |
| | 13 years old | 14 | 38,9 |
| | 14 years old | 15 | 41,7 |
| 2 | Gender | | |
| | Male | 14 | 38,9 |
| | Female | 22 | 61,1 |
| 3 | Class | | |
| | Class 7 | 16 | 44,4 |
| | Class 8 | 7 | 19,4 |
| | Class 9 | 13 | 36,1 |

Based on Table 1, it is explained that almost all (41.7%) of 14-year-old teenagers, more than half (61.1%) of female teenagers, and almost all (44.4%) of teenagers are in grade 7. The results of this study indicate that female teenagers are more involved in bullying behavior. Verbal bullying and relational bullying are models of bullying that often occur in girls. At that age, teenagers tend to direct their attention more to social adaptation or socializing with peers who could potentially become part of the bullying circle.

Table 2. Distribution of Adolescent Knowledge Levels in Preventing Bullying Before and After Being Given Short Education Movies (SEM) to Adolescents at MTs Muhammadiyah 29 Gedangan

| Knowledge Level | Pre Test | | Post Test | |
|---|---|---|---|---|
| | f | % | f | % |
| Good | 2 | 5,6% | 36 | 100% |
| Enough | 20 | 55,6% | 0 | 0% |
| Less | 14 | 38,9% | 0 | 0% |
| Total | 36 | 100% | 36 | 100% |
| Mean | 61,11 | | 97,67 | |
| Std. Deviation | 12,718 | | 3,295 | |
| Wilcoxon Sign Rank Test | p=0,000 | | | |

Based on Table 2, data obtained that before being given Short Education Movie (SEM) more than half of the level of knowledge of adolescents was sufficient, amounting to 20 (55.6%) adolescents, after being given Short Education Movie (SEM) all adolescents amounting to 36 (100%) had a good level of knowledge. So, it can be concluded that there is an increase in knowledge in adolescents both in terms of value and category in preventing bullying after being given Short Education Movie (SEM). Table 2 also displays the results of data analysis that have been carried out by the Wilcoxon signed ranks test with the SPSS 27.0 For Windows program related to the pre-test and post-test values on the knowledge variable obtained that the significance number p = 0.000 with a significance standard of p <0.05, which means that there is an influence of the level of knowledge of adolescents in preventing bullying before and after being given Short Education Movie (SEM) in adolescents.


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## DISCUSSION

Level of Knowledge of Adolescents in Preventing Bullying Before Being Given Short Education Movie (SEM)

Based on the results of this study, it was found that before being given the Short Education Movie (SEM), more than half (55.6%) of the adolescents' level of knowledge was sufficient, and a small portion (5.6%) of the adolescents' level of knowledge was good. This can be caused by the lack of information or learning about bullying obtained by adolescents from educators at school or health workers in the surrounding environment, which can result in actions such as teasing, insulting, and hitting friends and causing bullying. In this study, the results obtained were that most adolescents thought that knowledge related to bullying was more related to actions that led to physical violence, while saying rude things and giving bad nicknames to friends was considered a joke for adolescents. The level of knowledge of adolescents before being given the Short Education Movie (SEM) was mainly in the sufficient and poor categories, which was caused by the lack of knowledge related to the impacts that could occur due to bullying behaviour in line with Notoatmodjo's theory in Livana et al. (2020), namely, knowledge is a series of ideas, thoughts, understandings and concepts possessed by humans regarding the world and its contents, including humans and their lives. According to Green in Andriati & Anissa (2020), knowledge is one of the factors causing bullying behaviour. A good level of knowledge is expected to create positive behaviour for individuals so that it can prevent them from engaging in bullying behaviour. Based on this description, researchers argue that knowledge has a vital role in determining behaviour; if individuals know a good category level, it will produce motivation to behave positively. For example, teenagers are not advised to engage in bullying behaviour without explaining the impact that will occur due to bullying behaviour. Teenagers will still try to engage in bullying behaviour because it is not based on knowledge about the effects of bullying behaviour.

Level of Knowledge of Adolescents in Preventing Bullying After Being Given Short Education Movie (SEM)

Based on the results of this study, it was found that after being given a Short Education Movie (SEM), there was a change in the level of knowledge, both in terms of value and category, from a level of expertise that was lacking and sufficient to good in all adolescents (100%). This fact states that there was a change in the category of adolescent knowledge after being given a Short Education Movie (SEM), which was initially more than half (55.6%) of teenage knowledge levels sufficient to a level of knowledge in the good category. This statement is in accordance with the theory that one of the aspects that can influence the level of adolescent expertise is the education received by adolescents through applying a Short Education Movie (SEM). In accordance with the results, which show that before being given a Short Education Movie (SEM), there were still many adolescents with sufficient knowledge. However,


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after being given a Short Education Movie (SEM), the number of adolescents who had good knowledge increased.

The methods and techniques used to deliver education play a significant role in supporting the success of providing this education. Supported by the theory according to Notoatmodjo (2019), namely the main stage in delivering education, namely by forming a message that is in accordance with the target, one of which is by selecting the right media, intensity, and duration of message presentation. Health education with appropriate press is expected to attract the attention of adolescents so that it can be used as a facility for adolescents to learn about bullying prevention. In line with the results of Nuraini (2022), learning experiences can be obtained through stages in the form of doing or going through what has been understood, stages of listening and paying attention using certain media, and stages of listening through language. Based on the research conducted, the researcher argues that after being given a Short Education Movie (SEM), there is an increase in adolescents' knowledge regarding bullying prevention. This is obtained through the selection of the right media. Through Short Education Movies (SEMs), adolescents can get information related to bullying prevention by utilising media that contain image and sound components, where the process of delivering information combines the senses of hearing and sight so that the process of providing information becomes more effective.

The Effect of Short Education Movies (SEM) on the Level of Knowledge of Adolescents in Preventing Bullying

Based on the results of this study, SEM can be applied to improve adolescent knowledge in preventing bullying. Based on Table 2, there is an increase in teenage expertise before and after being given a Short Education Movie (SEM). Before being given SEM, the majority of adolescents had sufficient and poor levels of knowledge. After being given SEM, there was a very significant increase; namely, all adolescents (100%) had a level of expertise in the good category, with a significance value in the Wilcoxon signed ranks test of $p = 0.000$. This states that Short Education Movie (SEM) influences the level of adolescent knowledge in preventing bullying at MTs Muhammadiyah 29 Gedangan. The results of this study are relevant to the research (Suhailah, Kusumaningrum, and Nastiti, 2019; Fitiriana, 2022; Febtrina et al., 2023; Sari and Erika, 2023), which shows the influence of the method of providing education with Short Education Movies (SEMs) on the level of student knowledge. The use of Short Education Movies (SEMs) as creative learning media involves attaching a composition of educational strategies. Through a combination of sound, images, and text, participants are the overall experience related to the topics shown. The use of technology in providing this education produces additional appeal, combining creative and innovative factors to strengthen knowledge about the concepts provided (Febtrina et al., 2023).

Based on the description above, providing education by applying Short Education Movies (SEMs) is an aspect that directly/indirectly influences the level of knowledge. By using SEM, teenagers are brought to pay attention to topics that have been presented in the form of short movies or short films by seeing and hearing events and descriptions related to bullying behaviour in teenagers. Thus, the ability of teenagers to understand and remember can increase, which can later encourage effectiveness in the information delivery stage. Therefore, Short Education Movie (SEM) is effective as a medium for delivering information that can be given to teenagers to increase their knowledge in preventing bullying.

## CONCLUSION

Based on the results of the study, it was concluded that short educational movies (SEMs) influence adolescents' level of knowledge in preventing bullying. This study can be a comparison and utilise Short Education Movie (SEM) media by considering the effectiveness of the duration of provision and the length of implementation of health education to obtain results according to expectations.

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# Risk Factors of Acute Respiratory Infection in Children Aged 6-12 Years in Urban Areas: A Literature Review Study

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**A B S T R A C T**

One disease that affects school-aged children is Acute Respiratory Infections (ARI). Acute Respiratory Infections (ARI) can be caused by various causative agents, such as viruses, bacteria, or even fungi; air pollution from smoke or gas can also cause Acute Respiratory Infections (ARI). The method used in preparing this article is a literature review. Article or journal searches were conducted on five databases: Mendeley, PubMed, ScienceDirect, Google Scholar, and Garuda. The keywords used in Mendeley, Google Scholar, and Garuda were "*Faktor Risiko ISPA*" AND "*Anak*", while PubMed and ScienceDirect used "risk factor" AND "acute respiratory infection" AND "child". Several risk factors exist for Acute Respiratory Infections (ARI) in children in urban areas. Environmental factors such as roofing, ventilation, and occupancy density are the risk factors for Acute Respiratory Infections (ARI) in urban school-aged children. Then, there are individual factors where age, gender, and other congenital diseases also affect the occurrence of ARI in children.

## INTRODUCTION

At school age, children are still vulnerable to disease, and this is a crisis that school-aged children must face (Sitohang, 2016). Acute Respiratory Infection (ARI) is among the most vulnerable diseases experienced by school-aged children, and this is due to the weak immune system of children, who are still susceptible to diseases that viruses and bacteria can easily enter the child's body (Tomatala et al., 2019). According to the Ministry of Health of the Republic of Indonesia (2023), respiratory diseases, or Acute Respiratory Infections (ARI), are one of Indonesia's most common health problems. Infectious diseases that attack the respiratory tract can be triggered by many things, including viruses, bacteria, fungi, and air pollution from smoke or gas that can cause Acute Respiratory Infection (ARI) and various other types of diseases (Putra and Wulandari, 2019).

Air pollution and smoke can be caused by environmental conditions around the place of residence and can affect the occurrence of ARI (Haryani and Misniarti, 2021). As smoke generated by parents who are smoking is included in factors that can affect exposure to respiratory tract diseases or ARI, the duration of smoking and the number of cigarettes consumed are also related to exposure to Acute Respiratory Infection (ARI) and other diseases associated with the respiratory system (Rullah, Arlianti, In, and Arbi, 2023). In addition, it can trigger various diseases, such as acute respiratory infections (ARI). This is interrelated because the surrounding environment is not proper, healthy, and clean due to bacterial and



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viral infections that can spread when children gather and play (Jayanti, Ashar, and Aulia, 2018). Densely populated residential areas like this are often seen in urban areas because many people move from villages to cities, which is what is commonly called urbanisation (Pasya, 2016).

According to the Central Bureau of Statistics of Indonesia (BPS), 15,736 cases of ARI occurred in Malang City in 2019. They became the highest disease in Malang City (Badan Pusat Statistik (BPS), 2019). Similarly, in Kupang City in 2018, Acute Respiratory Infection (ARI) occupied the top position as the disease with the highest incidence of 65,844 (Badan Pusat Statistik (BPS), 2019). In Tasikmalaya City, the ARI rate reached 36.466 in 2019 (Badan Pusat Statistik (BPS), 2020). Similarly, in Pakistan, the prevalence of Acute Respiratory Infections (ARI) in children was 29% (Mir et al., 2022). In contrast to rural areas, school-aged children are rarely affected by Acute Respiratory Infections (ARI) compared to children living in urban areas. This is influenced by residential or environmental factors such as air pollution, population density, cigarette smoke and kitchen smoke, nutritional status, and demographic factors such as age and other congenital diseases. Besides that, people who live in densely populated areas have a high risk of developing an infectious disease (Simbolon and Wulandari, 2023).

Urban areas have 1.2x more potential for ARI or Acute Respiratory Infection than rural or non-urban areas (Simbolon and Wulandari, 2023). Some of the effects of acute respiratory infections in school-aged children are body weakness, decreased appetite, influenza, malaise, headaches, and feelings of discomfort that will cause children's activities at school and at home to be disrupted and sleep quality to be affected (Sholeh, Juliningrum, and Rahmawati, 2024). Another impact that can be caused by respiratory tract diseases or ARI is that it can cause irritation and infection of the respiratory tract, sputum secretion, inflammation of the respiratory tract, coughing, chest pain, and shortness of breath (Cahyani et al., 2024). Therefore, early detection and treatment of acute respiratory infections will immensely help save lives, and paying attention to their developmental process is essential so that children can achieve their best potential from optimal child development. Therefore, this article aims to find out what factors can influence ARI in children aged 6-12 years in urban areas.

## METHOD

The preparation of this article uses the literature review method by following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and PECO (Population, Exposure, Comparison, Outcome) guidelines to identify and determine the risk factors for ARI in children ages 6-12 years in urban areas. The search for sources was carried out through databases of articles or journals published nationally and internationally and for searching articles or journals in 5 databases, such as Mendeley, PubMed, ScienceDirect, Google Scholar, and Garuda. The keywords used in Mendeley, Google Scholar, and Garuda were "Faktor Risiko ISPA" AND "Anak", while PubMed and ScienceDirect

used "risk factor" AND "acute respiratory infection" AND "child". In the search for articles in the PubMed database, there were 3,522 articles, Mendeley there were 96 articles, ScienceDirect there were 45,799 articles; in Google Scholar, there were 1,780 articles; and in Garuda, there were 10 articles. The total for all articles obtained was 51,204 articles.

After conducting the search process, a screening process was carried out wherein each database, an automatic filter process was carried out, which eliminated articles that were not included in less than five years (2019-2023), free full text, books & documents, clinical trials, and children 6-12 years old. After filtering, the articles obtained from the five databases were 1,868 articles. The next step is to eliminate articles based on duplication (articles published in all databases used), of which there are 7 duplicate articles. The next step is to filter articles based on PECO and Repository; in this process, the articles that have been obtained will be checked based on population, exposure, comparison, and the result. After all the screening processes, 8 articles will be used to prepare this article.

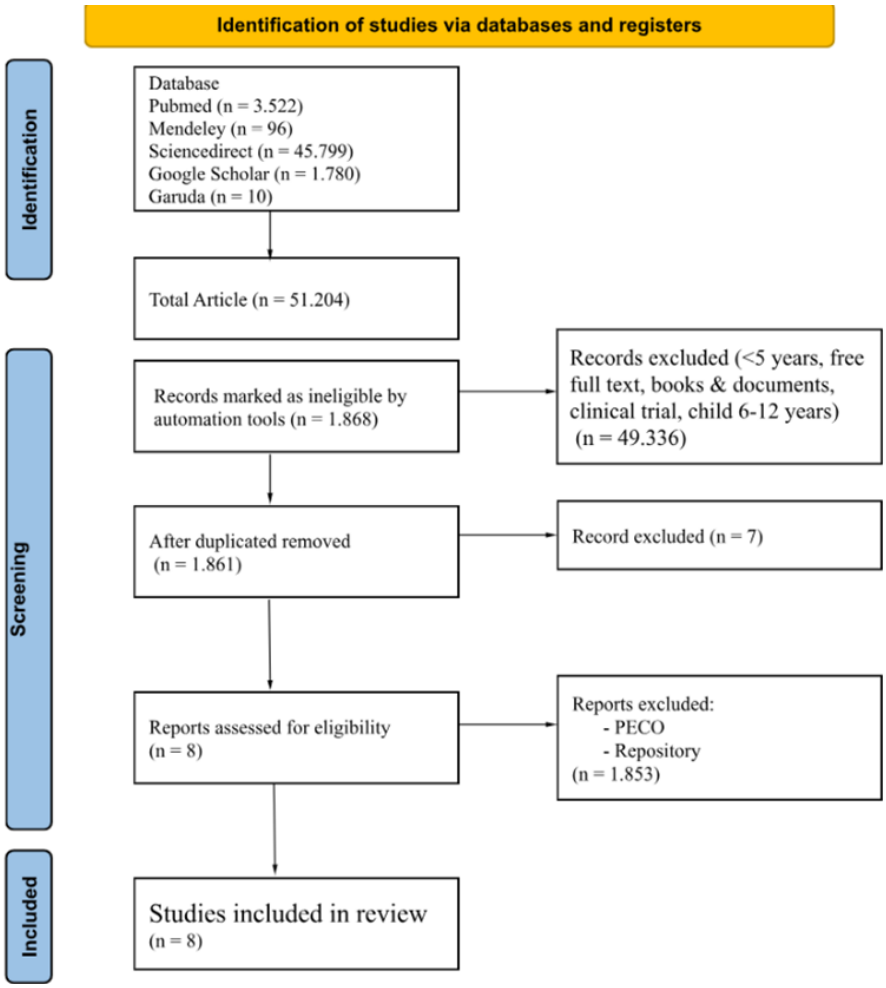



Figure 1. Article Selection with PRISMA Diagram


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## RESULT

The result of the search for scientific articles through various national and international databases, such as PubMed, ScienceDirect, Google Scholar, Mendeley, and Garuda, obtained eight supporting articles published between 2019 and 2024. The findings present a comprehensive study of the risk variables that cause Acute Respiratory Infection (ARI) in school-aged children. The keywords used were "ARI risk factors", "child", "risk factor", "acute respiratory infection", and "child". Researchers used the Boolean principle "AND" to narrow down the documents to be obtained.

Table 1. Study Results

| No | Researcher, Year | Title | Research Design | Sample Size | Results |
|---|---|---|---|---|---|
| 1 | Ritonga & Kurniawan (2021) | Relationship Risk Factors with Arrives in Children in The Working Area of The Tanjung Beringin Puskesmas, Serdang Bedagai Districtin 2020 | *Cross-Sectional* | 53 children aged 6-13 years in the working area of Tanjung Beringin health center. | The results showed that the p-value = 0.000 (p-value <0.05) for each risk factor. It can be concluded that there is a relationship between age, gender, height, and weight with the incidence of ARI in children. |
| 2 | Ningrum & Ardillah (2021) | Determinants of ARI in School-Age Children in Prabumulih | *Cross-Sectional* | 106 children aged 10-12 years in the Prabumulih Community Health Center area | The results showed a relationship between the incidence of ARI and the physical environment of the house. The most crucial factor is the type of roof. The absence of a ceiling will make it easier for dust to enter the house. |
| 3 | Tomatala, et al. (2019) | Relationship Between Physical Activities with The Construction of Artificials in School Age Children in Bringin District, Semarang District | *Correlation Study* | 62 elementary school children aged 6-12 years old in Bringin Subdistrict, Semarang Regency who had a history of ARI. | The correlation test results showed a weak association between physical activity and ARI recurrence with between physical activity and ARI recurrence with a p-value of 0.107, which means the significance value is 0.01. It can be assumed that other factors besides physical activity are associated with ARI risk factors. In addition, the coefficient of the relationship between physical activity was 0.206. This proves that a person's chance of suffering from ARI will increase along with the level of frequent physical activity. |
| 4 | Hanifiah, Y (2024) | Relationship Between History of Infectious Disease Symptoms and Sanitation with Nutritional Status of Children Aged 6-12 Years at UPT SDN 060831 Medan | *Cross-Sectional* | 225 children 6-12 years old | The results showed no significant correlation between children's nutritional condition and risk factors for infectious diseases, especially ARI. |
| 5 | Anggraini, et al. (2021) | Off-Label Prescribing of Drugs in Children with Acute | *Cross-Sectional* | 124 school-aged pediatric ARI patients | The results showed a substantial correlation between gender and age and ARI incidence. Boys supported by environmental factors will be |



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| | | | | | |
|---|---|---|---|---|---|
| | | Respiratory Infections | | | more susceptible to ARI than girls. The results showed that the use of off-label drugs that are not appropriate for the age of the child can increase the likelihood of ARI. |
| 6 | Ng, et al. (2021) | Clinical and Epidemiological Characteristics of Children with COVID-19 in Negeri Sembilan, Malaysia | *Retrospective Observational* | 261 children aged <12 years old | Studies show that close contact with infected family members may increase the risk factor for SARS-CoV-2 respiratory infection in children. |
| 7 | Haryanto & Djafri (2020) | Air Pollution and School Children Respiratory Diseases in Indonesia: A Cohort Study | *Cohort Study* | 392 schoolchildren from 25 elementary schools | The results showed a significant influence of air pollution on the risk of respiratory diseases in elementary school students in Jakarta's high and low-pollution areas. |
| 8 | Martinez-Vega et al. (2019) | Risk Factor Profiles and Clinical Outcomes for Children and Adults with Pneumococcal Infections in Singapore: A Need to Expand Vaccination Policy? | *Retrospective Observational* | 88 children aged 5-15 years | The results showed that age, gender, history of disease syndromes, especially meningitis, and vaccination status were the main risk factors for pneumococcal infection. |

## DISCUSSION

After conducting a study review of the eight articles, there are articles with a cross-sectional research design, two articles with a retrospective observational research design, 1 article using a cohort research design, and 1 article using a correlation research design; the results show the factors that cause Acute Respiratory Tract Infection (ARI) disease. In general, there are 3 (three) risk factors for the incidence of acute respiratory infections (ARI), namely environmental factors, individual child factors, and behavioural factors. Ecological factors include air pollution in the neighbourhood, the physical condition of the house, and occupancy density. Child factors include age, birth weight, nutritional status, vitamin A, and immunisation status. Meanwhile, behavioural factors are related to preventing and warding off diseases (Cahyani et al., 2024).

1. Environmental Factors

Environmental factors include the shape of the floor, wall selection, roof type, ventilation area, humidity, room temperature, distance of the dwelling occupied, and the house's physical condition. For proper air exchange to occur in the house, the house should have an air passage or ventilation area of at least 10% of the floor area. The house should have a temperature of 18-30°C and an air humidity of 40-60%. High or low air humidity can cause rapid microbial development (Agungnisa, 2019). The findings of Ningrum and Ardillah (2021) show a relationship between the shape of the house and ARI disease. The most dominant condition of the shape of the residence is the type of roof. If there is no ceiling, dust will

quickly enter the house. Besides that, the distance between houses that are too close can also affect the condition of children because of the lack of sufficient space for them to breathe clean air, which can trigger the occurrence of various diseases, such as ARI, due to a poor home environment due to viral and bacterial infections that spread when families gather and play (Jayanti, Ashar and Aulia, 2018). Environmental conditions with air pollution can cause inflammation of the mucosal surface of the respiratory tract. If a room with a lot of pollution does not have ventilation, smoke and pollution can be trapped in it, so breathing becomes very stuffy and uncomfortable. For good air exchange, houses should have a ventilation area or breezeway of at least 10 per cent of the floor area (Sofia, 2017). If the air cycle is reasonable with high oxygen levels in the dwelling, this will significantly affect the health of the occupants (Jayanti, Ashar, and Aulia, 2018). Air pollution from dust or gas can lead to ARI, bronchitis, asthma, and lung cancer (Putra and Wulandari, 2019). Atmospheric pollution from particulate matter can also trigger pharyngitis, pneumonia, allergies, and irritation. This is reinforced by the findings of Haryanto & Djafri (2020), which show a correlation between air pollution factors and risk factors for respiratory diseases in elementary school children with high and low pollution levels.

2. Individual Factors

Individual factors in children include age, gender, low birth weight, nutritional status, and immunisation status. Children's defence systems and physical endurance are deficient at school, making them vulnerable to bacteria and viruses (Tomatala et al., 2019). Individual factors related to Acute Respiratory Tract Infection (ARI) are corroborated by the results of the Ritonga & Kurniawan study (2021), which states that there is a relationship between the risk factors of age, height, weight, and gender with ARI disease in children. In this study, it is explained that body weight is an indicator of health. The research results by Anggraini et al. (2021) showed a strong relationship between age and gender factors and the risk of ARI. In the study, it was found that most ARI patients were children aged 2-12 years. The survey by Hasan et al. (2022) identified significant age inequalities in the incidence of childhood ARI, where older children were considered more protected. Similar results have been observed in several studies conducted at local (states in India), national, and global levels. Male children tend to be more susceptible to ARI than girls because boys are more often outside the home than girls (supported by environmental factors). The research results by Martinez-Vega et al. (2019) showed that, in addition to age and gender, a history of specific disease syndromes and other congenital diseases, such as meningitis, and vaccination status were the main risk factors for pneumococcal tract infections.

3. Behavioural Factors

Behavioural factors have a close relationship with the management and prevention of ARI in children. Parents' knowledge is essential for disease management because children's health and life are the parents' responsibility. Maternal knowledge and attitudes about the characteristics and treatment of ARI are the

most essential elements in shaping good behaviour for improving children's health (Zaman and Rabial, 2023). In addition to the influence of parental knowledge, children's behaviour and habits also affect their health, such as the results of research by Tomatala et al. (2019), which showed a relationship between physical activity and the recurrence of weak ARI. Physical activity is a factor in the incidence of ARI in these children, but other factors cause recurrence. The behaviour of children at school who consume food sold in the area near the school will increase the high risk of ARI in children because these snacks may not be well-managed, processed, and clean. The behaviour of children who often play outside and ignore the surrounding conditions can also affect their exposure to a disease. This statement is corroborated by the research results by Ng et al. (2021), which show that a risk factor that can potentially cause SARS-CoV-2 respiratory tract infection in children is close contact with infected families.

## CONCLUSION

Acute Respiratory Infection (ARI) is the most common disease in childhood because the child's body is still vulnerable to invading bacteria and viruses. The risk factors for Acute Respiratory Infection (ARI) in urban school-age children are environmental factors such as the roof of the house, air ducts or ventilation, and the density of the home and residential environment. Then, there are individual factors where age, gender, and other congenital diseases also affect the incidence of Acute Respiratory Infections (ARI) in school-age children. Behavioural factors are also one of the risk factors for Acute Respiratory Infection (ARI), which includes parental knowledge, children's physical activity, and others.

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# Emergency Installation Staff Satisfaction with the Use of Electronic Medical Records

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**A B S T R A C T**

Proper implementation of electronic medical records (EMRs) is essential to increase health worker satisfaction, which in turn improves the quality of health services. However, the use of EMR can also cause dissatisfaction, in part due to limitations in sentence format when completing medical assessments in the EMR system. This study aims to explore the relationship between the use of EMR and the satisfaction of health workers in the emergency room of RSMM (Rumah Sakit Mata Masyarakat), East Java. With a quantitative analysis approach, this research used a cross-sectional design with 19 participants selected through a total sampling method. This research focuses on two main variables: officer satisfaction (free) and EMR use (bound). Data was collected through interviews and questionnaires, and statistical analysis was carried out using the Spearman test. Findings showed that 63.2% of respondents were satisfied, with 78.9% expressing confidence in the quality of EMR use. The Spearman test produced a significant p-value of 0.006 ($p < 0.05$), indicating a significant relationship between the use of RME at RSMM East Java. RSMM East Java is committed to continuing to increase personnel satisfaction by continuously improving the EMR system based on feedback.

## INTRODUCTION

One of the innovative advances in the health sector, driven by advances in information technology, is the transition from paper-based recording and reporting methods to hospital management information systems (Andini et al., 2022). Currently, health service institutions in Indonesia are required to implement RME in accordance with Minister of Health Regulation No. 24 of 2022 concerning medical records (Prasetyo, 2023). Based on the Regulation of the Minister of Health No. 24 of 2022, Electronic Medical Records (EMR) are medical records compiled using an electronic system for the purpose of managing medical records (Permenkes RI, 2022). The use of EMR provides the advantage of faster access to results or updates from other healthcare providers. In addition, EMR provides long-term benefits such as better patient monitoring and safety and improved coordination of patient care (Chang and Gupta, 2015). The implementation of EMR involves the use of information technology to collect, store, manage, and access patient medical data. In more sophisticated environments, some hospitals have combined EMR with Hospital Management Information System applications (Handiwidjojo, 2015).

EMR at Mata Masyarakat Hospital, East Java, uses Medify, which has been integrated with Hospital Management Information System applications. RSMM East Java began implementing EMR in the emergency installation in August 2023. Meanwhile, outpatient installations, inpatient installations, and central surgical installations are still in the trial and improvement stage. The use of EMR involves officers



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who actively operate the system. When officers use EMR, this increases officer job satisfaction. When officers are satisfied with their work, they show positive behaviour in carrying out their responsibilities (Rachmawati et al., 2021).

Officer satisfaction can be evaluated using one of the methods, namely End User Computing Satisfaction (EUCS), which has been developed by Doll & Torkzadeh. This method is widely used because it has strong validity and uses reliable instruments derived from previous research developments (Febrianti et al., 2023). The EUCS approach evaluates user satisfaction with an application by comparing their expectations with their experience in using the information system (Damayanti, Mursityo, and Herlambang, 2018). When using RME, various variables are used to evaluate its use. These variables include two leading indicators: frequency of use and duration of daily use (Rahmatulloh, 2017).

In Pardede's 2023 study at Santa Elisabeth Hospital Medan, it was observed that 29 individuals (72.5%) predominantly used EMR. The survey showed that 26 respondents, or 65.0%, stated that they were satisfied with the use of EMR by most health professionals. Statistical analysis with a p-value of 0.029 indicated a correlation between the use of EMR and the satisfaction of health workers in the hospital's inpatient ward in 2023 (Pardede, 2023).

This study differs from previous studies in several ways. The differences include a special focus on the emergency room officers of Mata Masyarakat Hospital East Java as the population and sample studied. The sampling approach used was total sampling, and the Spearman test was used as a statistical method to evaluate the relationship. Based on the results of an initial survey with officers at the Emergency Room of RSMM East Java, the use of EMR is very helpful and speeds up the work of officers. The use of EMR can also cause officer dissatisfaction; one of which is in terms of appearance (format), there are limitations in sentences when filling out medical assessments in EMR. This study is very important to improve the effectiveness and quality of service. Based on the results of an initial survey with officers at the Emergency Room of Mata Masyarakat East Java, the use of EMR is very helpful and speeds up the work of officers. The use of RME can also cause officer dissatisfaction, one of which is in terms of appearance (format); there are limitations in sentences when filling out medical assessments in EMR. This study is very important to improve the effectiveness and quality of service.

## METHOD

This study uses quantitative analytical research by analysing the relationship between satisfaction with and the use of EMR at Mata Masyarakat East Java. Analytical research design involves the use of statistical analysis to investigate the correlation between cause and effect or risk factors and their impacts, with the aim of understanding the mechanisms and reasons behind a phenomenon (Syapitri, Amila, and Aritonang, 2021). Using research instruments for data collection and quantitative or statistical analysis,

this approach examines a specific population or sample to evaluate previously formulated hypotheses (Sugiyono, 2019).

The design in this study used a cross-sectional approach. Cross-sectional research investigates the correlation between exposure or risk factors (dependent variables) and outcomes or effects (independent variables). With the point-in-time approach, data collection is carried out simultaneously between risk factors and outcomes, meaning that all variables are observed (Syapitri, Amila, and Aritonang, 2021).

In this study, validity and reliability tests were not conducted because the questionnaire was adopted from previous studies. This study uses non-parametric analysis techniques with a Spearman correlation test. Correlation analysis is used to determine the relationship between two or more variables. Determining whether the relationship exists depends on the level of significance: if > 0.05, Ho (null hypothesis) is accepted, and Ha (alternative hypothesis) is rejected. Conversely, if the level of significance is < 0.05, Ho is rejected and Ha is accepted (Sutha, 2019).

## RESULT

The satisfaction criteria for respondent characteristics consist of four indicators, namely gender, type of work, age, and length of service of the respondent.

Table 1. Satisfaction Criteria for Respondent Characteristics

| No | Respondent Characteristics | Statisfied (f) | Not Statisfied (f) | Total (f) |
|---|---|---|---|---|
| 1. | Gender | | | |
| | Male | 5 | 1 | 6 |
| | Female | 7 | 6 | 13 |
| 2. | type of work | | | |
| | Doctor | 3 | 3 | 6 |
| | Nurse | 2 | 3 | 5 |
| | counter attendant | 7 | 1 | 8 |
| 3. | age | | | |
| | 17-25 yo | 1 | 1 | 2 |
| | 26-35 yo | 8 | 4 | 12 |
| | 36-45 yo | 3 | 2 | 5 |
| | 46-55 yo | 0 | 1 | 1 |
| 4. | years of service | | | |
| | 1-5 year | 10 | 3 | 13 |
| | 6-10 year | 2 | 3 | 5 |
| | >10 year | 0 | 1 | 1 |

Based on table 1, the satisfaction criteria based on gender characteristics, the majority of respondents are dissatisfied with female gender, age characteristics in the age range of 26-35, respondents who are dissatisfied, the type of work of doctors and nurses that dominate dissatisfaction with the use of RME, and the characteristics of work period in the work period of 1-5 years and 6-10 years who feel dissatisfied.


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Table 2. Criteria for Satisfaction of Emergency Room Officers at Mata Masyarakat Hospital East Java

| Officer Satisfaction | Frequency (f) | Percentage (%) |
|---|---|---|
| Satisfaction | 12 | 63,2 |
| Non satisfaction | 7 | 36,8 |
| Total | 19 | 100 |

Based on table 2, the results of the study show that the satisfaction of the IGD officers who were respondents, as many as 63.2% felt satisfied, while 36.8% felt dissatisfied. Respondents who felt dissatisfied were mostly on the appearance aspect in the RME.

Based on the results of the questionnaire and interviews with emergency room officers, they were satisfied with the use of EMR. In the emergency room of Mata Masyarakat Hospital East Java, there was a down system, but the information technology team at Mata Masyarakat Hospital East Java quickly responded to it.

Table 3. Criteria for the Use of RME in the Emergency Room of RSMM East Java

| EMR Usage | Frequency (f) | Percentage (%) |
|---|---|---|
| Good | 15 | 78,9 |
| Less | 4 | 21,1 |
| Total | 19 | 100 |

Based on table 3, the results of this study indicate that the use of RME in the Emergency Room of Mata Masyarakat Hospital East Java, as many as 78.9% feel good, while 21.1% feel less. The use of EMR in the Emergency Room of Mata Masyarakat Hospital East Java is very good because it has been used in all activities in the Emergency Room of Mata Masyarakat Hospital East Java.

Table 4. Results of the Test of the Relationship between IGD Officer Satisfaction and the Use of EMR

| | Officer Satisfaction | EMR Usage |
|---|---|---|
| Correlation coefficient | 0,604** | 0,604** |
| *p-value* | 0,006 | 0,006 |

Based on table 4, hypothesis testing in this study uses the Spearman correlation test technique, using IBM SPSS software version 25 for analysis. The results of Table 4 show a significant correlation between satisfaction with the use of EMR, with a significance value (2-tailed) of 0.006, indicating acceptance when sig <0.05. The SPSS output produces a correlation coefficient of 0.604, indicating a strong correlation between the satisfaction of health workers in the emergency department and the use of EMR. A positive correlation coefficient indicates that high satisfaction among health workers at Mata Masyarakat Hospital East Java is related to better use of EMR

## DISCUSSION

Satisfaction is an emotional response of joy or disappointment that arises after comparing anticipated results or performance. When performance falls short of expectations, individuals feel dissatisfied, while


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exceeding expectations results in a high level of satisfaction or happiness (Putri, 2020). In this study, five aspects indicate the satisfaction of the Masyarakat Hospital East Java Emergency Room officers, namely:

1. Content

The content aspect in this study aims to evaluate user satisfaction by assessing the relevance of the system content. It also evaluates how well the system produces information that meets the needs of users smoothly during their work (Siregar, 2020). Based on the results of the questionnaire that was given to the emergency room officers of Masyarakat Hospital East Java regarding the use of EMR, it was found that the content aspect of EMR was already satisfied. However, in this aspect, there is one piece of information that is not seen, namely the patient visit data.

2. Accuracy

The purpose of this study is to assess the accuracy of user satisfaction with the hospital management information system installation. There must be no duplication or error in the process of inputting or outputting data from the EMR system. The accuracy component will measure the level of accuracy and verify whether the input and output are in accordance with EMR standards (Siregar, 2020). Based on the results of the questionnaire and interviews with the emergency room officers of Mata Masyarakat Hospital, East Java, the officers were satisfied with the accuracy of the use of EMR. In the use of EMR when processing input from users, there were no errors or mistakes in the data processing process. However, there is still duplication of patient medical record numbers, which should not happen.

3. Format

In this study, the display aspect (format) is used to assess EMR user satisfaction with its system interface. The evaluation focuses on EMR user interaction with the interface, including the EMR application display. The clarity and lack of ambiguity in the EMR application interface, supported by the right choice of colours, ensure that the interface does not cause eye strain and allows users to work more effectively (Siregar, 2020).

Based on the results of the questionnaire and interviews with the Mata Masyarakat Hospital East Java Emergency Room officers, some officers felt dissatisfied with the appearance of several displays because there were changes in the display from when EMR was first implemented. There were several columns where the number of words used was limited, and a template should have been provided to make it easier and faster to fill in the form.

4. Ease of Use

In this study, to assess user satisfaction with the EMR system in terms of ease of use using the ease-of-use aspect. EMR is intentionally designed to be easy to use, allowing users to easily navigate and use the tools available when operating the information system. The ease-of-use aspect evaluates how effectively users can use the EMR provided (Siregar, 2020). Based on the results of the questionnaire and interviews


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with the Mata Masyarakat Hospital East Java Emergency Room officers regarding the use of EMR, the officers did not feel they had any difficulty inputting data into EMR, and the officers felt helped by the existence of EMR.

5. Timeliness

In this study, to measure user satisfaction with EMR based on how quickly the system responds using timeliness. Timeliness here reflects the system's ability to quickly deliver the latest data and information. This aspect also includes the system's ability to provide information quickly without causing delays for EMR users (Siregar, 2020).

In this study, two indicators were used to measure the use of EMR at Mata Masyarakat Hospital, East Java, namely frequency of use and daily time usage. In this study, the frequency of use of EMR was very high, which was caused by the consistent use of EMR in every stage, from registration to patient entry into the emergency room. Respondents also stated the importance of the availability of EMR that is ready to be used at any time when needed. In addition, respondents emphasised that EMR is used and utilised in every daily activity. Utilisation of EMR relates to how often EMR is used during tasks and management of processes involving electronic records containing health information. Given that EMR implementation has begun in various health services, its use in these facilities must be carried out efficiently (Rahmatulloh, 2017).

Based on the results of the questionnaire and interviews with the emergency room officers of Mata Masyarakat Hospital East Java, the use of EMR is always for more than 4 hours in 1 day. However, at certain times, sometimes EMR experiences a system down which causes EMR to not be able to be used at that time, usually at night, so that officers cannot operate it.

The results of this study are supported by Rahmatulloh's (2017) research on the use of EMR. Of the 81 respondents surveyed, Rahmatulloh found a positive assessment of the use of EHR. Specifically, 53 respondents (65%) believed that EMR should always be accessible and reported using EMR for more than 6 hours each day (Rahmatulloh, 2017).

In this study, it was observed that most of the satisfied officers showed effective use of EMR, while those who were less satisfied tended to show inadequate use of EMR. The results of this study indicate that satisfaction of health workers significantly influences the use of EMR. The findings of this study are in line with the results of Sapriadi and Lase's study in 2022. According to their findings, out of a total of 82 respondents, most officers, namely 44 people (53.7%), considered the use of EMR to be good, and 41 people (50.0%) stated that they were satisfied with its use. The results of the chi-square test revealed a significant relationship between the use of electronic medical records and user satisfaction in the outpatient department of RSU Mitra Medika Amplas in 2022. The p-value of 0.018 indicates statistical significance at the $\alpha = 0.05$ level (Sapriadi and Lase, 2022).



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## CONCLUSION

Satisfaction of the emergency room officers of Mata Masyarakat Hospital East Java: as many as 63.2% felt satisfied, while 36.8% felt dissatisfied. The use of EMR in the emergency room of Mata Masyarakat Hospital, East Java: as many as 78.9% felt good, while 21.1% felt lacking. Satisfaction criteria based on gender characteristics, the majority of whom were female who were dissatisfied; on age characteristics in the age range of 26-35, respondents who were dissatisfied; on the type of work of doctors and nurses who dominated dissatisfaction with the use of EMR; and on the characteristics of the length of service at the work period of 1-5 years and 6-10 years, who were dissatisfied. There is a relationship between the satisfaction of emergency room officers and the use of EMR at Mata Masyarakat Hospital, East Java.

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# Analysis of Determinants of Anemia Incidence in Third Trimester Pregnant Women

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**A B S T R A C T**

Anemia in third-trimester pregnant women increases the risk of pregnancy complications such as preterm labor and low birth weight. Contributing factors include adherence to iron tablet consumption, maternal age, parity, nutritional status, and compliance with antenatal care (ANC) visits. This study aims to analyze the determinants of anemia in third-trimester pregnant women at the Gunung Selamat Labuhan Batu Health Center. This cross-sectional study involved 96 third-trimester pregnant women selected using consecutive sampling. Data were collected through interviews, hemoglobin level examinations, and evaluations of iron tablet adherence, nutritional status, and ANC visits. Data analysis used bivariate (chi-square) and multivariate (logistic regression) tests. Bivariate analysis showed a significant relationship between anemia and iron tablet adherence (p=0.00; PR=5.95), maternal age (p=0.00; PR=5.11), parity (p=0.00; PR=4.95), nutritional status (p=0.00; PR=7.55), and ANC visit compliance (p=0.00; PR=8.55). Multivariate analysis identified nutritional status (p=0.00; Exp(B)=16.69) and ANC visit compliance (p=0.00; Exp(B)=14.51) as the most dominant factors influencing anemia. Nutritional status and ANC visit compliance are key determinants of anemia in third-trimester pregnant women. Interventions focusing on nutritional education, ANC service optimization, and increased adherence to iron supplementation are essential to reduce anemia prevalence among pregnant women.

## INTRODUCTION

Anaemia in pregnant women remains a critical health concern, particularly in developing countries, where its prevalence continues to be high and affects both maternal and foetal health. The World Health Organisation (WHO) defines anaemia during pregnancy as a haemoglobin level below 11 g/dL (Srour et al., 2018). Globally, the WHO estimates that around 40% of pregnant women experience anaemia, with the highest cases found in South Asia and Sub-Saharan Africa (WHO, 2021). In Indonesia, data from the Ministry of Health (Riskesdas, 2018) indicate that anaemia prevalence in pregnant women reached 48.9%, showing an increase from 37.1% in 2013. Furthermore, in Labuhan Batu Regency, the Health Office reported in 2023 that the prevalence of anaemia among pregnant women was 52.3%, exceeding the national average.

Anaemia during pregnancy can lead to severe complications, including preterm birth, low birth weight, and a higher risk of maternal and neonatal mortality (Umuro et al., 2019). Various studies have identified several key risk factors for anaemia, such as iron deficiency, poor nutrition, chronic illnesses, and socioeconomic constraints (Ouzennou et al., 2019; Yuliarti et al., 2022).

One of the main causes of anaemia in pregnancy, particularly during the third trimester, is iron deficiency due to increased iron demand to support foetal and placental growth (Suryanarayana et al., 2016). Many



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women enter pregnancy with already depleted iron stores, worsening their anaemia condition throughout gestation (Seu et al., 2019; Varghese et al., 2019). Thus, ensuring compliance with Fe tablet supplementation is crucial in anaemia prevention. However, low adherence to Fe tablet consumption remains a significant challenge in maternal health interventions (Khanam et al., 2022).

Beyond Fe tablet consumption, a pregnant woman's nutritional status significantly affects anaemia occurrence. Deficiencies in essential micronutrients like folate and vitamin B12 heighten anaemia risk, which in turn can compromise foetal development and maternal well-being (Ouzennou et al., 2019). Additionally, maternal age and parity also influence anaemia incidence. Pregnant women under 20 years or over 35 years face an elevated risk due to potential nutritional deficiencies and suboptimal physiological conditions (Fajrin et al., 2023; Noviyanti et al., 2019; Pitale, 2018). Multiparous women are also more susceptible to anaemia, as frequent pregnancies prevent the full recovery of iron reserves between gestations, increasing anaemia vulnerability (Esem, 2023; Jasa & Listiana, 2023).

The frequency of antenatal care (ANC) visits plays a crucial role in anaemia prevention. Studies reveal that pregnant women who consistently attend ANC appointments benefit from nutritional counselling and iron supplementation, reducing their anaemia risk (Al-Nuzaili, 2023; Orwa et al., 2019). Conversely, pregnant women with irregular ANC visits are at a higher risk of anaemia due to insufficient early detection and medical interventions (Asres et al., 2022; Fernández-Batanero et al., 2022; Yadav et al., 2020).

Despite numerous studies on anaemia in pregnant women, there remains a gap in research regarding the most dominant factors influencing its occurrence. Previous research has often focused on isolated factors, overlooking potential interactions between variables (Ahmed et al., 2021; Ngonzi et al., 2024). To address this gap, this study adopts a comprehensive approach to identify the key contributors to anaemia among pregnant women in their third trimester.

The main research question of this study is: Which determinant factors have the strongest correlation with the incidence of anaemia in third-trimester pregnant women at the Gunung Selamat Labuhan Batu Health Centre? Answering this question will help develop more effective strategies to reduce anaemia prevalence and improve maternal and foetal health. Specifically, this study aims to examine the relationship between Fe tablet consumption compliance, maternal age, parity, nutritional status, and ANC visit frequency in relation to anaemia incidence. Additionally, the study seeks to determine the most influential factor contributing to anaemia cases at the Gunung Selamat Labuhan Batu Health Centre.

Anaemia during pregnancy is defined as a condition where haemoglobin levels drop due to iron deficiency, insufficient nutrient intake, or chronic illnesses. The World Health Organisation (WHO) emphasises the importance of Fe supplementation during pregnancy to prevent iron deficiency anaemia

(Varghese et al., 2019). However, adherence to Fe supplementation is influenced by multiple factors, including side effects, limited awareness, and accessibility to healthcare services (Khanam et al., 2022).

Maternal age significantly affects anaemia risk, with both younger and older mothers being more susceptible due to physiological limitations (Fajrin et al., 2023; Noviyanti et al., 2019). Additionally, women with higher parity levels are at greater risk since their iron reserves may not have fully recovered between pregnancies (Jasa & Listiana, 2023). Nutritional status also plays a crucial role, as malnutrition can hinder optimal red blood cell production (Diana et al., 2020; Ugwa, 2016).

Regular ANC visits are essential for early anaemia detection and timely interventions. WHO recommends a minimum of four ANC check-ups during pregnancy (Orwa et al., 2019). Research has shown that women who attend ANC consistently have a lower likelihood of developing anaemia compared to those with infrequent visits (Ngonzi et al., 2023).

This study aims to contribute to a better understanding of the primary risk factors associated with anaemia in third-trimester pregnant women. It also seeks to provide evidence-based recommendations for anaemia prevention and management. The findings can support healthcare professionals in enhancing education on Fe supplementation adherence, improving ANC services, and promoting healthy nutritional habits. These efforts will align with maternal and child health policies to reduce anaemia prevalence within primary healthcare facilities.

## METHOD

This research utilised a cross-sectional approach to examine the correlation between various determinant factors and the occurrence of anaemia in third-trimester pregnant women at the Gunung Selamat Labuhan Batu Health Centre. This method enables data to be collected simultaneously within a specific timeframe, allowing for an assessment of anaemia prevalence and its contributing factors.

The study population comprised third-trimester pregnant women who attended antenatal care at the Gunung Selamat Health Centre between March and April 2024. Participants were selected through consecutive sampling, ensuring that only those meeting the inclusion criteria—gestational age between 28 and 41 weeks and willingness to undergo haemoglobin level examination—were included. Pregnant women with chronic illnesses were excluded. The sample size was calculated using the Slovin formula, determining a minimum of 96 respondents.

Data collection involved both questionnaires and laboratory assessments. The questionnaire gathered information on sociodemographic factors, pregnancy history, adherence to Fe tablet consumption, and compliance with antenatal care (ANC). Haemoglobin levels were measured using the Easy Touch Hb device, while nutritional status was assessed using LiLA tape to detect maternal chronic energy deficiency (SEZ).

Ethical approval for this research was obtained from the Health Research Ethics Committee of the Deli Husada Health Institute under approval number 097/KEP-IKDH/II/2024. All respondents provided informed consent, and their data were treated confidentially, strictly for academic purposes.

The data analysis process consisted of three stages: univariate analysis to describe frequency distributions, bivariate analysis using the chi-square test to examine variable relationships, and multivariate analysis through logistic regression to determine the most influential factors in anaemia incidence. The study findings are expected to serve as a foundation for anaemia prevention strategies in primary healthcare settings.

## RESULT

Table 1 presents the findings from the univariate analysis, detailing the characteristics of the respondents. These characteristics include maternal age, adherence to Fe tablet consumption, parity, nutritional status, frequency of ANC visits, and the prevalence of anemia among pregnant women at the Gunung Selamat Labuhan Batu Health Center.

Table 1 Frequency Distribution of Respondent Characteristics of Pregnant Women at the Gunung Selamat Labuhan Batu Health Center.

| Characteristics | Frequency (f) | Percentage (%) |
|---|---|---|
| Age | | |
| <20-35 | 42 | 43.8 |
| >35 Year | 54 | 56.3 |
| Adherence to Fe Tablet Consumption | | |
| Non-compliant | 33 | 34.4 |
| Compliant | 63 | 65.6 |
| Parity | | |
| Risk | 41 | 42.7 |
| Non-Risk | 55 | 57.3 |
| Nutritional Status | | |
| CED | 40 | 41.7 |
| Non-CED | 56 | 58.3 |
| ANC visit | | |
| Compliant | 38 | 39.6 |
| Non-compliant | 58 | 60.4 |
| Incidence of Anemia | | |
| Anemia | 37 | 38.5 |
| No Anemia | 59 | 61.5 |
| Total | 96 | 100 |

Table 1 presents the frequency distribution of respondent characteristics among pregnant women at the Gunung Selamat Labuhan Batu Health Center. Most respondents were over 35 years old (56.3%), with 65.6% demonstrating adherence to Fe tablet consumption. Regarding parity, 42.7% of pregnant women were classified as high-risk, while 41.7% were identified as experiencing Chronic Energy Deficiency (CED). Additionally, 60.4% of respondents did not comply with ANC visit recommendations, which could increase their risk of developing anemia. Out of the 96 respondents,


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38.5% were diagnosed with anemia, while 61.5% did not experience the condition. These findings suggest that maternal age, adherence to Fe tablet supplementation, nutritional status, and ANC visit compliance contribute to the incidence of anemia in pregnant women.

Table 2. Relationship between adherence to Fe tablet consumption and the incidence of anemia in third trimester pregnant women at the Gunung Selamat Labuhan Batu Health Center

| Variable | Incidence of Anemia | | | | | | *Prevalence ratio* | *95 % CI* | | *P* |
|---|---|---|---|---|---|---|---|---|---|---|
| Adherence to Fe Tablet Consumption Tablet Fe | Anemia | % | Non Anemia | % | Total | % | | Lower | Upper | |
| Non-compliant | 26 | 70.2 | 11 | 29.8 | 37 | 100 | 5,949 | 6,095 | 50,585 | 0,00 |
| Compliant | 7 | 11.9 | 52 | 88.1 | 59 | 100 | | | | |

Table 2 illustrates that among pregnant women who did not adhere to Fe tablet consumption, 70.2% experienced anemia, whereas only 11.9% of those who complied with supplementation were anemic. With a prevalence ratio of 5.949 and a p-value of 0.00, the analysis indicates that non-adherent mothers face a 5.95 times higher likelihood of developing anemia. These results highlight a significant correlation between adherence to Fe tablet consumption and the occurrence of anemia.

Table 3. Relationship between maternal age and the incidence of anemia in third trimester pregnant women at the Gunung Selamat Health Center

| Variable | Incidence of Anemia | | | | | | Prevalence ratio | 95 % CI | | p |
|---|---|---|---|---|---|---|---|---|---|---|
| Mother's age | Anemia | % | Non Anemia | % | Total | % | | Lower | Upper | |
| High Risk | 32 | 86.5 | 5 | 5.2 | 13.5 | 100 | 5,11 | 9,809 | 100,264 | 0,00 |
| Risk Low | 10 | 17 | 49 | 83 | 59 | 100 | | | | |

Table 3 reveals that 86.5% of pregnant women in the high-risk age category experienced anemia, which is significantly higher compared to only 17% in the low-risk age group. Conversely, 83% of pregnant women who did not have anemia belonged to the low-risk age category. The prevalence ratio of 5.11 with a p-value of 0.00 indicates that mothers in the high-risk age group were 5.11 times more likely to develop anemia compared to those in the low-risk age group. These findings confirm a significant relationship between maternal age and the incidence of anemia.

Table 4. The Relationship between Maternal Parity and the Incidence of Anemia in Third Trimester Pregnant Women at the Gunung Selamat Labuhan Batu Health Center

| Variable | Incidence of Anemia | | | | | | *Prevalence ratio* | *95 % CI* | | *p* |
|---|---|---|---|---|---|---|---|---|---|---|
| Parity | Anemia | % | Non Anemia | % | Total | % | | lower | Upper | |
| Risk | 31 | 83.7 | 6 | 16.3 | 37 | 100 | 4,95 | 8,364 | 76,633 | 0,00 |
| Non-Risk | 10 | 17 | 49 | 83 | 59 | 100 | | | | |

Table 4 illustrates that 83.7% of pregnant women classified as having high-risk parity experienced anemia, which is significantly greater compared to the 17% found in the low-risk parity group.


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Conversely, 83% of non-anemic mothers belonged to the low-risk parity category. The prevalence ratio of 4.95 with a p-value of 0.00 suggests that mothers with high-risk parity were 4.95 times more likely to develop anemia than those in the low-risk group. These results indicate a significant correlation between parity and the incidence of anemia.

Table 5. Relationship between Nutritional Status and the Incidence of Anemia in Third Trimester Pregnant Women at the Gunung Selamat Labuhan Batu Health Center

| Variable | Incidence of Anemia | | | | | | Prevalence ratio | 95 % CI | | p |
|---|---|---|---|---|---|---|---|---|---|---|
| Nutritional Status | Anemia | % | Non Anemia | % | Total | % | | Lower | Upper | |
| CED | 33 | 89.1 | 4 | 10.9 | 37 | 100 | 7,550 | 16,642 | 225,691 | 0,00 |
| Non-CED | 7 | 11.8 | 52 | 88.2 | 59 | 100 | | | | |

Table 5 presents that 89.1% of pregnant women with Chronic Energy Deficiency (CED) experienced anemia, which is significantly higher compared to the 11.8% found in the non-CED group. Conversely, 88.2% of non-anemic mothers were from the non-CED category. The prevalence ratio of 7.550 with a p-value of 0.00 indicates that pregnant women with CED are 7.55 times more likely to develop anemia than those with adequate nutritional status. These findings highlight a significant association between nutritional status and the incidence of anemia.

Table 6. Relationship between ANC visits and the incidence of anemia in third trimester pregnant women at the Gunung Selamat Labuhan Batu Health Center

| Variable | Incidence of Anemia | | | | | | Prevalence ratio | 95 % CI | | p |
|---|---|---|---|---|---|---|---|---|---|---|
| ANC visit | Anemia | % | Non Anemia | % | Total | % | | Lower | Upper | |
| Non-compliant | 32 | 86.4 | 5 | 13.6 | 37 | 100 | 8,554 | 15,951 | 200,369 | 0,00 |
| Compliant | 6 | 10.1 | 53 | 89,9 | 59 | 100 | | | | |

Table 6 reveals that 86.4% of pregnant women who did not adhere to ANC visits experienced anemia, a considerably higher percentage than the 10.1% found in the compliant group. On the other hand, 89.9% of non-anemic mothers belonged to the ANC-compliant category. With a prevalence ratio of 8.554 and a p-value of 0.00, the results indicate that pregnant women who were non-compliant with ANC visits had an 8.55 times greater likelihood of developing anemia compared to those who followed the recommended ANC schedule. This suggests a significant correlation between ANC visit adherence and the occurrence of anemia.

Table 7. First stage logistic regression test of the incidence of anemia in third trimester pregnant women at the Gunung Selamat Labuhan Batu Health Center

| Variable | p | Exp (B) |
|---|---|---|
| Age | 0,00 | 0,00 |
| Parity | 0,999 | 0,00 |
| Fe Tablet Consumption | 0,230 | 2,572 |
| Nutritional Status | 0,00 | 0,00 |
| ANC visit | 0,001 | 12,925 |


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Table 7 shows the results of the first stage logistic regression test on the incidence of anemia in third trimester pregnant women. Age (p = 0.00), nutritional status (p = 0.00), and ANC visits (p = 0.001) had a significant association with the incidence of anemia. ANC visits had the strongest influence with Exp(B) = 12.925, indicating that mothers who did not comply with ANC visits had a 12.93 times greater risk of anemia. Meanwhile, parity (p = 0.999) and Fe tablet consumption (p = 0.230) showed no significant association in this regression model.

Table 8. Logistic regression test of the second stage of the incidence of anemia in third trimester pregnant women at the Gunung Selamat Labuhan Batu Health Center

| Variable | *p* | *Exp (B)* |
|---|---|---|
| Age | 0,00 | 0,00 |
| Fe Tablet Consumption | 0,280 | 2,697 |
| Nutritional Status | 0,001 | 45,277 |
| ANC visit | 0,001 | 13,492 |

Table 7 presents the findings from the first-stage logistic regression analysis on anemia incidence among third-trimester pregnant women. The results indicate that maternal age (p = 0.00), nutritional status (p = 0.00), and ANC visit compliance (p = 0.001) had a significant correlation with anemia occurrence. Among these factors, ANC visit adherence exhibited the strongest impact, with an Exp(B) value of 12.925, meaning that mothers who did not comply with ANC visits were 12.93 times more likely to develop anemia. In contrast, parity (p = 0.999) and Fe tablet consumption (p = 0.230) did not demonstrate a statistically significant relationship within this regression model.

Table 9. Third stage logistic regression test for the incidence of anemia in third trimester pregnant women at the Gunung Selamat Labuhan Batu Health Center.

| Variable | p | Exp (B) |
|---|---|---|
| Age | 0,99 | 0,00 |
| Nutrtitional Status | 0,001 | 45,277 |
| ANC visit | 0,001 | 13,492 |

Table 9 presents the results of the third-stage logistic regression analysis on anemia incidence among third-trimester pregnant women. The findings indicate that nutritional status (p = 0.001, Exp(B) = 45.277) and ANC visit compliance (p = 0.001, Exp(B) = 13.492) were significantly associated with anemia occurrence. Pregnant women experiencing Chronic Energy Deficiency (CED) had a 45.28 times higher likelihood of developing anemia, while those who did not adhere to ANC visits faced a 13.49 times greater risk. In contrast, the maternal age variable (p = 0.99) did not exhibit a significant correlation within this regression model.

Table 10. Fourth stage logistic regression test for the incidence of anemia in third trimester pregnant women at the Gunung Selamat Labuhan Batu Health Center.

| Variable | p | Exp (B) |
|---|---|---|
| Nutritional Status | 0,00 | 16,687 |
| ANC visit | 0,00 | 14,505 |


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Table 10 presents the results of the fourth-stage logistic regression analysis on anemia incidence among third-trimester pregnant women. The analysis reveals that nutritional status (p = 0.00, Exp(B) = 16.687) and ANC visit compliance (p = 0.00, Exp(B) = 14.505) had a significant correlation with anemia occurrence. Pregnant women with Chronic Energy Deficiency (CED) were 16.69 times more likely to develop anemia, while those who did not adhere to ANC visits had a 14.51 times higher risk. These findings emphasize that nutritional status and compliance with ANC visits are the most influential factors in the incidence of anemia among third-trimester pregnant women.

## DISCUSSION

Relationship Between Adherence to Fe Tablet Consumption and the Incidence of Anemia

The results of this study indicate that adherence to Fe tablet consumption has a significant effect on the incidence of anaemia in pregnant women. Mothers who did not comply with taking Fe tablets had a 5.95 times higher risk of experiencing anaemia compared to those who adhered to the supplementation regimen. This finding aligns with the World Health Organisation (WHO) guidelines, which highlight the necessity of iron supplementation in pregnancy to prevent anaemia and its associated complications (Varghese et al., 2019). Additionally, previous studies have shown that regular Fe tablet intake can lead to increased haemoglobin levels, subsequently reducing anaemia prevalence among pregnant women (Seu et al., 2019).

Despite its well-documented benefits, adherence to Fe supplementation remains a major challenge. Several factors contribute to poor compliance, including side effects such as nausea, constipation, and gastrointestinal discomfort, which discourage some women from continuing supplementation. Other barriers include a lack of awareness regarding the long-term benefits of Fe tablet consumption and limited access to healthcare facilities, which prevents some women from obtaining the necessary supplements (Astuti et al., 2023; Khanam et al., 2022). To address these challenges, healthcare providers must intensify educational efforts, ensuring that pregnant women receive adequate counselling on the importance of iron intake and practical strategies to manage its side effects. Improving access to Fe supplementation through community-based health programmes and government support can further enhance compliance rates.

Relationship Between Maternal Age and Anemia Incidence

This study found that maternal age is an important determinant of anaemia incidence. Pregnant women aged over 35 years had a significantly higher risk—5.11 times greater—of developing anaemia than those aged 20-35 years. This elevated risk can be attributed to physiological changes associated with ageing, including a reduced ability to absorb iron and an increased likelihood of pre-existing conditions such as hypertension and diabetes, which can worsen anaemia (Noviyanti et al., 2019; Pitale, 2018). As maternal

age increases, iron metabolism becomes less efficient, leading to depleted iron stores that may not be replenished through diet alone.

In addition to physiological factors, increased metabolic demands during pregnancy further exacerbate the risk of anaemia in older women. The body's iron requirements rise significantly during pregnancy and failing to meet these needs results in lower haemoglobin levels. Previous research has consistently demonstrated that older pregnant women tend to have lower haemoglobin levels and are more vulnerable to iron deficiency due to their diminished iron reserves and heightened metabolic stress (Umuro et al., 2019). To mitigate this risk, healthcare providers should prioritise early prenatal screening, ensuring that older pregnant women receive iron supplementation and dietary counselling to maintain optimal haemoglobin levels.

Relationship Between Parity and Anemia Incidence

The findings of this study indicate that multiparity is a significant risk factor for anaemia, with mothers who had undergone multiple pregnancies being 4.95 times more likely to develop anaemia than those with lower parity. This supports existing literature, which suggests that successive pregnancies can lead to chronic depletion of iron stores, increasing the likelihood of anaemia if adequate nutritional recovery does not occur between pregnancies (Esem, 2023; Fajrin et al., 2023). Each pregnancy imposes additional physiological demands on the mother’s body, particularly in terms of iron requirements, making iron deficiency anaemia more prevalent among multiparous women.

Additionally, inadequate birth spacing contributes to iron depletion, as women do not have sufficient time to restore their iron stores before conceiving again. Studies also indicate that mothers with higher parity tend to experience a decline in nutritional status due to increased household responsibilities and reduced access to healthcare services, exacerbating the risk of anaemia (Jasa & Listiana, 2023). Addressing this issue requires the promotion of family planning programmes, nutritional education, and targeted iron supplementation for women with high parity to prevent chronic iron depletion and improve maternal health outcomes.

Relationship Between Nutritional Status and Anemia Incidence

Nutritional status is a critical factor influencing anaemia risk in pregnant women. The results of this study show that women experiencing Chronic Energy Deficiency (CED) had a 16.69 times higher likelihood of developing anaemia compared to those with good nutritional status. This is primarily due to deficiencies in essential micronutrients, such as iron, folate, and vitamin B12, which are necessary for red blood cell production (Diana et al., 2020). Poor dietary intake and inadequate nutrition during pregnancy hinder haemoglobin formation, increasing the risk of anaemia. The role of nutritional status in anaemia has been widely studied, with research confirming that malnutrition significantly contributes to anaemia prevalence (Karagiannidis et al., 2020; Yuliarti et al., 2022).


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Women with poor nutritional status often exhibit lower haemoglobin levels due to the insufficient intake of essential nutrients needed for healthy blood formation. Malnourished pregnant women are also more susceptible to infections and pregnancy complications, further exacerbating anaemia risk. Addressing this issue requires a holistic approach, including dietary interventions, micronutrient supplementation, and food fortification strategies. Healthcare providers should prioritise nutritional education and provide targeted interventions to ensure that pregnant women receive adequate nutrition. Improving access to iron-rich foods and ensuring the widespread availability of prenatal supplements can significantly reduce anaemia prevalence among nutritionally vulnerable pregnant women (Ugwa, 2016).

Relationship Between Frequency of ANC Visits and Incidence of Anemia

The frequency of antenatal care (ANC) visits plays a crucial role in the prevention and management of anaemia during pregnancy. This study found that pregnant women who did not comply with regular ANC visits had an 8.55 times higher risk of developing anaemia than those who attended ANC regularly. This result highlights the significance of ANC in monitoring maternal health, as it provides essential services such as iron supplementation, nutritional education, and routine haemoglobin checks (Al-Nuzaili, 2023; Srour et al., 2018). Pregnant women who fail to attend ANC visits consistently are at a higher risk of missing critical interventions, including early detection of anaemia and timely supplementation, which are essential in preventing the condition from worsening (M Afolabi et al., 2020; Saaka et al., 2017).

Furthermore, inadequate ANC attendance limits access to preventive healthcare services, leaving pregnant women more vulnerable to anaemia-related complications. Previous studies have shown that ANC visits also serve as an opportunity for healthcare providers to educate pregnant women on balanced nutrition, proper iron intake, and overall maternal well-being (Yadav et al., 2020). The findings of this study reinforce the importance of strengthening ANC programmes at the primary healthcare level, ensuring that pregnant women are aware of and encouraged to participate in regular prenatal check-ups. Increasing awareness and accessibility to ANC services can significantly contribute to reducing anaemia prevalence and improving maternal health outcomes.

This study shows that anaemia in third-trimester pregnant women is influenced by various factors, including Fe tablet consumption compliance, maternal age, parity, nutritional status, and frequency of ANC visits. The most influential factors were nutritional status and ANC visit compliance, which is in line with previous research. Therefore, intervention strategies should focus on improving education on the importance of nutrition during pregnancy as well as increasing ANC coverage and iron supplement compliance.


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## CONCLUSION

Anaemia in third-trimester pregnant women at Puskesmas Gunung Selamat Labuhan Batu is influenced by several main factors, namely Fe tablet consumption compliance, maternal age, parity, nutritional status, and ANC visit compliance. The results showed that nutritional status and ANC visit compliance were the most dominant factors in the incidence of anaemia. Mothers with CED have a greater risk of anaemia, as do mothers who do not regularly attend ANC. Therefore, efforts to prevent anaemia should focus on these two main aspects, namely improving the nutritional status of pregnant women through education on healthy eating patterns and increasing coverage and compliance with the ANC programme. In addition, efforts should be made to improve adherence to Fe tablet consumption by providing education on the benefits of iron supplementation and how to overcome side effects. In the future, further research is needed to explore innovative approaches to increase ANC adherence and iron supplement consumption and improve the nutritional status of pregnant women.

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# The Risk Level of Type 2 Diabetes Mellitus in University Students: A Descriptive Study

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**A B S T R A C T**

University students are vulnerable to sedentary lifestyles, characterised by poor diet and minimal physical activity, which increase the risk of type 2 diabetes mellitus (T2DM). Early detection is essential to reduce the prevalence of T2DM among young individuals. This study aimed to assess the risk levels of T2DM among university students using the FINDRISC-BI screening tool and analysed the distribution of risk levels—low, slightly increased, moderate, and high—along with contributing factors. A descriptive quantitative method with a cross-sectional design was utilised, conducted in March 2025. A total of 251 respondents participated using a convenience-cluster sampling technique. The study found 64.1% of participants at low risk, 25.1% at slightly increased risk, 6.8% at moderate risk, and 4.0% at high risk of T2DM. Many students showed inadequate physical activity and lacked daily consumption of vegetables and fruits. In conclusion, while most students were at low risk, a significant portion exhibited elevated risk levels, highlighting the need for further medical assessment and preventive strategies.

## INTRODUCTION

Diabetes mellitus (DM) is a prevalent non-communicable disease that continues to rise in incidence globally, posing a significant public health challenge. According to the International Diabetes Federation (IDF), as of 2021, an estimated 537 million individuals aged 20–79 years were affected by DM. This number is projected to increase to 643 million by 2030 and further to 783 million by 2045, highlighting the growing burden of diabetes on healthcare systems worldwide (IDF, 2022). In 2021, the prevalence of DM in Southeast Asia reached 90 million individuals, with projections indicating an increase to 113 million by 2030 and 151 million by 2045. Notably, approximately 73.7% of DM cases in the region remain undiagnosed, suggesting a significant gap in disease detection and management. Given this high proportion of undiagnosed cases, the actual global prevalence of DM is likely to surpass the reported figures provided by the International Diabetes Federation (IDF), underscoring the need for improved screening and diagnostic efforts worldwide.

According to the Basic Health Research conducted by the Indonesian Ministry of Health in 2013, the prevalence of DM among individuals aged over 15 years in Indonesia was recorded at 1.5%. By 2018, this figure had risen to 2.0%, reflecting a 0.5% increase over five years (KEMENKES RI, 2019). In Yogyakarta Province, 2.4% of the total population across all age groups were diagnosed with DM, while the prevalence among individuals aged over 15 years was higher at 3.1% (KEMENKES RI, 2019). The



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rising incidence of DM is closely associated with various risk factors that contribute to its development (Delfina et al., 2021). Preventive measures play a crucial role in mitigating the growing burden of DM, particularly through early detection strategies aimed at assessing risk factors from a young age. Early screening and intervention efforts are essential in reducing the prevalence and impact of DM in affected populations.

Early detection of DM risk plays a crucial role in preventing the increasing incidence of the disease (Savitri et al., 2022). Several risk factors contribute to the development of DM, including genetic predisposition, hormonal influences, family history, age, obesity, and lifestyle-related factors such as an unhealthy diet, physical inactivity, and smoking (KEMENKES RI, 2024). Among the at-risk populations, university students represent a vulnerable group due to lifestyle habits that may predispose them to DM (Sattu et al., 2024). Implementing preventive strategies, including early screening and promoting healthier lifestyles, is essential to mitigating the long-term impact of DM.

Students are typically individuals in the early stages of adulthood, generally ranging in age from 18 to 24 years (Fitriani et al., 2022). The demands of academic life, coupled with unhealthy habits, can significantly influence students' lifestyles (Sattu et al., 2024). According to Murtiningsih et al. (2021), contemporary student lifestyles are often characterised by the frequent consumption of fast food, junk food, and foods high in carbohydrates and sugars, alongside limited physical activity and prolonged sedentary behaviour. These patterns place students at an elevated risk of developing T2DM (Murtiningsih et al., 2021). With the advancement of technology, young individuals increasingly utilise mobile applications to order food and beverages online, a trend that has contributed to the rise of sedentary behaviour among this population (Asriati, 2023). In campus environments, the growth of culinary businesses, such as cafeterias, and the academic demands placed on students encourage the frequent use of these establishments, whether for social interactions or completing assignments. Many cafeterias predominantly offer fast food and sugary beverages, further exacerbating sedentary habits and unhealthy dietary patterns. Sedentary lifestyles have been linked to an elevated risk of T2DM in young adults, increasing the likelihood of developing the condition by 1.55 times. This is attributed to the lack of physical activity, which impairs the body's ability to convert glucose into energy (Nurfauziah et al., 2023).

In line with the explanation, the American Diabetes Association (ADA) states that individuals over the age of 45 are at increased risk of developing DM, with T2DM most commonly occurring among those aged 45 to 64 years (ADA, 2024). However, in recent years, the incidence of DM has been observed among individuals in early adulthood, particularly those aged 18 to 24 years. Nugroho et al. (2023) found that following the initial diagnosis of T2DM in adolescents and young adults aged 15 to 24 years, 3.3% of participants were classified as having excess abdominal circumference, and 6.7% were identified as being


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overweight, both of which are recognised risk factors for the development and progression of T2DM. (Nugroho et al., 2023).

Based on the phenomenon, early identification and assessment of T2DM risk factors play a critical role in preventing the rising incidence of diabetes. One effective strategy involves screening for T2DM risk factors among young adults, including university students.

## METHOD

This study employed a descriptive quantitative design with a cross-sectional approach. The research was conducted at the Nursing Study Program, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, from March 6 to 8, 2025. The population consisted of active nursing students from 2021, 2022, 2023, and 2024 cohorts, totaling 676 individuals. A sample of 251 respondents was selected using a convenience-cluster sampling technique. The researcher divided the population into four clusters based on academic year and selected 63 students from each cohort who were most accessible, easily contacted, or willing to participate. The inclusion criteria were active nursing students from FKIK UMY in the specified cohorts, aged 18 to 24 years, and willing to participate in the study. The exclusion criteria included students from programs other than nursing, inactive nursing students, and those outside the 18–24 age range.

The research instrument used in this study was the Finnish Diabetes Risk Score–Bahasa Indonesia (FINDRISC-BI) questionnaire, which is an effective tool for assessing the 10-year risk of developing T2DM. This instrument identifies T2DM risk in otherwise healthy individuals through a risk scoring system, thereby contributing to early prevention efforts and helping to curb the increasing prevalence of diabetes in Indonesia (Pertiwi et al., 2021). FINDRISC-BI demonstrated excellent predictive validity for T2DM in cross-sectional assessments, with an area under the curve (AUC) value of 0.935. Furthermore, the reliability of the instrument, as measured by Cronbach’s alpha, was 0.727. These findings indicate that the questionnaire's reliability falls within the acceptable range, supported by an AUC between 0.7 and 0.79 (Pertiwi et al., 2021).

This study received ethical approval from the Health Research Ethics Committee (Komite Etik Penelitian Kesehatan/KEPK) of the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta (FKIK UMY), with approval no. 035/EC-KEPK FKIK UMY/I/2025. Prior to data collection, researchers informed the student coordinators of 2021, 2022, 2023, and 2024 cohorts that a risk screening for T2DM would be conducted, with 63 participants to be selected from each cohort. Participants were selected based on accessibility, ease of contact, availability, and willingness to participate. Data collection was conducted according to the prearranged schedule for each class year. Before completing the questionnaire, all respondents received a detailed explanation of the study and provided informed consent.

Participants were given access to the questionnaire via a Google Form barcode and were provided with measuring tools to record their height, weight, and waist circumference. These measurements were conducted directly by the researcher to ensure accuracy. Upon completing the questionnaire, respondents received a small token of appreciation. The collected data were subsequently reviewed for completeness and accuracy prior to analysis.

## RESULT

Table 1 Frequency distribution of T2DM risk factors based on FINDRISC-BI

| Sub-Variables Risk Factors | Category | Total | |
|---|---|---|---|
| | | N | Percentage (%) |
| Age | Under 45 years | 251 | 100.0 |
| | 45-54 years | 0 | 0.0 |
| | 55-64 years | 0 | 0.0 |
| | Above 64 years | 0 | 0.0 |
| IMT | Less than 25 kg/ $m^2$ | 168 | 66.9 |
| | 25-30 kg/$m^2$ | 57 | 22.7 |
| | More than 30 kg/$m^2$ | 26 | 10.4 |
| Circumference Waist | Women <80 cm, Male <90 cm | 182 | 72.5 |
| | Women 80-88 cm, Male 94-102 cm | 29 | 11.6 |
| | Women > 88 cm, Men >102 cm | 40 | 15.9 |
| Activity Physique | Yes, vigorous physical activity 30 minutes/day | 72 | 28.7 |
| | No, moderate physical activity (walking, housework/ vigorous physical activity 30 minutes/week) | 179 | 71.3 |
| Consumption of Fruits and Vegetables | Every day (eat vegetables and fruit 5x/day) | 74 | 29.5 |
| | Not every day (consume vegetables and fruit <5x/day) | 177 | 70.5 |
| Consumption of Anti- Hypertensive Drugs | No | 235 | 93.6 |
| | Yes | 16 | 6.4 |
| History of High Blood Sugar | No | 208 | 82.9 |
| | Yes | 43 | 17.1 |
| Family History of DM | No | 164 | 65.3 |
| | Yes: grandparents, aunts, uncles, or first cousins (not biological) | 61 | 24.3 |
| | Yes: parents, older or younger siblings | 26 | 10.4 |
| DMT2 Risk Level | Risk Low | 161 | 64.1 |
| | Risk A little Increase | 63 | 25.1 |
| | Medium Risk | 17 | 6.8 |
| | High Risk | 10 | 4.0 |
| | Very High Risk | 0 | 0.0 |

## DISCUSSION

Factors associated with T2DM risk are based on FINDRISC-BI.

1. Age

In this study, all respondents were under the age of 45 years (100%), and therefore, age did not contribute as a risk factor for T2DM in the sample population. This finding is consistent with the study by Suharno et al. (2024), which reported that individuals aged 45 to 65 years are at a higher risk of developing DM compared to those aged 18 to 44 years (Suharno & Nisa, 2024). Age is one of the factors associated with

the incidence of T2DM, as increasing age is linked to a higher likelihood of glucose intolerance. This condition results in a decline in the body's ability to metabolize glucose effectively, thereby elevating the risk of developing T2DM (Delfina et al., 2021). As individuals age, the functional capacity of various organs declines, which can lead to reduced insulin sensitivity and diminished metabolic activity, including impaired glucose metabolism. These physiological changes contribute to an increased risk of developing T2DM (Haris & Kristianti, 2020). However, the findings of this study offer a different perspective, indicating that T2DM is not solely influenced by age. Several respondents in this study, despite being under 45 years old, were identified as having multiple risk factors for developing T2DM. This aligns with the findings of Andini et al. (2024), who reported that their study participants were also under the age of 45 and demonstrated the presence of several risk indicators for T2DM. These results suggest that young adults may also be at significant risk and should be included in early screening and preventive efforts (Andini et al., 2024). This may occur because young adulthood is considered a productive stage of life, during which individuals often engage in numerous activities and responsibilities. As a result, they may neglect healthy lifestyle practices, thereby increasing the risk of developing DM and failing to engage in preventive behaviors (Ramadhani & Khotami, 2023).

2. Body Mass Index (BMI)

Based on the results of this study, most respondents had a BMI below 25 kg/m², with 168 individuals (66.9%) classified in the normal BMI category. This suggests that most participants had a proportionate body weight relative to height. However, 57 respondents (22.7%) had a BMI ranging from 25 to 30 kg/m², while 26 respondents (10.4%) had a BMI greater than 30 kg/m². According to the general BMI classification, a BMI between 25 and 30 kg/m² falls into the Obesity Class I category, while a BMI exceeding 30 kg/m² is classified as Obesity Class II (KEMENKES RI, 2025). Previous research has demonstrated a significant association between BMI and the risk of developing T2DM, indicating that individuals with higher levels of body fat are at greater risk of developing the disease (Ruku et al., 2022). Supporting previous findings, this study identified 83 young adults who were at risk of developing T2DM, which may be attributed to obesity. An increased BMI is influenced by various lifestyle-related factors, including excessive body weight, physical inactivity, and high consumption of carbohydrate, all of which are recognized risk factors for obesity and, subsequently, for T2DM (Hafizi et al., 2024). The substantial academic workload, combined with a sedentary lifestyle often influenced by prolonged use of social media, may contribute to an increased BMI among medical faculty students (Badaruddin et al., 2024). According to Strati et al. (2024), obesity resulting from unhealthy lifestyle behaviors is a major contributing factor to the early onset of T2DM in young adults (Strati et al., 2024).


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3. Waist Circumference

In this study, the waist circumference of respondents was predominantly within the normal range, with 182 individuals (72.5%) having a waist circumference of less than 80 cm for women and less than 90 cm for men. This suggests that most respondents either had a normal waist circumference or were free from central obesity. However, 40 individuals (15.9%) had waist circumferences between 80–88 cm for women and 94–102 cm for men, while 29 individuals (11.6%) had waist circumferences exceeding 88 cm for women and 102 cm for men, indicating a higher risk for central obesity. These findings indicate that 69 respondents had waist circumferences exceeding the normal range. An elevated waist circumference is a clinical indicator of overweight or central obesity, which is a major risk factor for the development of degenerative diseases such as DM. Therefore, waist circumference measurement is considered an effective method for predicting central obesity and assessing the risk of related health conditions (Panna et al., 2021). Central obesity can be influenced by several factors, including dietary habits characterized by high glycemic index foods, frequent consumption of fast food, physical inactivity, and socio-economic conditions (Nugroho & Sudirman, 2020). Consistent with the researcher's findings, several students reported that they frequently consumed fast food due to its convenience and quick availability. Moreover, with the advancement of technology, many respondents reported using electronic devices such as smartphones to order food online, a behavior that contributes to physical inactivity and sedentary habits. This is supported by the physical activity distribution data, which indicates that a considerable number of respondents engage in insufficient physical activity thereby increasing the risk of central obesity. Central obesity is a critical public health concern, as it is strongly associated with various metabolic disorders and increases the risk of chronic diseases. (Rahmaniah et al., 2023). According to Cao et al. (2024), central obesity is associated with a 1.72 times increased risk of developing DM (Cao et al., 2024).

4. Physical Activity

The table shows that many respondents, 179 individuals (71.3%), engaged in moderate physical activity. In this study, moderate physical activity such as walking, performing household chores, or engaging in vigorous physical activity for 30 minutes per week was identified as a risk factor for T2DM. The lack of sufficient physical activity among respondents can be attributed to their demanding schedules as health students, which leaves them with limited time for exercise. When free time is available, many respondents choose to rest rather than engage in physical activity. Physical activity is closely linked to metabolic diseases, as a lack of regular exercise, defined as at least 30 minutes of physical activity per day or 3 times per week, can lead to the accumulation of fat in the body. This accumulation, combined with insufficient insulin to convert glucose into energy, results in an increased risk of developing T2DM and elevated blood glucose levels (Murtiningsih et al., 2021). The lack of physical activity among respondents can lead to elevated blood sugar levels, as insufficient physical activity prevents the proper

utilization of glucose. As a result, glucose remains in the bloodstream, causing an increase in blood sugar levels beyond normal ranges (Sattu et al., 2024). Furthermore, as technology continues to advance, it has led to negative health consequences, including a reduction in physical activity. This decrease in physical activity contributes to the accumulation of body fat, which can result in overweight or obesity. (Badaruddin et al., 2024). The lack of physical activity can increase the likelihood of obesity, which, in turn, is a significant risk factor for T2DM among the respondents in this study.

5. Consumption of vegetables and fruits

The results of this study revealed that many respondents, 177 individuals (70.5%), did not consume vegetables and fruit daily (<5 times/day). This suggests that insufficient daily consumption of vegetables and fruits may increase the risk of developing T2DM among young adults. This finding aligns with the research conducted by Sarifah et al. (2023), which found that individuals who consume fewer fruits and vegetables have a 6.889 times greater risk of developing T2DM compared to those who consume an adequate amount (Sarifah & Siyam, 2023). The findings of this study revealed that the presence of eateries offering fast food and sugary drinks, particularly in campus cafeterias, contributes to students' dietary habits. The researchers also found that students tend to consume more fast food due to its convenience and appeal. This is consistent with the research by Sattu et al. (2024), who noted that many students, particularly those living away from home in boarding houses, opt for fast food because it is easily accessible, often available through quick online ordering options (Sattu et al., 2024). Research by Wahyudi et al. (2024) demonstrates that students primarily consume fast food due to its convenience, speed, and appealing taste (Wahyudi et al., 2024). Additionally, the types of fast food consumed by students include burgers, pizza, kebabs, snacks, instant noodles, fried foods, and fried chicken. Consumption of fast food at least once a week has been shown to have a positive correlation with high fat intake, thereby increasing the risk of developing T2DM. (Murtiningsih et al., 2021).

6. Consumption of Anti-Hypertensive Drugs

The results indicated that many respondents (235 individuals, 93.6%) did not take antihypertensive medications, suggesting that most did not have a history of hypertension. However, 16 respondents (6.4%) were using antihypertensive drugs, which may indicate a history of high blood pressure. This could be attributed to various factors, such as genetic predisposition, stress, or an imbalanced diet, including the consumption of foods high in sodium, such as fast food or junk food. Junk food refers to foods that are typically high in calories, fat, sugar, and salt (Fardlillah, 2024). In line with the research conducted by Haris et al. (2023), the type, quantity, and timing of food consumption must be considered, as these factors can significantly affect an individual's blood pressure (Haris & Kristianti, 2020). According to Meher et al. (2023), hypertension is influenced by several factors, including age, overweight (obesity), alcohol consumption, family history of hypertension, and the intake of foods high in salt


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(Meher et al., 2023). Supported by Damayanti et al. (2023), the study identified both modifiable and non-modifiable risk factors for hypertension in individuals with DM. Non-modifiable risk factors include age, gender, education, marital status, blood type, family history of hypertension, family history of DM, and the duration of DM. In contrast, modifiable factors include smoking habits, occupation, physical activity, and BMI (Damayanti et al., 2023).

7. History of High Blood Sugar

The results of this study indicated that many respondents, 208 individuals (82.9%), did not have a history of elevated blood sugar levels. However, 43 respondents (17.1%) reported having a history of high blood sugar. Other studies have shown a significant relationship between blood sugar levels and the incidence of T2DM, with individuals who have abnormal blood sugar levels being at 93.302 times greater risk of developing T2DM compared to those with normal blood sugar levels (Suci & Ginting, 2023). According to Nurita et al. (2024), factors that exacerbate the risk of T2DM in college students include a history of hyperglycemia (Nurita & Yulistiani, 2024). According to the researcher's findings, the occurrence of T2DM can be influenced by genetics or heredity. This is supported by the data showing that 87 respondents have family members, including grandparents or biological parents, with a history of DM. In line with the research by Andini et al. (2024), individuals with a family history of DM are at a significantly higher risk of developing the condition themselves (Andini et al., 2024). In addition, high blood sugar levels in these students may be attributed to excessive sugar consumption. While sugar serves as a source of energy necessary for physical activity and growth, excessive intake can lead to insulin dysfunction. In such cases, insulin becomes unable to effectively respond and carry out its role in converting sugar into energy, potentially leading to high blood sugar levels (Dewanti & Sukendra, 2024). Research by Wahidah et al. (2022) demonstrated that young adults with higher consumption of sugary drinks have a 2.87 times greater risk of developing T2DM compared to those with lower consumption of sugary drinks (Wahidah & Rahayu, 2022).

8. Family History of DM

The results revealed that many respondents, 164 individuals (65.3%), did not have a family history of DM. However, 61 respondents (24.3%) had a history of DM in their immediate family, while 26 respondents (10.4%) had a history of DM in their parents or siblings. Overall, 87 respondents (35.3%) had family members ranging from parents, siblings, grandparents, aunts, uncles, or first cousins (excluding siblings) with a history of DM. Research by Fatria et al. (2022) found significant results between family history and the incidence of T2DM (Fatria & Maidar, 2022). Individuals with family members who have a history of DM are at a higher risk of developing the condition compared to those without such a family history. Those with a family history of DM are at 2 to 4 times greater risk than individuals without a family history of the disease (Annashr, 2024). If one of an individual's parents has

DM, the risk of developing the condition increases by 15%. If both parents have DM, the risk is elevated by 75%. Additionally, the risk of developing DM is 10-30% higher if the mother has the condition, as genetic influences during fetal development are thought to be more significant from the mother than the father (Andini et al., 2024).

T2DM Risk Level

The results of this study indicated that 161 respondents (64.1%) were classified as being at low risk, meaning that 1 in 100 young adults in this group is expected to develop type 2 T2DM in the next 10 years. A total of 63 respondents (25.1%) were categorized as having a slightly increased risk, with 1 in 25 young adults in this group expected to develop T2DM in the same period. Additionally, 17 respondents (6.8%) were at moderate risk, implying that 1 in 6 young adults in this group will develop T2DM within the next 10 years. Lastly, 10 respondents (4.0%) were at high risk, meaning that 1 in 3 young adults in this category will develop T2DM over the next decade. These findings demonstrate that the risk levels for T2DM among the 251 students are distributed across low, slightly increased, moderate, and high-risk categories. The greater the deviation from the risk factors associated with T2DM, the higher the likelihood of developing the condition within the next 10 years (Andini et al., 2024).

## CONCLUSION

In this study, all respondents were aged 18-24 years, with the majority being female. Most respondents had a BMI and waist circumference within the normal range. Additionally, most participants did not take antihypertensive medications, did not have a history of high blood sugar, and did not have a family history of DM. However, many respondents exhibited low levels of physical activity and infrequently consumed fruits and vegetables daily. The results indicated that most students were classified as being at low risk of developing T2DM within the next 10 years. Despite this, a portion of the students were identified as having risk factors that placed them in the slightly increased, moderate, and high-risk categories for T2DM.

Future researchers are encouraged to conduct further studies involving blood sugar and blood pressure examinations, as well as to explore other populations, including non-health students, and assess students' knowledge of risk factors and prevention strategies for T2DM. For healthcare professionals, this research can serve as a foundation for promoting preventive measures for T2DM at a younger age, not just in older adulthood. Health promotion efforts should focus on educating students about maintaining a healthy lifestyle within the campus environment, including proper diet, physical activity, and other healthy habits to reduce the risk of developing T2DM. For both respondents and readers, it is recommended to take preventive measures, improve unhealthy lifestyle habits, and seek further medical evaluations when necessary.



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# Analysis of Pesticide Usage Behavior and Personal Protective Equipment (PPE) among Farmers in Batu Bangka Village

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**A B S T R A C T**

Various chronic health effects can arise due to long-term exposure to pesticides. Unsafe pesticide usage behaviour and inadequate Personal Protective Equipment (PPE) usage pose potential hazards to farmers. This study aims to analyse the behaviour of pesticide usage and Personal Protective Equipment (PPE) among farmers in the Batu Bangka Village, West Nusa Tenggara. This research is a quantitative study using a cross-sectional approach. The study sample was taken using a simple random sampling technique, involving 40 individuals. Respondent characteristics indicate that respondents in the age category are predominantly between 36 and 45 years old, with 15 respondents (50%); those with elementary or junior high school education were 25 respondents (62.5%); and the majority have been farmers for more than 10 years (37.5%). Farmer behaviour and personal protective equipment show that many respondents have an inadequate knowledge level, with 27 respondents (67.5%); the majority have a good attitude, with 29 respondents (72.5%); and the majority have good practices, with 33 respondents (82.5%), but the majority do not use complete PPE, with 21 respondents (52.5%). Efforts and cooperation from various parties are needed to improve farmers' knowledge and advise farmers to use complete PPE to prevent pesticide poisoning and work-related diseases.

## INTRODUCTION

Indonesia, as one of the agrarian countries in the world, heavily relies on the agricultural sector as the driving force of its economy. Agriculture plays a central role in the economic advancement of this country. In addition, Indonesia is also known for its abundant agricultural produce, including the richness of rice, which is one of the main agricultural products. In efforts to improve the quality of farm products, farmers often rely on pesticides to reduce the negative impact caused by plant pests. As a result of this approach, farmers and the use of pesticides have become integrated and difficult to separate (Louisa et al., 2018).

In the Moyo Hilir area, West Nusa Tenggara, the use of pesticides remains an issue that needs attention. According to data from the Department of Agriculture and Plantations of West Sumbawa Regency (2019), several types of pesticides are frequently used by farmers in the region, such as insecticides, fungicides, and herbicides. However, many farmers are still unaware of the dangers of pesticide use and safe usage practices. Additionally, economic factors and access to information are also obstacles for farmers in using pesticides wisely. Research by Syamsi (2019) in West Nusa Tenggara Province shows that access to information about pesticide use is still lacking, and the affordable price of pesticides is also a significant factor in the use of pesticides by farmers in the region.



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The toxicity of pesticides, the quantity of pesticides, the poison of pesticides, and the level of pesticide exposure significantly impact health. This is supported by the fact that farmers still use hazardous pesticides and engage in high-risk spraying behaviours that lead to poisoning (Pawukir & Mariyono, 2002). Every day, thousands of farmers and agricultural workers in Indonesia are poisoned by pesticides, and it is estimated that millions of people involved in agriculture suffer from pesticide poisoning each year due to unsafe and unhealthy pesticide use practices. Generally, during pesticide use or spraying, about 85% of farmers do not wear Personal Protective Equipment (PPE). Of the 15% of farmers who do use PPE, the equipment does not meet the standards of the Indonesian Ministry of Health when interacting with pesticides (Erwin et al., 2019).

The issue of unwise pesticide use by farmers in the Moyo Hilir area of West Nusa Tenggara has become a significant concern for the government and related institutions. To address this problem, efforts must be made to enhance farmers' understanding of the dangers of pesticides and safe usage practices. Several community service programs have previously been conducted in Indonesia with the same objective. For instance, a community service program carried out by Alizamar et al. (2020) in Solok Selatan Regency, West Sumatra, successfully increased farmers' knowledge and awareness about the dangers of pesticides and safe usage practices.

Many of the population in Sumbawa Regency are farmers. Their daily activities involve farming from morning until evening. The main crops dominating agricultural practices in this region are Oryza sativa (rice) and Zea mays (corn). Farmers in Batu Bangka Village use pesticides to care for their crops. The timing of pesticide spraying depends on the type of plant. For rice plants, spraying is done several times during the early growth stages to eliminate pests, while for corn plants, spraying is done one month after planting. Most farmers are accustomed to not using personal protective equipment (PPE) when spraying them and only wear everyday clothes instead of special clothing for working in the fields.

## METHOD

This research is a quantitative study using an analytical design. It employs a cross-sectional design in Batu Bangka Village, Moyo Hilir Subdistrict, Sumbawa Regency, West Nusa Tenggara, from August to December 2023. The sample for this study was taken using simple random sampling with the Slovin formula, resulting in a sample size of 40 individuals. The basic criteria for this research are as follows:

1. Rice or corn farmers
2. Able to read and write
3. Willing to be respondents during the study

The research data were processed descriptively, and hypothesis testing was conducted using ordinal regression with the assistance of SPSS for Windows version 16.0.

## RESULT

This study involved 40 respondents in Batu Bangka Village, Moyo Hilir Subdistrict.

Table 1. Frequency Distribution of Respondent Characteristics

| Respondent Characteristics | n | Percentage (%) |
|---|---|---|
| Age | | |
| 18-25 years | 2 | 5 |
| 26-35 years | 15 | 37.5 |
| 36-45 years | 20 | 50 |
| 46-55 years | 3 | 7.5 |
| Education | | |
| Elementary/Junior High School | 25 | 62.5 |
| Senior High School/Vocational School | 12 | 30 |
| Associate/bachelor's degree | 3 | 7.5 |
| Farming Experience | | |
| < 1 years | 5 | 12.5 |
| 1-5 years | 13 | 32.5 |
| 6-10 years | 7 | 17.5 |
| > 10 years | 15 | 37.5 |

(Source: Primary Data, 2023)

Based on Table 1, it is known that the respondents are predominantly in the age category of 36-45 years, with 15 respondents (50%). The education category of Elementary/Junior High School has the most respondents, with 25 respondents (62.5%). The majority of respondents have been farmers for more than 10 years (37.5%).

Table 2. Frequency Distribution of Farmers' Pesticide Use Behavior

| Farmers' Behavior | Number | |
|---|---|---|
| | n | % |
| Level of Knowledge | | |
| Good | 13 | 32.5 |
| Poor | 27 | 67.5 |
| Attitude | | |
| Good | 29 | 72.5 |
| Poor | 11 | 27.5 |
| Respondent Actions | | |
| Good | 33 | 82.5 |
| Poor | 7 | 17.5 |
| Use of PPE | | |
| Complete | 19 | 47.5 |
| Incomplete | 21 | 52.5 |
| Total | 40 | 100 |

(Source: Primary Data, 2023)

Based on Table 2 above, it is shown that many respondents have a poor level of knowledge, with 27 respondents (67.5%). However, the majority have a good attitude, with 29 respondents (72.5%). Most respondents exhibit good actions, with 33 respondents (82.5%), while the majority have incomplete use of PPE, with 21 respondents (52.5%).


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Table 3. The Influence of Knowledge, Attitude, and Pesticide Use Actions on the Use of Personal Protective Equipment among Farmers

| Variable | Category | Estimate | Wald |
|---|---|---|---|
| Knowledge | Good | 1.097 | 1.270 |
| | Poor | 22.208 | 153.169 |
| Attitude | Good | 1.811 | 1.380 |
| | Poor | 0.256 | 0.100 |
| Actions | Good | 2.712 | 4.315 |
| | Poor | 1.720 | 1.890 |

(Source: Primary Data, 2023)

Based on Table 3, the test results indicate that among the variables of knowledge level, attitude, and actions, the variable with the greatest influence on the use of PPE among farmers when using pesticides is the level of knowledge, with a Wald value of 153.169.

## DISCUSSION

The use of pesticides in agriculture is a common practice to control pests and plant diseases. However, it is crucial to use the correct dosage to be effective in combating pests without harming humans and the surrounding environment. Unfortunately, there is a tendency among farmers to use pesticide dosages that do not align with recommended guidelines. This can lead to serious health and environmental issues (Smith, 2018). The amount of pesticide used in Indonesia increases each year. This rise in pesticide use can elevate the risk of pesticide exposure, leading to various health issues such as poisoning and fluctuations in blood pressure. The most used pesticides among farmers are chemical pesticides due to their ease of application and quick results (Mawaddah et al., 2022).

One main reason for the use of incorrect pesticide dosages is the lack of understanding and awareness among farmers about the risks associated with excessive pesticide use. Some farmers believe that using more pesticides will be more effective in controlling pests. However, this is a misconception that can be potentially harmful (Jones, 2019). Pesticide exposure can enter a farmer's body through the skin, respiration, and ingestion. Farmers may be exposed to pesticides while carrying, storing, transferring concentrates, mixing, spraying, and cleaning used spray equipment. For instance, 40.7% of farmers use more than 10 types of active ingredients in a single mix, and 51.9% of farmers use 6-10 tanks per day for spraying. The higher the likelihood of pesticide exposure, the greater the incidence of chronic poisoning among farmers. Farmers need to use pesticides correctly and wisely by reading product labels, adhering to scheduled spraying times, and using personal protective equipment to ensure workplace safety (Yunarti et al., 2013).

Additionally, economic factors can also influence the use of incorrect pesticide dosages. Some farmers may wish to save costs by reducing the recommended pesticide doses. They may not realise that reducing


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these doses can decrease the effectiveness of pest and disease control, ultimately affecting their crop yields (Brown, 2020).

Aside from issues with incorrect pesticide dosages, the habit of not using PPE during spraying is also a serious problem. PPE, such as face masks, gloves, and protective clothing, is crucial in preventing direct exposure to pesticides and protecting farmers' health. However, some farmers neglect to use PPE due to discomfort or a belief that it is unnecessary (Garcia, 2017).

The consequences of using incorrect pesticide dosages and not using PPE can be extremely dangerous. Long-term exposure to pesticides can lead to various health problems, including neurological damage, hormonal disruptions, and an increased risk of cancer (Johnson, 2021). Furthermore, uncontrolled pesticides can contaminate groundwater and other water sources, threaten wildlife, and disrupt ecosystem balance (Anderson, 2019).

To address these issues, better education and training must be provided to farmers. They need a deeper understanding of the correct pesticide dosages and the importance of using PPE during spraying. Additionally, the government and relevant institutions should enhance monitoring of pesticide use in the field and impose sanctions on those who do not adhere to existing guidelines (Clark, 2022).

## CONCLUSION

The characteristics of the respondents show that the majority fall into the age category of 36-45 years, with 15 respondents (50%), and have an education level of Elementary/Junior High School, with 25 respondents (62.5%). Many respondents have been farmers for more than 10 years, making up 37.5%. Regarding behaviour and personal protective equipment (PPE), many respondents have a poor level of knowledge, with 27 respondents (67.5%). However, the majority have a good attitude, with 29 respondents (72.5%), and exhibit good actions, with 33 respondents (82.5%), while most have incomplete use of PPE, with 21 respondents (52.5%). The variable most influencing the use of PPE among farmers is the level of knowledge.

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# Knowledge, Attitudes, and HIV/AIDS Preventive Behaviors Among Tattooed Papuan Adolescents in Eastern Indonesia: A Cross-Sectional Study of Cultural Risk Factors

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**A B S T R A C T**

HIV/AIDS remains a significant global health challenge, with a 2.3% prevalence in Papua and an estimated 12,050 cases in West Papua by 2024. The prevalent practice of tattooing among Papuan adolescents potentially increases the risk of HIV transmission. This study aimed to analyze the levels of knowledge, attitudes, and preventive behaviours regarding HIV/AIDS among tattooed Papuan ethnic secondary school students in Sorong City. A cross-sectional study was conducted in March 2024 at a secondary school in Sorong City. The sample comprised 150 Papuan ethnic students in Years XI-XII, aged 15-18 years, with tattoo history, selected through purposive sampling. Data were collected using validated questionnaires (Cronbach's alpha >0.7) measuring knowledge (10 items), attitudes (12 items), and preventive behaviours (8 items). Analyses employed descriptive statistics and chi-square tests using SPSS version 25.0. The study received ethical approval (approval number DM.03.05/8/138/2024, dated 17 January 2024). Many respondents (53.3%) demonstrated moderate knowledge levels, 43.3% exhibited neutral attitudes, and 46.7% showed adequate preventive behaviours. Significant positive correlations were found between knowledge and attitudes ($r=0.65$; $p<0.01$) and preventive behaviours ($r=0.72$; $p<0.01$). Sociodemographic analysis revealed a predominance of respondents aged 17-18 years (46.7%) from middle-income backgrounds. The findings indicate the necessity for culturally sensitive educational interventions to enhance knowledge and promote positive attitudes towards HIV/AIDS prevention among tattooed Papuan ethnic adolescents.

## INTRODUCTION

HIV/AIDS remains one of the most significant global health challenges, profoundly impacting individuals, families, and communities. According to recent reports, in 2023, approximately 1.4 million children under the age of 15 years were living with HIV worldwide. In Indonesia, attention to HIV cases among children has become increasingly urgent, with an additional 700–1,000 children infected annually. The prevalence of HIV in Papua is 2.3%, with an estimated 12,050 people living with HIV (PLHIV) in West Papua Province by 2024. Within this context, research on the knowledge, attitudes, and behaviours regarding HIV/AIDS prevention among Papuan adolescents in Sorong City is highly relevant (Hardisman, 2009; Jocelyn et al., 2024; NIH's Office of AIDS Research, 2024; Nyoko & Hara, 2020; Romantir et al., 2024a; Solihin et al., 2023; UNICEF, 2024; United Nations in Indonesia, 2023).

Adolescents are a vulnerable group to HIV/AIDS infections. Data indicate that by 2022, approximately 1,929 adolescents aged 15–24 years were infected with HIV in Indonesia (Ministry of Health, 2022). In Sorong City, although only 12 positive HIV cases were reported in early 2024, it is essential to understand the factors influencing adolescents' knowledge and attitudes toward HIV/AIDS prevention.



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Tattoos, a prevalent form of self-expression among Papuan adolescents, may contribute to risk behaviours associated with HIV transmission. Tattoos often hold profound cultural significance for Papuan communities and may shape their perceptions of health and infection risks (CDC, 2024; Cohen, 2021; Dzinamarira & Moyo, 2024; Hasnia et al., 2024; Karagözoğlu & İlhan, 2024; Karman et al., 2024; Khairunisa et al., 2024; Khan et al., 2024; Koch et al., 2005; Naully & Romlah, 2018; Perkins et al., 1997; Permatasari et al., 2025; Ratnawati, Setiawan, et al., 2024a; Sulistina et al., 2024).

Although several studies have been conducted on HIV/AIDS prevention in Indonesia, gaps remain in the understanding of how knowledge and attitudes among Papuan adolescents relate to prevention practices. Most previous studies have focused on the general population or high-risk groups, such as commercial sex workers and injection drug users (Jocelyn et al., 2024; K et al., 2024; Mela et al., 2024; Mudazkir & Puspitasari, 2024; Ramdan & Setiadi, 2024; Ratnawati, Setiawan, et al., 2024a; Ribeiro Banze et al., 2024; Romantir et al., 2024a; Sundareshan et al., 2024; Tao et al., 2024; Wulandari et al., 2024). This study aimed to address this gap by exploring the knowledge, attitudes, and behaviours surrounding HIV/AIDS prevention among high school students of Papuan ethnicity in Sorong City.

The primary objective of this research was to identify the level of students' knowledge about HIV/AIDS and their attitudes and behaviours toward its prevention. The research questions included: What do students know about HIV/AIDS? What are their attitudes toward preventing infection? How do they behave when implementing preventive measures? This study also hypothesised a positive relationship between knowledge about HIV/AIDS and attitudes and behaviours regarding prevention among adolescents.

Utilising a quantitative approach with a survey design, this research collected data from high school students of Papuan ethnicity through structured questionnaires. This methodology was selected because of its ability to provide statistically measurable data on students' knowledge and attitudes. Key variables to be analysed included the level of knowledge about HIV/AIDS, attitudes toward infection prevention, and actual behaviours in implementing preventive measures.

This study not only contributes to the academic understanding of the factors influencing HIV/AIDS prevention among Papuan adolescents but also offers practical implications for developing more effective health education programs. It is anticipated that these findings will provide new insights for policymakers and healthcare practitioners in designing appropriate interventions to enhance awareness and preventive actions among adolescents.

## METHOD

Study Design



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This study used a cross-sectional design to investigate the knowledge, attitudes, and preventive behaviours towards HIV/AIDS among high school students of Papuan ethnicity in Sorong City with a history of tattoos. The independent variables were knowledge and attitudes toward HIV/AIDS, while the dependent variable was HIV/AIDS preventive behaviour.

Participants and Setting

The target population consisted of high school students of Papuan ethnicity in Sorong City, specifically those in Grades XI and XII. The inclusion criteria were students aged 15–18 years who had a history of tattoos and were willing to participate in the study. Exclusion criteria comprised Students lacking fundamental knowledge of HIV/AIDS or those with medical conditions that could potentially influence study outcomes were excluded. The sample size was determined using Slovin's formula to calculate the required sample size with a 95% confidence level and 5% margin of error. A sample size of 150 students was selected based on an approximate population of 500 students in Sorong City. Purposive sampling was employed, wherein participants were selected based on specific criteria. The study was conducted at a single centre, a high school located in Sorong City, West Papua. This site was chosen because of the high prevalence of HIV infection in the area and the presence of a Papuan community with rich tattooing traditions. Informed consent procedures involved elucidating the study's purpose to the participants and obtaining written consent from them and their parents or guardians, as required.

Intervention

This study did not involve direct interventions because its primary focus was on data collection regarding knowledge, attitudes, and preventive behaviours toward HIV/AIDS. Data collection was conducted in one session over two weeks in March 2024. Each session lasted 60 minutes, during which the participants completed the questionnaires. Data collection protocols adhered to established standard operating procedures (SOPs) to ensure consistency in gathering information. The data collectors underwent training before the study to provide a comprehensive understanding of the instruments and data collection procedures.

Data Collection

The research instrument consisted of a questionnaire specifically designed to measure knowledge, attitudes, and preventive behaviours toward HIV/AIDS. The questionnaire consisted of the following questions:

1. Knowledge of HIV/AIDS: 10 multiple-choice questions.
2. Attitudes toward HIV/AIDS Prevention: 12 statements using a Likert scale (1–5).
3. Preventive behaviour: Eight questions about respondents' concrete actions.


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Instrument validity was assessed using exploratory factor analysis (EFA), and reliability was evaluated using Cronbach's alpha, with values above 0.7 indicating good internal consistency. Data collection was conducted by a team of trained researchers who adhered to standardised procedures to ensure data quality and integrity. All data were stored securely in a restricted-access system to safeguard participant confidentiality.

Data Analysis

Data analysis was conducted using SPSS software version 25.0. Primary analyses encompassed descriptive statistics to characterise the demographic profiles of respondents and their levels of knowledge, attitudes, and preventive behaviours regarding HIV/AIDS. Inferential analysis, specifically the chi-square test, was employed to determine the relationships between the independent and dependent variables. Missing data was addressed through imputation techniques, which are necessary to maintain dataset integrity. Sensitivity analyses were also performed to evaluate the impact of missing data on study outcomes.

Ethical Considerations

This study was approved by the Health Research Ethics Committee of the Sorong Health Polytechnic (approval number DM.03.05/8/138/2024, dated 17 January 2024). All participants were provided with comprehensive information regarding the study's purpose and rights before giving informed consent. Data confidentiality was strictly maintained by anonymising the respondents' identities when the results were published. Risks to participants were minimised through stringent risk management procedures, including training data collectors to manage sensitive situations related to HIV/AIDS. Participants were not offered financial compensation; however, they were provided with information about HIV/AIDS-related health services as a form of support.

## RESULT

Characteristics of Respondents

This study involved 150 high school students of Papuan ethnicity in Sorong City with a history of tattoos. The respondents' characteristics are summarized based on age, gender, and socioeconomic status.

Table 1 Demographic Characteristics of Respondents

| Characteristic | (n) | (%) |
|---|---|---|
| Age | | |
| 15–16 years | 50 | 33.3 |
| 17–18 years | 70 | 46.7 |
| >18 years | 30 | 20.0 |
| Gender | | |
| Male | 80 | 53.3 |
| Female | 70 | 46.7 |



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| | | |
|---|---|---|
| Economic Status | | |
| Low | 60 | 40.0 |
| Middle | 70 | 46.7 |
| High | 20 | 13.3 |

The table presents the demographic distribution of respondents across three main categories: age, gender, and economic status. The findings reveal that most respondents are aged 17–18 years, comprising 46.7% of the sample. Male respondents slightly outnumber females at 53.3%. Regarding socioeconomic status, the middle-income category dominates, representing 46.7% of the respondents. These results offer valuable demographic context for interpreting subsequent analyses.

Students' Knowledge of HIV/AIDS

A questionnaire with 10 multiple-choice questions was used to evaluate the students' knowledge level. The results are summarized in the following table:

Table 2 Knowledge Levels about HIV/AIDS

| Knowledge Level | Frequency (n) | Percentage (%) |
|---|---|---|
| Low | 40 | 26.7 |
| Moderate | 80 | 53.3 |
| High | 30 | 20.0 |

Note: Knowledge levels were categorised based on questionnaire scores.

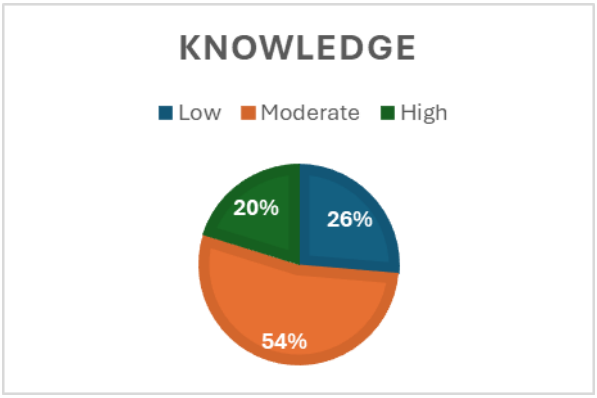



Figure 1 Distribution of Knowledge Levels about HIV/AIDS

The table illustrates the respondents' level of knowledge about HIV/AIDS. The majority (53.3%) exhibit a moderate level of expertise, indicating a foundational understanding of the topic. However, 26.7% demonstrate low knowledge levels, emphasizing the need for targeted educational initiatives to bridge this gap and promote awareness.

Attitudes toward HIV/AIDS Prevention

Respondents' attitudes toward HIV/AIDS prevention were assessed using a Likert scale. The findings are presented below:


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Table 3 Respondents' Attitudes toward HIV/AIDS Prevention

| Attitude | (n) | (%) |
|---|---|---|
| Negative | 35 | 23.3 |
| Neutral | 65 | 43.3 |
| Positive | 50 | 33.3 |

Note: Attitude scores were grouped into three categories based on data analysis.

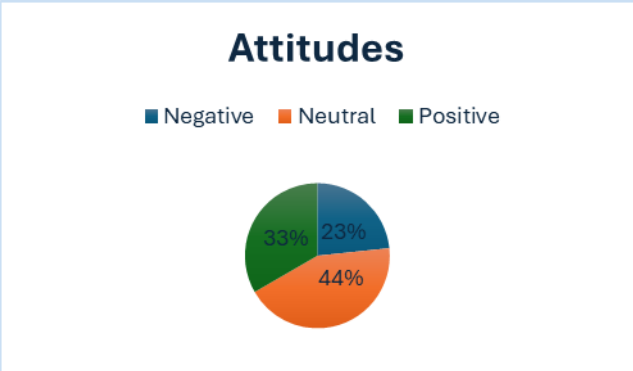



Figure 2 Attitudes toward HIV/AIDS Prevention

The table highlights the respondents' attitudes toward HIV/AIDS prevention. Positive attitudes were observed in 33.3% of respondents, reflecting supportive perspectives on preventive measures. However, 23.3% displayed negative attitudes, suggesting challenges in fostering awareness and encouraging proactive prevention efforts.

Preventive Behaviours toward HIV/AIDS

Preventive behaviours were assessed based on three main dimensions: condom use, avoidance of risky activities, and peer education. The results are summarized below:

Table 4 Preventive Behaviours toward HIV/AIDS

| Behaviour Level | (n) | (%) |
|---|---|---|
| Inadequate | 50 | 33.3 |
| Adequate | 70 | 46.7 |
| Highly Adequate | 30 | 20.0 |

Note: Behaviour levels were categorised based on a specially designed questionnaire scale.

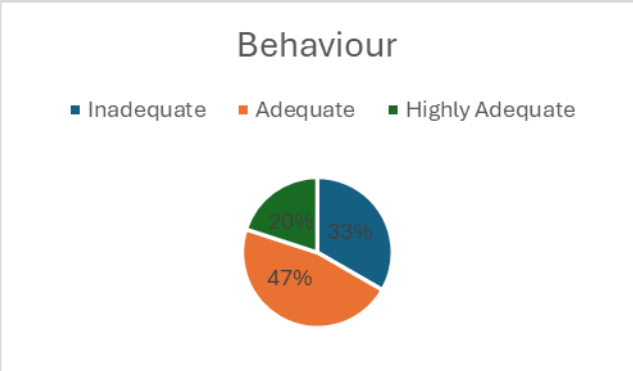



Figure 3 Preventive Behaviours toward HIV/AIDS


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The table examines respondents' preventive behaviours toward HIV/AIDS. Nearly half (46.7%) display adequate behaviours, indicating some awareness and action. However, 33.3% exhibit inadequate behaviours, highlighting the need for targeted interventions to improve practices and mitigate risks.

Relationship between Knowledge, Attitudes, and Preventive Behaviours

Statistical analysis revealed significant relationships between knowledge levels and both attitudes and preventive behaviours toward HIV/AIDS.

Table 5 Relationships among Knowledge, Attitudes, and Preventive Behaviours

| Variable | Correlation Coefficient (r) | p-value |
|---|---|---|
| Knowledge vs Attitude | 0.65 | <0.01 |
| Knowledge vs Behaviour | 0.72 | <0.01 |

Note: Pearson correlation analysis was used to measure relationships among variables.

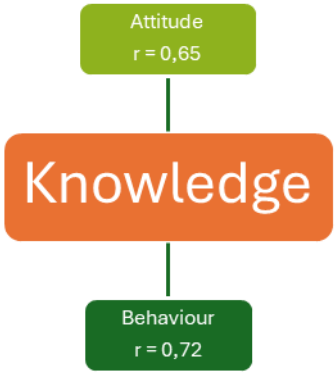



Figure 4 Relationships between Knowledge and Preventive Behaviours

The analysis indicates significant positive correlations between knowledge and both attitudes ($r = 0.65$; $p < 0.01$) and preventive behaviours ($r = 0.72$; $p < 0.01$). These results support the hypothesis that increased knowledge about HIV/AIDS positively influences attitudes and behaviours, underscoring the importance of educational interventions in addressing this public health concern.

## DISCUSSION

This study shows that high school students of Papuan ethnicity in Sorong City with a history of tattoos demonstrate varying levels of knowledge, attitudes, and behaviours regarding HIV/AIDS prevention. The principal findings indicated that most students possessed moderate knowledge, neutral attitudes, and relatively adequate preventive behaviours. Moreover, a significant positive correlation was observed between knowledge levels, attitudes, and preventive behaviours. These results correspond to the research objective of identifying students' levels of knowledge, attitudes, and behaviours related to HIV/AIDS prevention.

From a theoretical perspective, these findings corroborate the relationship model between knowledge, attitudes, and behaviours commonly employed in public health research. Enhanced knowledge appears to


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influence positive attitudes, which subsequently promote preventive behaviours. However, specific unexpected findings, such as the proportion of students with negative attitudes despite moderate knowledge levels, necessitate further analysis. This pattern suggests the presence of additional factors that influence students' attitudes and behaviours, such as social norms and personalities (Balaskas et al., 2023; F. Alves, 2024).

The primary findings indicated that students' knowledge levels fell within the moderate category. This suggests that information about HIV/AIDS has reached most students, but that their comprehension requires further enhancement. The neutral attitudes held by many respondents reflected their ambivalence towards HIV/AIDS prevention. While they recognise the importance of preventive measures, social stigma or lack of environmental support may affect their responses (Qashqari et al., 2022; Ruff et al., 2023; Terra et al., 2024).

These findings are consistent with those of previous studies that highlight how knowledge alone is insufficient to change behaviour. Additionally, the observed positive correlation between knowledge and behaviour aligns with the Health Belief Model (HBM), which emphasises the importance of understanding risks and benefits as drivers of behaviour (Alyafei & Easton-Carr, 2025; Mosleh et al., 2024).

In the existing literature, Utami et al. demonstrated that increasing knowledge through school-based health education significantly improved HIV/AIDS preventive behaviours (Ratnawati, Huda, et al., 2024). This is consistent with the findings of the present study, which indicate that students with higher knowledge levels are more likely to exhibit adequate preventive behaviours. However, this study also identified inconsistencies, particularly in students' attitudes, which did not always align with their knowledge levels. Cultural factors, local norms, and community beliefs might explain these inconsistencies.

The findings reveal that nearly one-third of students have negative attitudes towards HIV/AIDS prevention despite possessing moderate knowledge levels. Alternative explanations for this finding might include limited exposure to effective awareness campaigns or the prevalence of misinformation about HIV/AIDS within communities. Further research is necessary to determine the influence of these external factors.

This study provides new insights into the dynamic relationship between knowledge, attitudes, and behaviours in the context of HIV/AIDS prevention among Papuan adolescents. It also underscores the importance of adopting a holistic approach when designing interventions, considering cultural and social factors alongside individual (Ratnawati, Setiawan, et al., 2024b; Romantir et al., 2024b). These findings


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extend the existing conceptual frameworks and address knowledge gasping under-represented communities in the global literature.

From a practical standpoint, these findings highlight the need for locally tailored intervention programmes. Culturally sensitive awareness campaigns and participatory educational approaches can help foster positive attitudes and encourage better preventive behaviours. Stakeholders, including schools and healthcare institutions, can utilise these findings to design more effective and inclusive programs. For instance, integrating HIV/AIDS information into school curricula through interactive and experiential approaches could yield significant (Chooniedass et al., 2025; Wagner et al., 2025).

Limitations and Directions for Future Research

This study has several methodological limitations, including the use of a cross-sectional design, which does not allow causal analysis. Additionally, the sample, which only included high school students in Sorong City, limits the generalisability of the findings to a broader population. Challenges in data collection, such as respondents' openness to answering the questionnaires, may also affect the validity of the results.

Future research should employ longitudinal designs to explore changes in knowledge, attitudes, and behaviours over time. Expanding the sample to include other regions in Papua and populations with similar risk factors would enhance the scope of the study. Furthermore, investigating the role of psychosocial factors, such as family and peer support, could provide deeper insights into the determinants of HIV/AIDS preventive attitudes and behaviours. This study offers a robust foundation for developing intervention programmes and conducting follow-up studies focusing on strengthening factors that support effective preventive behaviours in vulnerable populations.

## CONCLUSION

This study aimed to identify the levels of knowledge, attitudes, and HIV/AIDS preventive behaviours among secondary school students of Papuan ethnicity in Sorong City with a history of tattoos. The findings indicated that many students possessed moderate knowledge levels, neutral attitudes, and relatively adequate preventive behaviours. The significant positive correlation between knowledge, attitudes, and behaviours underscores the importance of knowledge-based educational interventions to enhance HIV/AIDS prevention efforts. This research contributes theoretically by reinforcing the relationship between knowledge, attitudes, and behaviours as conceptualised in the Health Belief Model (HBM). Additionally, it offers practical insights into the necessity of culturally tailored approaches to intervention programs within local communities. Despite the study's limitations, including its cross-sectional design and geographical focus, the findings provide a robust foundation for the development of effective public


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health policies. Further research is recommended to explore additional determinants, such as psychosocial factors and cultural norms, and adopt longitudinal designs to evaluate long-term changes. Practical recommendations include integrating HIV/AIDS education into school curricula and fostering collaboration with communities to reduce stigma and promote positive preventive behaviours.

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# Prevalence and Characteristics of Computer Vision Syndrome Among Nursing Students in Online Learning Environments: A Cross-Sectional Study

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**A B S T R A C T**

The increased use of digital devices in online learning poses health risks, one of which is Computer Vision Syndrome (CVS). Nursing students are among the vulnerable groups due to high visual load and long learning duration. This study aims to describe the symptoms of CVS in nursing students during online learning and evaluate the behaviour of using digital devices as a risk factor. The study used a quantitative descriptive design with a cross-sectional approach. A total of 399 nursing students from various universities in Indonesia participated through a total sampling technique. Data were collected online using a questionnaire based on the American Optometric Association guidelines, including demographic information, online learning behaviour, and CVS symptoms. The analysis was done descriptively with frequency distribution and percentage. The results showed that the majority of respondents experienced CVS symptoms in the mild to moderate category, such as headache (47.9% mild; 37.8% moderate), burning eyes (42% mild), and blurred vision (39.6% mild). Most students (62.9%) used smartphones and had been studying online for more than six months (94.9%). In conclusion, CVS is a common problem among nursing students in online learning. Educational and preventive interventions are needed to maintain students' visual health.

## INTRODUCTION

The development of information and communication technology has driven a significant transformation in the world of education, especially since the COVID-19 pandemic. Lectures that were previously dominated by face-to-face learning have drastically changed to online learning based on digital devices. While online learning provides flexibility, time efficiency, and broad access to digital resources, prolonged exposure to computer screens, laptops, and smartphones has its health impacts (Jakhar et al., 2023). One of the most reported effects is visual fatigue or Computer Vision Syndrome (CVS), which can slowly reduce students' learning comfort and academic performance (L. Wang et al., 2021).

Various studies have shown that CVS is becoming an increasingly common health problem in the digital age. Data shows that around 50-90% of computer users experience symptoms of eyestrain due to intensive use of digital screens (Seresirikachorn et al., 2022). A study revealed that during the pandemic, the prevalence of CVS increased significantly, with around 70% of students and college students experiencing at least one symptom (C. Wang et al., 2023). In Indonesia, a study found that 74% of university students experienced eyestrain after following online learning for more than 4 hours per day, characterised by complaints of headache, dry eyes, and blurred vision (Noreen et al., 2021).



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Although various studies have addressed Computer Vision Syndrome in the general population, there is limited research that evaluates this condition explicitly in nursing students, especially considering demographic characteristics and digital device usage behaviour in the context of online learning. In fact, understanding the prevalence and characteristics of CVS symptoms in this group is very important, given the strategic role of nursing students as future health workers who will be the pioneers of promotive and preventive education in the community (Iqbal et al., 2021). This lack of contextual data creates a gap in efforts to develop appropriate interventions in nursing higher education.

In response to this problem, this study was designed to provide a descriptive picture of CVS symptoms experienced by nursing students during online learning. This study is expected to provide a comprehensive mapping of the form, intensity, and distribution of visual symptoms experienced by students. The findings can also serve as a basis for designing promotive, educative, and ergonomic strategies for healthier digital learning in the nursing environment.

Based on the above background, the purpose of this study is to identify and describe the symptoms of Computer Vision Syndrome in nursing students during online learning. This study also aims to explore the relationship between demographic characteristics and digital learning behaviours with the intensity of visual symptoms experienced, to provide strategic recommendations for educational institutions in managing student visual health more optimally.

## METHOD

This research is a quantitative study with a descriptive approach and cross-sectional design. The purpose of this study was to describe the symptoms of Computer Vision Syndrome (CVS) experienced by nursing students during online learning. The research was conducted in November 2020 - February 2021. The population in this study was all nursing study programme students from various public and private universities in Indonesia. The sampling technique used was non-probability sampling with a total sampling approach, where all students who met the inclusion criteria were asked to participate in the study. In this study, the inclusion criteria were (a) nursing students who participated in online learning for at least 1 month, (b) actively participated in learning activities, and (c) filled out the questionnaire completely. The exclusion criteria were students who did not complete the questionnaire.

The minimum sample size was calculated using the proportion estimation formula at the 95% confidence level and 5% margin of error, assuming an event proportion of 0.5 (Bujang, 2023). Based on these calculations, the minimum number of samples required is 385 respondents. In this study, 399 respondents met the inclusion criteria and were declared eligible for analysis.

The data collection procedure used an online questionnaire distributed through WhatsApp groups and nursing student forums. Before filling out the questionnaire, each participant was explained the objectives and methods of the study and asked to agree to the informed consent sheet. Confidentiality of respondents' identity and data was guaranteed throughout the research process. The research instrument was a structured questionnaire that was prepared based on CVS symptoms according to the guidelines of the American Optometric Association (Gadain Hassan, 2023). The questionnaire consisted of three main sections: (a) demographic data (age and gender), (b) behaviour during online learning (daily duration of learning, devices used, and total length of online learning), and (c) CVS symptoms, which included headache, burning eyes, blurred vision, double vision, eye strain, dry eyes, neck pain, and shoulder pain. Assessment of symptoms was conducted using a 4-point Likert scale: 1 = Never, 2 = Sometimes, 3 = Often, 4 = Always. Data were analysed descriptively with frequency distribution and percentage to describe demographic characteristics, online learning behaviour, and prevalence of CVS symptoms among respondents.

## RESULT

Respondent Characteristics.

399 nursing students were participating in this study. Many respondents were between 17-20 years old (56.9%), while the rest were 21-25 years old (43.1%). Based on gender, most respondents were female (87.7%), and the rest were male (12.3%). Respondent demographics can be seen in table 1 below.

Table 1. Demographics of nursing student respondents

| Demography | n | % |
|---|---|---|
| Age | | |
| 17 – 20 | 227 | 56.9 |
| 21 - 25 | 172 | 43.1 |
| Gender | | |
| Man | 49 | 12.3 |
| Woman | 350 | 87.7 |

Behavior during online learning

Duration of online learning per day, more than half of the respondents (59.1%) follow online learning for less than 5 hours per day, while the other 40.9% spend more than 5 hours per day. In terms of devices used, many students use smartphones (62.9%), while the rest use laptops (37.1%). As for the overall duration of participation in online learning, almost half of the respondents have been participating in online learning for more than 12 months (48.6%), followed by those who have been learning online for more than 6 months (46.4%), and only a small proportion (5%) have been participating in online learning for less than 6 months.


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Table 2. Student behaviour during online learning

| Behaviour | n | % |
|---|---|---|
| Learning duration per day | | |
| < 5 hours | 236 | 59.1 |
| > 5 hours | 154 | 40.9 |
| Equipment when online | | |
| Smartphone | 251 | 62.9 |
| Laptop | 148 | 37.1 |
| The length of learning carried out | | |
| < 6 Months | 20 | 5 |
| > 6 Months | 185 | 46.4 |
| > 12 Months | 194 | 48.6 |

Visual fatigue symptoms

Visual fatigue symptoms experienced by university students showed variations in severity. The most common symptom reported was headache, with 47.9% of respondents experiencing mildness, 37.8% moderate, and 3.3% severe. Other symptoms that were reported quite frequently were: Eye burning: 42% mild, 25.1% moderate, 3.5% severe. Blurred vision: 39.6% mild, 30.3% moderate, 4.8% severe. Eye strain: 42.9% mild, 29.1% moderate, 4.3% severe. Dry eyes: 40.6% mild, 27.3% moderate, 4.5% severe. Some of the symptoms reported with lower intensity were double vision, with the majority (51.9%) not experiencing such symptoms, and neck and shoulder pain, which were significant with 14.3% and 11% of respondents reporting severe symptoms respectively.

Table 3. Prevalence of Computer Vision Syndrome (CVS) Symptoms Felt by College Students (N=399).

| Symptoms of VCS | No Complaints | | Minor Complaints | | Moderate Complaint | | Serious Complaints | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| Headache | 44 | 11 | 191 | 47.9 | 151 | 37.8 | 13 | 3.3 |
| Burning eyes | 116 | 29.1 | 169 | 42 | 100 | 25.1 | 14 | 3.5 |
| Blurred vision | 101 | 25.3 | 158 | 39.6 | 121 | 30.3 | 19 | 4.8 |
| Double vision | 207 | 51.9 | 119 | 29.8 | 62 | 15.5 | 11 | 2.8 |
| Strained eyes | 95 | 23.8 | 171 | 42.9 | 116 | 29.1 | 17 | 4.3 |
| Dry eyes | 110 | 27.6 | 162 | 40.6 | 109 | 27.3 | 18 | 4.5 |
| Sore neck | 39 | 9.0 | 151 | 37.8 | 155 | 38.8 | 57 | 14.3 |
| Shoulder core pain | 49 | 12.3 | 162 | 40.6 | 144 | 36.1 | 44 | 11 |

## DISCUSSION

Characteristics of respondents

This study involved 399 nursing students from various universities in Indonesia. The majority of respondents were between 17-20 years old (56.9%), while the rest were 21-25 years old (43.1%). This age range reflects that most participants are in the early to mid phase of higher education, which is cognitively and psychosocially still in an active stage of development. Young age is often associated with faster adaptation to digital technology, but can also increase the risk of visual fatigue due to intensive use of digital devices. Research shows that young students are prone to experiencing eyestrain during prolonged online learning (Kumar et al., 2022).


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The proportion of respondents was dominated by women at 87.7%, while men only amounted to 12.3% based on gender. This is in line with the demographic trend in nursing study programs in Indonesia, where the nursing profession is still dominated by women. Some studies show that women are more likely to report symptoms of visual fatigue than men. For example, research found that women more often experienced symptoms of eyestrain during online learning (Abuallut et al., 2022).

This demographic composition provides an overview of the profile of nursing students targeted in this study, and is an important basis for analyzing the relationship between individual characteristics with learning behavior and the prevalence of Computer Vision Syndrome (CVS) symptoms experienced (Noreen et al., 2021). With the productive age background and the dominance of female respondents, it can be anticipated that visual load during online learning may have different impacts based on age group and gender, which needs to be further analyzed at a later stage.

Behavior during Online learning

The change of learning system to online mode during the COVID-19 pandemic has brought major implications to the learning behavior of students, including nursing students. In this study, it was found that most respondents (59.1%) participated in online learning for less than 5 hours per day, while the rest (40.9%) spent more than 5 hours per day in front of digital devices. This duration of exposure has the potential to increase the risk of visual fatigue, especially when online activities are carried out continuously without adequate breaks. Previous research has shown that screen exposure of more than 4 hours per day can significantly worsen symptoms of Computer Vision Syndrome (CVS), especially when not accompanied by good device ergonomics (Nowik, 2020).

In addition, the type of device used also contributes to the level of visual comfort during learning. Most respondents in this study (62.9%) used smartphones as their main device, while only 37.1% used laptops. Prolonged use of smartphones tends to increase eye strain due to the small screen size, contrasting lighting, and closer viewing distance compared to the use of laptops or external monitors (Chu et al., 2023). The study noted that intensive use of devices with small screens is associated with complaints such as dry eyes, eye strain, and decreased visual accommodation (Minarni Wartiningsih, 2023). This is an important concern in the context of online education, especially among nursing students who are busy with visual-based learning activities and academic reading.

The overall duration of participation in online learning was 48.6% of respondents had participated in online learning for more than 12 months, and 46.4% for more than 6 months. This means that the majority of students have experienced prolonged exposure to screen-based learning activities. Long-term exposure to screens, especially without eye health interventions such as periodic breaks, screen filters, or the application of the 20-20-20 rule (take an eye break every 20 minutes, looking at objects 20 feet away for 20 seconds), can lead to the accumulation of visual fatigue (Alghamdi & Alrasheed, 2020). This fact

reinforces the importance of understanding and educating digital learning ergonomics in order to prevent long-term visual impairment, including CVS, in nursing students.

Prevalence of Computer Vision Syndrome (CVS) Symptoms felt by students

Based on the results of the study, most nursing students experienced various forms of visual complaints during online learning. The most commonly reported symptom was headache, which was experienced by almost all respondents in varying degrees of severity. In addition, complaints such as burning eyes, blurred vision, eye strain, and dry eyes were also commonly found. While mild to moderate complaints predominated, the presence of severe complaints in some respondents is noteworthy. This situation indicates the visual stress experienced by students during prolonged interaction with digital screens, both in synchronous lecture activities and independent assignments.

Various factors can influence the appearance of CVS symptoms in students, including the long duration of screen exposure, the use of devices with small screen sizes such as smartphones, and learning environments that do not necessarily support visual comfort (Lindo-Cano et al., 2022). In this study, the majority of respondents used smartphones as their main device for online learning, which tends to pose its own challenges to eye comfort. The close proximity of the screen, the small font size and the lack of appropriate lighting also make the work of visual accommodation more difficult. In addition, the habit of studying without taking breaks or stretching the eyes can also accelerate the appearance of visual fatigue. This result is in line with the findings, who mentioned that prolonged use of digital devices can trigger various symptoms of eye discomfort (Pavel et al., 2023).

Not only limited to visual symptoms, some respondents also reported neck and shoulder complaints, which are thought to be related to posture while studying. A less ergonomic sitting position during online learning can cause repetitive stress on the neck and shoulder muscles. These complaints often co-occur with CVS symptoms and suggest that the impact of screen use is not only limited to the visual system, but can also affect general physical comfort. Therefore, a preventive approach to CVS needs to include a thorough organization of the learning environment, from the aspects of lighting, sitting position, study duration, to the type of device used.

In terms of prevention, nursing students are advised to implement strategies that have been proven to help reduce visual fatigue, such as the 20-20-20 rule, use of screen filters, and adjusting the distance and viewing angle of digital devices. It is also important to take regular breaks during online learning sessions and maintain adequate hydration to support eye moisture. Considering that nursing students have a role as future health educators, an understanding of the ergonomics of using digital devices and their impact on eye health needs to be strengthened through relevant education and training. This effort is expected to not only support the sustainability of a healthy learning process, but also equip students with responsible digital literacy.

## CONCLUSION

This study revealed that the majority of nursing students who participated in online learning experienced various symptoms of Computer Vision Syndrome (CVS), with the highest prevalence in complaints of headache, eye strain, eye burning, and blurred vision. The main risk factors identified included prolonged use of digital devices, predominant use of smartphones with small screens, and lack of visual breaks during the learning process. In addition to visual symptoms, some respondents also experienced musculoskeletal complaints such as neck and shoulder pain, indicating ergonomic disturbances during online learning.

It is recommended to implement healthier online learning practices, such as using devices with larger screens, maintaining ideal viewing distances, adjusting room lighting, and following the 20-20-20 rule (rest your eyes every 20 minutes by looking at objects 20 feet away for 20 seconds). It is also important to do light stretches periodically and maintain good posture while studying.

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# The Relationship of Personality Type in Early Adolescents and Bullying Behavior in Students at SMP Negeri 1 Gedangan Sidoarjo

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**A B S T R A C T**

Many teenagers engage in bullying acts against their peers without thinking about the consequences of their actions. If it continues, it can make teenagers who are victims of bullying behaviour insecure and can even cause them to withdraw from the surrounding environment. The role of health workers as educators is to educate about the dangers of bullying behaviour. This study uses an analytic observational design with a cross-sectional approach. In this study the instruments used were the demographic questionnaire, the Free MTBI Personality Test questionnaire to provide a brief description of personality types, and the Adolescent Peer Relations Instrument (APRI) questionnaire to assess bullying behaviour that would be distributed to adolescents of classes VII and I, with as many as 235 respondents using the probability sampling technique with a stratified random sampling approach. This research was conducted through Google Forms due to the current pandemic conditions, which made it impossible to conduct research directly. At the beginning of the Google Form page, informed consent will be used to approve becoming a prospective subject. The results showed that most of the adolescents had 183 extrovert personality types (77.9%), and many mild bullying behaviours were 204 people (84.8%). Spearman's Rho test showed that the value of r = 0.401 with a value of ρ = 0.000 (ρ < α = 0.05), i.e., there is a moderate relationship between adolescent personality types and bullying behaviour.

## INTRODUCTION

The large number of cases of violence that occur among school-age children today is for the world of education. Bullying behaviour carried out by teenagers at school can be found everywhere and has long been part of school life in Indonesia (Yusuf & Haslinda, 2018). According to observations found at SMP Negeri 1 Gedangan Sidoarjo, it was found that children aged 13 - 15 years experienced bullying behaviour. In this case, the results of interviews from 10 students were strengthened, 6 of whom felt ridiculed, 2 felt threatened, and 2 felt ostracised by their classmates. This causes children who have been bullied to have feelings of a lack of self-confidence, often skip school, be less used to socialising with friends, and be even afraid to go to school. Research by Khamidah & Suherman (2016) shows that the thinking process regarding bullying behaviour for each student is different, which can be seen from the individual's personality type; apart from that, gender differences also influence the thinking process. In psychology, Hippocrates (460-370 BC) stated that every human being has a personality which is divided into four types according to the state of the fluids in the body, including sanguine, melancholic, choleric, and phlegmatic (Fitria & Siswono, 2014). A person with a sanguine personality type has a cheerful, happy nature, high curiosity, and an optimistic attitude. A person with a melancholic personality type has a serious nature, gets angry easily, plans things, is creative and talented, and likes to think. A person with a choleric



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personality type is careful, easily angered, determined, firm, and does not give up easily. A person with a phlegmatic personality type has a calm nature, is not in a hurry, responds to problems in a relaxed and gradual manner, and is not easily affected by disturbing conditions (Mayasari et al., 2019). One aspect of the formation of bullying behaviour is personality type. Many of the perpetrators do not know the impact that bullying has on the victim. What they know is that when they act, it is fun, and they feel that the treatment does not hurt either party, namely the victim or the perpetrator. The high number of junior high school students with cases of bullying needs to be emphasised to teenagers in the millennial era to form personality types. It needs to be considered by various parties, especially local government institutions, in preparing programme plans to prevent acts of violence and bullying against children. This research is essential to carry out as reference material for information on the bullying actions of students in junior high schools.

From the background description and several studies on personality type in students, researchers are interested in researching "The Relationship of Personal Type in Early Adolescent and Bullying Behaviour in Students at SMP Negeri 1 Gedangan Sidoarjo".

## METHOD

This research design is a correlational quantitative study with a cross-sectional approach. The study population was all 568 respondents. Based on the calculation of the Slovin formula with an error degree of 5%, a sample size of 235 respondents was obtained. The sampling technique uses purposive sampling, which is done with specific consideration. Alternatively, based on certain criteria that follow the research topic (Notoadmojo, 2010).

The instruments in this study were the Free MTBI Personality Test questionnaire used to identify the. Personality type and the Adolescent Peer Relations Instrument questionnaire were used for bullying. Data analysis conducted in this study was univariate analysis and bivariate analysis.

## RESULT

Univariate Analyisis Results

Table 1. Personality Type

| No | Personality Type | Frequency (F) | Presentase (%) |
|---|---|---|---|
| 1. | Introvert | 52 | 22.1% |
| 2. | Extrovert | 183 | 77.9% |
| Total | | 235 | 100% |

Based on table 1, it shows the distribution of respondents based on adolescent personality types, out of 235 students showing the introvert personality type, namely 52 people (22.1%), and the extrovert personality type as many as 183 people (77.9%).



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Table 2. Bullying Behaviour

| No | Bullying Behaviour | Frequency (F) | Presentase (%) |
|---|---|---|---|
| 1. | Mild bullying | 204 | 86.8% |
| 2. | Moderate bullying | 26 | 11.1% |
| 3. | Severe bullying | 5 | 2.1% |
| Total | | 235 | 100% |

Based on table 2.14, it shows the distribution based on the type of bullying behavior among teenagers. Of the 235 respondents, 204 people showed mild bullying (86.8%), 26 people had moderate bullying (11.1%), and 5 people had severe bullying behavior (2.1%). %).

Bivariate Analysis Results

Relationship Personality Type and Bullying Behaviour

| Personality Type | Bullying Behaviour | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Mild bullying | | Moderate bullying | | Severe bullying | | | |
| | F | % | F | % | F | % | Σ | % |
| Introvert | 28 | 11.9% | 19 | 8.1% | 5 | 2.1% | 52 | 100% |
| Extrovert | 176 | 74.9% | 7 | 3.0% | 0 | 0% | 183 | 100% |
| Total | 204 | 86.8% | 26 | 11.1% | 5 | 2.1% | 235 | 100% |
| Nilai Uji *Spearman Rho* dengan nilai ρ = 0,000 dan nilai r = 0,401 | | | | | | | | |

Table 3 shows that there is a relationship between the personality type of early adolescents and the bullying behaviour of students at SMP Negeri 1 Gedangan, Sidoarjo Regency. The results show that those who have an introverted personality type are likely to have mild bullying behaviour (as many as 28 people, 11.9%); moderate bullying behaviour (as many as 19 people, 18.1%); and serious bullying behaviour (as many as 5 people, 2.1%). Meanwhile, if a teenager has an extroverted personality type, the probability of the teenager having mild bullying behaviour is 176 people (74.9%), moderate bullying behaviour is 7 people (3.0%), and there is no heavy bullying behaviour.

Based on the results of the Spearman Rho statistical test, the value ρvalue = 0.000 is obtained, which is smaller than the α value, namely 0.05 (ρ<0.05), which indicates that H0 is declared rejected and H1 is declared accepted. Apart from that, based on the results of the Spearman Rho test, it shows a value of r = 0.401 with a value of ρ = 0.000 with a value of r = 0.400 - 0.700, a moderate relationship, so it shows a moderate relationship, and statistically, there is a significant relationship between personality type and bullying behaviour at SMP Negeri 1 Gedangan Regency, Sidoarjo.

## DISCUSSION

Based on the research results, many teenagers have an extrovert personality type: 183 people (77.9%), and 52 teenagers have an introvert personality type (22.1%). Personality type assessment was obtained using a questionnaire from the Free MTBI Personality Test. This research shows that the extrovert personality type is dominant among students at SMP Negeri 1 Gedangan, Sidoarjo Regency. It is shown in the questionnaire answer with the highest score in question number 2, which is "I enjoy interacting


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directly with other people". Based on research data, it shows that 61 people (26.0%) chose the answer strongly agree, 152 people agreed (64.7%), 17 people disagreed (7.2%), and five people strongly disagreed (2.1%). Research (Jamil, 2012) states that early adolescents with an extroverted personality type are sociable, impulsive, and very active; capable and optimistic; and have other traits that indicate appreciation for relationships with other people when interacting or communicating with other people. Researchers assume that teenagers who have an extroverted personality type are cheerful, active, and easy to make friends with. Based on the results of questionnaire number 1, "I feel happy when I get to know other people", the answers to the questionnaire questions show that of the 235 respondents, the majority of teenagers chose to agree (129 people, 54.9%), strongly agree (73 people, 31.1%) or disagree. Twenty-seven people (11.5%) and six people (2.6%) strongly disagree. Research (Widiantari & Herdiyanto, 2013) shows that teenagers who feel happy when they get to know each other are classified as extroverts. Researchers assume that this can provide a feeling of joy and enthusiasm, which makes it easier for teenagers to get along and socialize with their surroundings. Based on questionnaire question number 14, "I take part in activities that involve many people (organizations)", the answers to this questionnaire question show that of the 235 respondents, the majority of teenagers chose the answer agree with 109 people (46.4%), strongly agree with 38 people (16.2%), disagree with 73 people (31.1%),1%), and strongly disagree with 15 people (6.4%). In research (Rahmat, 2014), teenagers who enjoy participating in activities involving many people or organizations describe the uniqueness of individuals in behaving in a stimulus as a manifestation of the individual's character, physical and intellectual ability, and ability to adapt to their environment. Researchers assume that teenagers, by participating in organizational activities, can form an individual character that aims to develop the potential to adapt to their environment. Based on the research result, it shows that of the 235 teenage respondents who had bullying behaviour, 204 people showed mild bullying behaviour (86.8%), 26 people had moderate bullying behaviour (11.1%), and five people had severe bullying behaviour. (2.1%). Bullying behaviour assessment uses the APRI (Adolescent Peer Relations Instrument) questionnaire. This research shows that the dominant behaviour of bullying is mild. This is proven by the respondents' answers to questionnaire question number 13, "I was teased/laughed at by saying something about me," based on research data showing that 115 people (48.9%) chose the answer never, sometimes 79 people (33.6%), often as many as 31 people (13.2%), and very frequently as many as 10 people (4.3%). In research (Tri Fajariani Fauzia, 2019), it is stated that teenagers experience bullying by their peers. Commenting on victims of bullying can make teenagers feel less confident, distance themselves from the environment, or withdraw, making it difficult to socialize or have friends. The comments made by each individual varied, such as calling them bad or disliked names, laughing at something, and even insulting them for being Black, having acne, and so on. Researchers assume that teenagers who receive nasty comments will make themselves less


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confident and not easily socialize with their peers. At the same time, commenters do not understand the damaging impact on victims of bullying. Based on the results, the Spearman Rho test results using the SPSS 21 program show that ρ=0.000. This shows that the results are smaller than ρ=0.05, which means there is a relationship between personality type and bullying behaviour among teenagers. Apart from that, the coefficient value is 0.401, which means that there is a moderate relationship between adolescent personality types and bullying behaviour, because the r value is between 0.400 and 0.700.

## CONCLUSION

Personality types significantly correlate with bullying behaviour. The research findings provide a strong foundation for future policies and interventions to reduce bullying in early adolescence.

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# The Influence of Educational Media Via Youtube Social Platform on The Interest in Selecting an Intrauterine Device (IUD) Contraceptive

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**A B S T R A C T**

Intrauterine Device Contraception (IUD) is one of the Long-Term Contraceptive Methods (MKJP, which tends to be low. YouTube can be a valuable social media platform for accessing information about IUD contraception. The objective of this study is to assess how educational content on YouTube influences interest in selecting intrauterine device (IUD) contraception. This research used a one-group pretest-posttest design with a sample of 60 respondents, and the sampling technique used was purposive sampling. This research instrument uses a questionnaire with Wilcoxon signed-rank test data analysis. Drawing from the findings of the Wilcoxon Signed Rank Test, there was an influence before and after providing educational media via YouTube on interest in choosing intrauterine device (IUD) contraception among couples of childbearing ages. This study indicates that educational content on YouTube increases the interest of couples of childbearing ages in choosing intrauterine device (IUD) contraception.

## INTRODUCTION

The Long-Term Contraceptive Method (MKJP) is a contraceptive method that is rarely popular in Indonesia. National MKJP achievement in 2022 is 22.6% of the target of 28% in 2024. MKJP acceptors in East Java still tend to be low and are still dominated by non-MKJP (Profil Kesehatan Provinsi Jawa Timur Tahun 2022, 2023). Based on data on active family planning participants in the city of Surabaya in 2022, namely 77.28%, consisting of injections 62.45%, pills 14.16%, IUD 8.18%, MOW 5.04%, MOP 0.4%, condoms 4.73%, and implants, namely 5.04% (Profil Kesehatan Tahun 2022, 2023). This shows that contraception by Intrauterine Device (IUD) is less popular with couples of childbearing ages, even though it is more effective and efficient at spacing pregnancies than short-term contraceptive methods.

Based on previous research, it was found that knowledge, husband's support, sources of information, and provision of KIE are mothers' interests in using MKJP. The source of information is an essential factor that can influence interest in choosing contraception, one of which is IUD contraception (Rismawati & Sari, 2021). Social media can be used as a source of information because it is easy to access anywhere and anytime. The following are some social media that are commonly used in Indonesia: Facebook, Twitter, Instagram, WhatsApp, TikTok, Path, Kaskus, Google+, Market Place, Blog and Email Marketing, and YouTube. Information that varies, regardless of its nature, can be positive or negative and will influence various aspects of life, one of which is choosing a contraceptive method for couples of



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childbearing ages (PUS) (Herispon, 2022). This is closely related to the influence of social media on decision-making to use contraception.

Interest is an interest in a thing or activity without being prompted by someone else. Interest means a high inclination towards something or a desire. So that there is something good that arises from within yourself, not from the outside, to like something. There are 3 factors that influence interest, namely, predisposing factors, which are factors that originate from oneself, such as knowledge, attitudes, age, number of children, perceptions, education, economics and demographic variables; enabling factors, which are supporting factors that include supporting facilities, information sources and source capabilities; and reinforcing factors, which are strengthening factors that include family support (husband) and community leaders (Pramesti Intan, 2023). The interest referred to in this research is interest in choosing contraception Intra Uterine Device (IUD), in couples of childbearing ages.

Family planning is a conscious process by couples to decide the number and spacing of children and the time of birth, thereby avoiding unwanted births and spacing births. The government has a policy of directing PUS to use MKJP contraception because it is an effective and efficient contraceptive for spacing births over a long period of time (Atika N et al., 2022). MKJP is a contraceptive method that has a high level of effectiveness with a low failure rate and has few complications and side effects compared to non-MKJP contraceptive methods. IUD is a type of MKJP recommended by the government. An Intrauterine Device (IUD) is a contraceptive device shaped like the letter "T" which is installed in the uterus with an effectiveness rate of up to 99.4% (prevents 1-5 pregnancies per 100 women per year) and can prevent pregnancy for up to 5-10 years and is reversible (“Edukasi Metode Kontrasepsi Jangka Panjang/MKJP,” 2022).

Educational media is anything in the form of humans, objects or the surrounding environment that can be used to convey messages so that they can stimulate the attention, interest, thoughts and feelings of the recipient. Media is a container for a message or information that you want to convey to the target or recipient so that the purpose of the message can be conveyed well. One of the benefits of educational media is that it can increase interest and motivation, curiosity and enthusiasm and can help convey abstract material more concretely (Daniyati STAI DRKHEZ Muttaqien Purwakarta et al., 2023). Educational media can provide a systematic overview and framework in the process of conveying messages. Educational media can overcome limitations of space, time and energy in that some educational materials require quite a lot of space and time to deliver (Arifin et al., 2025). The type of educational media used in this research is audio-visual media. Audiovisual media is a media that displays a combination of sound and images.


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Social media is used as a source of educational information about contraception, specifically intrauterine devices (IUDs). Social media is an online media where users can easily participate, share and create content, including blogs, social networks, wikis, forums and virtual worlds. In the current digital era, almost all activities can be done digitally. Social media users in Indonesia are also increasing every year. In 2023, it is estimated that there will be 214.3 million social media users, and it is predicted that it will increase to 236.97 in 2026 (Abdillah, 2022). Social media helps users interact with anyone at any time in a short time via an internet connection. The variety of information circulating in cyberspace makes social media a means of learning and self-development. YouTube became one of the social media that is practical and easy to access, so YouTube is one of the most popular platforms and is watched by thousands of people every day. Every day there are millions of videos uploaded to YouTube so that YouTube can be used as a source of news, entertainment and educational information in the form of videos.

Almost every generation uses social media so that it can be used in various fields, one of which is in the field of health education, especially about contraceptive methods, because social media has become one of the central digital activities for modern people (Abdillah, 2022). The MKJP target has not been achieved, one of which is IUD contraception due to a lack of communication of information and education to the public, especially through social media. Social media is an effective tool used for health information media because a post can be directly reached by thousands or even millions of targets in a short time. Exposure to information sources is an indication of how much or little knowledge is accessible to the public. The benefits of social media as a source of development information are an effective way to achieve this successful Family Planning (KB) programme in Indonesia. Utilisation of educational media through social media YouTube, can be the newest solution and can be a promising feature in carrying out interventions, especially regarding contraception (intrauterine device (IUD)) (Santikasari & Laksmini, 2019).

## METHOD

This research uses a research design by design, *One Group Pretest – Posttest*. The population used was 162 non-MKJP family planning acceptors in the PMB Afah Fahmi Surabaya area. The sample calculation results obtained a total of 60 respondents. The sampling technique in this research is using *purposive sampling*. *Purposive sampling* is a sampling technique that randomly selects individuals from the population who meet the selection criteria to be used as respondents or samples. In this study, to measure interest in choosing IUD contraception using a questionnaire. In this study, the answers given by respondents were measured using an ordinal scale. The assessment system uses a questionnaire with a


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*Likert scale.* The 4 answer choices are "Strongly Agree", "Agree", "Disagree" and "Strongly Disagree". The data analysis technique in this research uses the SPSS application, which is divided into univariate analysis and bivariate analysis.

## RESULT

The characteristics of respondents based on age are divided into two, namely 20 – 35 years and > 35 years, and the characteristics of respondents based on the latest education are divided into 3, namely Primary Education, Secondary Education, and Higher Education. A description of these characteristics can be seen in the following table:

Table 1: Characteristics of Respondents

| Respondent Characteristics | Frequency | Percentage (%) |
|---|---|---|
| Age (years) | | |
| ≤35 | 51 | 85 |
| >35 | 9 | 15 |
| Last education | | |
| Basic education | 9 | 15 |
| Secondary Education | 44 | 73,3 |
| Higher Education | 7 | 11,7 |
| Total | 60 | 100 |

Based on table 1, it is found that the characteristics of the 60 respondents based on age are almost all PUS aged between 20 - 35 years, 52 people. Most of the PUS's final education was secondary education, as many as 44 people.

Table 2. Analysis of the Influence of Educational Media Through Social Media YouTube Regarding Interest in Contraceptive Choice Intra Uterine Device (IUD)

| Wilcoxon Signed Rank | Variable | p-value |
|---|---|---|
| | Interest | 0,00 |

Based on statistical test results, the Wilcoxon signed-rank test. The result obtained is that the p-value is 0.00 ($p < 0.05$), which means that H0 is rejected and H1 is accepted, so it can be concluded that there is an influence of educational media through social media. YouTube on interest in choosing contraception Intra Uterine Device (IUD) in Couples of Childbearing Age.

## DISCUSSION

Based on the research results, it is known that before the intervention was given, educational media was used via social media YouTube. Couples of reproductive ages have an interest in choosing contraception Intra Uterine Device (IUD) is low, whereas after being given the intervention, many Childbearing Age Couples have moderate interest. In this research, a test was used, Wilcoxon Signed Rank, to analyze the data so that a Sig value of 0.00 < 0.05 is obtained; this provides evidence that providing health education


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via social media to couples of childbearing ages has an influence on interest in choosing the Intra Uterine Device (IUD).

The results of this research are supported by research conducted by Ilminatun et al. (2023), which produced conclusions before being given education using audiovisuals. The majority are not interested in using Long-Term Contraceptive Methods (MKJP), with a frequency of 38.64%. After being given audiovisual education, respondents interested in using MKJP increased to 37.07%. This means that there is an influence of providing health education through audio-visual media regarding interest in using MKJP. Interest is a high tendency towards a desire without coercion from other people so that there is something that arises from within or from outside to like something (Pramesti Intan, 2023). Educational media can be used to convey messages so that they can stimulate the attention, thoughts, feelings and interests of the recipient of the information. In the digital era, you can use educational media online; the use of educational media via social media can minimize limitations of space, time and energy. One of the most popular types of social media today is the platform YouTube (Abdillah, 2022). YouTube social media can be used as a faster information medium than traditional media (Syaiful et al., 2023).

The social media used in this research is YouTube, media YouTube has become a social media that is practical and to access (Penggunaan & Masyarakat, n.d.). Among social media platforms, YouTube is in second place as the most widely used platform. By spreading health information on social media, especially about contraception (Intra Uterine Device (IUD), as a forum for education, so that if more information is spread, it can influence the interest of couples of childbearing ages in choosing contraception (IUD). Based on the results of this research, it was found that before being given educational media through social media YouTube Most couples of childbearing ages have low interest, even after being given educational media via social media. YouTube Most respondents had moderate interest in choosing contraception, specifically Intrauterine Device (IUD). This means that there is an influence of providing educational media through social media. YouTube about contraception: Intrauterine Device (IUD) in Couples of Childbearing Age.

## CONCLUSION

Based on the results of the research and discussion presented in the previous chapter, the conclusion that can be drawn is that there is an influence of educational media via YouTube social media on interest in choosing contraception. *Intrauterine Device* (IUD) in Couples of Childbearing Age (PUS). Future researchers are expected to be able to use factors such as number of children or perceptions and add other methods of collecting data in other forms, such as conducting evaluations and using methods other than


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those used in this research so that future research will be more creative and innovative in producing methods for providing health education, thus triggering respondents' interest in material provided.

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# Effectiveness of Audiovisual E-Module on the Behavior of Prospective Brides Regarding Preparation for Healthy Pregnancy

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A B S T R A C T

Prospective brides are the target group in efforts to improve pre-pregnancy health. Ahead of marriage, many prospective brides do not have enough information about reproductive health in the family, so that after marriage, pregnancy is often not well planned and not supported by good health status. The purpose of this study was to determine the effectiveness of audiovisual e-modules on the behaviour of prospective brides about healthy pregnancy preparation. This research is a quantitative study that uses a quasi-experimental design with a control group and a two-group pretest-posttest design. Samples were taken using the purposive sampling technique, obtaining a total of 32 respondents. The independent variable is education with audiovisual e-module media and leaflets. While the dependent variable is the behaviour of prospective brides about healthy pregnancy preparation. Data collection using a questionnaire. In analysing the effect of using the Wilcoxon Signed Rank Test using α = 0.05%. The results of the study showed that intervention through audiovisual e-module media was effective in improving the behavior of prospective brides and grooms related to healthy pregnancy preparation (p = 0.000). The Wilcoxon Signed Rank test proved that there was a significant change. Health education using audiovisual e-module media effectively influences bride-to-be behavior in preparing for a healthy pregnancy. Therefore, it is recommended to enhance reproductive health during the preconception period.

## INTRODUCTION

The health status and behaviour of the bride-to-be before conception is known as the preconception period and is important for the health of women and future generations. Optimising health behaviour and lifestyle during the preconception period is very important because several developmental mechanisms and factors that affect birth outcomes occur in the early stages of pregnancy. Some modified health behaviours negatively impact outcomes during pregnancy that are difficult to change in the short term; therefore, addressing this requires early intervention during the preconception period. Efforts that must be made by the bride-to-be to look their best include consuming a balanced diet, exercising regularly with moderate intensity, controlling weight, and not gaining (Chivers, Boyle, Et al, 2020). Brides-to-be are the target for improving pre-pregnancy health. Ahead of the wedding, many brides-to-be do not have enough knowledge and information about reproductive health, so pregnancy after marriage is often not planned properly and is often associated with health problems (Mariyana dan Oktiningrum, 2022).

Based on data from the East Java Provincial Health Profile, AKI was recorded to increase in 2020 due to a lack of monitoring of high-risk pregnant women. AKI in Indonesia is 305 per 100,000 live births, and AKI in East Java is 98.39 per 100,000 live births. Meanwhile, in Sidoarjo, the maternal mortality rate (AKI) in 2022 is 37.3, meaning 37.3 maternal deaths per 100,000 live births. In absolute terms, the



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number of maternal deaths is 13. The neonatal mortality rate is 1.8 per 1,000 live births, and the absolute number is 61 neonatal deaths. Meanwhile, the reported infant mortality rate (AKB) was 2.4 per 100,000 live births, or equivalent to an absolute value of 84 out of 34,834 live births (Profil Kesehatan Sidoarjo, 2022).

Brides-to-be need to be given information about reproductive health and how to plan a healthy pregnancy to improve their health before pregnancy. Brides-to-be are the right target group to improve pre-pregnancy health. Many couples do not understand reproductive health. As a result, pregnancies after marriage are often poorly planned and not supported by ideal health conditions. This is due to a lack of reproductive health knowledge (Irawati, Mawaddah, et al, 2023). Therefore, the researcher provides counselling with audiovisual e-module media at the Sidoarjo Health Centre with the hope that the maternal mortality rate at the Sidoarjo Health Centre will decrease and the quality of life of mothers will be good. Therefore, this study has the purpose of determining the effectiveness of the audiovisual e-module on the behaviour of prospective brides about preparing for a healthy pregnancy.

## METHOD

This study uses a quasi-experimental design and uses the method of two groups: a pre-post control design group before treatment and a post-test control design group after treatment. In the design of this study, there are pretests, treatments, and post-tests, which are used to measure the state after treatment. Therefore, the measurement results after being given treatment become more accurate because they compare the pretest and post-test. The study has a population of 32 prospective brides at the Sidoarjo Health Centre. The sample in this study uses Federer's formula. Thus, each treatment group obtained 16 samples. The researchers used 16 samples for the experimental group of the audiovisual e-module and 16 samples for the control group of leaflets. The total number of subjects in this study is 32 women, with a research time of February-April 2024. The data collection technique of this study uses primary data through questionnaires that have been filled out by respondents. Previously, informed consent had been given to a catin who was willing to become a respondent. Next, respondents fill out a questionnaire (pretest). Then, respondents were given a health education intervention with an experimental group of audiovisual e-module media and a control group of leaflet media that focused on discussing the actions of prospective brides about preparing for a healthy pregnancy. After the treatment was completed, the respondents in the experimental group were given 3 days to understand the material contained in the audiovisual e-module. Meanwhile, the control group were given 1 day to understand the material contained in the leaflet. Furthermore, the researcher collected final data (post-test) by making observations of the respondents using a questionnaire sheet. The results of the observations of all respondents were collected when the pre-test and post-test were conducted and the data were processed

from the research. The Wilcoxon signed-rank test is used as a non-parametric test that aims to find out whether there is an influence on the intervention that has been given to the respondent. The next step is to carry out a normality test using the Shapiro-Wilk test.

## RESULT

Table 1. Distribution of Respondent Characteristics for March - April 2024

| Characteristic | Treatment Groups (Audiovisual E-Module) | | Control Group (Leaflet) | | Total | Percentage |
|---|---|---|---|---|---|---|
| | f | % | f | % | | |
| Age (years) | | | | | | |
| 19-26 | 14 | 87,5% | 15 | 93,75% | 29 | 90,625% |
| 27-35 | 2 | 12,5% | 1 | 6,25% | 3 | 9,375% |
| Education Level | | | | | | |
| Primary Education (SD, SMP) | 0 | 0 | 0 | 0 | 0 | 0 |
| Secondary Education (SMA, SMK) | 8 | 50% | 11 | 68,75% | 19 | 59,375% |
| Higher Education (Diploma, S1, S2) | 8 | 50% | 5 | 31,25% | 13 | 40,625% |
| Work | | | | | | |
| Freelance | 4 | 25% | 1 | 6,25% | 5 | 15,625 |
| Private Employees | 9 | 56,25% | 12 | 75% | 21 | 65,625% |
| Merchant | 1 | 6,25% | 2 | 12,5% | 3 | 9,375% |
| PNS Teacher | 2 | 12,5% | 1 | 6,25% | 3 | 9,3755 |
| Total | 16 | 100% | 16 | 100% | 32 | 100% |

Based on Table 1, in the treatment group using Audiovisual E-Module media, the results of the characteristics of the respondents in this study were obtained; most of the respondents were 19-26 years old, and almost all respondents. The education level of the respondents was found to have the same results, namely Secondary Education (SMA, SMK) and Higher Education (Diploma, S1, S2), for half of the respondents. The work of the respondents is for private employees of most respondents.

In the control group using leaflet media, the results of the characteristics of the respondents in this study, aged 19-26 years, were obtained for almost all respondents. The education level of the respondents was found to be the result of secondary education (SMA, SMK) for most respondents. The jobs of most respondents are private employees of almost all respondents.

Table 2. Data Analysis of Audiovisual E-Module Media and Leaflets Against the Knowledge of Brides to Be about Healthy Pregnancy Preparation Using the Wilcoxon Test

| Knowledge | | Before | | | After | | | Wilcoxon Test Results (*p-value*) |
|---|---|---|---|---|---|---|---|---|
| | | f | % | Mean | f | % | Mean | |
| Treatment Groups Audiovisual E-Module | Good | 11 | 68,75% | 23,50 | 16 | 100% | | |
| | Enough | 5 | 31,25% | | 0 | 0 | 28,50 | 0.000 |
| | Less | 0 | 0 | | 0 | 0 | | |
| Control Group Leaflets | Good | 14 | 87,5% | 26,12 | 15 | 93,75% | | |
| | Enough | 1 | 6,25% | | 0 | 0 | 27,69 | 0,035 |
| | Less | 1 | 6,25% | | 1 | 6,25 | | |
| Total | | 16 | 100% | | 16 | 100% | | |

Based on table 2 In the E-Visual Module treatment group before being given the intervention percentage, there were good results with most of the respondents and an average of 23.50, while after being given the


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intervention percentage, there were good results with all respondents and an average of 28.50 with the results of the Wilcoxon Signed Rank Test (p-value) 0.000.

In the Leaflet control group before being given the percentage intervention, there were good results with almost all respondents and an average of 26.12, while after being given the percentage intervention, there were good results with almost all respondents and an average of 27.69 with the results of the Wilcoxon Signed Rank Test (p-value) 0.035.

It can be concluded that the results of the Wilcoxon signed rank test statistical test have a significant value obtained in the experimental group of 0.000 which means that there is an influence between the provision of audiovisual e-module media and leaflets on the knowledge of prospective brides about preparing for a healthy pregnancy. Therefore, it can be seen from these two methods that the Audiovisual E-Module is more effective in increasing the knowledge of prospective brides about preparing for a healthy pregnancy.

Table 3. Table of Data Analysis of Audiovisual E-Module Media and Leaflet Towards the Attitude of Prospective Brides about Healthy Pregnancy Preparation Using the Wilcoxon Test

| Attitude | | Before | | | After | | | Wilcoxon Test Results (*p-value*) |
|---|---|---|---|---|---|---|---|---|
| | | f | % | Mean | f | % | Mean | |
| Treatment Groups Audiovisual E-Module | Positive | 14 | 87,5% | 28,70 | 16 | 100% | 31,81 | 0.000 |
| | Negative | 2 | 12,5% | | 0 | 0 | | |
| Control Group Leaflets | Positive | 8 | 50% | 26,12 | 15 | 93,75% | 27,69 | 0,035 |
| | Negative | 8 | 50% | | 1 | 6,25 | | |
| Total | | 16 | 100% | | 16 | 100% | | |

Based on table 3 In the E-Visual Module treatment group before being given the intervention percentage, there were positive attitude results with almost all respondents and an average of 28.70, while after being given the intervention percentage, there were positive results with all respondents and an average of 31.81 with the results of the Wilcoxon Signed Rank Test (p-value) 0.000.

In the Leaflet control group before being given the percentage intervention, there were positive results with some half of the respondents and an average of 24.00, while after being given the percentage intervention, there were good results with almost all respondents and an average of 33.13 with the results of the Wilcoxon Signed Rank Test (p-value) 0.003.

It can be concluded that the results of the Wilcoxon signed rank test statistical test have a significant value obtained in the experimental group of 0.000 which means that there is an influence between the provision of audiovisual e-module media and leaflets on the attitude of prospective brides about preparing for a healthy pregnancy. Therefore, it can be seen from these two methods that the Audiovisual E-Module is more effective in increasing the knowledge of prospective brides about preparing for a healthy pregnancy.


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Table 4. Data analysis based on Audiovisual E-Module Media and Leaflet on the Actions of Prospective Brides on Healthy Pregnancy Preparation Using Wilcoxon Test

| Actions | | Before | | | After | | | Wilcoxon Test Results (*p-value*) |
|---|---|---|---|---|---|---|---|---|
| | | f | % | Mean | f | % | Mean | |
| Treatment Groups Audiovisual E-Module | Good | 3 | 18,75 | 28,75 | 13 | 81,25 | 31,81 | 0.000 |
| | Enough | 13 | 81,25 | | 3 | 18,75 | | |
| | Less | 0 | 0 | | 0 | 0 | | |
| Control Group Leaflets | Good | 3 | 18,75 | 29,63 | 11 | 68,75 | 32,06 | 0,041 |
| | Enough | 13 | 81,25 | | 5 | 31,25 | | |
| | Less | 0 | 0 | | 0 | 0 | | |
| Total | | 16 | 100% | | 16 | 100% | | |

Based on table 4, In the Audiovisual E-Module treatment group before being given the percentage intervention, there were sufficient results with almost all respondents and an average of 28.75, while after being given the percentage intervention, there were good results with almost all respondents and an average of 31.81 with the results of the Wilcoxon Signed Rank Test (p-value) of 0.000.

In the Leaflet control group before being given the percentage intervention, there were sufficient results with most respondents and an average of 29.63, while after being given the percentage intervention there were good results with most of the respondents and an average of 32.06 with the results of the Wilcoxon Signed Rank Test (p-value) of 0.041.

It can be concluded that the results of the Wilcoxon signed rank test have a significant value obtained in the experimental group of 0.000, which means that there is an influence between the provision of audiovisual e-module media and leaflets on the actions of prospective brides about preparing for a healthy pregnancy. Therefore, it can be seen from these two methods that the Audiovisual E-Module is more effective in increasing the knowledge of prospective brides about preparing for a healthy pregnancy..

## DISCUSSION

1. Effectiveness Before and After Being Given Audiovisual E-Modules and Leaflets on Healthy Preparation for Knowledge of Brides-to-be

Based on the results of the analysis that has been carried out, the knowledge of prospective brides before and after about preparing for a healthy pregnancy using audiovisual e-module media and leaflets has increased. The results of the knowledge statistics test before and after being given audiovisual e-module media and leaflets using the Wilcoxon Signed Rank Test obtained significant values, so it can be concluded that audiovisual e-module media is more effective in increasing the knowledge of prospective brides than leaflets.

Knowledge is the result of knowing something after a person has experienced sensing something. Research by Sutrisno and Umami (2019) found significant differences in the knowledge of prospective brides before and after being treated in the experimental group and the control group in the bride-to-be. The average


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number of brides-to-be after being educated has increased compared to before the education was delivered. According to Aminin (2015), based on knowledge, a cat in data obtained at the time of the pretest who is less knowledgeable becomes more knowledgeable at the time of the posttest. The level of knowledge affects the decision to undergo premarital screening.

Another study conducted by Misha et al. (2017) is known to have succeeded in significantly increasing knowledge. The results of this study confirm the findings of previous research that electronic modules are still very diverse, with modifications and innovations, and continuing the design of e-modules is still. Many studies show that the use of electronic modules can help increase engagement, motivation, and participation, as evidenced by the increased participation of brides-to-be. According to Zarei & Mohammadi (2021), however, the educational process also requires a sufficient internet connection to access learning materials. However, this is not too much of a problem when using the internet, because the e-modules created can be downloaded and used outside the network. Therefore, e-modules are recommended for use in developing countries.

The researcher argues that the knowledge of the bride-to-be in the audiovisual e-module group has increased compared to leaflet media. This is because the bride-to-be is more interested in a spectacle than reading. Audiovisual e-module media has advantages over leaflet learning. In addition to audio, moving images are also displayed, and videos can show phenomena that are difficult to see in real life. This shows that media users in the learning process make it easier for respondents to access new knowledge.

2. Effectiveness Before and After Being Given Audiovisual E-Modules and Leaflets on Healthy Preparation for Attitudes of Brides-to-be

Based on the results that have been carried out, the attitude of the bride-to-be before and after about preparing for a healthy pregnancy using audiovisual e-module media and leaflets has improved. The results of the statistical test of attitudes before and after being given audiovisual e-module media and leaflets using the Wilcoxon Signed Rank Test obtained significant values, so it can be concluded that audiovisual e-module media is more effective in improving the attitude of prospective brides than leaflets.

Research by Heni Irawati, Apoina Kartini, and Sri Achadi Nugraheni (2019) states that from the attitudes obtained through education, one then digests and understands the information received. This change in attitude leads to becoming more self-respecting. A good attitude is based on good knowledge. The media is also a factor that affects a person's attitude. The increase in attitude is also due to the increase in knowledge. The increase in knowledge and attitude is achieved through a learning process involving all senses, where 13% of knowledge is obtained through hearing and 35-55% through training and vision. According to Arifah (2020), healthy attitudes and behaviours are difficult to achieve if other supporting aspects are not considered. If basic knowledge and adequate social support are not provided when

conducting the premarital test, it will be difficult to gain understanding and motivation to conduct premarital screening.

Annisa's research (2022) uses audiovisual e-module media to convey communication, the message conveyed serves as a guideline for thoughts and feelings in the form of ideas, information, beliefs, hopes, and appeals. The use of audiovisual e-module media as a learning tool aims to change attitudes and behaviours. In the process of changing attitudes and motivations, these changes are inseparable from changes in beliefs through the media of audiovisual e-modules. This change changes attitudes by incorporating new ideas, thoughts, and opinions through video communication messages shown to the individual attitude components. Safitri, Pangestuti & Kartini (2021), The use of audiovisual media is suspected to advance learning goals because it stimulates the senses of hearing and vision and can attract more (Mawaddah, 2023).

The researcher argues that the use of promotional methods and media must be appropriate and easily accepted by the target audience and can provide benefits such as stimulating the interest of the target group, overcoming special, temporal, linguistic and sensory limitations in the educational process, overcoming the passive attitude of the target group, providing stimulation and experience and achieving the same understanding. The media can play a role in overcoming barriers to understanding, promoting the provision of health information, and facilitating the delivery of information to target groups.

3. Effectiveness Before and After Being Given Audiovisual E-Modules and Leaflets on Healthy Pregnancy Preparation for Bride-to-be's Actions

The results of the analysis showed that the actions of prospective brides before and after preparing for a healthy pregnancy using audiovisual e-module media and leaflets increased. The results of the statistical test of actions before and after being given audiovisual e-module media and leaflets using the Wilcoxon Signed Rank Test obtained significant values, so it can be concluded that audiovisual e-module media is more effective in increasing the actions of prospective brides than leaflets.

An action is an act or something that is done with a specific purpose and intent. The research of Wulandari, Sukmandari, and Purnamayanthi (2021) said that self-confidence in general is a series of specific challenges and actions communicated by the bride-to-be that can be improved through several experiences with health problems. Handayani and Nurwindasari (2021) said is in accordance with the theory that convincing oneself to control one's health begins with the experience of taking expected actions based on past successes and failures.

The research of Abbasi et al. (2021) said that expectant mothers with high self-confidence said they would be better able to overcome challenges in the preconception process. It provides better control over physical and situational health and helps better understand that unpreparedness for pregnancy can have a serious impact on future pregnancies. They tend to get pregnant as early as possible because they believe

that preventive measures and maintaining health will be beneficial. On the other hand, mothers-to-be who have low confidence tend not to prepare for their pregnancy properly. They tend to avoid difficult behaviours, are unsure of what they are doing, and experience complications during pregnancy, childbirth, and BBLR. Karami et al. (2018) said that self-confidence allows a person to believe and act correctly to achieve the desired outcome, such as preparing for pregnancy.

Research by Dina Sri, M. Alamsyah & Hasi Susiarno (2023) said confidently that the success of health education is inseparable from the success of good and interesting media. One of the interesting media is audiovisual media that can be used to educate brides-to-be. Audiovisual as a medium is suitable for explaining the process because it is more realistic, absorbable, and can provide information that can be repeated or stopped as needed. Putri, Andara, and Sufyan (2021), Audiovisual media have more vision and hearing, increasing absorption and memory up to 50% of the information conveyed. is because it is influenced by the intensity of attention and awareness of the object.

According to Ratnasari (2018), currently, the health education media that are widely used in Indonesia are still traditional, such as the use of leaflets. This medium was chosen because it is considered very cheap and easy to make. Catin only receives information during medical consultations in the medical environment, so the use of brochures to communicate consultation materials is not very effective. In addition, it is often lost, forgotten, or easily torn, making the distribution of brochures less efficient.

Researchers argue that the actions of brides-to-be in the audiovisual e-module group are higher compared to leaflet media. This is because the bride-to-be is more interested in a spectacle than reading. Audiovisual e-module media have advantages over leaflet media. The advantages of audiovisual e-module media include animated video media that add a dimension of learning, and animated videos that display videos other than audio. Videos can also show phenomena that are difficult to see in real life. This shows that the use of media in the learning process makes it easier for respondents to accept new behaviours.

## CONCLUSION

Based on the results of the research that has been carried out at the Sidoarjo Health Centre, Sidoarjo District, described in the discussion in the previous chapter, the researcher can conclude that there is knowledge that the prospective bride before and after being given the audiovisual e-module has good knowledge of all respondents, and the leaflet has good knowledge of almost all respondents; the attitude of the bride-to-be before and after being given the audiovisual e-module has a positive attitude of all respondents. Respondents and leaflets had a positive attitude in almost all respondents, and the actions of the bride-to-be before and after being given the audiovisual e-module were good. Almost all respondents and leaflets had good actions; most of the respondents.


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