

P-ISSN:2085-3475
E-ISSN: 2540-9972

JURNAL PROMKES

The Indonesian Journal of Health Promotion and Health Education



Vol. | No.
13 | 2
September, 2025

Published by:
Universitas Airlangga

Training and Counselling of Sex Education as a Prevention for Sexual Risk Behaviour in Adolescents: A Quasi-experiment Study

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ABSTRACT

Background: Adolescents have a high sense of curiosity, including issues of sexuality. Adolescents' curiosity about sexuality is due to the developmental period of adolescents entering puberty, which is marked by the maturation of the reproductive system and the production of sex hormones. Risky sexual behaviour is sexual behaviour that can cause negative impacts such as unwanted pregnancy, abortion and sexually transmitted diseases. Adolescents need to be equipped with various knowledge about reproductive health, which includes understanding the physiology of reproductive organs, menstruation, fertility, sexual orientation, STI/HIV/AIDS prevention techniques, pregnancy, family planning techniques and skills. **Objectives:** To determine the effect of sex education through training and counselling as a preventive measure against risky sexual behaviour in adolescents: Participants of the Adolescent Reproductive Health Information and Counselling Center (PIK-KRR) in Medan City. **Method:** This research uses a quasi-experimental group pre-test and post-test design. The number of samples in this study was 30 adolescents. The statistical test analysis method used the paired sample t-test with the SPSS application. **Results:** This research shows an increase in adolescents' knowledge, attitudes and actions regarding risky sexual behaviour (p -value <0.05). **Conclusion:** Health services provide education about reproductive health knowledge and the impact of dangers of engaging in sexual behaviour to all adolescents so that they gain useful knowledge so as not to do other negative things.

Keywords: Adolescent, Counselling, Education, Training, Risky sexual behaviour.

INTRODUCTION

The adolescent phase is a bridge between childhood and adulthood, where adolescents experience rapid growth and development. It is essential to provide them with proper nutrition to support their physical and mental development. According to the 2010 Population Census, Indonesia has 237.6 million people, of which 63.4 million are adolescents, consisting of 32,164,436 males (50.70%) and 31,279,012 females (49.30%). The significant youth population in the country will have a significant impact on future population growth, according to BKKBN, 2011.

The progress and future of a nation are very dependent on the younger generation. They hold the power to direct the course of the country. However, certain factors can affect their quality of life, including understanding their reproductive identity and maintaining a balanced diet. A lack of knowledge in this area can lead to problems such as risky

sexual behaviour. Therefore, educating youth about this topic is very important for their wellbeing and the development of the country (Takalawangen, Mantiri and Monintja, 2019; Ardiansyah, Yuliatin and Zubair, 2021; Parwitasari, 2022).

Adolescence is a phase that lasts from 10 to 19 years of age and is marked by the maturation of the reproductive organs, which is commonly called puberty; this period witnesses significant cognitive, psychosocial and physical changes. Adolescents experience growth in terms of height and weight, and their reproductive organs also experience maturity. Their curiosity increases, and they are drawn to new, challenging experiences. However, adolescents are also prone to increased sensitivity, anxiety and frustration. Youths need to engage in positive activities to unlock their true potential. Unfortunately, not all teens choose constructive pursuits. Furthermore, physical development and maturity of the reproductive organs during adolescence can lead to unhealthy sexual

urges (Dartiwen and Mira Aryanti, 2022; Gultom and Sari, 2022; Sinaga, 2022).

Adolescence is a transitional period that brings various growth opportunities and health risks. This stage of development is characterised by physical and psychological changes (Qoriaty and Azizah, 2018; Octavia, 2020; Qomariah, 2020). Adolescents experience physical changes, manifested by the emergence of primary and secondary sexual characteristics, while psychological changes are marked by emotional sensitivity and a tendency to experiment with new things. However, while searching for their identity, adolescents may be less emotionally stable and may face temptation in their social environment. Adolescents are eager to explore adult behaviour, which makes them vulnerable to various risks (Jackson, Janssen and Gabrielli, 2018; Littman, 2018; Do, Sharp and Telzer, 2020).

Youth must be equipped with various knowledge, including religious and general education. However, they must also know about reproductive health, including understanding the physiology of the reproductive organs, menstruation, fertility, sexual orientation, STI/HIV/AIDS prevention techniques, pregnancy, family planning techniques, and skills. This comprehensive knowledge enables youths to become responsible individuals capable of making positive decisions and changing their behaviour (Noor *et al.*, 2020).

Sexual behaviour is an act that involves physically touching other people's body parts or oneself that is driven by sexual desire (Hodson *et al.*, 2019). This action can start from holding hands to engaging in sexual intercourse. Risky sexual behaviour is sexual behaviour that can hurt the perpetrator. The negative impacts that arise are unwanted pregnancies (KTD), sexually transmitted diseases (STDS), and an even further impact is that it is easy to contract HIV/AIDS.

Risky sexual behaviour in adolescents greatly influences their daily lives; adolescents live in an environment where they interact with family, friends, the school environment, and other world environments. Entering adolescence, adolescents' sexual desires begin to develop; for this reason, adolescents must learn to adapt to all the cultural rules and customs that exist in society (Gibbons and Poelker, 2019). In Indonesian society, the

number of adolescents has increased to more than 66%; one in four of the population in Indonesia is a teenager. The culture of sexual risk behaviour among adolescents has threatened the future of the Indonesian nation, where parents, schools and the community have an important role in it. Based on the results of the 2015 interim RPJM survey, in which 42,243 adolescents completed, 45 adolescents had had sexual relations before marriage.

Many Indonesians view the LGBT community as violators of human nature, moral destroyers, and social outcasts. They are often labelled as mentally disabled, destroyers of religious norms, and even equated with the prophets of Lut (Pratama, Fahmi and Fadli, 2018; Mustafa, 2019; Mafaza and Royyani, 2020). It should be noted that Indonesia has the fifth-largest LGBT population in the world, with 3% of the country's 250 million people identifying as LGBT, according to various independent surveys at home and abroad. This means around 7.5 million Indonesians are part of the LGBT community, or in simpler terms, about 3 out of every 100 people (Asri and Hayati, 2018; Pratama, Fahmi and Fadli, 2018; Safitri *et al.*, 2018; Sari *et al.*, 2020; Muzakir, 2021; Sugiarto, 2022).

An initial survey of direct interviews with adolescent health managers at the Medan City Health Office revealed that there were cases of LGBT adolescents in several sub-districts in Medan City. Medan City, the capital city of North Sumatra Province, is a vital transit point for domestic and foreign tourists. Its strategic location has driven the growth of various accommodations, infrastructure, shopping centres and entertainment venues. The city's modernisation is reflected in the emergence of nightclubs, karaoke rooms and cafes, which attract a young population. However, this causes a change in the lifestyle of the people of Medan City, especially adolescents, who tend to spend their nights at these entertainment venues. As a result, there is a decline in moral values and an increase in the possibility of promiscuity and sexual perversion among adolescents in the city.

The terms 'gay' or 'homosexual' refer to sexual behaviour that is considered inappropriate. Deviations from this norm are also observed in individuals who identify as lesbian, bisexual, or

transgender (LGBT). Human nature is inherently designed with a male and female binary sexual orientation, which does not include same-sex attraction. 'Gay' refers to same-sex sexual attraction between men, while 'lesbian' denotes same-sex attraction between women. Bisexuals, on the other hand, are individuals who are attracted to both men and women simultaneously. 'Transgender' is a term used to describe individuals who identify with the gender opposite to the sex assigned at birth, such as waria or men who show feminine traits. In addition, there are also many examples of men engaging in sexual activity with transgender women (Panich and Chaiumporn, 2018; Alizamar, 2019; Zeeman *et al.*, 2019; Hall, Dawes and Plocek, 2021; Mulyadi, Oktavianisya and Ulfa, 2021; Ummah, Najeh and Tongat, 2021).

Adolescents' awareness of reproductive organs and health still needs to be improved, and accurate information is still scarce. Reproductive health is still considered taboo, causing parents and teachers to struggle to communicate important information (Anggraeni, Kurnia and Harini, 2018; Kyilleh, Tabong and Konlaan, 2018; Widiyastuti and Nurcahyani, 2019). However, according to the findings, cultivating a solid understanding of reproductive health is critical in promoting healthy sexual behaviour (Basri *et al.*, 2022; Indraswari *et al.*, 2022).

The Centre for Youth Information and Counselling, known as the Youth PIK, is a unique forum for PKBR programme activities. Intended to provide information and counselling services on Family Planning for Youth and other related activities, PIK Juvenile is a versatile name that can be adapted to local youth preferences and programme requirements. The Centre for Information and Counselling for Youth, or PIK-R, is another forum that offers youth reproductive health programme activities. Managed by and for youth, PIK-R provides adolescent reproductive health information and counselling services. In Indonesia, currently, there are 8,121 PIK-R spread across 6,093 sub-districts. Of these, 6,992 are in the Growth stage, 879 are in the Upright stage, and 250 are in the Stiff stage. However, the development of PIK-KRR in middle and high schools still needs

to be improved and expanded. The Centre for Information and Counselling on Adolescent Reproductive Health, or PIK-KRR in SMUN, offers easy access to the correct information about reproduction.

METHODS

The research design used a quasi-experimental group pre-test and post-test design. The subject group was observed before treatment (pre-test) and was then observed again by providing counselling and counselling to respondents and then giving intervention (post-test). The sample in this research activity was 30 adolescents in PIKR education paths active in Medan, namely PIKR Kampung Gaharu and Helvetia, Medan. The data collection process began with a pre-test (efforts to prevent risky sexual behaviour) for all youth who were respondents to find out what they were doing in efforts to prevent risky sexual behaviour. The intervention phase for participants begins with health education and counselling interventions about efforts to prevent risky sexual behaviour for two months. The subjects in this study will receive interventions 2-3 times daily, and the enumerators will monitor progress during the research process. The material presented during the health education and counselling was: sexual risk behaviour, reproductive health, prevention of risky sexual behaviour and LGBT risk behaviour. The subjects underwent a post-test about behaviour to obtain developmental data after being given health education and counselling about efforts to prevent risky sexual behaviour. Data analysis was performed using the SPSS statistical test, the paired sample t-test. This research has received ethical approval from the Medan Ministry of Health Polytechnic Research Ethics Committee No:01.0166/KEPK/POLTEKKES KEMENKES MEDAN 2022.

RESULTS AND DISCUSSION

Research Results

Respondent's Internal Factors

Respondents in this study were adolescents aged 12-17 years, both male and female adolescents, and who were PIK-KRR members in the working area of the Helvetia Health Centre, Medan City, totalling 30 people. The internal factors

taken by the respondents were age, gender and sources of information.

Table 1. Frequency Distribution of Respondents Based on Age (Adolescent Stage), Gender, and Sources of Information on Sex Education.

No	Variable	Frequency (n)	Percentage (%)
1	Age		
	– Early Adolescents (10-12 years)	8	26.7
	– Middle Youth (13-15 years)	12	40
	– Late Adolescents (16-17 years)	10	33.3
2	Gender		
	– Man	13	43.3
	– Woman	17	56.7
3	Resources		
	– Internet	13	43.3
	– Television	3	10
	– Teacher	5	16.7
	– Parent	9	30
Total		30	100

Based on the results of research conducted on 30 respondents, it was found that most adolescents were aged 13-15 years, with as many as 12 people (40%),

with the majority, 17 (56.7%), being female. As many as 13 people (43.3%) received the most information about sex education and nutrition from the internet.

Table 2. Level of Knowledge, Attitudes and Actions of Respondents Before and After Conducting Training and Counselling to Prevent Risky Sexual Behaviour.

No	Variable	Before		After	
		n	%	n	%
1	Knowledge				
	Good	5	16.67	27	90
	Currently	10	33.33	2	6.67
	Not enough	15	50	1	3.33
	Amount	30	100	30	100
2	Attitude				
	Good	3	10	26	86.67
	Currently	10	33.33	2	6.67
	Not enough	17	56.67	2	6.67
	Amount	30	100	30	100
3	Action				
	Good	4	6.7	27	90
	Currently	6	23.3	1	3.33
	Not enough	20	70	2	6.67
	Amount	30	100	30	100

Based on Table 2 above, it can be seen that before being given training and counselling, most respondents had low knowledge about efforts to prevent risky sexual behaviour, namely 15 people (50%).

Meanwhile, after being given training and counselling, the majority of respondents had good knowledge about efforts to prevent risky sexual behaviour, as many as 27 people (90%).



The Effect of Training and Counselling as an Effort to Prevent Risky Sexual Behavior

Sexual Behaviour can be seen in the table below:

The Effect of Training and Counselling as an Effort to Prevent Risky

Table 3. The Effect of Training and Counselling as an Effort to Prevent Risky Sexual Behaviour.

No	Variable	Elementary School Average	Change Rate	P Value*
1. Knowledge				
	Before	54.83 ± 20.218	-28.84 ± 7.766	0.001
	After	84.67 ± 15.452		
2. Attitude				
	Before	52.33 ± 19.106	-32.84 ± 6.966	0.001
	After	84.16 ± 12.140		
3. Action				
	Before	50.17 ± 19.050	-36.33 ± 6.792	0.001
	After	86.50 ± 12.258		

*Difference within groups (before and after) using paired t-test, at a significance level of 5%.

From Table 3 above, it can be seen that after conducting training and counselling as efforts to prevent risky sexual behaviour, there was an increase in the mean value of adolescent knowledge of 28.84, and the participants were in a sound knowledge category of 84.67. In attitudes, there was also an increase in the average value of adolescents, namely 32.84, and all respondents had a good attitude of 84.16. There was also an increase in the average value of adolescents, namely 36.33, and all respondents had good actions of 86,50. The results of statistical tests using the statistical paired t-test showed differences in the mean knowledge, attitudes and actions of the participants in training and counselling as an effort to prevent risky sexual behaviour.

Based on the result, it can be seen that before being given training and counselling, most respondents had low knowledge about efforts to prevent risky sexual behaviour, namely 15 people (50%). Meanwhile, after being given training and counselling, the majority of respondents had good knowledge about efforts to prevent risky sexual behaviour, as many as 27 people (90%).

Then, from the data above, before providing training and counselling, the majority of respondents had poor attitudes about efforts to prevent risky sexual behaviour, namely 17 people (56.67%), while after training and counselling, the majority of respondents had good attitudes about efforts to prevent sexual behaviour. At risk, namely 26 people (86.67%).

It can be seen from the data above that before providing training and counselling, the majority of respondents did not take enough action regarding efforts to prevent risky sexual behaviour, namely as many as 20 people (70%), whereas after training and counselling the majority of respondents had a good attitude towards efforts to prevent risky sexual behaviours many as 27 people (90%).

The findings of this research reveal a substantial transformation in the behaviour, actions and knowledge of adolescents who receive sex education through training and counselling at the Medan City Adolescent Reproductive Health Information and Counselling Centre (PIK-KRR).

Sexual education starts from an early age through parents at home. In urban areas, parents admit that it is difficult to monitor their children's movements and whereabouts (Ram & Mohammadenzhad, 2020). Preventing sexual deviance is critical, and families, schools and communities can all take preventive measures. Families can educate adolescents about sex from an early age and limit social interactions outside the home (Wajdi and Arif, 2021; Magta and Lestari, 2022). Counselling and education about the risks of deviant behaviour can be provided at school. Community efforts can act as activating youth organizations and warning adolescents involved in these activities. By educating children about sex at a young age, or at least during their

school years, they can develop a better understanding of sexual orientation and avoid deviant behaviour (Pradani, 2018; Depi, 2021).

When sexual education is introduced at an early age, students are made aware of their natural sexual urges. This understanding leads to a greater sense of self-care, protecting oneself from negative outside influences. Unfortunately, adolescents who view casual sex as the norm are often under the influence of misleading information from sources such as the internet, as well as peers who pressure and encourage them to engage in promiscuity. To overcome this, the PIK-KRR initiative offers information, training and counselling services as a positive means of preventing sexual deviation in adolescents (Agustina, 2019; Detek, 2020).

The goals of sex education vary depending on the child's developmental stage. Toddlers, for example, must be taught about intimate organs and other body parts, including their function and how to protect them (Hemasti, 2021; Oktalistina, 2021; Fransisca and Putri, 2022). Delaying this education can lead to problems such as genital touching, inappropriate touching, and other problems. Sex education is also useful for explaining dangerous sexual behaviour, such as promiscuity, instilling morals, and teaching the principle of "say no" to premarital sex. In addition, it can help build self-acceptance and prepare couples for healthy and appropriate sexual relations before marriage (Setyanti *et al.*, 2022; Martin and Nilawati, 2023).

Several studies from research support this (Solehati *et al.*, 2022). The results of the study show that there is an influence between health education related to sexual harassment and knowledge ($p = 0.000$) and attitudes of adolescents ($p = 0.001$) towards sexual harassment. Based on the research results, it can be concluded that health education is effective in increasing the level of knowledge and attitudes of adolescents in preventing sexual violence. Apart from that, the results of Yusnia *et al.*'s (2022) Statistical test calculations using computerisation obtained a t value of -4.792 and $p=0.000$ ($p<0.05$) so that there is an influence of health education on knowledge with an increase in results in post-test scores. Likewise, (Hutapea *et*

al.'s (2023) findings, analysed from the pre-post-test results, show that the education provided can increase participants' knowledge, namely an increase of 23.4 points. Based on the results of the t -test, the p -value was <0.001 , namely that there was a significant difference in participants' understanding before being given the material and after being given the material. From research (Kuswanti & Rochmawati, 2021; Sabriyanti, 2020) regarding the effectiveness of health promotion through audiovisual media regarding HIV/AIDS in increasing adolescents' knowledge about HIV/AIDS, it was concluded that providing health promotion about HIV/AIDS through audiovisual media was effective in increasing students' knowledge about HIV/AIDS.

Reproductive health education or formal sexual education can change behaviour, either delaying or reducing early sexual behaviour in adolescents. Adolescents who have not had sex, if they receive sexual education, tend to delay their first sexual intercourse. In addition, adolescents who do not agree to sexual relations outside of marriage will have strong protection from unwanted pregnancies, STDS and HIV/AIDS. Comprehensive reproductive health education or sexual education is very important and necessary with a large amount of sexual information available on the internet, television, radio, books and magazines. This is because the main aim of reproductive health education is not only to provide information about sexuality but also to foster positive attitudes, behaviour and critical reflection through counselling. Knowledge becomes the basis for actions carried out by individuals. What people know will influence their behaviour. Knowledge is important in determining and directly influencing individual behaviour (Liobikienė and Poškus, 2019). For example, if a teenage girl knows that any sexual intercourse can result in pregnancy, she will refrain from sexual intercourse. However, if a person does not know about sexual relations, if there is an invitation or encouragement from others, then they may have sexual relations. Knowledge can also influence behaviour indirectly by influencing a teenager's norms, values, attitudes, perspectives and self-efficacy (Wang *et al.*, 2023). For example, suppose adolescents do not know their parents'

views on sexual relations among adolescents. In that case, their views on sexual relations among adolescents will be shaped by friends and the media. This will open up opportunities for early sexual behaviour in adolescents.

CONCLUSION

Research results show an increase in knowledge, attitudes and actions regarding efforts to prevent risky sexual behaviour ($p\text{-value} < 0.05$). Adolescents can understand risky sexual behaviour. They can control themselves with prevention efforts given through schools, families and communities so that they do not easily fall into sexually deviant behaviour that will harm themselves and their families. The implication of adolescent sexual education is to create adolescents who are tough, have sufficient knowledge about sexual education and can prevent themselves from premature sexual behaviour, promiscuity, and its negative impacts. Sexual education for adolescents will also create adolescents who can find and solve problems, have initiative, empathy and self-efficacy, and insight into creating a good future for themselves.

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Improving Cadres Knowledge and Skills in Non-Communicable Disease Control and Care in Kulonprogo, Yogyakarta

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ABSTRACT

Background: Non-communicable disease (NCD) necessitates prolonged continuous intervention that impacts enormous morbidity, mortality, and socioeconomic repercussions on a global scale. Community and private primary healthcare facilities need to be more interconnected, although they have significant roles in NCDs' prevention and care. **Aims:** To enhance the community's competencies regarding NCDs through the involvement of private primary care. **Method:** The method used was a quasi-experiment (non-control, nonrandomisation) with the 'Aisyiyah Clinic involvement as the mentor for participants. The study involved 41 faith-affiliated cadres from 'Aisyiyah and Nasyiatul Aisyiyah, Kulonprogo, Yogyakarta Special Region Province, Indonesia. Interventions include health education sessions on NCDs and essential health examinations for NCD screening practices. The study evaluation was conducted using a pre-test and post-test of knowledge and skill observation checklist, followed by the Wilcoxon signed-rank, Spearman, and Kruskal-Wallis tests. **Results:** Education and practices increased participants' knowledge of NCDs ($p=0.000$) with a large effect size ($r=0.50$). The cadres also observed that they could perform their competencies in these examinations (100%). Additionally, there was no significant difference in knowledge (pre-test and post-test) based on cadres' demographic background ($p>0.05$). In contrast, there was a significant difference in initial knowledge (pre-test), according to both duration of time as a cadre ($p = 0.011$). **Conclusion:** Health education and practices effectively increase health cadres' knowledge and skills related to NCD control. Simultaneously with continuous community empowerment, the study findings highlight a need for better integration between public health initiatives and private sector resources to sustainably improve the community health workers' role.

Keywords: Chronic Diseases, Community Health Worker, Health Cadres, Private Primary Care

INTRODUCTION

Globally, non-communicable diseases (NCDs), such as cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, are leading causes of morbidity and mortality (Hiremath Lalita, & Hiremath Dhananjaya], 2012). They account for approximately 71% of all global deaths, with 15 million people aged 30-69 years dying prematurely each year (WHO, 2020). NCDs also impose substantial socioeconomic burdens, contributing to healthcare costs and loss of productivity

(Oktaria & Mahendradhata, 2022; Hiremath Lalita, & Hiremath Dhananjaya, 2012). The global community recognises the urgency of addressing NCDs, as emphasised by the World Health Organization's Global Action Plan for the Prevention and Control of NCDs 2013-2020, which aims to reduce the burden of NCDs through comprehensive and coordinated approaches (Hunter & Reddy, 2018).

In Indonesia, NCDs have become a significant public health challenge, contributing to more than 70% of the country's total mortality (Republic

Indonesia Ministry of Health, 2018). The prevalence of risk factors such as smoking, physical inactivity, unhealthy diets, and hypertension is high among the population (Arifin et al., 2022). The Indonesian government has implemented various policies to combat NCDs, including the National Action Plan for NCD Prevention and Control and the integration of NCD services into primary healthcare (Republic Indonesia Ministry of Health, 2017; WHO, 2018a). However, despite these efforts, gaps remain in the effective management and control of NCDs, particularly at the community level.

Despite the existing policies and efforts to manage NCDs in Indonesia, there are significant gaps in the implementation and effectiveness of these strategies, especially in community-based settings. One critical gap is the underutilisation of private primary care facilities, which serve a large portion of the population but must be connected with community health workers (CHWs). Research has shown that private primary care providers cater to a substantial number of patients and have the potential to impact NCD management significantly (Arini et al., 2022; Marshall et al., 2023). However, the lack of integration between these private entities and community health workers limits their effectiveness in comprehensive NCD control (Kamvura et al., 2022; Leon & Xu, 2023). This disconnect highlights the need for collaborative approaches that leverage the strengths of both private primary care and community health cadres.

Empowering healthcare cadres through training and education plays a vital role in enhancing the capacity of the healthcare workforce, particularly in addressing NCDs (Andrianto et al., 2020; Kosasih et al., 2019). By leveraging non-physician health workers to perform tasks traditionally carried out by health professionals, empowerment initiatives improve efficiency and access to care, especially in underserved areas (Woldie et al., 2018). These initiatives not only enhance job satisfaction and retention among healthcare workers by offering professional development opportunities and adequate resources (Carboni et al., 2023), but also contribute to more effective NCD prevention, diagnosis, and management, ultimately leading to improved public health outcomes (Abdel-All et al., 2017; Reynolds et al., 2018). By

building a skilled and motivated cadre, healthcare systems can better control and care for NCDs, ensuring a more comprehensive and accessible healthcare delivery system.

Enhancing community engagement in the care of NCDs follows the strategies outlined in the Chronic Care Model (CCM) (Reynolds et al., 2018). Hence, interconnecting community is essential in developing a model for chronic disease management and involves four interconnected components: health service providers, health service systems, community partners, and patients and their families (Maimela et al., 2018). This model employs an integrated and coordinated approach.

This study addresses these gaps by initiating the linking of faith-affiliated health cadres with private primary care to improve knowledge about preventing and managing NCDs. Although community empowerment initiatives are frequently conducted by research, this study is unique due to the private sector involvement and the highlight of the faith-based-affiliated cadres. Most of them are not formerly health cadres, but they have value and the potential to become health cadres and strengthen NCD care and control in the community (Soni et al., 2023). Specifically, the study seeks to enhance the competencies of community health workers through targeted education and training sessions on chronic diseases and essential health examinations as a pilot model for private sector-community engagement. The findings are expected to provide insights into practical strategies for continuous community empowerment, private sector engagement, and sustainable health interventions ultimately contributing to the broader goal of reducing the NCD burden in the country.

METHODS

Study Design

The methods used in this study are quasi-experiments (no control, nonrandomisation). As the study uniqueness, to enhance the sustainability of the community empowerment programme, 'Aisyiyah Sewugalur Clinic was involved as a mentor for the community. The intervention package was formulated together with this clinic. This study was conducted in Sewugalur, Kulon Progo,

Yogyakarta, Indonesia as part of a series of umbrella studies on establishing a faith-affiliated health community cadre in this area.

The interventions implemented in this study encompass health education on chronic diseases and their prevention and management. Two role-play practice sessions were provided: 1) basic physical examination, consisting of anthropometric measurements, body mass index (BMI) calculation and interpretation, and blood pressure measurement; 2) blood glucose, uric acid, and cholesterol screening using test strips. The second author performed the role of an educator in a 90-minute lecture presentation that included a question-and-answer segment. The other authors and clinic staff served as mentors during training sessions, guiding role-playing and assisting practice exercises.

Participants and Sampling Technique

The participants were members from 'Aisyiyah and Nasratiyyah 'Aisyiyah Kulonprogo, Yogyakarta Special Region Province recruited purposively using criterion sampling. The total number of participants was 41.

The inclusion criteria in this study programme include being an active member of one of these two women organisations, being willing to actively engage in all study endeavours, and being of legal age, precisely over 18. These two organisations are autonomous women's organisations within Muhammadiyah, one of Indonesia's most significant Islamic mass movements.

Data Collection

Data were collected by giving a pre-test before the intervention was carried out and a post-test after completion. There are ten statements in the offline paper-based questionnaire with binary true-false answer choices. The researcher prepared the questionnaire based on material in the health education session given to the participants. The questions were about general knowledge about signs and symptoms, prevention, and care of NCDs. For the construct and face validity, the questionnaire was reviewed by community health experts. Cadre's skills in conducting anthropometric measurements, BMI calculation and interpretation, and strip test screening were evaluated with structured

observation (post-test only). Cadres' skills were scored 0-100% according to the accuracy of practising examinations compared to observation checklists.

Data Analysis

The obtained data were then analysed using descriptive statistics to determine the frequency of participants' demographic data. Due to the data being not normally distributed, a difference test was carried out using the Wilcoxon signed-rank test to evaluate any changes in the level of knowledge before and after the intervention was given. The effect size (*r*) calculation was carried out to determine the strength of the impact of the intervention on participants' knowledge. Finally, a comparative test was carried out (Kruskal-Wallis and Mann-Whitney U) between age categories, last education, employment, period as health cadre, and formal cadre training history with pre-test and post-test score. The entire analysis was carried out using SPSS software.

Ethics

This study has received ethical approval from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Muhammadiyah University of Yogyakarta, with No. 071/EC-KEPK FKIK UMY/1/2024. Before study was carried out, all participants had received a detailed explanation and provided written consent.

RESULTS AND DISCUSSION

Forty-one individuals participated in this study (Table 1). The data on education levels indicate that most participants are relatively well-educated, with nearly half being high school graduates (48.8%) and a similar proportion holding a diploma or bachelor's degree (46.3%). Furthermore, 19 participants (46.3%) were predominantly housewives or retirees. A half of (51.2%) the total had yet to gain experience as formal health cadres. Similarly, 22 participants, representing 53.7%, had never received formal training from the government.

The participants' demographic characteristics reveal essential insights relevant to the effectiveness and potential of health education interventions. All participants were women, reflecting women's significant role in community

health efforts, particularly in Indonesia; Arini & Primastuti, 2023). Several participants were more than 60 years old, which aligns with other study showing older adults often participate in health-related community activities (Najafi et al., 2023). Moreover, the finding that most participants were homemakers or retirees highlights a demographic with potentially more time to commit to community health activities as supported by previous studies that found that homemakers and retirees often have more flexibility to engage in volunteer health work (Andrianto et al., 2020; Arini & Primastuti, 2023).

Table 1. Participant Characteristics

Variable	Category	n	%
Gender	Man	0	0
	Woman	41	100
Age (years old)	20 - 40	18	43.9
	41 - 60	18	43.9
	>60	5	12.2
Last education	Junior high school	1	2.4
	Senior high school	20	48.8
	Diploma/Bachelor	19	46.3
	Postgraduate	1	2.4
Work	Formal sector	8	19.5
	Informal sector	7	17.1
	Student	4	9.8
	Health workers	3	7.3
	Unemployed/house wife/retired	19	46.3
Period of being health cadre (years)	0	22	53.7
	> 0 - 5	11	26.8
	> 5 - 10	4	9.8
	> 10	4	9.8
Formal Training History	Never	21	51.2
	Have attended training	20	48.8

The relatively high educational attainment among participants is noteworthy. This finding contrasts with some studies in similar settings where educational levels were lower, potentially limiting the effectiveness of training programs (Babagoli et al., 2021; Fenta et al., 2024). However, over half had no experience as health cadres, and a similar percentage had never received formal training, suggesting a significant gap in

preparedness and capacity. The data align with study by Carboni et al. (2023), which emphasised the need for targeted training to enhance the effectiveness of community health workers. The substantial proportion of participants without formal training or cadre experience underscores the critical need for capacity-building initiatives. The data are consistent with findings from a study by Abdel-All et al. (2017) which demonstrated that structured training programmes significantly improve the knowledge and skills of cadres. Overall, these findings emphasise the potential for targeted education and training programmes to significantly enhance the capabilities of community health workers, particularly those who are well-educated but need more formal training and experience.

Participants' improvement knowledge was measured using a pre-test and post-test. Since the data were determined to be non-normally distributed based on the normality test results ($p=0.000$), the Wilcoxon signed-rank test was conducted. The mean score improved from 6.34 to 7.68, with the difference test yielding a p -value of 0.000, indicating a statistically significant difference between the pre-intervention and post-intervention periods concerning education and training on managing chronic diseases (Table 2). The cadres also observed that they could perform competently in these examinations skills (100%) (Table 3).

Subsequently, the effect size (r) calculation yielded a result of 0.50, strengthening evidence that the intervention significantly enhanced participants' knowledge. Here are the formula and findings of the effect size calculation:

$$r = \frac{Z}{\sqrt{n}} = \frac{4.550}{\sqrt{82}} = \frac{4.550}{9.055385138137417} = 0.5024634436405518 \approx 0.50$$

Table 2. Normality Test and Wilcoxon Signed-Rank Test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk			Wilcoxon Signed-Rank Test			
	S	df	p	S	df	p	Mean	SD	Z	p
Pre-test	0.236	41	0.000	0.874	41	0.000	6.34	1.109		
Post-test	0.444	41	0.000	0.595	41	0.000	7.68	0.567	4.55	0.000

^aS=statistic; df=degree of freedom; SD=standard deviation

Table 3. Cadre's Competency After Hands-on Training

Skills	Achievement (n=41)
Anthropometric measurement	100%
Body mass index calculation and interpretation	100%
Blood pressure measurement	100%
Blood glucose test	100%
Uric acid test	100%
Cholesterol test	100%

The study findings show that education and training can significantly increase participants' knowledge regarding NCDs and their management. Research studies have shown that through educational programmes and training sessions, cadres can significantly improve their abilities to control NCD risk factors (Abdel-All et al., 2017), provide mental health support (Eka et al., 2023), support joint disorder prevention with exercises (Fauzia et al., 2023), and deliver comprehensive health services for the elderly (Arini & Primastuti, 2023). These initiatives involve various methods such as lectures, discussions, demonstrations, and practical exercises to equip cadres with the necessary expertise. These findings also align with research that explains that interactive training and education programmes carried out simultaneously can significantly increase the knowledge of female cadres about hypertension (Andrianto et al., 2020). The results indicate a notable increase in knowledge levels, skills proficiency, and the ability to provide counselling and conduct assessments independently, ultimately contributing to more effective NCD prevention and management strategies within communities.

This study demonstrates the significant impact of private clinics in enhancing community health cadres' knowledge and skills in NCD through practical training. The improved skills among cadres align with the findings by Abdel-All et al. (2017) and Carboni et al. (2023), who emphasised the effectiveness of structured and experiential training programmes. Several healthcare professionals' tasks could be shifted to CHWs by providing training (Seneviratne et al., 2022). A systematic review also proved that programmes involving CHWs navigation enhanced compliance with cancer screening and promoted the utilisation of primary care for managing chronic diseases effectively. Therefore, it is essential to consider the recruitment criteria, the time frame, and the method of training and supervision

procedures to ensure the high-quality performance of CHWs (Mistry et al., 2021). The study findings highlight a need for better integration between public health initiatives and private sector resources. Overall, the study underscores the pivotal role of private clinics in strengthening community health efforts against NCDs. Although the cadres' skills showed exemplary achievements, regular refreshing trainings are needed to ensure sustainable competency. Studies have evidenced that knowledge and skills achievements always require repetitive learning (Cervantes et al., 2022; Westgate et al., 2021). Increasing cadre knowledge occurs with education and training about chronic diseases accompanied by implementing multi-strategy, context-specific evaluation capacity-building efforts focusing on long-term results and impacts at various levels (LaMarre et al., 2020).

Furthermore, we conducted comparison between demographic data and pre-and post-tests. The analysis findings indicated no significant difference in knowledge (pre-test and post-test) based on age, education, and occupation categories ($p > 0.05$). In contrast, there was a significant difference in initial knowledge, as measured by the pre-test, according to both duration of time as a cadre ($p = 0.011$) and formal training history ($p = 0.049$) (Table 4).

Table 4. Comparison of Cadres' Knowledge by Demographic Attributes

Test	Variables	Knowledge	
		Pre-Test (p-value)	Post-Test (p-value)
Kruskal-Wallis H	Age category	0.369	0.789
	Education category	0.263	0.134
	Occupation category	0.200	0.498
	Period of being health cadre	0.011*	0.123
Mann-Whitney U	Formal training history	0.049*	0.206

This study revealed no significant disparity in knowledge amongst cadres regardless of their age, education, and job categories, both before and after the test. However, the training background and duration as a cadre significantly differ in the first level of knowledge (pre-test). According to a prior study, there is a tendency for knowledge to develop progressively between the ages of 18 and around 40-50 years. However, the situation

can stabilise or decline due to the lack of ongoing education (Salthouse, 2003). Conversely, a study conducted in Iran demonstrated a positive relationship between age and information acquisition (Anbarlo & Irvanlo, 2015). Consistent with our investigation, a study conducted in England found no correlation between schooling and enhancing health knowledge (Johnston et al., 2015).

Our findings differ from those of research conducted in Indonesia, which discovered that higher levels of formal education can considerably enhance learning (Andrianto et al., 2020). Several factors influence the effectiveness of education and training for cadres' knowledge regarding chronic diseases, including learning theory, behaviour change, and collaborative approaches (Ruiz, 2012). On the other side, other factors influencing increasing community knowledge are cultural perceptions, beliefs, and extrinsic motivators (Manus et al., 2016).

Education and training, which are interconnected with primary care, as implemented in our study, are essential initial steps for encouraging community and private sector involvement in managing chronic diseases more integratively. The Chronic Care Model (CCM), one of the most comprehensive frameworks, involves utilising resources from various entities, including public health organisations, healthcare systems, communities, governments, and individuals, to change chronic disease prevention and address health inequities to eliminate them (Barr et al., 2003; New York State Department of Health, 2013). A review paper revealed that empowered CHWs can perform three prominent functions that support healthcare facilities, especially primary care, including clinical care, community resource linkages, and health education and coaching (Hartzler et al., 2018). However, several barriers to private health sector engagement in NCDs control and care include the complexity of providers, lack of system integration, equity issues, and higher costs for privately delivered services, which emerged from several previous study (Collins et al., 2023; Siddiqi et al., 2023). Hence, these barriers to private health sector engagement for NCD control necessitating government

regulation and more comprehensive approach.

This study presents notable strengths and limitations that should be considered. The close engagement of researchers and clinics with participants in our study enhances the interactive learning process, as our study strengths. Our study limitation pertains to the short-term education and training session for enhancement of community knowledge and skills. Therefore, conducting a comprehensive assessment of behavior and knowledge change is crucial for long-term evaluation. Furthermore, as an Islamic mass organisation, the participants in our study possess a few distinctive characteristics that may differ from those in other study settings. Hence, it is crucial to consider the contextual aspect of community-based intervention.

CONCLUSION

Community education and hands-on training, interconnected with private primary care, effectively increase participants' knowledge and skills about NCDs. The effectiveness of the intervention was not influenced by demographic factors, and training history and length of work only have significant differences in initial knowledge, indicating that this programme can be widely implemented regardless of participant background. These findings make this intervention a potential model for similar programmes in the future.

Further interconnection models between CHWs and private primary care still need to be tested, especially in long-term action in the community. Future research is recommended to test the effectiveness of changing the behaviour and practices of health cadres over a long period. Continuous capacity building and smooth engagement with healthcare facilities and other stakeholders are required to improve the quality of care by the community.

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Flashcards on Reproductive Health Education for Elementary School Children: Development and Validation

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ABSTRACT

Background: Reproductive health problems among children and adolescents are increasing. These problems can be prevented starting from a young age. Parents play a significant role in protecting children from sexual and reproductive health problems. Educational media are needed to improve parents' knowledge of reproductive health in elementary school age children so parents can provide this information to their children. **Objective:** To develop flashcards to support parents in educating children about reproductive health from an early age. **Method:** The study used a research and development method conducted from February-May 2024 in Kartasura, Sukoharjo. The ADDIE model was used as the stages in media development. One material expert and one media expert, ten parents in the small group evaluation, and 20 parents in the field evaluation tested the suitability of the media. This was followed by implementing media use with a one group pre- and post-test design involving 30 parents to assess the effectiveness of the media. The parents involved in this research were parents of elementary school children in grades 1-3. Data were collected using questionnaires. Data were analyzed using N-gain value. **Results:** Flashcard media was very suitable and effective (with the percentage of media feasibility in the experts' assessment being 90%, small group evaluation 90.3% and 88.6% in the field evaluation). At the implementation stage, there was an increase in the average knowledge score before and after using flashcards with N-gain score was 0.43. **Conclusion:** Flashcards can be used for reproductive health education for parents of elementary school children.

Keywords: Children, Flashcard, Parent, Reproductive Health.

INTRODUCTION

Reproductive health problems in children and adolescents, such as sexual abuse and HIV/AIDS, are currently prevalent and need to be addressed immediately because they will have an impact on the quality of health for the nation's future generation. Based on data for Indonesia, in 2022, there were 2,133 cases related to special protection for children, 39.09% of which were sexual crimes against children (Indonesian Child Protection Commission, 2023). Positive HIV cases in Indonesia have increased from 5,750 cases in 2021 to 9,341 cases in 2022. The age

group with the highest percentage of HIV cases in Indonesia in 2022 was 25-49 years old (67.42%), followed by 20-24 years old (17.45%), ≥50 years (9.25%), and 15-19 years (3.88%) (Ministry of Health of the Republic of Indonesia, 2024). Central Java Province also showed an increase in HIV cases, from 2,708 in 2021 to 3,120 in 2022. The largest proportion of HIV cases in Central Java was in the 25-29 year age group (Central Java Provincial Health Service, 2023). Sukoharjo Regency, a district in Central Java, saw an increase in the discovery of new HIV cases from 60 cases in 2021 to 82 cases in 2022, and there were 19.7% of new HIV cases occurring in



Kartasura District, which is included in the District of Sukoharjo Regency (Sukoharjo Regency Health Office, 2023). Based on data from Indonesia in 2023, the high number of HIV cases in the productive age is attributed to their vulnerability to HIV risk behaviors such as premarital sex behavior, unsafe sexual behavior, and injecting drug use. Data from Sukoharjo District in 2022 also showed that the majority of HIV transmission was due to risky and unsafe sexual behavior (0.67% of men who have sex with men, and 0.31% of female sex workers) (Ministry of Health of the Republic of Indonesia, 2024; Sukoharjo Regency Health Office, 2023).

The role of parents is the basic foundation for shaping children's character and increasing children's knowledge about health. Parents need to gain knowledge regarding reproductive health, which is a crucial factor influencing the provision of reproductive health information to their children. Reproductive health communication from parents to children is an essential aspect in helping children avoid risky behavior (Abdallah et al., 2017; Feyissa et al., 2020; Kusumaningrum, Suci, et al., 2022; Listyorini & Kusumaningrum, 2022; Ndugga et al., 2023; Purwanti et al., 2021; Scull et al., 2019; Sievwright et al., 2023). If reproductive health communication is not carried out to children, the children will become vulnerable to behavior or conditions that are at risk of reproductive health problems (Ndugga et al., 2023). Education and efforts to increase parental knowledge are essential for parents to increase their understanding regarding reproductive health topics in children (Bekele et al., 2022). Parents need reproductive health education to increase their knowledge about their children's reproductive health and begin to consider providing reproductive health information to their children (Abdallah et al., 2017; Kusumaningrum, Suci, et al., 2022). Most parents of elementary school children in grades 1-3 have not provided reproductive health education. Based on a survey in Kartasura, it was revealed that parents felt they needed information about reproductive health for elementary school children. Consequently, there is a need for media that can assist parents in communicating reproductive health to their children.

Developing reproductive health media for elementary school children is an essential step toward providing appropriate and comprehensive education regarding reproductive health at an early age. A study in Yogyakarta found that education can increase mothers' knowledge about reproductive health (Utami et al., 2023). However, there has been no development of reproductive health media specifically for parents of elementary school-age children. The existing media in Indonesia on reproductive health for adolescents at the elementary school level is in the form of a module, which is intended for teachers (Ministry of Education and Culture et al., 2017). The module contains topics for students in grades 1-6. For grades 1-3, the topics that need to be delivered by teachers are relationships with others (self-concept and ways to protect themselves from others, communication between children and parents, boundaries in friendship or association), reproductive health (clean and healthy living behavior, protecting reproductive organs), culture and human rights (how to play a role in the social environment as men and women, and sexual violence). The module also specifies the time allocation needed per topic, learning objectives, material points, learning steps, reflection and discourse for teachers and students (Ministry of Education and Culture et al., 2017).

Based on the International Guidelines for Sexuality Education, it is stated that reproductive health and sexuality education that can be delivered to elementary school children in grades 1-3 includes relationships with others, self-concept, gender, sexual violence and prevention of sexual violence, skills for health optimization (health literacy), growth and development of reproductive organs (puberty, anatomy and physiology of reproductive organs), and reproductive organ health (UNESCO et al., 2018). The module and guidelines do not contain specific explanations or examples of active sentences to convey reproductive health information to children and adolescents. Furthermore, there is a need for media that can be used by parents, which contains sentence statements that can be delivered to children in grades 1-3 of elementary school about reproductive health.

Flashcard media has increased health knowledge in children and pregnant women. However, this media has never been developed with the topic of child reproductive health among parents of elementary school-age children. Digital comics, animated videos, modules, infographics, games, pop-up books, puzzles and visuals have been used for reproductive health education for elementary school-age children. These media are typically used directly with elementary school students, rather than through their parents. The proposed media that will be developed is such that parents can also use to provide reproductive health education to their children (Billa & Solikhah, 2022; Rimawati & Nugraheni, 2018; Sepiani et al., 2023; Simaibang et al., 2021). Flashcards are health promotion media in printed form. Print media has proven effective for health education because the information it covers is broad and can potentially shape public perceptions (Kanchan & Gaidhane, 2024).

Providing comprehensive information to parents can influence adolescent behavior. The existence of communication between parents and teenage children makes them more open to their parents (Bikila et al., 2021). Reproductive health education for parents in the context of communication with children is a crucial aspect of building a foundation for a healthy and accurate understanding of reproductive health. Furthermore, parents are also the most widely accessed and primary source of reproductive health information for teenagers after friends. However, friends tend to negatively influence teenagers (Kusumaningrum, Kusumawati et al., 2022). Parents must provide reproductive health information but do not yet know what needs to be conveyed to children and adolescents (Kusumaningrum, Suci et al., 2022; Othman et al., 2020; Singh et al., 2023). Therefore, this research aims to develop health promotion media in the form of flashcards that can be used for reproductive health education by parents in elementary school children in grades 1-3.

METHODS

This type of research was a research and development. The research was carried out in Kartasura, Sukoharjo,

Central Java, Indonesia, with the research time being from February - May 2024. The research subjects were one media expert and one material expert (first step in the pretesting media), and 30 parents as media evaluators. The 30 parents consisted of: a) 10 parents involved in the second stage of the small group evaluation; b) 20 parents involved in the third stage, namely field evaluation. The research aimed to develop flashcard media to educate parents of elementary school-age children about reproductive health material from an early age. The research used the ADDIE development model, which includes analysis, design, development, implementation, and evaluation (ADDIE).

The ADDIE stages include the following:

1. Analysis Stages

This stage analyzed the potential and problems in society, especially among parents of elementary school-age children and their children. It was hoped that educational efforts for parents could increase their knowledge to provide reproductive health information to children. At this stage, needs of parents of elementary school children in grades 1-3, teachers and health promotor in Kartasura was carried out using interviews. The output at this stage was to describe their needs.

2. Product Design Stage

The design stage was carried out to address the problems of parents and children. The activity carried out at this stage was compiling media material. The material to be developed was based on parents, teachers, and health promoters needs and topics on elementary school-level health education modules issued by the Ministry of Education and Culture of the Republic of Indonesia. Based on this material, a media design was then developed. The output at this stage was the formulation of learning objectives and the material to be studied.

3. Product Development

Product development was carried out by packaging all reproductive health topics on one reproductive health flashcard. After the media was finished, the next step was media testing. In media trials, media experts validated the finished media to assess the design content, feedback, color, and use of language

suitable for target audience. Material experts also assessed whether the material in the media was in accordance with the target, and whether the material presented was easy to understand. The output was a draft flashcard. In this step, media pretesting was also carried out with 10 parents. This stage is commonly referred to as small group evaluation. Media that received input from 10 parents, then proceeded with media revision according to the parents' input. After the media was revised, it continued with a field evaluation involving 20 parents. If the media received input from 20 parents, researchers revised the media again before using it for the implementation stage.

4. Implementation

Implementation was carried out by testing the media with 30 parents of elementary school-age children in grades 1-3 in Kartasura, and implementation was carried out using a one group pre and post-test design. The parents were selected using simple random sampling technique. At this stage, parents were also given a knowledge questionnaire that had been tested for validity and reliability. The questionnaire was reliable with a Cronbach's alpha value of 0.7.

5. Evaluation

There were two types of evaluation: formative for revising or finalizing the media and summative for assessing the suitability of the media.

Data analysis used both qualitative and quantitative method. Qualitative data were taken based on input from material experts and media experts as material for improving flashcard media. Quantitative data used an average Likert scale ranging from 1-5 with a scale from strongly disagree to strongly agree for the media assessment and measured media effectiveness with the N-gain standard by calculating how influential the media was as a learning method.

Changes in knowledge were measured by question scores obtained before and after being given the flashcard media. The correct score was 1, and the incorrect score was 0, then totaled and compared between the pre and post-test scores so that the average value of media differences in respondents' knowledge could be measured. This research met the ethical requirements of the Health Research Ethics Commission of the Faculty

of Health Sciences, Universitas Muhammadiyah Surakarta, Number 262/KEPK-FIK/III/2024.

RESULTS AND DISCUSSION

Development of reproductive health education media with flashcards followed the ADDIE method. At the analysis stage, researchers investigated parents' problems and needs regarding the media they wanted to use for providing reproductive health education to children. Researchers conducted interviews with parents of elementary school children, who wanted media that could be used for interactive communication at any time and taken anywhere. Parents also requested material on personal hygiene of reproductive organs and puberty to be included in the flashcard content. Additionally, parents expected examples of how to communicate about reproductive health to children, accompanied by pictures. Researchers also analyzed the needs of elementary school teachers and health promotor regarding the material that needs to be included in the media. Based on the opinion of elementary school teachers and health promotor, additional material is needed regarding social boundaries between boys and girls.

The second stage involved designing the product. The flashcards developed measured 12.5x18 cm, allowing parents to hold them in one hand. The flashcards covered topics including: introduction to reproductive organs, body organs that cannot be seen or touched by other people, boundaries in relationships, differences between boys and girls, how to care for reproductive organs, puberty, values related to reproductive health in the family, how to prevent sexual harassment, and the role of information and communication technology in seeking information. Media development was focused on the way parents communicate with their children. Each topic included information regarding the scope of material and message sentences that could be conveyed to children when explaining that topic.

In the third stage, namely product development, media test results were obtained from experts, as shown in Table 1.

Table 1. Data from the feasibility test of media experts and material experts

Question	Validator		Mean	Information
	1	2		
Attractive cover design	4	5	4.5	Very worthy
Background with the suitable material	4	5	4.5	Very worthy
The image illustrations are presented clearly and appropriately	5	5	5	Very worthy
Selection of image illustrations according to the material	5	4	4.5	Very worthy
The image size is correct	5	4	4.5	Very worthy
The characters fit the theme	4	5	4.5	Very worthy
The color proportions are appropriate and attractive	5	4	4.5	Very worthy
The layout of text and images is balanced	3	4	3.5	Worthy
Flashcard media is easy and safe for targets	5	5	5	Very worthy
Flashcards according to the target's level of knowledge	5	4	4.5	Very worthy
Mean			4.5	Very worthy

The overall material and media expert validation test results reached an average of 4.5, with a feasible category. Based on media and material experts, some things need to be revised in the media, namely revising material in the form of puberty for both men and women as well as daily reproductive organs hygiene, changing the font size to be bigger so that it is easy to read and

providing examples of messages that can be conveyed to children as a learning guide for parents in the future. Suggestions and input are accepted and incorporated into the media to improve its quality.

After the media was revised according to input or suggestions from material and media experts, a media test was conducted on 10 parents (small group evaluation). The 10 parents were given a media test form to find out the parents' opinions and assessments of the flashcard. Based on trials with 10 parents, feedback was obtained in the form of spacing, font size, and image editing on personal hygiene material. The results of the media assessment from 10 parents are presented in Table 2. In the results of media trials to 10 parents, the average media test results were 4.51 so that the media could be said to be very feasible to proceed to the next stage. Furthermore, the flashcards were revised according to the input of 10 parents. After the flashcards were revised, the field evaluation was continued with 20 parents. The parents involved in the small group evaluation and field evaluation were different people. Based on the results of the field evaluation of 20 parents, the results are listed in Table 2 and the average media test from 20 parents was 4.43 so that the flashcards were suitable for the implementation stage. In the field evaluation, additional suggestions were made, such as adding titles to images. The two picture titles were revise: 1) In the picture whose original title was reproduction, it was changed to reproductive organs; 2) In the picture that was originally titled caring for reproduction was changed to caring for reproductive organs.

Table 2. Data on target feasibility test results with 10 parents and 20 other parents

parents		Inform ation
Question	Mean of validator	
	10 parent s	
Display Aspect		

Attractive cover design	4.9	4.5	Very worth y	and safe for targets			
Background with the suitable material	4.5	4.4	Worthy	Simple and easy to carry everywhere	4.7	4.5	Very worth y
The image illustrations are presented clearly and appropriately	4.4	4.5	Worthy	Aspects of learning materials Flashcards according to the target's level of knowledge	4.5	4.4	Worth y
Interesting picture illustrations	4.5	4.6	Very worthy	Media can motivate students in learning activities	4.5	4.7	Very worth y
Selection of image illustrations according to the material	4.4	4.5	Worthy	Mean	4.51		
The composition of the image is correct	4.3	4.5	Worthy	4.43			
The image size is correct	4.4	4.4	Worthy				
The characters fit the theme	4.7	4.5	Very worthy				
The color proportions are appropriate and attractive	4.6	4.5	Very worthy				
Choose the right typeface	4.6	4.1	Worthy				
Easy-to-read font size	4.5	4.2	Worthy				
It is an exciting combination of writing	4.4	4.2	Worthy				
The layout of text and images is balanced	4.2	4.4	Worthy				
The sentences used are simple and to the point	4.6	4.4	Very worthy				
Aspects of Media Materials Flashcard media is easy	4.6	4.4	Very worth y				

Based on the results of media trials, it was found that the percentage of media feasibility in pretesting media with media and material experts was very feasible (90%), stage 2 (small group evaluation with 10 parents) was very feasible (90.3%), and stage 3 (field evaluation with 20 parents) also was feasible (88.6%). It can be concluded that the media is very suitable for use in reproductive health education for parents of elementary school children.

Figure 1. Table of contents of the reproductive health flashcard for grades 1-3 of elementary school

The fourth stage was implementing education for parents of elementary school children using flashcards. The

Based on the results of media trials, it was found that the percentage of media feasibility in pretesting media with media and material experts was very feasible (90%), stage 2 (small group evaluation with 10 parents) was very feasible (90.3%), and stage 3 (field evaluation with 20 parents) also was feasible (88.6%). It can be concluded that the media is very suitable for use in reproductive health education for parents of elementary school children.

DAFTAR ISI	
KATA PENGANTAR.....	i
DAFTAR ISI.....	ii
Kesehatan Reproduksi Anak.....	1
Ini Tubuh Kita.....	3
Batas Privasi.....	5
Batasan Perlakuan.....	7
Menjaga Hubungan Pertemanan.....	9
Memahami Jenis Kekerasan.....	11
Perbedaan Anak Laki-laki Dan Perempuan.....	13
Organ Reproduksi.....	15
Kebersihan dan Kesehatan.....	17
Merawat Organ Reproduksi.....	19
Berganti Pakaian.....	21
Kebersihan Baju dan Badan.....	23
Kerapian.....	25
Makan Minum Yang Baik.....	27
Keluarga Dan Nilai-nilai.....	29
Peran TIK Dalam Peningkatan Kesehatan.....	31
Pubertas.....	33
Pubertas Laki-laki.....	37
Daftar Pustaka.....	39

Figure 1. Table of contents of the reproductive health flashcard for grades 1-3 of elementary school

The fourth stage was implementing education for parents of elementary school children using flashcards. The

effectiveness of the media was measured using pretest and post-test scores on the parents' knowledge of reproductive health. Knowledge was measured from 17 questions about reproductive health information tested for validity and reliability. If the parent answers correctly, the value is one and incorrectly 0. The questions were given to 30 parents in Kartasura using a sampling technique, namely simple random sampling.

Table 3. Results of Media Application

Mean of pre-test score	13.5
Mean of post-test score	15.0
Maximum Score	17

There was an increase in the average knowledge score before and after being given flashcards 1.5. The results are then calculated using the following N-Gain media effectiveness formula:

$$N - \text{Gain} = \frac{\text{Post} - \text{testScore} - \text{Pre} - \text{test Score}}{\text{Maximum Score} - \text{Pre} - \text{test Score}}$$

$$N - \text{Gain} = \frac{15 - 13.5}{17 - 13.5}$$

$$N - \text{Gain} = 0.43$$

The effectiveness of the media was determined using the N-gain score, which was found to be 0.43. This indicates that the flashcard media was effective in increasing parents' knowledge of reproductive health education for children. Previous research in Banjul on children with intellectual disabilities found that flashcard media had more influence on increasing knowledge and attitudes than audiovisual media. This is because it is easier for children to understand the meaning of the reading content from pictures that attract attention (Kelrey & Kusbaryanto, 2021). Other research also reveals that flashcards can increase the target's knowledge about health (Baska et al., 2020; Zahni et al., 2020). Implementing flashcards in this research can increase parents' knowledge about reproductive health because the flashcards contain material accompanied by pictures and examples so that no material gives a scary impression so that readers are interested in learning more. Research in Kenya shows that reproductive health communication should avoid a frightening impression in the material provided (Maina

et al., 2020). In this study, parents' knowledge that improved was about the right time to provide reproductive health information. Before the flashcards, parents still have the knowledge that children will know these topics independently when they are teenagers. However, after being given flashcards, parents understand that children should be given information about self-concept, limits of opposite sex relationships and differences in male and female reproductive organs since elementary school. This aligns with reviews that have been conducted in developing countries that the use of attractive media can increase knowledge about reproductive health (Utami et al., 2024).

Media about reproductive health education needs to be well-developed because nowadays, many children only get information about reproductive health when they are teenagers or adults (Wulandari et al., 2023). This can lead to a lack of knowledge about changes or development of body organs and reproductive health. Societal changes and technological advances, including accessible internet and social media access, may provide information that is not always accurate or appropriate for children. This is based on a literature review, which reveals that the use of social media is tough to control and that there is a mismatch between social media and the reproductive health problems being sought (Engel, 2023). Therefore, education from trusted sources of information is essential, and parents can use these flashcards to provide reproductive health education to children because well-designed media can provide appropriate and appropriate information for their age. Early education can help prevent future reproductive health problems, including knowledge about hygiene, preventing sexual harassment, and the importance of healthy, respectful relationships. Open communication with children minimizes future reproductive health problems, so good reproductive health information for children is beneficial (Collins et al. Lenhart, 2017).

LIMITATIONS

This research produces data that flashcard media is feasible to use. The results also showed that there was an increase in the average knowledge of

parents regarding reproductive health education from parents to elementary school children, especially grades 1 to 3. The increase in the average knowledge of parents before and after the study was 1.5. This study used a one group pre- and post-test design without a control group so that future studies should measure the effectiveness of the media with a design accompanied by a control group. The use of a control group can serve as a standard for comparison.

CONCLUSIONS

Media development for parents of elementary school children is very important because parents are the main source of information for children. The flashcard media developed is classified as very feasible and effective for parents to use to educate children and interact with printed media accompanied by images. This flashcard can also increase the average knowledge of parents about reproductive health by using media that is easy to use and fun or can cause interaction between parents and children. The flashcard can be used as a handbook for parents in early childhood learning so that it can prevent reproductive health problems early through good communication between children and parents. The development of reproductive health media is expected to provide accurate, relevant, and age-appropriate information to children. This is essential to support children's physical and emotional development, as well as to equip them with the necessary knowledge to make healthy and positive decisions in the future. The government, especially the Ministry of Health, needs to increase the socialization of reproductive health modules for primary school-age children to parents and teachers. Additionally, The Ministry of Health should create reproductive health media aimed at parents so that parents can utilize the media to increase their knowledge and communicate with their children.

ACKNOWLEDGMENT

The researchers would like to thank the Innovation Research Institute of Universitas Muhammadiyah Surakarta for assisting in obtaining research grants for our research. The researchers also

expresses their gratitude to PP Muhammadiyah, especially the Higher Education Research and Development Council, which provided a research grant in 2024 through the regular fundamental scheme II (SK Number: 0258.656/I.3/D/2024).

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Stunting Prevention Strategy Through Empowerment of Pregnant Women and Mothers of Toddlers in The "Siap Genting" and "Sobat Tensi" Programs in Banjar Village, Banyuwangi District

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ABSTRACT

Background: Stunting is a problem caused by a prolonged lack of nutrition from food and infectious diseases. Based on data from the Indonesian Ministry of Health in 2022, the prevalence of cases was 21.6% in Indonesia and 20.1% in Banyuwangi Regency. One of the Sustainable Development Goals (SDGs) is eliminating hunger, achieving food security and good nutrition, and increasing sustainable agriculture. The problem of stunting is closely related to the health of pregnant women. One of the many health problems that occur in pregnant women is hypertension. **Aims:** This community empowerment aims to increase the target's knowledge about preventing stunting and hypertension. **Methods:** This activity uses a socialization approach to the target group consisting of 24 pregnant women and mothers of toddlers with lecture methods, discussions and continued direct screening for 3 hours. **Results:** High engagement was indicated by participation in this socialization activity, questions and answers during the event and enthusiasm to follow the screening session. **Conclusions:** Targeted participants demonstrated increased knowledge through their ability to answer questions and plan follow-up. This initiative significantly increased participants' knowledge, awareness, and engagement to be able to take care of their babies' health and safeguard their health from the dangers of hypertension.

Keywords: Hypertension, Knowledge, Nutrition, SDGs, Stunting.

INTRODUCTION

Indonesia is currently experiencing health problems that often occur in pregnant women and toddlers. The problem that has received special attention from the government to solve is stunting. Stunting is a chronic nutritional problem caused by a lack of nutritional intake over a long period of time and food intake that is not in accordance with nutritional needs (Junaidi et al., 2020). Based on data from the World Health Organization (WHO), Indonesia is among the countries with the fifth highest number of stunted children. According to the World Health Organization (2023), the prevalence of stunting in the world until 2022 is estimated to reach 22.3%. Around 148.1 million children under the age of five are stunted. Meanwhile in Indonesia, stunting is also a very serious concern. The prevalence of stunting in all regions of

Indonesia is still quite high even though it has decreased in the previous year. In 2021, the prevalence of stunting reached 24.4% until it finally dropped to 21.6% in 2022 (Indonesian Ministry of Health, 2022). Indonesia is the second country with the highest prevalence of stunting in ASEAN, with 31.8%, followed only by Timor Leste with 48.0% (Romadhona et al., 2023). Based on the Study of the Nutritional Status of Indonesian Toddlers (SSGBI) research, the prevalence of stunting in Indonesia was 27.67% in 2019. This figure is high enough to exceed the standard set by WHO, which is 20%. Presidential Regulation No. 42 of 2013, which was replaced by Presidential Regulation No. 72 of 2021 on the Acceleration of Stunting Reduction to specifically address the problem of stunting. The framework of nutrition-specific and nutrition-sensitive interventions, this law includes efforts to handle stunting through coordination,



synergy, and synchronization between the central, regional, and village governments (Oktavianty et al., 2022). Until now, the stunting rate in Banyuwangi Regency is still quite high. The prevalence of stunting in 2022 reached 3.6% of all toddlers in Banyuwangi. Meanwhile, the stunting rate target to be achieved in Banyuwangi is 0% by 2024 according to Banyuwangi Regent.

Stunting reduction is targeted at the Sustainable Development Goals (SDGs) in 2030. The SDGs are a sustainable development program that has 17 goals. In their study, Mishra et al. (2019) found that twelve of the 17 SDG goals are either directly or indirectly related to undernutrition. This is especially true for the second goal, zero hunger. The commitment of SDGs countries, including Indonesia, in this sustainable development starts with children, by ensuring they can grow up free from poverty, with a good education, feeling happy, and safe, which is the basis for creating adults who can contribute to their country's economy. Reducing the prevalence of stunting is a top priority in terms of child health.

The second goal of the Sustainable Development Goals is to eliminate hunger, achieve food security and good nutrition, and promote sustainable agriculture. Stunting is one of the indicators that must be achieved and set as a national priority program. Indicators for solving the stunting problem target a 40% reduction in stunting rates by 2025 and the elimination of all types of malnutrition by 2030. One way to prevent stunting among children under five is to provide education to the community, especially families, to increase knowledge and awareness about stunting prevention and stunting reduction in the village (Badan Pusat Statistik, 2014).

Based on studies conducted by the WHO related to country backgrounds, stunting can be caused by various factors. There are two main factors, namely external factors and internal factors. External factors themselves can include the community or country environment. Meanwhile, internal factors include conditions in the home environment. The community environment includes culture, education, health services, economic and political conditions, agricultural conditions and food systems, as well as water, sanitation and environmental conditions, which are included in external factors that affect the problem of stunting. Meanwhile,

internal factors in the home include conditions of exclusive breastfeeding, low birth weight, infection, early breastfeeding initiation, complementary foods and early marriage (Windasari et al., 2020).

The Supplementary Feeding Program (PMT) is one of the initiatives designed and run by the Ministry of Health to help address the problem of stunting. The program is regulated by Presidential Regulation No. 42 of 2013 on the National Movement for the Acceleration of Nutrition Improvement, Improving Community Nutrition through the Supplementary Feeding Program, and Presidential Regulation No. 72 of 2021 on the Acceleration of Stunting Reduction. Focusing on the factors that cause stunting starts with health conditions during pregnancy in pregnant women. During pregnancy, there is a fetus in the mother's womb. By doing good health preparation, it is very important to determine the growth and development of the fetus, thus affecting the growth and development of the baby after birth.

Common health problems among pregnant women include hypertension. This is something that mothers should pay attention to in order to increase their awareness in taking care of themselves. Hypertension in pregnancy (HTN) is one of the leading causes of morbidity and mortality in pregnant women and their fetuses. Between 15% and 25% of mothers diagnosed with high blood pressure in early pregnancy develop a condition called severe preeclampsia (PEB). The percentage of hypertension in pregnancy is almost 30% in Indonesia (Nur Fatimah et al., 2020).

According to the 2018 Riskesdas data, the prevalence of people with high blood pressure in East Java Province was 36.3% (Kemenkes RI, 2018). Banyuwangi ranks 12th out of 38 regencies/cities in East Java with 373,528 residents with estimated hypertension aged ≥ 15 years. The number of maternal deaths due to hypertension in Banyuwangi in 2022 amounted to 20% of the total deaths of pregnant women (Dinas Kesehatan Provinsi Jawa Timur, 2020).

Hypertension problems that occur in pregnant women are caused by calcium deficiency, obesity, excessive caffeine consumption, excessive salt consumption, smoking, drinking alcohol, excessive stress

and a lack of nutritional intake (Marmi, 2014). Hypertension in pregnant women, if left unchecked, will become a problem that has a great risk for pregnant women and the fetus. The impact given when pregnant women experience hypertension is stroke, blood clots, seizures and induction during labor that occur in pregnant women. Then for the fetus, the baby is born prematurely due to LBW, MMR, IMR and risk factors for stunting.

Due to the existence of these problems, students of the Public Health Study Program in Field Work Practice (PKL) activities will intervene in promotive and preventive efforts to solve these problems through two programs, namely the "SIAP GENTING" and "SOBAT TENSI". The "SIAP GENTING" program is a socialization program on stunting prevention programs that aims to increase knowledge related to programs and media interventions carried out by puskesmas in an effort to deal with stunting problems in Licin Sub-district, including Banjar Village, as a form of monitoring the growth and development of infants and toddlers. Licin Sub-district had been chosen because it was part of the field work practice. This program is obtained from the results of the search for alternative solutions. The implementation of the program will be held at Banjar Village Hall, Licin Sub-district. The media that will be used in socialization is in the form of power points, as well as medical devices to screen for stunting in infants and toddlers. While the "SOBAT TENSI" program is a socialization program about free hypertension in women where this socialization aims to provide information to the target about hypertension, both in the form of causes, symptoms, diagnosis, treatment, and prevention. There are two activities carried out, the first is the socialization of the stunting prevention program and the second is the socialization of hypertension-free. For the second program, namely the examination or screening of infants and toddlers and the examination or screening of hypertension, namely checking blood pressure. In addition, this program is also a form of reminder to the target to care about their health conditions where the impact is not only on them but does not have an impact on health problems in a sustainable manner.

METHODS

In this community empowerment activity, the methods used in the "SIAP GENTING" and "SOBAT TENSI" programs are socialization methods with media appearances through PowerPoints and health measurements on infants, toddlers, and blood pressure checks. This activity aims to increase target knowledge in preventing stunting and free from hypertension. The intended targets are pregnant women and mothers who have infants and toddlers. The target achievement is that there are two to four participants who are able to explain the PKL group 4 program and provide feedback from this socialization activity. The tools needed for this health check are:

- a. Tensimeter
- b. *Blood Glucose Meters* or BGM
- c. Antropometri
- d. Baby weight scales

The "SIAP GENTING" and "SOBAT TENSI" programs go through four stages: licensing, preparation, implementation, and evaluation. Licensing was carried out by the Banjar Village PKL Team to several parties from the head of the RT, the person in charge of the posyandu, namely the village midwife, and the Licin District health center. This was done as the first step in the SIAP GENTING and SOBAT TENSI activities. Preparations were made by determining the targets, especially the number of participants, preparing the venue, and preparing the media used for the activities. The implementation of this program includes:

- a. Filling in the attendance list
- b. Opening
- c. Submission of material
- d. Discussion and question and answer session
- e. Health check
- f. Closing

This empowerment was conducted with this conditions:

- a. Place of Implementation: Banjar Village Hall, Licin District, Banyuwangi Regency
- b. Implementation Time: Sunday, January 7, 2024, 08.00-11.35 WIB
- c. Resource persons: Angelistya Devi Pertiwi, A.Md.Gz and dr. Ari Fiani

For the last one, namely evaluation where after the activity is complete, only group 4 PKL evaluates each individual member. Starting from the shortcomings during the activity, the obstacles that occurred, and the role of each member that needs to be improved in the future.

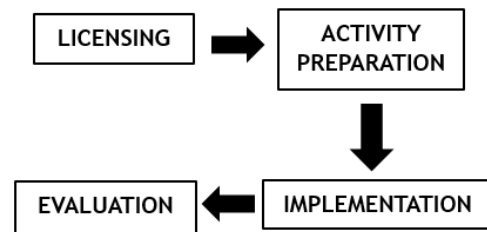


Chart 1. Activity Flowchart

RESULTS AND DISCUSSION

No	Activity	Day/Date	Place	Results/Achievements
1.	Program Licensing: a. Coordination With Puskesmas b. With Banjar Village c. Together with the sponsor of Parahita	a. September 29, 2023 b. October 2, 2023 c. December 26, 2023	a. Licin Health Center Office b. Banjar Village Hall c. Parahita Clinic	a. Coordinate with presenters from the community health center b. Coordinating permission for the venue at Banjar Village Hall c. Coordination regarding the doctor who will be the presenter
2.	Activity Preparation: a. Determination of activity targets b. Activity venue c. Media used	December 20, 2023 - January 2, 2024	a. Sobo Campus FIKKIA UNAIR b. Banjar Village Hall	a. Recap the number of participants who attended b. Preparation of the venue
3.	Implementation: a. Filling in the attendance list b. Opening c. Submission of material d. Discussion and question and answer session e. Health check f. Closing	January 7, 2024	Banjar Village Hall	a. Provision of socialization materials by the Licin Health Center for the problem of stunting in Banjar Village, namely "SIAP GENTING". b. Introduction of the Banjar Village group 4 PKL program c. Counseling related to Hypertension in women d. Stunting screening for infants and toddlers e. Hypertension screening in participants
4.	Evaluation	January 8, 2024	Group 4 PKL post Banjar Village	Evaluating each group member and preparing activity reports

The results of community empowerment activities targeting pregnant women and mothers of toddlers or toddlers in Banjar Village with partners at the Licin District Health Center and Banjar Village, Licin District, Banyuwangi Regency. The purpose of this community empowerment activity is to increase target knowledge in preventing stunting and free from hypertension. This activity is a series

of review results from the survey of group 4 of Field Work Practices (PKL) before carrying out PKL where this program was made because of the expectations of the target who wanted a different way of approaching increasing knowledge about stunting and hypertension. The advantage of these two programs compared to programs that have been held by the government is that there is an intensive

approach in increasing the target's knowledge about stunting and hypertension. The material provided by group 4 PKL itself contains programs that will be implemented during PKL in Banjar Village. Starting from door to door education to hoping to contribute to community empowerment. The following are the community empowerment activities that have been carried out.

The table above shows the results of community empowerment activities as follows:



Picture 1. Provision of “SIAP GENTING” Material by the Licin Health Center

In this socialization activity, the first activity of SIAP GENTING was socialization from the Licin Health Center which provided the first material delivery, namely regarding stunting socialization. The program with the abbreviation of Motivation Class for Pregnant Women and Mothers of Toddlers with nutritional problems is This socialization activity was held on January 7, 2024, at 08.00 WIB until completion. The location of the implementation of this activity is at Banjar Village Hall, Licin District, Banyuwangi Regency. The participants of this activity are mothers who have toddlers, toddlers and pregnant women.

This SIAP GENTING socialization discusses material about programs that will be given to target participants regarding nutrition, stunting problems that occur in infants, toddlers and consultation in the form of classes. This program is aimed specifically at pregnant women and

mothers who have infants and toddlers. The topic raised is related to nutrition issues. The material discussed in this material is the cause of nutritional problems of toddlers caused by the socio-economic level of the family, parenting patterns, sanitation, latrines in the residence and accompanying diseases. Meanwhile, the causes of nutritional problems in pregnant women include the socioeconomic level of the family and the 4Ts in pregnant women. Giving birth too young, too many (children), too close (birth distance) and too old which is a high risk factor. Furthermore, there is a flow of implementation of Kelambi Gamiz which starts from reporting, visiting participants' homes, providing motivational classes, and Linsek.



Picture 2. Provision of PKL Program Material by Group 4 PKL Banjar Village

The second activity was the delivery of material from group 4 of the Banjar Village PKL. The material provided was about a series of work programs from group 4 during field work practices in Banjar Village. Among them are door to door education about stunting and nutritious food, door to door education about posyandu visits and immunization, monitoring door to door education about stunting and nutritious food, door to door monitoring of pregnant women with cadres, door to door monitoring of posyandu visits and immunization, and the last one is GUGUH STUNTING.



Picture 3. Provision of Hypertension Material for Women by Klinik Parahita

The last material delivery activity was about hypertension in women given by doctor Ari Fiani from Klinik Parahita. The presentation of the material provided focused on what are the dangers of hypertension in women (especially in pregnant women), the causes of hypertension, how to prevent hypertension, and control blood pressure and hypertension treatment.



Picture 4. Stunting Screening for Toddlers



Picture 5. Screening for Hypertension in Mothers

Furthermore, the last activity of the SIAP GENTING and SOBAT TENSI event is a health check or screening for stunting in

targeted infants and toddlers and hypertension screening in targets. PKL students collaborate with related parties related to this program, namely the puskesmas. Screening of stunted toddlers is done to measure the height of toddlers compared to the standards for their age. Further examinations can include anthropometric examinations, laboratory tests, and other supporting examinations. For hypertension screening, blood pressure is measured. Adults who have high blood pressure will be referred to a hospital or health center for treatment. Treatment of hypertension may include the administration of medications, lifestyle changes, and regular health monitoring.

This empowerment uses the concept of health education. Health education should be able to help change the target thinking to have an interest and a desire to be ready to study, willing to learn, and a fixed reason to study. (Putri et al., 2018). According to Daryanto (2015), health education using visual media equipped with material, pictures, colors, and writing showed success in delivering information to the target (Nurchayani, 2021).

Empowerment was carried out in line with previous research showing an increase in knowledge before and after intervention (Astuti & Suharni, 2017). This explains that the higher a person's education, the higher the ability to absorb information to enhance the knowledge he has. The increase in information and knowledge will be very closely related to the outcome of decision-making on something in one's life. Public empowerment is a measure of health education that aims to create a behaviour change. So it takes an effort to improve that one through the empowerment program.

CONCLUSIONS

The socialisation of SIAP GENTING and SOBAT TENSI activities carried out by group 4 PKL Banjar Village students is expected to provide education and services to the participants, namely mothers, where, through this activity what is the purpose of this socialisation can help to increase the knowledge of the target community and efforts to reduce stunting rates, especially in Banjar Village, Licin District, Banyuwangi Regency. Efforts to prevent and reduce stunting must be

carried out optimally by increasing the knowledge of the community and support is needed from all circles from the government, community, and family.

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Crossing The Gap Between Stakeholders: Qualitative Study of Stakeholders' Perspective on Adolescent Health Program in Surabaya

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ABSTRACT

Background: Nearly 30% of Indonesian population is adolescent. Indonesia has various programs to improve the health status of adolescents from various sectors. However, the program intended for adolescent reproductive health has not been fully utilized, with one of the reasons being improper management by primary healthcare on cross-sector cooperation causing a knowledge gap among adolescents about the program. **Purpose:** This study aims to identify the perception of stakeholders from various sectors on adolescent health program in Surabaya, East Java. **Methods:** This study used a qualitative descriptive approach through interviews and FGDs to relevant stakeholders. Research subjects came from elements of government (health, education, religion, family planning, and social), NGOs, media (radio, newspaper media), teachers (representatives of 10 high schools in Surabaya), parents (Family Health Empowerment group). Data were analyzed by thematic analysis. **Results:** Every governmental office has a program for adolescents, but most are only providing information. Therefore, NGOs complete programs have not been implemented by the government such as a peer educator program for high-risk community. The media also has youth programs that are tailored to the needs or trends. Teachers and parents as having the closest control with adolescents, also play a role in providing information and accompanying adolescents. The various roles of the various stakeholder groups require synergy efforts to avoid overlapping. **Conclusion:** Adolescents in Surabaya are considered unhealthy and engage in risky behaviors by relevant stakeholders. Various programs have been implemented to support adolescent health. However, different perspectives on implementing adolescent health programs can cause conflict between stakeholders or confusion among adolescents. The diversity of stakeholders involved in adolescent health programs also needs to be encouraged.

Keywords: Adolescent Health, Good Health & Well-Being, Reproductive Health, Stakeholders, Synergy.

INTRODUCTION

As many as 1.2 billion adolescents aged 10-19 years constitute 16% of the world's population. More than half of adolescents globally lived in Asia (UNICEF, 2019a). The number of adolescents in Indonesia reaches 44.25 million individuals (BPS, 2023). Throughout 2012-2023, 46.63% of suicide cases in Indonesia were adolescents (Wardhani, 2023). Smokers aged 13-15-year-old increased from 18.3% in 2014 to 18.8% in 2019 (UNICEF, 2021). The incidence of premarital sex, teenage

pregnancy and child marriage is still high in Indonesia (Ahiyanasari et al., 2020; Devi et al., 2022; Nurmala, Ahiyanasari et al., 2020; Click or tap here to enter text. Nurmala, Astutik et al., 2020), which resulted in an increase in Age Specific Fertility Rate (ASFR) in the adolescent age group. ASFR of women aged 15-19 years increased from 30 births per 1,000 women in the 2018 to 33 births per 1,000 in the 2019. Although ASFR in East Java decreased by 25.9%, 17.5% of the cases were unwanted pregnancies (BKKBN, 2019). Therefore, it is necessary to



prevent unwanted pregnancy in adolescents, because adolescents are an asset as well as an investment for future generations (Boru, 2019a).

Adolescents are defined as individuals, aged 10-19 years old (WHO, 2019), who are in the transition period from children to adulthood and are experiencing a phase of puberty which is marked by changes in physical, biological, mental, and maturation of sexual functions (Boru, 2019b) (Nurmala, Pertiwi, Devi et al., 2020). Adolescent risky behaviour is a behaviour that can endanger the health and well-being of adolescents such as risky sexual behavior, smoking, consuming alcohol, drugs, and engaging in multiple risk behaviors (Bella et al., 2019; Margaretha, 2012) Click or tap here to enter text.. These behaviors can be influenced by personality, family, environment, education, and social and community, and vulnerable population factors (Nurmala, Pertiwi, Devi, et al., 2020). Even some forms of risky behavior can cause harm to others. Therefore, adolescent health is very important to pay attention to. Because if adolescents cannot filter information appropriately it will allow adolescents to take the wrong actions. Given the increasingly sophisticated technological advances, makes it easier for adolescents to access various available information (Bella et al., 2019).

Various adolescent health programs have been intensified by both the government, the private sector and the community as an effort to prevent and reduce adolescent risky behavior in Indonesia. Ministry of Health in Indonesia has developed the Adolescent Health Program using the Adolescent Care Health Services approach since 2003. The Youth Integrated Service (Posyandu Remaja/ Posrem) is a community forum that provides services to individuals aged 10-24 years with the main goal of providing health education to adolescents, monitoring and supporting the development of adolescent physical and mental health (Adawiah, 2023). This program is one of the government's strategies to solve problems related to adolescent reproductive health which focuses on activities in the form of outreach and counselling. The term "care for youth" here is intended so that adolescents do not think only about

reproductive health so that adolescents are open about their health problems (Ayu et al., 2020a).

So far, the Posrem program has not been fully utilized. The most dominant factor for the lack of use of Posrem as conveyed by the main informant was due to the adolescent's lack of knowledge about the program as a result of poor cross-sector management by the primary healthcare (Ayu et al., 2020b). Other factors such as adolescent attitudes, self-efficacy, the location of primary healthcare, sources of information and the role of officers' and cadres' support also played an important role (Rohana et al., 2023). However, the implementation of the Adolescent Care Health Services program is still low and uses less attractive methods (Muthmainnah et al., 2019). Conventional methods are still being used across the region, such as offline education and counseling and the number of primary healthcare centers which have Posrem is only 15 out of 62 healthcare centers in Surabaya (Ningsih, 2018), despite digitalization and today's adolescent's characteristics being close to technology (Muthmainnah, 2022).

The success of program implementation is greatly influenced by the involvement and role of all relevant stakeholders, starting from the government as policy-makers, program implementers, and the community to youth (Muthmainnah et al., 2022). In addition, the existence of government policies and the collaboration between stakeholders in providing assistance can encourage the optimal implementation of adolescent health programs (Ayu et al., 2020b). One of the major challenges in implementing these adolescent health policies according to the stakeholders was the lack of inter-sectoral coordination and fragmentation of governance (Roy et al., 2019). Synchronization and clear definitions of each stakeholders' roles must be encouraged to support the provision of adolescent reproductive health services in Indonesia (Siswantara et al., 2019a). Therefore, this study aims to identify the perception of stakeholders in the synergy efforts of adolescent reproductive health programs.

METHODS

Design and Informants

This research was a qualitative descriptive approach. Informants consist of elements of government (health, education, religion, family planning, social, youth and sports, NGOs, media (radio, newspaper), teachers (representatives of 10 high schools in Surabaya), and parents (Family Health Empowerment group). The informants were selected by purposive sampling with the criteria being informants who have adolescent health program and minimum two-year work period in the adolescent health program. A total of 20 informants were involved in the qualitative research, whose answers were deemed to be saturated and representative.

Data Collection

Data were obtained through in-depth interviews and focus group discussions with the maximum duration of one hour. The interview discussed perceptions on adolescent health status, various programs in adolescents' health, different points of view of adolescent's health efforts among stakeholders, and perceptions about the leading sector in adolescent health programs. The sources were obtained by contacting the leading sector: the Surabaya City Health Office. Then, the Surabaya Health Office instructed to conduct in-depth interviews with related stakeholders: the Department of Religion, the Population and Family Planning Control Office (DP2KB), the National Population and Family Planning Board (BKKBN) in the region, the Education Office, and the Department of Social. The researcher also conducted in-depth interviews with several news outlets (radio and newspapers) as stakeholders related to the media and NGOs engaged in the field of adolescent health. Parent representatives were also interviewed. All the informants were interviewed twice. FGD was conducted with 10 representative teachers from 10 schools.

Data Measures

Qualitative data obtained through informants, were recorded and processed to produce information which was then analyzed.

Data Analysis

Data analysis was carried out with a thematic analysis: adolescent health

status, adolescent health program, misconception of adolescent health effort, and also leading sectors in adolescent health programs, that began with making a transcript of the results of the discussion, then checking the completeness of the data and analyzing the initial substantive, methodological, and analytic findings. The data obtained were then validated using peer debriefing techniques. Member checking technique was done by discussing the results of the discussion with experts or practitioners in their field (reconfirming the results with the source person).

Ethical Approval

This study was approved by Health Ethics Research Committee from Faculty of Nursing, Universitas Airlangga, ref: 2052-KEPK (8 July 2020). All of the informants agreed to join this study and provided written informed consent; they were allowed to withdraw during this study and this study was also anonymous and voluntary.

RESULTS AND DISCUSSION

Table 1. Characteristics of informants.

Characteristics	Number
Gender	
Man	8
Woman	12
Latest Education	
Bachelor	16
Master	4
Total	20

Table 1 shows the characteristics of informants in this study were mostly female and the education level was bachelor graduate. Stakeholders involved in adolescent health program in Surabaya, as many as 20 stakeholders include government stakeholder, media, parents, NGOs, and provider at school, which are described in Table 2 below.

Table 2. Affiliation of informants as the stakeholders in adolescent health program

Affiliation of Informants	Stakeholders
1 Health sector	Government

	Affiliation of Informants	Stakeholders
2	Religious Sector	
3	Education Sector	
4	Social Sector	
5	National Radio	Media
6	Private Radio	
7	Newspaper	
8	Family Empowerment Organization (FMO)	Parent Representative
9	Family Planning "X"	NGOs
10	Private "Y"	
11	10 teachers from 10 school representatives	Provider at school

Stakeholders' Perceptions about Adolescent Health Status

The informants explained that the health conditions of adolescents in Indonesia today were unhealthy, adolescents do a lot of risky behavior and the number of adolescents who have STIs is higher than before, and the risky behavior get worse as technology develops.

"Adolescents in Surabaya are not healthy, because they have busy lifestyle makes adolescents do not maintain their sports and eating patterns (tend to eat instant). Supported by the development of technology and information so that adolescents if they want to be naughty are more easily realized." (Private Radio)

"Based on data released by the health facilities, the list of Surabaya public health centers patient visits for their reproductive health, many adolescents experience STIs. Increasingly the risky behavior of adolescents is higher." (Private NGO)

Various Programs in Adolescents Health

There are many health problems in adolescents, so many stakeholders have programs to prevent adolescents from risky behavior and improve adolescent health such as mental training and mentoring for adolescent drug rehabilitation, Pokja Remaja, Aku Bangsa Aku Tahu-ABAT (I'm

Proud I Know) program, and peer educator.

"Private NGO has a reproductive health promotion program for adolescents, Pokja Remaja to increase the number of adolescents who can access health facilities independently. There is the Aku Bangsa Aku Tahu-ABAT (I'm Proud I Know) program, a program from the Ministry of Health. With a national target of 95% of adolescents must have been exposed to HIV-AIDS information. High-risk adolescents (transsexuals, MSM, IDU) also have a national program, training peer educators who are trained by the health department. Peer educator is from a high-risk community that has the main duty of providing information, asking to check into a health facility, if you find an HIV positive task to assist and follow up." (Private NGO)

Difference in Perspective of Adolescents' Health Efforts in Stakeholders

The number of adolescent health programs in Indonesia is already large; however, the way stakeholders view some programs may result in confusion for adolescents, such as the purpose of implementing condom use, blocking pornographic sites, or the way to deliver adolescent health material.

"According to the government, condoms are for adolescents who are married, because the aim is to decrease the number children. But, our clinic does not, the condom can be used for some purposes, it can prevent pregnancy, prevent transmission of disease (STIs, HIV-AIDS). So, when Private NGO talks about condoms at school it's often not agreed...." (Private NGO)

"Government programs cannot be considered sufficient, because of some unnecessary acts, like blocking porn sites, it is important, but there is something more that needs to be done, namely socialization. Because it's useless, the site will

still be hacked even it's blocked. The advice is that the government does more counseling, makes people understand rather than struggling with technology."
(Private Radio)

Adolescents now have enough knowledge about health with the development of technology but adolescents still do not have a positive attitude to protect themselves from risky behavior.

"The method of lecturing to adolescents is not interesting, it is even said that adolescents are now smart in theory, but there is no practice at all. Not about their knowledge, but other factors keep them doing it."
(Teacher)

Perceptions about the Leading Sector in Adolescent Health Programs

Adolescent health programs can take place continuously with the involvement and effective communication of stakeholders who have contributed to support and improve adolescent health.

"Collaboration with public health center related to the promotion of reproductive health. Coordination with Babinsa and BNN regarding drug socialization." (FMO)

Some stakeholders suggest that bridging the role of stakeholders can be initiated by the Education Office.

"The person responsible for the health of Madrasah adolescents is the Ministry of Religion. However, due to limited human resources is not optimal. The leading sector is the education office." (Ministry of Religion)

However, according to the Education Office, the sector most involved with adolescent health is the Health Office, because the Education Office takes care of student education, such as the curriculum and those related to school activities (educational scope). The Health Office had an judgement to synergize adolescent health programs from various cross sectors that need letters, MoUs, and hearings.

This study aims to identify the perception of stakeholders from various sectors in adolescent health efforts. A

good stakeholder identification and analysis, supported with ideal framework is crucial in determining the role of each stakeholder as an effort to make a program successful (Kivits & Sawang, 2021). Based on the results of the research, several informants stated that the health condition of adolescents in Indonesia is currently unhealthy, adolescents engage in a lot of risky behavior ranging from an unhealthy lifestyle to juvenile delinquency, and it is getting worse along with the development of technology. This is in line with research by UNICEF which found that adolescent health problems include smoking, malnutrition burden, unhealthy diet, lack of physical activity, and factors related to mental health (UNICEF, 2021). Therefore, the stakeholders developed the NGO Youth Working Group program, Aku Bangga Aku Tahu-ABAT (I'm Proud I Know) program from the Ministry of Health, a training peer educator program who are trained by the health department, and many more.

Educational materials and methods, as well as information providers, are things that need to be considered by stakeholders in making health programs (Bella et al., 2019). The results also showed that adolescents actually have sufficient knowledge about health with technological developments so that the lecture method alone to adolescents is considered unattractive, which is supported by research that states that the peer education method is more effective than the lecture method (Nurmala I et al., 2019a). Besides, it is important to make an adolescent health program with adolescent involvement (Muthmainnah et al., 2019). This is because the ideas and actions taken by adolescents as primary stakeholders will have more impact on program planning and implementation because they understand their own needs, and understand how to motivate and influence their peers (Nadia et al., 2022). In peer educator activities, adolescents have a role as the main driver but are only limited to being users of the program (Nurmala I et al., 2019b).

The Education Office should be involved in developing adolescent health programs. Teachers, as representatives of the education office who are close to adolescents at school, have roles in adolescent health programs in enabling, mediating, and advocating (Nurmala,

Muthmainnah et al., 2019b). Another role that can be carried out by the teacher is providing information, advising and providing supervision to adolescents while at school (Bella et al., 2019). In addition, teachers are also part of the monitoring and evaluation team in the success of the peer educator program (Nurmala I, Muthmainnah et al., 2019b). As a conveyor of correct information, the teacher should have sufficient knowledge about adolescent health (Nash et al., 2021). Wrong perceptions of adolescent will plunge them into wrong attitudes and behaviors, especially risky behavior (Bella et al., 2019).

Parents have a role as the closest control to adolescents and also play a role in providing information and accompanying adolescents. It is very important to provide understanding to parents who have at least basic knowledge and skills related to adolescent health so that they can impart knowledge to their children (Sunarsih et al., 2020). Parents also act as role models making the influence of parental behavior to be very strong on their children (Nash et al., 2021). The existence of family support will have a positive impact on knowledge and utilization of adolescent reproductive health services (Sunarsih et al., 2020).

The media as a supporting stakeholder also has a very important role as a facilitator in providing correct information related to adolescent health. Previous study has found that access to information directly influences adolescent reproductive health behavior, where the source of information obtained by adolescents will greatly determine their reproductive health behavior (Sunarsih et al., 2020). The accessibility of mass media that is very easy for adolescents to reach will be an opportunity in disseminating information about adolescent reproductive health quickly and accurately (Bramastya et al., 2022). The mass media is considered a more important source of information related to adolescent health than parents, because the mass media can provide a better picture of the wants and needs of adolescents (Sunarsih et al., 2020).

The results show that the leading sector that plays a strong role in adolescent health efforts is the Education Office or the Health Office. Previous research mentioned that the Health Office has a role as a 'savior' in implementing strategic steps for adolescent health

programs, including public policy advocacy, integration of collaboration and coordination, monitoring and evaluation, recording and reporting (Hermayanty & Yulianti, 2020). The Health Office is one of the stakeholders who have high authority and interest in adolescent health programs (Fitri Mutmainah & Katon Mahendra, 2019). Collaboration between local stakeholders and non-healthcare stakeholders have a strong influence on shaping better population health (Alderwick et al., 2021). Besides, stakeholders still have overlap in conducting their adolescent health programs (Muthmainnah et al., 2020). The school and teachers can improve the curriculum to promote students' health and prevent their risky behavior (Nash et al., 2021). Previous research showed that adolescent reproductive health promotion models were designed to enhance the role of stakeholders (Sunarsih et al., 2020).

The last stakeholder is NGOs, which act as supporting stakeholders or facilitators in the development of adolescent health programs. In this case, NGOs also have a role to complement programs that have not been implemented by the government as it creates harmony with other key health players (Sanadgol et al., 2021). The programs owned by NGOs include the adolescent reproductive health promotion program or Pokja Remaja which aims to increase the number of adolescents who can access health facilities independently. Then there is a peer educator training program that involves NGOs and various existing stakeholders. The role and involvement of stakeholders is needed to support the overall success of the adolescent health program.

The advantage of this study is that it can analyze the roles of various stakeholders so that it can optimize the responsibilities of each stakeholder. Meanwhile, the limitation of this study is that the variables studied are still limited, so that further research can furthermore develop toward the alignment of stakeholder's main duties in regard to adolescents' needs.

CONCLUSIONS

Adolescents in Surabaya are considered unhealthy by relevant stakeholders because they do not move actively, eat unhealthy food, and engage in risky behavior which is supported by the

convenience of technology. Various programs have been implemented by various stakeholders in Surabaya to support adolescent health. However, stakeholders still have different perspectives on implementing adolescent health programs, which can cause conflict between stakeholders or confusion among adolescents. The stakeholders involved in adolescent health programs must also be diverse, not only from the government and private sector, but also schools.

Improving adolescent health status requires a lot of effort from various sectors. Optimizing roles through the synergy of various sectors can make adolescent health programs in Indonesia more effective. Schools, youth community groups, and parents as the main target groups need to be involved as well as to start the planning process so that the sustainability of adolescent health programs is guaranteed.

ACKNOWLEDGMENTS

We gratefully acknowledge the senior high school students in Surabaya, East Java Province, Indonesia for cooperating during survey. In addition, we would like to address special thanks to Universitas Airlangga, which has provided funding, and the Education Office that has granted the clearance for the research. No potential conflict of interest was reported by the authors. This study was conducted as a part of Health Educator Program in Surabaya, supported by the Institute for Research and Community Service, Universitas Airlangga.

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Provider Initiative HIV Testing And Counseling (PITC) Skills At Public Health Centers In Rural And Urban Areas

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ABSTRACT

Background: Improving the quality of HIV testing services in public health centers must be supported by the knowledge of HIV that health worker professionals must have. In PITC services, the ability of health professionals to build relationships is crucial to establishing trust and good communication with patients. Providing information about HIV will help patients make decisions about their health status. However, the PITC services provided by health workers are less than satisfactory. **Aims:** This study aims to analyze the factors associated with the PITC skills of health professionals at Indonesian public health centers in urban and rural areas. **Methods:** Observational design with a cross-sectional approach was used in this research. The sample in this study involved 120 health worker professionals, including nurses, doctors, and midwives, who implemented HIV testing, who were selected using simple random sampling based on the location of their health center. The data were analyzed using multigroup analysis in SmartPLS 3 **Result:** The knowledge of HIV positively influenced the capability of health professionals to assess HIV risk factors and PITC skills ($p = 0.011$). The capability of health professionals to determine HIV risk factors also positively influenced PITC skills ($p = 0.000$). In addition, the ability of health professionals to build relationships with patients positively influenced PITC skills ($p = 0.000$). **Conclusion:** Different variables affect health professionals' PITC skills compared to rural and urban health professionals. Learning a language that the patient understands is highly recommended in providing good service during a HIV test.

Keywords: HIV, PITC, Public Health Centers, Rural, Urban.

INTRODUCTION

One of Indonesia's Sustainable Development Goals (SDGs) is to ensure healthy lives and promote prosperity for all people of all ages by 2030. One of the ways to do this is to end the AIDS epidemic. HIV prevention and control efforts aim to achieve the Three Zero target by 2030 (Haeuser et al., 2022). The objective is to halt the spread of HIV by 2030. The program will be achieved by reducing the number of new HIV infections, reducing the number of deaths caused by AIDS, eliminating discrimination against people living with HIV/AIDS (PLWHA), improving the quality of life of PLWHA, and reducing the socioeconomic impact of HIV disease on individuals, families, and communities.

One of the steps in the prevention of HIV is to ascertain a patient's HIV status by taking a HIV test. Since its discovery in

Indonesia in 1987, the cumulative number of reported HIV cases from 2005 to March 2020 was 388,724 (67.4% of the 90% target of the estimated 640,443 people living with HIV). The cumulative number of AIDS cases from 2005 to March 2020 was 123,231. The five provinces with the highest incidence of HIV are the Special Capital Region of Jakarta, East Java, West Java, Papua, and Central Java (Kemkes RI, 2020).

Patients have the option of undergoing HIV testing voluntarily or as part of a voluntary counseling and testing (VCT) program. A patient may request HIV testing from health professionals as part of a clinical trial to facilitate a diagnosis of their health status. The provision of HIV testing by health workers is referred to as provider-initiated counseling and testing (PITC). PITC policies have necessitated the development of novel pathways for

healthcare delivery, which incorporate testing into routine procedures with minimal additional resource requirements. In reality, the implementation of PITC is highly dependent on the involvement of health professionals. They must follow the established standards in the service provision.

PITC is a crucial strategy in the global initiative to increase HIV testing. The international PITC guidelines propose that all patients attending health services in high-prevalence areas be offered a HIV test, regardless of their presenting complaint. PITC is an important method used to identify HIV-infected individuals who require medical care (Kunarisasi et al., 2022). PITC has significant implications for healthcare teams, requiring increased engagement with HIV issues, higher workloads, and the need to reorganize working patterns to incorporate HIV testing into routine care, however, in response to concerns about protecting individual rights in resource-limited clinical settings. Consent, confidentiality, and counseling (3C) should be implemented when doing PITC. It is a minimum package of HIV care, and informed consent can be guaranteed (Nuramalia & Lindayani, 2024).

HIV testing services are services available in public health centers. This program is a form of HIV prevention in the wider society. PITC in public health centers is implemented through a cross-program approach, where these activities are integrated with other health services in public health centers. For example, offering PITC is provided during integrated antenatal care (ANC) for pregnant women, the examination of TB patients, or general check-ups where the patient's condition indicates HIV. PITC involves all health professionals in public health centers, including doctors, nurses, and midwives.

In PITC services, health professionals must inform the patients about the importance of HIV testing. It is imperative that health professionals possess the knowledge regarding HIV and the PITC program. The ability of health professionals to build relationships is essential for establishing trust and good communication with patients. Information about HIV is provided through the PITC test policy by health professionals, thereby enabling patients to accept or refuse the PITC test (Nuramalia & Lindayani, 2024). In PITC services, health professionals must

inform about the importance of HIV testing. Knowledge of health professionals about HIV and the PITC program is something that health professionals must own. The skills of health professionals in building relationships with patients are essential to building patient trust and good communication. The provision of information about HIV is by the PITC test policy by health professionals so that patients have the right to accept or refuse the PITC test (Hasanah et al., 2022). Another study shows that 80% of health professionals, such as nurses, doctors, and midwives, have never attended training on PITC/VCT, which makes PITC service bad. This causes the PITC services provided by health workers to be less than satisfactory (Hikmah et al., 2023b). Another study indicate that health professionals who attend training on PITC have excellent communication opportunities in building relationships with patients during PITC services (Hikmah et al., 2023a).

This study aims to analyze factors related to the capability of health professionals in rural and urban areas to carry out HIV testing in public health centers (PHCs).

METHODS

Design

Observational design with a cross-sectional approach was used in this study. The sample consisted of health worker professionals, including nurses, doctors, and midwives, who implemented HIV tests. The sample was simple random sampling selected from 30 health centers out of 50 in Jember Regency, East Java, Indonesia. The sample in this research consists of 120 health worker professionals who provided PITC services in PHCs who participated in this study. The data were analyzed using multigroup analysis in SmartPLS 3.

Participants and Procedure

This study analyzed the factors associated with the PITC skills of health professionals in Indonesian public health centers in urban and rural areas. This study occurred in Jember Regency, East Java, Indonesia, which has 50 public health centers. The data were collected between July and November 2021 during the COVID-19 pandemic. As a consequence, the number of patients visiting PHCs declined.

The population was calculated based on the number of public health centers in Jember Regency, that is, 50 public health centers. The sample size was derived from estimating a proportion in the finite population formula. As a result, 30 samples from public health centers were obtained (Hasanah et al. 2022). The researchers selected public health centers randomly. Subsequently, for this study in each health center, a sample of four health workers was taken, consisting of doctors/nurses/boda who were tasked with conducting HIV tests. So that the total sample from 30 health centers was 120 health workers. 120 health Professionals, comprising 27 health professionals in urban PHCs and 93 health professionals in rural PHCs, administering HIV testing to patients in 30 public health centers in rural and urban areas. In this study, the characteristics of health centers were divided into rural and urban, this is because urban and rural communities have different characteristics.

Assessment

The data were collected through a questionnaire to determine the characteristics of the health professionals, such as age, sex, education level, length of employment, type of health worker profession, PITC/VCT training, knowledge, and attitude. PITC/ VCT Training was measured by answering yes-no questions. There are eight research variables consisting of two knowledge variables consisting of HIV knowledge (17 questions) and PITC knowledge (21 questions), one attitude variable (18 questions), one variable on the ability to build relationships with patients (5 questions), one variable on the ability to assess HIV risk factors (6 questions), and three PITC skills (15 questions). Meanwhile, knowledge was measured by choosing the correct answer. Furthermore, attitude was measured by selecting statements that reflect health professionals' perspectives in a four-point scale, namely strongly agree, agree, disagree, and strongly disagree.

The ability to build relationships with patients, the ability to assess HIV risk factors, and PITC skills were evaluated by

direct observation during the implementation of PITC. The researchers provided observers with training on the implementation of PITC. The observers evaluated the ability of health professionals to build relationships with patients, assess HIV risk factors, and develop PITC skills.

Before filling out the questionnaire, the health professionals provided the patients with an explanation of the objectives of this study and the data collection method, followed by signing an informed consent.

Ethics Approval and Consent Participant

In this research, all respondents were asked to provide written informed consent. Respondents can leave at any time without any influence on their current treatment. The study protocol was approved by Health Medical Research Ethical at Universitas Airlangga Faculty Dental Medicine with Reference Number 326/HRECC.FODM/VI/2021.

RESULTS AND DISCUSSION

Results

This study was conducted in Jember Regency, East Java, Indonesia, involving 120 health worker professionals administering PICT to patients in rural and urban public health centers. As many as 93 health professionals worked in rural public health centers, while 27 worked in urban health centers.

Table 1 presents the results of this study on the characteristics of health professionals and research variables that were differentiated based on the location of the public health centers. Most health professionals in this study, both in rural and urban areas, were between 31 and 40 years of age. In terms of sex, female health professionals dominate both rural and urban areas. Most health professionals in rural and urban regions completed a three-year diploma. In addition, most health professionals in rural and urban areas had worked for six to 15 years. Most health professionals in rural and urban areas who provided PICT were midwives. In comparison, health professionals in rural and urban public health centers were

dominated by those with no experience participating in PITC/VCT training.

The knowledge of health professionals regarding HIV was assessed through their basic knowledge of HIV and their basic knowledge of PITC. This study found that 79.6% of rural health professionals understood the basic knowledge of HIV, which is slightly more significant than urban health professionals (66.7%). However, a considerable number of health professionals in rural and urban public health centers lacked an understanding of the basic knowledge of HIV. On the other hand, 94.6% of rural health professionals had good knowledge of PITC, which is more significant than urban public health professionals (81.5%).

The proportion of health professionals with a good attitude towards implementing PITC in rural public health centers was found to be 58.1%, which is more significant than in urban public health centers (48.1%). It was also found that 55.9% of health workers in rural public health centers had a great ability to build relationships with patients during the implementation of PICT, which is more significant than that of urban health professionals (48.1 %). On the other hand, 8.6% of health professionals in rural public health centers had a poor ability to build relationships with patients during the implementation of PITC in rural areas (8.6%), which is more significant than urban health professionals (7.41 %). Furthermore, 44.1% of health professionals in rural areas were unable to assess HIV risk factors in the implementation of PITC, more significantly than urban health professionals (40.7%). The ability to build relationships with patients is assessed through observation when health workers provide PITC services by looking at the ability or skill of health workers to communicate with patients and the ability or skill to explore information about the patients' reasons for conducting PITC.

The pretest and posttest in this study are an assessment of the skills of health workers before and after carrying out a HIV test. This is the procedure for carrying out an HIV test, such as counseling skills, assessing the risk of contracting HIV, providing informed consent, providing referrals in accordance with the results of the HIV test and providing prevention messages. During the pretest, 44.1% of health professionals in rural areas had good

skills, which is more significant than urban health professionals (37%). During the posttest, 48.4% of health professionals in rural areas had good PITC skills, which is more significant than urban health professionals (33.3%). During the implementation, 46.2% of health professionals in rural areas had good PITC skills, which is more significant than urban health professionals (33.3%). PITC implementation skills are measured through observation by looking at the ability or skills of health workers to implement PITC following the established PITC implementation guidelines.

Table 1. Characteristics of health professionals and research variables based on the location of the public health centers

Research Variables	Category			
	Rural (n=93)	%	Urban (n=27)	%
Characteristics of health professionals				
1. Age				
<30	23	24.7%	6	22.2%
31-40	33	35.5%	13	48.1%
41-50	24	25.8%	4	14.8%
>51	13	14%	4	14.8%
2. Sex				
Male	22	23.7%	1	3.7%
Female	71	76.3%	26	96.3%
3. Education				
Three-year diploma degree	69	74.2%	21	77.8%
Bachelor's degree	12	12.9%	5	18.5%
Medical professional education	11	11.8%	1	3.7%
Postgraduate degree	1	1.1%	0	0%
4. Length of employment				
Up to 5 years	20	21.5%	4	14.8%
6-15 years	43	46.2%	12	44.4%
16-25 years	12	12.9%	6	22.2%
26-35 years	18	19.4%	5	18.5%
5. Profession				
Doctor	11	11.8%	1	3.7%
Nurse	38	40.9%	6	22.2%
Midwife	44	47.3%	20	75.21%
6. Training in PITC/VCT				
Never	71	76.3%	19	70.4%
Ever	22	23.7%	8	29.6%
Knowledge of health professionals about HIV				
1. HIV Knowledge				

Research Variables	Category			
	Rural (n=93)	%	Urban (n=27)	%
Poor	1	1.1%	1	3.7%
Fair	18	19.4%	8	29.6%
Good	74	79.6%	18	66.7%
2. PITC Knowledge				
Poor	0	0%	0	0%
Fair	5	5.4%	5	18.5%
Good	88	94.6%	22	81.5%
The attitude of health workers professionals toward the implementation of PITC				
1. Attitude				
Poor	0	0%	0	%
Fair	39	41.9%	14	51.9%
Good	54	58.1%	13	48.1%
Ability to build relationships with patients				
1. Building relationships				
Poor	8	8.6%	2	7.4%
Fair	33	35.5%	12	44.4%
Good	52	55.9%	13	48.1%
Ability to assess HIV risk factors.				
1. Assessing HIV risk factors				
Poor	41	44.1%	11	40.7%
Fair	45	48.4%	14	51.9%
Good	7	7.5%	2	7.4%
PITC skill				
1. Pretest skills.				
Poor	19	20.4%	8	29.6%
Fair	33	35.5%	9	33.3%
Good	41	44.1%	10	37%
2. Posttest skills				
Poor	30	32.3%	10	37%
Fair	18	19.4%	8	29.6%
Good	45	48.4%	9	33.3%
3. Implementation skills				
Poor	43	46.2%	16	59.3%
Fair	7	7.5%	2	7.4%
Good	43	46.2%	9	33.3%

Figure 1 illustrates the multigroup analysis model for the PITC skills of health professionals in rural and urban public health centers. The figure indicates that not all variables influenced each other. If the significant value of the variable is less than 0.05, there was an influence between

variables. For example, the knowledge of health professionals about HIV positively influenced their ability to assess HIV risk factors ($p = 0.011$) and PITC skills ($p = 0.036$). The ability of health professionals to assess HIV risk factors also positively influenced PITC skills ($p = 0.000$). Finally, the ability of health professionals to build relationships with patients positively influenced PITC skills ($p = 0.000$).

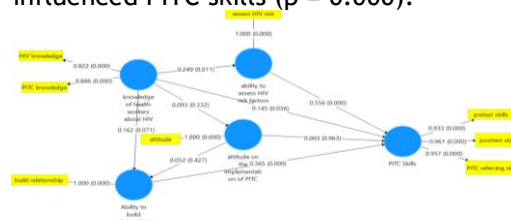


Figure 1. Model for PITC skills of health professionals in rural and urban public health centers

Figure 2 illustrates the multigroup analysis model for the PITC skills of health professionals in rural public health centers. The knowledge of health professionals about HIV positively influenced their ability to build relationships with patients ($p = 0.033$), their ability to assess HIV risk factors ($p = 0.000$), and PITC skills ($p = 0.012$). The ability of health professionals to assess HIV risk factors also positively influenced PITC skills ($p = 0.000$). Finally, the ability of health professionals to build relationships with patients positively influenced PITC skills ($p = 0.000$).

Figure 2 illustrates the multigroup analysis model for the PITC skills of health professionals in rural public health centers. The knowledge of health professionals about HIV positively influenced their ability to build relationships with patients ($p = 0.033$), their ability to assess HIV risk factors ($p = 0.000$), and PITC skills ($p = 0.012$). The ability of health professionals to assess HIV risk factors also positively influenced PITC skills ($p = 0.000$). Finally, the ability of health professionals to build relationships with patients positively influenced PITC skills ($p = 0.000$).

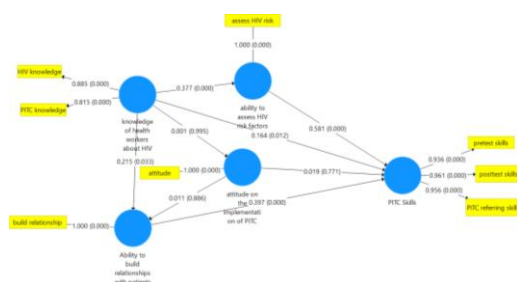


Figure 2. Multigroup analysis model for PITC skills of health professionals in rural public health centers

Figure 3 shows the multigroup analysis model for the PITC skills of health professionals in urban public health centers. The ability of health professionals to assess HIV risk factors positively influenced PITC skills ($p = 0.015$). Other variables, such as knowledge, attitude, and the ability to build relationships with patients, did not influence PITC skills. Figures 1, 2, and 3 illustrate that the attitude of health professionals toward the implementation of PITC did not influence any other variables. The attitude of health workers in the implementation of PITC assessed in this study is a reaction or response that is still closed from health workers in the implementation of PITC, so that the attitude when providing PITC services is not shown to patients. Health workers must implement PITC according to existing guidelines without looking at their attitudes.

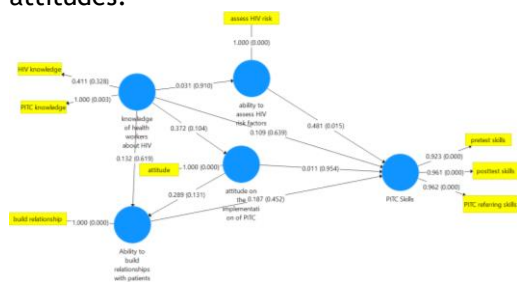


Figure 3. Multigroup analysis model for PITC skills of health professionals in urban public health centers

Discussion

HIV/AIDS has become a national health problem in Indonesia that requires comprehensive and collaborative approach to its management. However, the coverage of PICT services remains insufficient to ensure that at-risk populations are reached and their HIV status is ascertained. The role of health professionals, including doctors, nurses, and midwives, in carrying out HIV detection is becoming increasingly important because many PLWHA require

medical services and their HIV status is unknown. PITC services facilitate and accelerate diagnosis and treatment and are already widespread in countries with high HIV epidemic rates (Putri et al., 2020).

The PITC skills of health professionals were assessed based on their characteristics, which indicate no difference between health professionals in rural and urban areas. The Indonesian Government has established criteria for health professionals. Health professionals are expected to have completed at least a three-year diploma in the health sector. In addition, they must possess a registration certificate as professional health workers (Kemenkes RI, 2019).

Most health professionals in rural and urban public health centers had no experience participating in PITC/VCT training. Education and skills serve as intangible investments for health worker professionals in carrying out their roles following their job descriptions (Shofiah et al., 2019). Training can improve their skills to support the development of public health centers. Many public health centers whose health professionals have attended PITC/ VCT training are required to train other health professionals who have not participated in the training.

The multigroup analysis model for the PITC skills of health professionals using total sampling data revealed that health professionals' knowledge about HIV positively influenced their ability to assess HIV risk factors and PITC skills. A positive influence implies that better knowledge regarding HIV leads to a more extraordinary ability to evaluate risk factors and improved PITC skills. The ability of health professionals to assess HIV risk factors also positively influenced PITC skills. This is because the roles and responsibilities of health professionals are fundamental aspects of the approach to healthcare for patients with HIV/AIDS. Moreover, the ability of health professionals to build relationships with patients positively influenced PITC skills. A positive influence implies that a greater ability of health professionals to build relationships with patients leads to improved PITC skills. Several studies have identified the barriers faced by health professionals in the implementation of PITC, including negative perceptions of PITC, a lack of motivation and difficulties

in offering or conducting counseling, an increasing workload associated with PITC, a lack of specialized training for health professionals, and a shortage of testing materials. In addition, confidentiality is not guaranteed (Inghels et al., 2020).

It is imperative that health professionals possess PITC skills. Effective communication is essential for explaining the purpose and objectives of HIV testing. It motivates patients and their families and reduces the stigma of HIV disease (Kunarisasi et al., 2019). In order for patients to be empowered and able to make important decisions, they must have good knowledge about HIV testing (Yuni & Andika, 2020). On the other hand, to build good relationships with patients, health professionals must be able to communicate with patients. It is important to note that patients who seek healthcare services at medical facilities have different educational, cultural, or linguistic backgrounds. Therefore, health professionals must be able to convey health information in a language that patients easily understand.

The multigroup analysis model revealed different results in terms of the PITC skills of health professionals in rural public health centers. It was found that the knowledge of health professionals about HIV positively influenced their ability to build relationships with patients. A positive influence implies that better knowledge of health professionals leads to greater ability to build relationships with patients. Health professionals can obtain knowledge of HIV and PITC through education and training. This study found that most health professionals had never attended HIV/VCT/PITC training. As a result, this would hinder the provision of PITC services. Another study found that the lack of knowledge of health professionals impedes their ability to explain the purpose of PITC to patients. This lack of knowledge is attributed to the lack of PITC training attended by health professionals (Marwa & Anaeli, 2020). Therefore, the presence of well-trained health professionals in public health centers is essential for the adequate provision of PITC. Similar findings have been reported regarding the lack of proper knowledge and training on PITC among healthcare providers as a barrier to PITC provision (Yuni & Andika, 2020).

Health professionals in rural areas often face challenges in building relationships with patients because most patients speak their local language. Building relationships requires health professionals to be able to convey information about HIV in the local language. Using appropriate language will help patients understand and prevent misperceptions, which could potentially lead to refusal to take an HIV test (Yuni & Andika, 2020). Another study showed that communication using abusive language increases the stigma associated with HIV, which leads to refusal to take a HIV test (Wulandari et al., 2022). In this study, building relationships with patients in urban areas had no influence on other variables.

Other studies reported different results. Good knowledge does not always mean having a positive attitude, for example, reporting that health workers have good knowledge about HIV/AIDS and its transmission but refuse to treat patients with HIV/AIDS because of fear of infection (Sufiawati et al., 2021). Other studies also say that even though they have an excellent attitude, if it is not followed by the availability of facilities and infrastructure as well as appropriate training and monitoring at work; this will also affect the skills of a health worker in carrying out their work according to standards (Suryani et al., 2022); providing understanding during health services is the main thing. Language use is one of the determining factors in health services today. However, what is more important is the exact words and concepts that the community in health services can understand (Alderwick & Gottlieb, 2019).

The strength of this study is that during the measurement, questionnaires and observation check list were used which were very detailed and adjusted to the service standards that must be applied when offering HIV tests. In addition, enumerators who will collect data must undergo training on PITC so that they can assess whether the skills of health workers are appropriate or not. A limitation of this study is that data collection was conducted in July and November 2021 during the COVID-19 pandemic. Healthcare workers face challenges during PITC. Healthcare workers use personal protective

equipment, such as hazmat suits and masks, which hinder communication, such as not being loud enough, not knowing who is speaking, and maintaining social distancing policies. In contrast, when offering PITC, healthcare workers need good communication.

CONCLUSIONS

The factors associated with PITC skills of health professionals in Indonesian public health centers in urban and rural areas varied. However, in general, the PITC skills of health professionals were influenced by knowledge of HIV and PITC, ability to build relationships with patients, and ability to assess HIV risk factors. In rural areas, the knowledge of health professionals about HIV influenced their ability to build relationships with patients, assess HIV, and PITC skills. The ability of health professionals to assess HIV risk factors and build relationships with patients positively influenced their PITC skills. In urban areas, the ability of health professionals to assess HIV risk factors also positively influenced PITC skills. However, other variables, such as knowledge, attitude, and ability to build relationships with patients, did not influence PITC skills.

Learning a language that the patient understands is highly recommended in providing good service during a HIV test.

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Key Factors Influencing High Sweet Beverage Consumption During Complementary Feeding Period

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ABSTRACT

Background: Sweet beverages consumption during complementary feeding period is a major contributor to the increased risk of obesity and degenerative diseases in the future. Indonesia ranks third in Southeast Asia for sweet beverage consumption, with Central Java Province having the highest rate of fruit juice consumption during complementary feeding period (55.4%). An in-depth understanding of maternal characteristics is essential to formulate effective health promotion strategies to reduce sweet beverage consumption among children aged 6-23 months. **Objective:** This study aims to analyze the factors associated with sweet beverage consumption during complementary feeding period in Semarang Regency. **Methods:** This quantitative research uses a cross-sectional approach with 244 mothers of children aged 6-23 months in Semarang Regency. Univariate analysis was conducted using frequency distribution, while multivariate analysis was conducted using logistic regression tests ($p < 0.05$). **Results:** The percentage of high sweet beverage consumption among children aged 6-23 months in Semarang Regency was 63.93%. Lower maternal education ($p = 0.047$), increasing family income ($p = 0.000$), older child age ($p = 0.002$), higher support from health cadres ($p = 0.030$), and greater household food availability ($p = 0.000$) were associated with a higher odds of sweet beverage consumption during complementary feeding. Conversely, healthy children ($p = 0.000$) and greater access to information through social media ($p = 0.009$) were associated with a lower likelihood of sweet beverage consumption during this period. **Conclusion:** Factors influencing sweet beverage consumption during complementary feeding include maternal education level, child health status, family income, child age, support from health cadres, access to information through social media, and household food availability.

Keywords: Complementary Feeding, Health Status, Information Access, Social Media, Sweet Beverages

INTRODUCTION

Complementary feeding period for children aged 6-23 months represents a critical window of opportunity for influencing long-term health outcomes. The adoption of optimal complementary feeding practices during this period has been linked to enhanced child development, growth, and long-term survival. Adherence to the recommended feeding practices has been associated with a reduction in essential micronutrients deficiencies, a diminished risk of disease, and an increased likelihood of maintaining a healthy weight in later life (Bafila, Bisla and Gupta, 2023).

In light of the paramount importance of complementary feeding practices, the World Health Organization (WHO) has established a set of

fundamental global principles for complementary feeding in children aged 6-23 months. Among these principles, the avoidance of sweet beverages, including soda, fruit juice, packaged drinks, chocolate milk, syrup, and other beverages with added sugars or honey, is particularly significant. These beverages offer minimal nutritional value beyond energy and may result in the displacement of more nutrient-dense foods from the diet (UNICEF and WHO, 2021).

A higher intake of sweet beverages and an early introduction to these drinks are associated with an increased risk of obesity in children across all age groups (UNICEF and WHO, 2021). Excessive sugar consumption in early life can lead to a higher prevalence of chronic inflammation, diabetes, elevated cholesterol levels, and arthritis (Geltler



and Gracner, 2022). A positive correlation has been identified between fruit juice intake and infant weight-for-length, as well as child BMI z-scores. Furthermore, the consumption of free sugars, including those from fruit juice and sugar-sweetened beverages, has been linked to an increased risk of dental caries (Herrick et al., 2020).

The high consumption of sweet beverages in Indonesia is the third highest in Southeast Asia (World Bank, 2024). A substantial body of research indicates that 62% of children, 72% of adolescents, and 61% of adults consume sugar-sweetened beverages at least once a week. Furthermore, data from another study using a food frequency questionnaire reveal that 40.0% of children consumed sweetened beverages the day before the survey (Fanda et al., 2020).

The high consumption of sweet beverages among young children in Indonesia is a matter of significant concern. The results of the Indonesian Health Survey indicate that the provision of sweet beverages, including formula milk, fruit juice, and fruit nectar, during the complementary feeding period is relatively high. The proportion of formula milk provided in Indonesia is 38%, while fruit juice and fruit nectar are provided at rates of 45.3% and 22%, respectively. The province of Central Java exhibits the highest proportion of fruit juice provision, at 55.4%, with fruit nectar provision also exceeding the national average, at 27.1% (UNICEF & Ministry of Health Indonesia, 2023). This issue is not exclusive to a single region; rather, it is prevalent in various cities and regencies. A study conducted in a major city revealed that 40% of children under three years old consumed sweet beverages on the day prior to the interview. The most commonly consumed types of sweet beverages were sweetened milk and sweetened tea (Green et al., 2019).

The high consumption of sugary drinks is strongly associated with the rising prevalence of overweight among young children in Indonesia, which has increased from 3.5% in 2022 to 4.2% in 2023 (UNICEF & Ministry of Health Indonesia, 2023). Central Java Province, known as the region with the highest consumption of sugar-sweetened beverages, has also seen an increase in the prevalence of overweight among young children, from 3.5% in 2021 to 4.2% in 2023. Notably, Semarang

Regency in Central Java has a higher prevalence of overweight among young children compared to both the provincial and national averages, reaching 5.2% in 2023 (UNICEF & Ministry of Health Indonesia, 2023). This occurs because most parents in Semarang Regency introduce sugary drinks to children under the age of two, including sweetened tea, sweetened milk, and fruit juices with added sugar. Therefore, it is necessary to conduct research on the factors influencing sweet beverage consumption in children under two years old in Semarang Regency, in order to prevent the development of overweight and obesity in later years.

This issue is of concern because the consumption of sweet beverages during the complementary feeding period can shape unhealthy food preferences that persist into adulthood (Key National Health and Nutrition Organization, 2019). Repeated exposure to sweet beverages can reinforce the natural preference for sweet tastes, thereby reinforcing the consumption of sweet beverages. If this practice persists throughout adolescence and into adulthood, it may elevate the likelihood of developing overweight or obesity, as well as increasing the risk of developing chronic diseases (UNICEF and WHO, 2021).

It is unfortunate that the issue of sweet beverage consumption during the complementary feeding period has not yet been subjected to rigorous scrutiny in Indonesia. Despite the establishment of a specific indicator by the WHO, namely Sweet Beverage Consumption (SwB), for this phenomenon, only a limited number of studies have examined the introduction of sweet beverages during the complementary feeding period. Consequently, this study aims to assess the prevalence of sweet beverage consumption during this period and to analyze the factors influencing it. It is anticipated that the findings of this study will contribute to the raising of government awareness regarding the prevention of early obesity and will serve as a guideline for the development of more effective health promotion strategies to reduce the consumption of sweet beverages from an early age.

METHODS

Adopting a cross-sectional study structure, the research was conducted in

the workplaces of Bergas, Pringapus, and Lerep Community Health Centers in Semarang Regency, Central Java Province, between March and July 2024. The study sample consisted of 244 mothers with children aged 6-23 months who met the inclusion criteria of residing with their child at the study location, directly caring for the child for more than six hours a day without delegation to others, and having accurate knowledge about the foods provided during the food recall period, as well as being able to read and write. Mothers with children suffering from chronic diseases or congenital abnormalities, mothers with severe illnesses that significantly impair their ability to engage in daily activities, mothers who are not involved in child feeding practices, and mothers unable to communicate effectively were excluded from the study.

The independent variables in this study included residence, mother's education level, employment status, mother's age, mother's income, family income, number of children, child's age, child's health status, breastfeeding status, number of Integrated Health Post (Pos Pelayanan Terpadu/Posyandu) visits in the last six months, husband's support, family support, health cadre support, access to feeding practice information through social media, access to information via maternal and child health book (Buku KIA), access to information from healthcare professionals, personal autonomy, household food availability, mother's knowledge level, mother's capability and attitude toward child feeding practices, and availability of time for preparing and providing complementary foods.

The dependent variable was the practice of sweet beverage consumption in complementary feeding for children aged 6-23 months. This was measured based on the Sweet Beverage Consumption (SwB) indicators from the World Health Organization (WHO, 2021). The categorization of feeding practices was based on the inclusion of sweet beverages in the complementary diet. Practices were classified as "low sweet beverage consumption" if sweet beverages were included for less than two consecutive days. Conversely, practices were categorized as "high sweet beverage consumption" if sweet beverages were included for at least two consecutive days.

The data collection for the independent variables was conducted through interviews using a validated and reliable questionnaire, while the dependent variable was obtained from 3 x 24-hour food recall results. The data were analyzed using SPSS version 25. Univariate analyses were conducted using frequency distributions, while multivariate analysis employed backward-LR logistic regression. This study was conducted in accordance with the ethical standards of the Health Research Ethics Committee of the Faculty of Public Health, Diponegoro University, which approved the study under the approval number 219/EA/KEPK-FKM/2024.

RESULTS AND DISCUSSION

The study results indicate that 63.93% of respondents provided sweet beverages in complementary feeding for more than 2 x 24 hours during the food recall period (high sweet beverage consumption). The provision of sweet beverages mainly consists of sweetened tea, fruit juice with added sugar, sweetened milk, and various packaged drinks with sweet flavors.

This suggests that the provision of sweet beverages during the complementary feeding period in Semarang Regency is perceived as a normative and prevalent practice. A variety of sweet beverages are readily available and affordable to the community (Wiradiyanti, 2023). It is a common misconception that fruit juice with added sweeteners is a healthy and beneficial option for children. In fact, research suggests that it is preferable to provide fruit in its original form and with its natural flavor (Tiwari, Gaikwad and Aneja, 2021).

Furthermore, many individuals are unaware of the potential negative consequences of introducing sweet beverages at an early age. In this study, a question was posed to assess respondents' knowledge regarding the introduction of sugar and sugary beverages during the complementary feeding period. Only 31.15% of respondents correctly answered that children should not be given sugary beverages in any form during this period. In contrast, 68.85% of respondents provided incorrect answers, mistakenly believing that sugary beverages could be introduced during the complementary feeding period.

The study respondents were predominantly mothers residing in Bergas District. The findings indicate that the level of education and access to employment for women in Semarang Regency is quite high. This is reflected in the high educational attainment of respondents, with the majority achieving secondary education (74.59%). This high level of education suggests that women in this area have good access to educational opportunities, which can positively impact various aspects of their lives.

The employment rate among respondents was 44.26%, indicating that the rate of female labor force participation in Semarang Regency is relatively high. This indicates that a considerable number of families in this region derive benefit from the augmented economic

contribution of employed mothers, which has the potential to enhance the quality of life and access to essential resources. However, this rate is lower than the female labor force participation rate of 66.37% reported by the Central Statistics Agency of Semarang Regency (Central Bureau of Statistics of Semarang Regency, 2024). This discrepancy may be attributed to the difficulties associated with reconciling familial and occupational responsibilities. Mothers with young children who opt to engage in paid employment must demonstrate a combination of physical and mental preparedness, as well as the requisite skills (Fajriyati, Lestari and Hertinjung, 2023).

Table 1. Frequency distribution of background characteristics

No	Background Characteristics	Frequency	%
1	Sweet Beverage Consumption (SwB)	244	100%
	Low	55	36.07%
	High	156	63.93%
2	Residence	244	100.00%
	Bergas	97	39.75%
	Pringapus	87	35.66%
	West Ungaran	60	24.59%
3	Education Level	244	100.00%
	Primary	13	5.33%
	Secondary	182	74.59%
	Higher	49	20.08%
4	Employment Status	244	100.00%
	Unemployed	136	55.74%
	Employed	108	44.26%
5	Child health status	244	100.00%
	Unhealthy	23	9.43%
	Healthy	221	90.57%
6	Breastfeeding status	244	100.00%
	Non-breastfed	87	35.66%
	Breastfed	157	64.34%

The health status of children at the time of the study showed that 90.57% of children aged 6-23 months in Semarang Regency were healthy. This indicates that public health efforts, including immunization programs, access to healthcare services, and clean and healthy living behaviors, are effective. The coverage of basic immunizations in Semarang Regency, including BCG, DPT, Polio, MR, and IPV, has reached 100%. Furthermore, the regency has 26 community health centers (Puskesmas) and 68 assistant health centers distributed across all districts. The number of public health workers has increased from 67 in 2020 to 140 in 2023 (Central Bureau of Statistics of Semarang Regency, 2024).

This success demonstrates that these strategies have effectively improved child health status, ensuring protection from common illnesses and health issues at this age.

The data on breastfeeding status indicate that 64.34% of children aged 6-23 months are still being breastfed. Despite the fact that over 60% of mothers in this region endeavor to continue breastfeeding their children until they reach the age of two, this percentage is lower in comparison to the provincial breastfeeding continuation rate. The 2023 Maternal and Child Health Survey (SKI) indicates that 86.60% of children aged 6-23 months in Central Java Province are still being breastfed (UNICEF & Ministry of Health

Indonesia, 2023). The significant discrepancy between the rate observed in Semarang Regency and the provincial average suggests the presence of obstacles to maintaining breastfeeding until the child reaches at least 2 years of age.

The respondents in this study exhibited a range of ages between 19 and 51 years, with an average age of 30.66 years. The number of children among respondents exhibited a range from one to four, with the majority having two

children. The data indicate that the majority of respondents are within the childbearing age group, with the majority having two children, which aligns with government recommendations. This reflects the success of family planning programs in Semarang Regency, as evidenced by the increase in new family planning participants from 71.22% in 2022 to 93.60% of the target in 2023 (Central Bureau of Statistics of Semarang Regency, 2024).

Table 2. Frequency distribution of respondent characteristics

No	Characteristics	Unit	Mean	Median	Mode	Minimum Value	Maximum Value
1	Mother's age	y/o	30.66	30.00	29.00	19.00	51.00
2	Number of children		1.85	2.00	2.00	1.00	4.00
3	Mother's income	Rp	1112745.90	0.00	0.00	0.00	13000000.00
4	Family income	Rp	3701475.41	3000000.00	2500000.00	1000000.00	25000000.00
5	Child's age	m/o	14.10	14.00	10.00	6.00	23.00
6	Integrated Health Post visit	times	5.56	6.00	6.00	2.00	6.00
7	Husband support	%	48.63	50.00	33.33	0.00	100.00
8	Family support	%	34.82	33.33	33.33	0.00	100.00
9	Health cadre support	%	24.53	16.67	16.67	0.00	100.00
10	Information access through social media	%	41.09	40.00	30.00	0.00	80.00
11	Information access through maternal and child health book	%	93.20	100.00	100.00	60.00	100.00
12	Information access through health professional	%	34.40	35.71	0.00	0.00	100.00
13	Personal autonomy	%	74.66	83.33	91.67	50.00	100.00
14	Household food availability	%	70.32	71.43	100.00	14.29	100.00
15	Level of knowledge	%	59.05	61.54	53.85	7.69	100.00
16	Level of capability	%	56.95	60.00	60.00	0.00	100.00
17	Mother's attitude	%	78.76	77.78	73.33	53.33	100.00
18	Time availability	%	79.30	100.00	100.00	0.00	100.00

The respondents' incomes exhibited a wide range, from IDR 0.00 to IDR 13,000,000.00. The largest group was comprised of mothers with no income (IDR 0.00). A lack of personal income can affect an individual's autonomy in decision-making (Kibria et al., 2024). Without their own earnings, they are likely to be more dependent on partners or other family members with incomes, which can limit their financial decision-making freedom. This may result in a reduction in their purchasing power and ability to prioritize personal and children's needs (Shirisha and Bansal, 2022).

The family incomes of respondents exhibited a range from IDR 1,000,000.00 to

IDR 25,000,000.00, with the most prevalent family income falling within the IDR 2,500,000.00 bracket. The combined income of the husband and wife was approximately equal to the regional minimum wage (RMW) for Semarang Regency, which is IDR 2,582,287.00 (Governor of Central Java Province, 2024). In terms of purchasing power, an income close to the RMW suggests that these families may encounter difficulties in meeting basic needs such as food and housing. This situation may also restrict the quality and quantity of nutrition available to the family, which could ultimately impact the well-being and

health of their children (Yanti and Murtala, 2019).

The majority of respondents had children around 10 months old, with an average child age of 14.10 months. There are varied challenges in complementary feeding practices during those ages, including the transition from pureed to chopped foods, introducing a more varied diet, controlling sweet beverage intake, and avoiding unhealthy foods (Complementary Feeding Consortium et al., 2023).

The majority of respondents indicated that their children were approximately 10 months old, with an average age of 14.10 months. During this period, parents may encounter a range of challenges related to complementary feeding practices, including the transition from pureed to chopped foods, introducing a more varied diet, controlling sweet beverage intake, and avoiding unhealthy foods (Hafifah and Abidin, 2020).

The mean scores for husband support, family support, and health cadre support in reducing the provision of sweet beverages during complementary feeding practices were relatively low, at 48.63%, 34.82%, and 24.53%, respectively. Low levels of husband support are indicative of a lack of domestic task sharing and emotional, instrumental, and financial support, which serves to exacerbate the burden on mothers in managing complementary feeding practices (Martin et al., 2021). Low family support may be attributed to a number of factors, including distance, time constraints, emotional issues, cultural judgments, and expectations that mothers should be independent in managing the household and child-rearing (Fadilah, Muniroh and Atmaka, 2023). Furthermore, inadequate family support may originate from dysfunctional family dynamics that impede the mother's self-efficacy in performing complementary feeding practices. The lowest health cadre support indicates issues with accessibility to healthcare services and uneven training coverage, which constrains their capacity to provide effective support (Anwar et al., 2024).

The mean scores for the acquisition of information regarding complementary feeding practices through social media and healthcare professionals were relatively low, at 41.09% and 34.40%, respectively. Nevertheless, the Maternal and Child

Health Book (Buku KIA), published by the Ministry of Health, was the most frequently used source of information, with a high level of access (93.20%). The relatively low scores for social media access, despite the rapid growth of social media use, can be attributed to the fact that the majority of mothers access information unrelated to complementary feeding practices, and the sources of this information are often irrelevant or unqualified (Vinshula et al., 2022). The limited access to information from healthcare professionals can be attributed to the infrequency of interactions with them and the lack of relevance of the information provided. The majority of interactions with healthcare professionals occur during child health check-ups and immunizations, with a primary focus on the child's current illness or vaccination status, rather than on complementary feeding practices. The high level of access to complementary feeding information through the Buku KIA in Semarang Regency is consistent with the high proportion of Buku KIA ownership among children aged 0-59 months in Central Java Province, which reaches 90.2%, with a utilization rate of 84.2%.

The mean score for personal autonomy in relation to complementary feeding practices was 74.66%, which is relatively high. This high score reflects the growing empowerment of women and progress toward better social changes. It signifies an improvement in women's ability to make independent and autonomous decisions in both personal and professional domains (Kibria et al., 2024). The average score for household food availability was 70.32%, indicating that the majority of households with children aged 6-23 months in Semarang Regency have access to the recommended eight food items. In terms of food security, Semarang Regency is ranked 17th in Indonesia, with an index score of 86.31% in 2022. The food availability index, affordability index, and utilization index were 80.95%, 89.50%, and 87.93%, respectively (National Food Agency, 2022).

The mean scores for maternal knowledge and ability to prepare complementary foods were 59.05% and 56.95%, respectively, indicating that there is potential for improvement in these areas. The mean scores for maternal attitudes and the availability of time for preparing and providing complementary

foods were relatively high, at 78.76% and 79.30%, respectively. The high mean score for attitudes toward complementary feeding practices indicates that the majority of mothers in Semarang Regency adhere to recommended practices. The availability of time for preparing and providing complementary foods was also rated above 70%, indicating that the majority of mothers in Semarang Regency have sufficient time for these activities. As indicated by UNICEF and the Ministry of Health of Indonesia, one of the primary constraints on Indonesian mothers is their occupational responsibilities (UNICEF & Ministry of Health Indonesia, 2019). In this

study, over half of the respondents were not employed, and the majority of employed respondents had flexible positions, such as proprietors of small businesses, online entrepreneurs, or providers of sewing services.

The results of the multivariate analysis indicate that the factors most strongly associated with sweet beverage consumption during complementary feeding ($p < 0.05$) are maternal education level, child health status, family income, child age, cadre support, access to information via social media, and household food availability.

Table 3. Determinants of sweet beverage consumption in complementary feeding practices

No	Characteristics	B	P-Value	AOR	95%CI
1	Education level (ref: primary education)		0.047		
	Secondary education	0.107	0.911	1.113	(0.169 - 7.321)
	Higher education	1.473	0.197	4.361	(0.466 - 40.830)
2	Employment Status (ref: unemployed)				
	Employed	0.871	0.059	2.389	(0.967 - 5.901)
3	Child health status (ref: unhealthy)				
	Healthy	-5.288	0.000	0.005	(0.001 - 0.038)
4	Mother's age	-0.087	0.052	0.917	(0.840 - 1.001)
5	Number of children	0.644	0.067	1.904	(0.956 - 3.794)
6	Family income	0.000	0.000	1.000	(1.000 - 1.000)
7	Child's age	0.136	0.002	1.145	(1.052 - 1.247)
8	Health cadre support	0.039	0.030	1.040	(1.004 - 1.078)
9	Information access through social media	-0.029	0.009	0.971	(0.950 - 0.993)
10	Household food availability	0.032	0.000	1.033	(1.015 - 1.051)
11	Mother's attitude	-0.041	0.064	0.960	(0.919 - 1.002)
12	Time availability	-0.014	0.061	0.986	(0.971 - 1.001)
	Constant	7.957	0.001	2854.177	

The analysis indicates that there is a significant correlation between maternal education level and the consumption of sweet beverages during the period of complementary feeding. Maternal education level is inversely associated with the tendency to provide sweet beverages as part of the complementary diet. This finding is consistent with research conducted in Germany, which demonstrates that lower maternal education levels are associated with a higher frequency of providing non-recommended foods during the period of complementary feeding, including sweet beverages (Wang et al., 2019).

It can be reasonably assumed that mothers with higher levels of education will have greater access to information about food and nutrition, including the benefits and risks associated with consuming sweetened beverages during early childhood. Conversely, mothers with higher levels of education may be more susceptible to marketing of products that claim to be healthy or beneficial, such as sweetened beverages marketed with attractive labels, fruit juices, and formula milk. Furthermore, higher education levels often influence one's perspectives and habits (Harris et al., 2020). Educated mothers may be more inclined to follow

certain trends or guidelines, including the provision of sweetened beverages as part of complementary feeding, perceiving it as a modern or fashionable dietary choice (Rummo et al., 2020).

In contrast, children who are in good health are 0.005 times less likely to consume sweet beverages during the period of complementary feeding when they are introduced to solid foods, in comparison to children who are ill. Children in good health are more likely to adhere to a regular eating pattern and to follow nutritional guidelines, including limiting the consumption of sweet beverages. Parents of healthy children can prioritize the selection of appropriate foods and beverages for complementary feeding. Conversely, children who are ill or have poor health may experience a reduction in appetite, which can give rise to parental anxiety. In accordance with research conducted in the Philippines, which indicates that children who are ill or have poor health tend to exhibit reduced or irregular appetites, thereby making it challenging for their mothers to feed them it difficult for mothers to feed them (Goyena et al., 2019). Moreover, a study conducted in Helsinki elucidates that mothers of sick children frequently confront psychological challenges, such as anxiety regarding their child's health and distress over the ambiguity of which foods or beverages their child is able to tolerate (Erkkola and Kolho, 2022). This can result in mothers selecting foods that are more readily accepted by their child or that are more likely to be preferred by the child. In such cases, parents might choose sweet beverages to stimulate appetite and increase intake during the child's illness.

An increase in family income is associated with a higher probability of consuming sweet beverages during the complementary feeding period. As family income rises, the accessibility of a diverse range of commercial foods and beverages, including sweetened beverages, tends to increase. This can result in an increased consumption of sweet beverages by children during the complementary feeding period. This is consistent with research findings in Argentina indicating that as income increases, there is a corresponding rise in the consumption of unhealthy foods and beverages (Rovirosa et al., 2024). Sweet drinks, which are generally more accessible and appealing

due to their taste, often become a preferred choice for families with higher income, despite not providing optimal nutritional value for the child's growth and development.

As children grow older, there is a notable increase in their consumption of sweet beverages during the complementary feeding period. This finding aligns with the results of research conducted on children aged 6-23 months in the United States, which indicates that the proportion of sweet beverage consumption is markedly higher in older children compared to younger ones (Herrick et al., 2020). During the complementary feeding period, parents frequently introduce a variety of flavors, with sweet tastes being particularly preferred by children. This preference may be attributed to physiological factors, as children are naturally drawn to sweet tastes, which are associated with their early experience with breast milk, which also has a naturally sweet flavor. Furthermore, as children mature, they become increasingly exposed to social environments and food advertising, which may foster a greater inclination toward consuming sweet beverages (Sartika et al., 2022). At this stage, parents may also be more inclined to offer sweet drinks to gratify their children's desires or as part of their daily dietary routines, without fully recognizing the long-term health implications.

Greater support from health cadres is also associated with an increased probability of consuming sweet beverages. The provision of support by health cadres may not always include comprehensive nutrition education, which may result in families lacking a comprehensive understanding of the risks associated with excessive sugar consumption. Such support may prioritize meeting practical needs over the delivery of essential information regarding the limitation of sweet beverage intake (Setiawati et al., 2022). Furthermore, limitations in resources and time can restrict the capacity of health cadres to provide comprehensive nutritional guidance. As previously demonstrated in studies conducted in Bengkayang Regency and numerous other regions in Indonesia, it seems that a considerable number of health cadres still possess inadequate knowledge regarding infant and child feeding practices (Syabaniah et al., 2023). Local practices

and cultural norms may also exert an influence on dietary habits, including the consumption of sweet beverages, which health cadres may accommodate in their efforts to support families. It is therefore essential that health cadres integrate adequate nutrition education into their support to enable families to make healthier and more informed decisions.

The utilization of social media for the purpose of acquiring information regarding complementary feeding practices has been demonstrated to be associated with a reduction in the consumption of sweet beverages during the aforementioned feeding period. This is in contrast to research conducted in Jakarta based on national social and economic survey data, which indicates that access to information through social media actually increases the tendency to consume sweet beverages (Yahya, Kusuma and Ramadhan, 2023). When parents or caregivers obtain information from reliable and authoritative sources on social media platforms, they are more likely to become aware of the importance of maintaining a healthy diet for their children and the potential risks associated with excessive consumption of sweet beverages. This heightened awareness is frequently the consequence of educational content that underscores the significance of balanced nutrition and the adverse health consequences associated with the consumption of sugary beverages. Such informative and educational resources assist caregivers in making more informed decisions regarding their children's diets, including the reduction or elimination of unhealthy sweet beverages. Consequently, social media can play a pivotal role in disseminating valuable nutritional information and raising awareness about better feeding practices (Hanindita et al., 2024). This, in turn, contributes to improved dietary habits and overall health outcomes for children. By leveraging the reach and influence of social media, health professionals and organizations can effectively promote healthier eating habits and support families in making dietary choices that benefit their children's long-term well-being.

Nevertheless, an increase in household food availability has been linked to a greater probability of offering sweet beverages as part of the complementary feeding regimen. Households with good

food availability indicate an ease in providing a variety of foods and beverages, including sweet drinks (Spaniol et al., 2020). This condition of good food availability reflects a higher socioeconomic status, which often influences consumption patterns by making products such as sweet beverages seem affordable (Asghar, Fahim and Lifschitz, 2022). Furthermore, mothers may lack complete information or awareness about the health impacts of excessive sugar consumption, which may result in the overlooking of these risks when selecting foods and beverages for their children.

While maternal employment status, mother's age, number of children, mother's attitude, and availability of time for mothers are factors that warrant consideration, they did not demonstrate a statistically significant relationship with sweet beverage consumption during complementary feeding in this study ($p > 0.05$). The mother's employment status, which could influence the allocation of time and resources available for meal planning and preparation, did not demonstrate a statistically significant impact on the child's decision to consume sugary beverages. Similarly, the mother's age and number of children are factors that may influence the level of experience and skills in meal planning. The mother's age may be related to her experience and knowledge in managing child nutrition, while the number of children could affect the dynamics and challenges involved in meal planning. However, within the context of this study, neither the mother's age nor the number of children demonstrated a significant relationship with the frequency of sugary beverage consumption.

Furthermore, the mother's attitude may encompass an understanding and concern for the significance of optimal nutrition, whereas the availability of time may impact her capacity to prepare nutritionally balanced meals. While these factors could potentially influence overall dietary choices, the findings of the study suggest that they do not exert a substantial influence on the child's consumption of sugary beverages during the complementary feeding period.

CONCLUSION

The findings of this study indicate that the factors influencing the consumption of sweet beverages during the complementary feeding period include the mother's educational level, the child's health status, family income, the child's age, support from health cadres, access to information through social media, and the availability of household food supplies. The results of this research can serve as critical inputs for the formulation of health promotion policies aimed at reducing the consumption of sweet beverages among children, both at the regional and national levels.

In light of the findings of this study, it is recommended that health promotion policies prioritize the enhancement of maternal education and the dissemination of information regarding the impact of sugary beverage consumption on child health. It is recommended that intensive training programs related to complementary feeding practices (PMBA) for health cadres be implemented, along with enhanced access to accurate information through social media, to ensure effective dissemination of information. Additionally, efforts should be directed toward child health improvement programs, promoting clean and healthy living habits, and considering family income levels. This comprehensive approach is expected to reduce sugary beverage consumption and improve child health at both regional and national levels.

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Ludo Edutainment: A Media to Improving Knowledge and Attitude about HIV-AIDS Among Senior High School Students in Yogyakarta

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ABSTRACT

Background: Indonesia had the third-highest number of new HIV/AIDS cases in the Asia-Pacific. Adolescents are more vulnerable, for almost half of all new cases worldwide. HIV/AIDS cases among 15-19-year-olds have increased in Indonesia for the last three years. Media is necessary to increase teenagers' awareness of and favorable attitudes about HIV/AIDS prevention. **Objective:** This study assessed the influence of the Ludo Healthy Smart Game on adolescents' knowledge and positive attitudes toward HIV/AIDS prevention. **Methods:** The study was quasi-experimental with a non-equivalent control group design. Senior high school students in Yogyakarta were the study samples. There were 130 respondents divided into two groups. Questionnaires used for data collection have been subject to validity and reliability tests. Univariate and bivariate data analyses were used. **Results:** This study found that the Ludo Healthy Smart Game is effective in improving adolescents' knowledge about HIV/AIDS ($p=0.000$). The Ludo Healthy Smart Game does not affect positive attitudes toward HIV/AIDS prevention ($p<0.005$). However, there was an improvement in adolescents' attitudes following the treatment. **Conclusion:** The Ludo Healthy Smart Game can be used as health educational media to increase knowledge about HIV/AIDS among adolescents. The higher the adolescents' knowledge about HIV/AIDS, the better their behavior toward HIV/AIDS prevention.

Keywords: HIV/AIDS, Knowledge, Ludo, Prevention, Video

INTRODUCTION

The World Health Organization (WHO) defines that adolescence is the period of life between the ages of 10 and 19 and also between childhood and adulthood. The survey showed that adolescents accounted for 46 million of Indonesia's 270.2 million people in 2021, or 17% of the country's total population (United Nations Children's Fund, 2021).

The fast physical, mental, and emotional development of youth impacts how they feel, think, simply decide, and interface with their general surroundings. Adolescents are in danger of conceptive medical problems or health issues. They are highly susceptible to harm, disease, and death. However, it is also the most crucial time to establish healthy habits (Hurlock, 2009).

According to the World Health Organization (2023a), adolescents' certain

behaviors associated with diet, physical activity, sexual activity, and drug use can either protect or harm their own current and future health. HIV-AIDS is one of the reproductive health problems among adolescents, but which can be prevented. Indonesia had the third-highest number of new HIV-AIDS cases in the Asia-Pacific (UNAIDS, 2019). Adolescents are at the greater risk, with almost half of all new cases worldwide. HIV-AIDS cases among 15-19-year-olds have increased in Indonesia for the last three years (World Health Organization, 2023b).

In 2023, there were 19 new HIV cases in the Yogyakarta. Meanwhile, the number of AIDS cases was 45. The total number of HIV infections by March 2023 was calculated at 7,003 cases and AIDS at 2,095 cases. The largest proportion was in the 20-29 age group (LSM Victory Plus, 2023). This shows that the process of HIV transmission occurs during adolescence,

considering that the incubation period for HIV to become symptomatic is at least 8-10 years (Taisheng Li, 2022).

HIV is an infection that targets the body's immune system. The disease's most advanced stage is AIDS. HIV can spread through a contaminated person's bodily fluids, including their blood, breastmilk, semen, sperm, and vaginal secretion. This suggests that engaging in risky sexual activities can lead to HIV-AIDS (World Health Organization, 2023b).

According to the Indonesian Adolescent Reproductive Health Survey, 33% of adolescents reported having dating and having friends who had premarital sex (Infodatin Pusat Data dan Informasi Kementerian Kesehatan RI, 2016). A review led in East Java observed that there were very striking contrasts in the way of behaving of male and female young people. Risky sexual behavior was engaged in by 514 respondents, or 49.4%, according to the study. Males made up 56.6% of the total 514 respondents, while females made up 43.7% (Susanto *et al.*, 2016).

A previous study in Yogyakarta found that 18.5% of the 481 high school students stated that they had risk for premarital sex (Ayu *et al.*, 2019). Another study which was carried out in Yogyakarta showed that 51.8% or 192 students said they had accessed pornography (Meilani, Setiyawati and Barasa, 2020). Teens' lifestyles can be influenced by porn, particularly in terms of their sexual preferences and consumption of porn. The sexual attitudes and actions of adolescents are significantly influenced by pornography (Grubbs and Perry, 2019).

A study of premarital sexual behavior among adolescents revealed that males reported having premarital sex more often than females. The male respondents made sense of that the explanation was interest (57.5%) and the female respondents (38%) expressed that it simply worked out (Kemenkes RI, 2017). This demonstrates a lack of comprehension regarding HIV-AIDS prevention and reproductive health in adolescents. As many as 38.5% of adolescents in the Ponorogo, East Java, study have a low level of knowledge about reproductive health (Ernawati, 2018). Whereas in Yogyakarta, it was found only 18.5% of adolescents have a good knowledge level about reproductive health (Retno *et al.*, 2015). Therefore, improving knowledge levels

among adolescents toward reproductive health and HIV-AIDS is crucial.

Health promotion for adolescents requires specific strategies in terms of the methods and media to be deployed. Adolescents are active. They like things that are interesting and challenging, such as social media and games. Edutainment is explained as a communication strategy which includes educational and social processes wrapped in an entertainment program such as games, posters, and videos. The use of edutainment has been proven to provide better understanding to adolescents in a more interesting way (Port *et al.*, 2022). This study assessed the influence of the Ludo Healthy Smart Game on adolescents' knowledge and positive attitudes toward HIV-AIDS prevention.

Three elements of Lawrence Green's theory were predisposing, reinforcing and enabling factors. The level of knowledge and attitude was part of predisposing factor related to behavior (Porter, 2016). Improving attitude and awareness in order to avoid HIV AIDS among adolescents is a necessary strategy in health promotion.

METHODS

Quasi-experimental with a non-equivalent control group was this research design, held from April to June 2024. High school students in Yogyakarta were the participants of this study. According to Lemeshow, the mean difference hypothesis test formula was used to determine the sample size (Leny and Lemeshow, 2009). This study involved 130 respondents. The respondents were divided into two groups, the experimental and the control group, with 65 respondents for each group. Two senior high schools in Bantul and Sleman regencies were selected randomly and from the selected schools, two classes for grade XI were randomly selected. The sample consisted of students who were willing to participate as respondents and had parental consent.

The experimental group consisted of respondents who were given information about HIV-AIDS through the Ludo Healthy Smart Game and the control group was treated by video education. Ludo and video consist of information about HIV-AIDS, signs and symptoms, diagnosis, prevention, and therapy.

Ludo Healthy Smart Game and video: Ayo Cegah HIV (Lets Prevent HIV!)

had intellectual property rights from Kementerian Hukum dan Hak Asasi Manusia with the numbers EC00202441773, 27 Mei 2024 for Ludo, and EC00202436143, 7 Mei 2024 for video. The Ludo Healthy Smart Game is played by five people. It is composed of four players and one person as a leader also as a peer educator. This game set consists of a game board, dice, pawns, and a set of cards with questions and the answer keys. Figure 1 shows the Ludo Healthy Smart Game board.

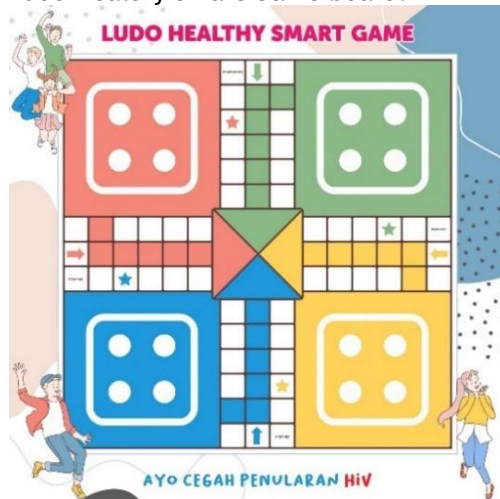


Figure 1. The Ludo Healthy Smart Game board

The guide to playing the Ludo Healthy Smart Game is as follows:

1. Each player places a pawn in a large box (prison) which is their respective area.
2. The player who gets the first turn must answer questions from the team leader related to HIV/AIDS. If the answer is correct, the player may place one pawn into the game area. If the answer is wrong, it continues to the next player to answer. The number of squares to be crossed is determined by rolling the dice.
3. Pawns will go back to prison if they meet other pawns or enter the danger zone, namely the zone of dating, smoking, pornography, and drugs.
4. The game lasts for one hour and the winner is the first to reach the final stage.

The list of questions in a question set in the Ludo Healthy Smart Game corresponds to the material prepared in the educational video given to the control group. A 10-minute educational video duration is divided into two parts. The first video discusses the meaning of HIV/AIDS, the epidemiology of HIV/AIDS, the causes

of HIV/AIDS, the vertical, horizontal, and transsexual transmission chains of HIV/AIDS, the signs and symptoms of HIV/AIDS, and how to diagnose HIV/AIDS. The second part discusses the impact of HIV/AIDS, HIV/AIDS treatment, HIV/AIDS prevention, and calls for non-stigmatization and non-discrimination of PLWHA.

The questionnaire's questions are also arranged in accordance with the content. Both the experimental and control groups saw an increase in the knowledge and attitudes of adolescents regarding HIV/AIDS following the treatment.

This study measured the change of knowledge levels also the attitudes after they had been given information about HIV/AIDS. At both the pre-test or before treatment and the post-test or after treatment respondents were required to complete the same questionnaire. The questionnaire has been tested to ensure its validity and reliability. The implementation of the research for both the Ludo Healthy Smart Game and video groups was three times with a break of one week from each meeting. The first meeting was held after the pre-test and the last meeting was held before the post-test.

Univariate and bivariate information examinations were performed. Statistical testing software was used to perform non-parametric and parametric statistical analyses on the data. The homogeneity and normality tests were used to test assumptions prior to analysis. This study has been approved and granted the ethical clearance of the number DP.04.03/e-KEPK.1/453/2024.

RESULTS AND DISCUSSION

The adolescents were aged 15-19 years. There was an increase in good knowledge about HIV/AIDS in both groups. The Ludo Healthy Smart Game is effective in improving adolescents' knowledge about HIV/AIDS. However, the Ludo Healthy Smart Game does not affect the attitudes toward HIV/AIDS prevention.

Respondents' Characteristic

Senior high school students in Yogyakarta were the study samples. Table 1 describes the respondents' characteristics regarding age and gender differences.

Table 1. Respondents' characteristics

Characteristics		Experimental Group		Control Group	
		N	%	n	%
Age	Min	16		15	
	Max	18		17	
	Mean	16.74		16.17	
Gender	Male	21	32.3	26	40
	Female	44	67.7	39	60

The average of age was 16 years old, in both groups. The age ranged from 16 to 18 years for the experimental group and 15 to 17 years for the control group. It was around the age of adolescence. Sixty percent of respondents in the control group and 67.7% of those in the experimental group were female. The World Health Organization (WHO) describe that adolescence between the ages of 10 and 19 is the changing period or transition from a child to and adult. It is a one-of-a-kind period in human development and a crucial time for establishing healthy habits (World Health Organization, 2023a). This definition refers to Minister of Health of the Republic of Indonesia No. 25 of 2014, the age range for adolescents is 10-18 years (Kementerian Kesehatan RI, 2014).

A previous study report that information about period, HIV, and STIs other than HIV expanded strongly with age. Teenagers aged 19 were 6.5 times more likely to be aware of period. Menstruation was understood more by women than by men. Compared to the reference group of under-10-year-olds, adolescents aged 19 were 1.4% more likely to be aware of HIV. Regardless of this, there were no critical distinctions in sexual orientation in information on HIV or STIs other than HIV (Finlay *et al.*, 2020).

This study showed that adolescents between the ages of 10 and 19 are the ideal audience for HIV-AIDS and

reproductive health education. Great information on conceptive well-being among youths affects conduct changes connected with HIV/Aids prevention (Obeagu *et al.*, 2023). Adolescents are expected to be mature and knowledgeable about HIV-AIDS by the age of 19.

HIV-AIDS student's knowledge in a good category based on Table 2 was low at 18.5% in the experiment group and 21.5% in the control group. However, after treatment for both groups, the good proportion was increased. In the experimental group before treatment, it was 18.5% to 61.5%. Meanwhile, in the control group before treatment, it was 21.5% to 72.3%. Z score showed that it increased 6.339 for Ludo and 5.779 for video.

A previous study in Yogyakarta found only 18.5% of a good level of knowledge about reproductive health among students in Yogyakarta (Retno *et al.*, 2015). Another study in 2022 found that 90.1% of adolescents had ever heard or known about HIV-AIDS and only 9.9% knew what HIV-AIDS was. Another fact was adolescents reported that they didn't really understand about HIV-AIDS (Justus, 2022).

Adolescents' knowledge about HIV-AIDS was obtained through a series of questions. It was found that there were respondents who answered incorrectly when assessing their knowledge about signs and symptoms of HIV-AIDS, chain of transmission of HIV-AIDS, and prevention of HIV-AIDS. The majority of respondents, 84%, did not correctly answer questions about HIV-AIDS symptoms. Approximately 47% of respondents also believed that People Living with HIV (PLHIV) who have not yet shown symptoms would not infect others.

Table 2. Knowledge level and attitudes toward HIV-AIDS prevention among adolescents

Variables			Experimental Group		Control Group	
			n=65	%	n=65	%
Knowledge level of HIV-AIDS prevention	Pre-test	Poor	10	15.4	7	10.8
		Sufficient	43	66.2	44	67.7
		Good	12	18.5	14	21.5
	Post-test	Poor	2	3.1	6	9.2
		Sufficient	23	35.4	12	18.5
		Good	40	61.5	47	72.3

Attitudes toward HIV-AIDS prevention	Pre-test	Mean	71.74	73.58
		Minimum	42	51
		Maximum	92	89
	Post-test	Mean	72.54	74.40
		Minimum	57	56
		Maximum	93	96

HIV primarily targets the immune system of the human body within 24 to 48 hours of HIV's entry into the human body to regional lymph nodes. The viral is detected in 5 to 10 days in the peripheral blood. HIV symptoms do not manifest immediately during this time. The asymptomatic phase lasts an average of eight years worldwide. However, the infection can still be spread by PLHIV (Taisheng Li, 2022). However, another study (Kawuki *et al.*, 2023) found that 82% of adolescents were aware that a healthy-looking person also could have HIV. HIV infection's clinical outcomes are largely influenced by viral factors, also host immune status, and genetic background.

In addition, not all respondents answered correctly about the horizontal and vertical chains of transmission of HIV-AIDS, with 77% of respondents answering incorrectly. Adolescents need to know about the transmission chain of HIV-AIDS in order to be able to avoid risky behaviors that increase the risk of HIV-AIDS. HIV-AIDS is also transmitted from mother to child. A 2023 literature study states that a lack of knowledge among adolescents is a factor that leads adolescents to engage in unsafe sexual relations and other risky behaviors such as premarital sex.

Premarital sex has an impact on other reproductive health issues for adolescents, including pregnancy, abortion, sexually transmitted infections (STIs), HIV-AIDS, regrets, guilt, loss of self-respect, depression, a lack of support from family, substance abuse, and even suicide (Shrestha, 2019).

Some respondents, 52%, still correctly answered the statement that one way to prevent HIV-AIDS is to stay away from those infected. HIV transmission occurs through sexual contact, blood or blood product, and mother-to-child. It cannot be transmitted by mosquito bites, food sharing, or physical contact (Arifin *et al.*, 2022).

An absence of HIV information can prompt confusions, particularly in regard to the HIV transmission chain bringing about pessimistic perspectives toward

individuals living with HIV/AIDS (PLWHA). People who had more knowledge about HIV were less likely to hold stigmatizing attitudes (Arifin *et al.*, 2022).

The post-treatment increase for both groups can also be seen in the adolescents' attitudes based on Table 2. The average score of adolescents' attitudes toward HIV-AIDS prevention in the experimental group was 71.74 to 72.54 after receiving information about HIV-AIDS through the Ludo Healthy Smart Game. In the control group, the average score of adolescents' attitudes toward HIV-AIDS prevention was 73.58 to 74.40 after receiving information about HIV-AIDS using video education. Adolescents' attitudes were measured by presenting respondents with a statement that included cognitive, affective, and conative attitude domains based on Benyamin Bloom's theory. Cognitive refers to individual beliefs, ideas, concepts, and stereotypes about HIV-AIDS. Affective is a personal feeling and related to emotions about HIV-AIDS prevention. The tendency to act toward HIV-AIDS prevention is addressed in the conative domain (Abd Nashir, Abdul Muthih, 2014).

The Correlation of the Ludo Healthy Smart Game on Knowledge Levels and Attitudes toward HIV-AIDS among Adolescents

Statistical data analysis by the Wilcoxon test was used to investigate how the Ludo Healthy Smart Game affected knowledge. In the attitude category with normal data distribution, it was tested with a paired sample t-test. Tables 3 and 4 contain the statistical data analysis.

Table 3. Effect of the Ludo Healthy Smart Game and video education about HIV-AIDS on knowledge levels about HIV-AIDS

Variables		Z-score	p-value
Experimental group	Pre-test	6.399	0.000
	Post-test		
Control group	Pre-test	5.779	0.000
	Post-test		

The Ludo Healthy Smart Game has an impact on adolescents' knowledge of HIV-AIDS with a p-value of 0.000. The Ludo Healthy Smart Game has been proven to improve the adolescents' knowledge about HIV-AIDS. Another study on the use of the Snakes and Ladders game also showed that there was an increase in knowledge about HIV-AIDS before, and after treatment with a value of $p=0.000$ (Thaha *et al.*, 2023). Health promotion media using games are considered attractive because they are efficient, modern, and more interactive. Gaming provides unique learning experiences for adolescents to improve their learning outcomes. The ludo game as a health promotion medium is packaged with a variety of pictures, questions, and answers that make it easier for adolescents to learn about HIV-AIDS and allow for discussions among friends. Games as a health promotion media are an appropriate health education solution. They can be used at any time and in the absence of a health educator.

A study by Pendergrass *et al.* found that video game-style edutainment had an influence on knowledge about HIV-AIDS and intentions to carry out HIV testing and counseling (Boomer *et al.*, 2024). According to the study, a previous study found that men who did not have comprehensive HIV-AIDS knowledge were less likely to test positive for HIV than men who did. Adolescents with good knowledge will be aware of their self-regarding to HIV transmission. HIV testing is crucial for those who are at risk of HIV-AIDS. Approximately 90% of people who know their status have access to antiretroviral therapy (Tetteh *et al.*, 2022). Good knowledge of HIV-AIDS leads to positive behavioral attitudes, which in turn reduce the risk of death and infection.

Video education in this study also had an impact on improving adolescents' knowledge about HIV-AIDS with a p-value of 0.000. This study is in line with a previous study that stated that video education significantly affects

adolescents' knowledge about HIV-AIDS and stigma toward PLWHA. The use of video is more effective than printed media (Setiyawati and Meilani, 2020). An element that assumes a basic part in the growing experience is the development of media. An audio-visual educational medium is video. Audiovisual media education can express an event and an object in their true state by simultaneously displaying images and sounds when communicating messages or information. It is considered more interesting and understandable because the use of these media can make adolescents hear, see, and pay close attention to what is displayed thereby increasing the reception of information by the brain. Recent research has shown that animated educational videos contain creative, in-depth, and comprehensive information that influences adolescents' knowledge of anemia. To increase knowledge, a 10-minute educational video was used (Aisah, Ismail and Margawati, 2022).

Table 4. Effect of the Ludo Healthy Smart Game and video education about HIV-AIDS on attitudes toward HIV-AIDS prevention

Variables		t-score	p-value
Experimental group	Pre-test	0.732	0.467
	Post-test		
Control group	Pre-test	0.754	0.454
	Post-test		

Adolescent attitudes toward HIV-AIDS prevention were unaffected by the Ludo Healthy Smart Game in the experimental group and by the videos in the control group, as shown in Table 4. With a p-value greater than 0.05, neither the Ludo Healthy Smart Game nor the videos have been shown to improve adolescents' attitudes. A similar study of the use of mobile game-based education revealed that mobile games helped adolescents learn more about HIV-AIDS. Be that as it may, there was no impact on youths' mentalities. The fact that the game treatment was carried out in a single session and that the study had a relatively small sample may suggest that attitudes did not significantly shift before or after the treatment (Tang *et al.*, 2022).

Realizing an item contains two viewpoints, to be specific the positive

perspectives and the negative viewpoints. a person's attitude is determined by these two factors. Assuming the more certain parts of an item are known, the more positive aspects of an object are known, the more positive attitudes will be made (Badru *et al.*, 2020).

This suggests that the effort to improve knowledge through the use of the Ludo Healthy Smart Game is still important in strengthening adolescents' knowledge about HIV-AIDS. It is trusted that having adequate information will assist with making inspirational perspectives toward HIV-AIDS among adolescents. The higher the level of knowledge, the more positive the attitude of a person toward HIV-AIDS prevention (Bor *et al.*, 2021).

There are two aspects to knowing an object: the positive aspects and the negative aspects. A person's attitude is determined by these two factors. According to Badru *et al.* (2020), more positive attitudes will be formed when more positive aspects of an object are known. This suggests that the Ludo Healthy Smart Game's efforts to expand adolescents' understanding of HIV-AIDS continue to be significant. It is trusted that having adequate information will assist with making uplifting outlooks towards HIV-AIDS anticipation among adolescents. A person's attitude toward HIV-AIDS prevention will be more upbeat the higher their level of knowledge (Bor *et al.*, 2021).

A previous study conducted on students at Mataram High School 2 found that the knowledge level was related to HIV-AIDS prevention behavior among adolescents. Similar results were also found in a study conducted in some high schools in Purbalingga, Denpasar, and Palopo. Knowledge becomes a stimulus. It causes a response that forms good behavior (Ulandari *et al.*, 2023). Benyamin Bloom's theory of educational psychology states that the cognitive aspect or knowledge of adolescents is the most dominant aspect that will influence their ability to think and act. Good knowledge is expected to lead to good behavior (Lafendry, 2023).

Negative stigma toward people living with HIV-AIDS (PLWHA) still exists in Indonesia. Negative stigma towards PLWHA has a negative impact on PLWHA in terms of treatment refusal and social withdrawal. Lack of knowledge about HIV-AIDS is the main cause of this negative stigma. This shows that there is also a need

for the public to have a good knowledge of HIV-AIDS. In addition to preventing new HIV-AIDS infections in the community by implementing HIV-AIDS prevention, good knowledge is needed to reduce negative stigma as a form of support for PLWHA in undergoing treatment and preventing transmission to others in order to reduce the death rate from HIV-AIDS (Fauk *et al.*, 2021).

Ludo is also an edutainment for adolescents and the peer strategy because this game consists of 3-4 people as a peer group. Previous study showed that peer education to avoid drug abuse effectively improves self-efficacy, self-esteem, and skill and also controls behavior challenges among adolescents (Nurmala *et al.*, 2024).

CONCLUSION

The Ludo Healthy Smart Game improves adolescents' understanding of HIV-AIDS. Positive attitudes toward HIV-AIDS prevention are unaffected by the Ludo Healthy Smart Game. Despite this, treatment resulted in a difference in mean and an increase in adolescents' knowledge and attitudes. The Ludo Healthy Smart Game is a health education tool that can be used to educate adolescents about HIV-AIDS. Adolescents' attitudes toward HIV-AIDS prevention improve with their knowledge of the disease. An in-depth investigation into the Ludo Healthy Smart Game's impact on positive attitudes toward HIV-AIDS prevention can be conducted using our findings as a reference for future research development and improvement.

ACKNOWLEDGMENTS

The author would like to thank the Director of Poltekkes Kemenkes Yogyakarta and Poltekkes Semarang, the Yogyakarta High School principal and everyone else who helped with the study.

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Can Weekly Home Visits by The Community Improve Iron Supplementation Intake among Pregnant Women?

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ABSTRACT

Background: Anemia is one of the significant health problems among pregnant women; one of the interventions by the government is through iron supplementation. The adherence rate among pregnant women to consume iron supplementation is still low. **Objective:** This study aims to determine the effectiveness of community empowerment on adherence to iron supplementation among pregnant women. **Methods:** This research was a mixed method with a quantitative and qualitative approach and used a quasi-experimental study. The pre- and post-tests of adherence rates were conducted using the Morisky Medication Adherence Scale (MMAS-8) questionnaire. The research sample was 261 pregnant women in eight villages in the Tongas Public Health Center (PHC) working area. A total of 50 Community Health Workers (CHWs) visited pregnant women's homes weekly to give health education and monitoring activities from October 2022 to April 2023. The statistical test used Wilcoxon and Chi-square. **Results:** There is a significant difference in adherence between before and after the weekly home visit with a p -value < 0.001 and there is no correlation between adherence rate in the post-test and the level of education of mothers with a p -value > 0.05 . The mothers know the benefit of supplementation and families support it. **Conclusion:** the CHW's weekly home visit can effectively improve the iron supplementation intake among pregnant women regardless of the level of education, and improve the knowledge of supplementation benefits and family support. It is recommended to continue the activity and the budget, and include iron adherence materials in all health activities for pregnant women.

Keywords: Community, Home Visit, Iron Supplementation, Pregnant Women.

INTRODUCTION

Indonesia has a high maternal mortality rate (MMR) with 189 per 100.000 live births based on the long-form result of the Indonesian population census in 2020 while the target of Sustainable Development Goals (SDGs) in 2030 is 70 per 100.000 live births (Central Bureau of Statistic of Indonesia., 2023). The World Health Organization (WHO) in 2023 stated that the determinants of MMR include the health problems of pregnant women that are mostly preventable and anemia is one of the causes that could higher the risk of maternal and neonatal mortality. It is estimated up to 37% of pregnant women all over the world are suffering from anemia (WHO, 2023). However, in Indonesia, it is even higher than worldwide prevalence. There were 48.9% of pregnant women with anemia (Ministry of Health of Indonesia, 2018).

In Indonesia, iron supplementation among pregnant women is one of the

government policies that is used to overcome the high prevalence of anemia. Unfortunately, basic health research showed low adherence in pregnant women as only 37.7% consume iron supplementation (Ministry of Health of Indonesia, 2018). Moreover, research in other countries also finds a low prevalence of adherence to consuming iron folic acid among pregnant women in Ethiopia, which is lower than WHO recommendations (Sendeku, Azeze and Fenta, 2020). Adherence to iron supplementation is significantly related to anemia among pregnant women (Bangun *et al.*, 2021). Additionally, iron supplementation for pregnant women as per regulation is given during the pregnancy with a minimum of 90 days and continues until the post-partum period is finished (Direktorat Jenderal Peraturan Perundang-undangan, 2021). Consequently, anemia and adherence to iron supplementation among pregnant women are still problems in Indonesia.

Previous research showed the positive result of direct observation from community health volunteers of pregnant women consuming to improve their adherence to iron supplementation (Bairwa *et al.*, 2017). It can enhance awareness as well as the mother's adherence (Wiradnyani *et al.*, 2016).

As a form of social support from CHW, the neighbors of pregnant women, it is aligned with the theory of social networks and social support which theory states that social support influences health behavior including medication adherence. At the individual level, it can improve problem-solving, information, and control capacity. At community level, it can improve community empowerment and competency (Glanz & Rimer, 2008).

Other research showed significant effectiveness in lowering anemia by monthly home visits by community health workers by control and intervention groups (Ilboudo *et al.*, 2021). Meanwhile, direct observation through four visits during 100 days of intervention showed effectiveness (Bilimale, 2010). The research used a sample with inclusion criteria including those who attend health facilities and are absent from chronic disease while using the same approach of weekly home visits by the community to measure the knowledge and attitude of mothers (Kamau *et al.*, 2019). The advantage was the effectivity can be assessed by comparing two groups, intervention and control. However, the inclusion criteria will limit some pregnant women from obtaining social support from the community because they did not participate in the program. The total population will allow for assessing all pregnant women's participation. In addition, a qualitative approach is also needed to explore the impact.

The Puskesmas (PHC) of Tongas has a different program of weekly home visits to all pregnant women by Community Health Workers (CHW). Firstly, they give CHWs training so they can give education through including the capacity to monitor, educate, and motivate the adherence to iron supplementation consumption among pregnant women. In conclusion, it is important to evaluate the program and social support through community empowerment by CHW for improving adherence to iron supplementation among pregnant women.

This study aims to analyze pregnant women's adherence to iron supplementation before and after health education and monitoring through weekly home visits by CHW in Tongas, Indonesia. The difference will indicate the effectiveness of the program in adherence to iron supplementation.

METHODS

This research was a sequential mixed method, quantitative and qualitative research. The quantitative research used a quasi-experimental study design. This research aimed to analyze the effect of health education and monitoring through weekly home visits by CHW on pregnant women's adherence to iron supplementation in Tongas, Kabupaten Probolinggo, Indonesia. The highest maternal mortality in 2021 was in the working area of Tongas PHC.

The study phases are shown in Figure 1. The first phase was identifying the total population of pregnant women in eight villages in Tongas PHC's working area then those who gave consent became the sample. The second phase was giving the training CHWs so they were skilled in giving health education and monitoring to pregnant women and their families toward iron supplementation and nutritious food. They were able to use monitoring forms and educate with posters. Meanwhile, the village midwives collected data for pre-tests of pregnant women in their village. The third phase was the implementation of the intervention. The CHWs visited the pregnant women weekly for seven months (total 28 times of home visits) and collected post-tests at the last home visit. The last phase was a discussion among representatives of 10 participants and 10 family members from one representative village (Sumberkramat).

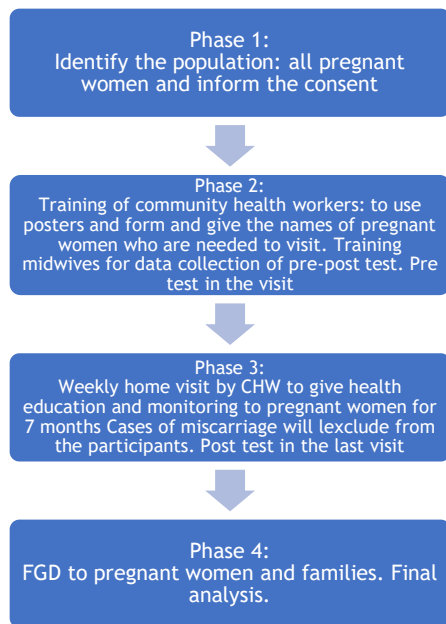


Fig.1 Study Phases

This research used a total population of 261 pregnant women from eight villages in the working area of Tongas PHC and data were collected from village midwives. All pregnant women were involved and research showed many contributing factors to adherence levels and indicated the importance of participating in all pregnant women.

A total of 50 CHWs trained and had several pregnant women to be assisted near their homes. The number of 50 CHWs was because there were 37 sub-villages in total and there was more than one CHW for sub-village with density of population and number of pregnant women. CHW gave health education and monitoring through weekly home visits for seven months from October 2022 to April 2023. The CHW brought forms and posters to educate pregnant women and their families. Along with CHW training, there was training for midwives for data collection for pre and post-test.

The variable to be tested was adherence rate which implies the level of adherence in consuming iron folic acid among pregnant women and is determined by the answers to eight questions in the MMAS-8 questionnaire. Meanwhile, in qualitative analysis, the explanation of the perceived benefit from the mother and family to the program was explored.

The questionnaire for the pre and post-test used the Morisky Medication Adherence Scale (MMAS-8) which consisted of eight questions. The questionnaire was

tested for validity and reliability using a sample of pregnant women from another area. The eight questions of MMAS-8 consist of:

1. Do you sometimes forget to take your vitamins?
2. During the past two weeks, was there a day when you did not take your vitamins?
3. Have you ever reduced or stopped taking vitamins without informing your doctor/midwife because you felt worse/uncomfortable while taking the medication?
4. When traveling or leaving home, do you sometimes forget to take your medication with you?
5. Did you take all your vitamins yesterday?
6. When feeling better, do you sometimes choose to stop taking your vitamins?
7. Some people feel uncomfortable if they have to take vitamins every day, do you ever feel that way?
8. How often do you forget to take your vitamins?

All of those questions if answered “yes” were then marked 1 point or it was unfavorable to adherence. The total points will determine the adherence rate and be categorized as high adherence if 0 questions with a “yes” answer; moderate adherence if one or two questions with a “yes” answer; and high adherence if more than two questions with a “yes” answer. This research uses categories from MMAS-8 that were collected by midwives.

Data analysis used an inferential test and tested for normality before choosing the test. The data were not normally distributed so the Wilcoxon was used to determine differences in adherence rate before and after the intervention. Data analysis used three categories and codes:

1. High adherence
2. Moderate adherence
3. Low adherence

After quantitative data were measured, the qualitative method was provided to assess the importance of the weekly home visit by CHW. This approach used focus group discussion with guidelines. There were 10 mothers and their families, so the total number of participants was 20 persons The FGD was conducted in May 2023 and data were analyzed starting from May 2023.

This research was approved for ethical clearance by the Public Health Faculty of Universitas Airlangga.

RESULTS AND DISCUSSION

After training by PHC, the phase of intervention was by giving health education and monitoring through weekly home visits by CHW. From the pre-test that was collected by midwives, the characteristics of participants were analyzed. Figure 2 shows the process of weekly home visits by CHWs for pregnant women and their families.



Fig 2. Weekly Home Visits by Community Health Workers to Pregnant Women

Quantitative Analysis

The total number of participants in this research was 261 pregnant women aged 20 to 35 years old. According to Table 1, there are about 81.61% in this category. However, there are still pregnant women with younger ages and at risk who are less than 20 years old. It is about 9.96% in this category. Meanwhile, other high-risk pregnancies are also for pregnant women in the age category above 35 (36-44 years

old) which is 8.43%. The ideal pregnancy age is between 20 and 35 years old.

Research showed that pregnant women aged more than 35 had a significantly higher risk of maternal mortality (Karlsen *et al.*, 2011). Moreover, very young pregnant women under 20 years and above 35 years old women were also at risk of having low birth weight children. Maternal age at delivery is significantly related to low birth weight in Indonesia. Thus, it is important to come up with strategies to prevent early marriage or delivering the baby at very old age (Tarigan, Simanjuntak and Nainggolan, 2023). Additionally, the prevalence of anemia among young people aged 15-24 years old is as high as 32% in Indonesia (Ministry of Health of Indonesia, 2018).

Table 1 Characteristics of participants

Characteristics	Participants	
	n	%
Mother's Age		
14-19	26	9.96
20-35	213	81.61
36-44	22	8.43
Mother's Education	156	59.77
Elementary	39	14.94
Graduate	53	20.31
Middle School	13	4.98
Graduate High School		
Graduate University		
Graduate		

Note: n = number of respondents

Source: Primary data, 2023

Table 1 shows the majority of respondents in the majority are graduates from primary school. There are about 59, 77%, in this category. However, the other 40, 22%, were middle school, high school, and university graduates while only 4.98% had university degrees.

The education status is important for pregnant women in processing health information and regarding their health conditions. Moreover, pregnant women with low levels of education were associated with higher maternal mortality so there is a need to pay attention to wider social determinants in strategies to reduce mortality (Karlsen *et al.*, 2011). Maternal mortality in Iran is distributed unequally which suggests the urgency of promoting health literacy for women with lower

education (Amini-Rarani, Mansouri and Nosratabadi, 2021). Thus, it is important to do health promotion in areas with low levels of education community.

Table 2. Pre-test and Post-test of adherence level among pregnant women

Participants	Pre-test Adherence		Post-test Adherence	
	n	%	n	%
Adherence level: Low	143	54.79	13	4.98
Moderate	114	43.68	87	33.33
High	4	1.53	161	61.69

Note: n = number of respondents

Source: Primary data, 2023

The graph shows significant differences in number of pregnant women before and after intervention. Before the intervention, there were more likely pregnant women with low and moderate levels of adherence towards iron supplementation. However, it changes after the intervention with the majority in the high and moderate category of adherence

Table 3. Correlation test for adherence on pre-test and level of education of participants

level of education * Adherence Pretest Crosstabulation					
		Adherence Pretest			Total
		low	moderate	high	
level of education	Primary School	Count 108	46	2	156
		Expected Count 85.5	68.1	2.4	156.0
Middle School	Count	16	23	0	39
		Expected Count 21.4	17.0	.6	39.0
High School	Count	18	34	1	53
		Expected Count 29.0	23.1	.8	53.0
University	Count	1	11	1	13
		Expected Count 7.1	5.7	.2	13.0
Total	Count	143	114	4	261
		Expected Count 143.0	114.0	4.0	261.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	40.025 ^a	6	<.001
Likelihood Ratio	41.413	6	<.001
Linear-by-Linear Association	34.440	1	<.001
N of Valid Cases	261		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .20.

Source: Primary data, 2023

According to the crosstab test result as shown in Table 3, there is a significant correlation between the level of education and adherence rate on the pre-test. It also shows the number of mothers with low adherence are those who graduate from primary school, 108 persons. This result supports previous

studies' findings that the level of education of mothers played important role in medication adherence among pregnant women. Research in Ethiopia showed that the educational status of pregnant women, knowledge about iron supplementation, and receiving health education about the benefits of iron folic acid were associated with adherence to iron supplementation among pregnant women (Sendeku, Azeze and Fenta, 2020). Moreover, women's education was one of the determinants that contributed to the improvement of iron folic acid consumption (Singh *et al.*, 2020).

Research in Indonesia showed a significant interaction between family support for iron supplementation and women's educational level to predict adherence. Improving pregnant women's knowledge and involving the family, especially the husband, was essential for less educated women to improve their adherence to iron-folic acid (Wiradnyani *et al.*, 2016). Meanwhile, the data ARE different on the post-test as shown in Table 4.

Table 4. Correlation test for adherence on post-test and level of education of participants

level of education * Adherence Posttest Crosstabulation					
		Adherence Posttest			Total
		low	moderate	high	
level of education	Primary School	Count 10	61	85	156
		Expected Count 7.8	52.0	96.2	156.0
Middle School	Count	2	12	25	39
		Expected Count 1.9	13.0	24.1	39.0
High School	Count	1	12	40	53
		Expected Count 2.6	17.7	32.7	53.0
University	Count	0	2	11	13
		Expected Count .6	4.3	8.0	13.0
Total	Count	13	87	161	261
		Expected Count 13.0	87.0	161.0	261.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.105 ^a	6	.085
Likelihood Ratio	12.316	6	.055
Linear-by-Linear Association	10.658	1	.001
N of Valid Cases	261		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .65.

According to Table 4, the statistical test shows no correlation between adherence rate in post-test and level of education among pregnant women. It showed that after the intervention the improvement in adherence rate could be at any level of education. Thus, the intervention has the potential to be implemented even in communities with low levels of education.

Table 5. Statistical test for adherence difference before and after CHW's weekly home visit

Ranks		N	Mean Rank	Sum of Ranks
Adherence Posttest - Adherence Pretest	Negative Ranks	4 ^a	80.00	320.00
	Positive Ranks	223 ^b	114.61	25558.00
	Ties	34 ^c		
	Total	261		

a. Adherence Posttest < Adherence Pretest
b. Adherence Posttest > Adherence Pretest
c. Adherence Posttest = Adherence Pretest

Test Statistics^a

	Adherence Posttest - Adherence Pretest
Z	-13.369 ^b
Asymp. Sig. (2-tailed)	<.001

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Source: Primary data, 2023

Table 5 is based on the results of the Wilcoxon test that compares the difference between before and after the CHW's health education and monitoring through weekly home visits as the intervention. It is significantly different with p-value < 0.001.

The difference between before and after the weekly home visit by CHW implies the effectivity of CHW's role in improving iron supplementation intake among pregnant women. This finding is also in line with previous research about community-based health education.

The community-based health education in Kenya can improve the knowledge and attitude of pregnant women and underlines the need for integration between community-based action with antenatal iron distribution (Kamau *et al.*, 2019).

Many types of research show the improvement of pregnant women's adherence to iron supplementation by direct observation and the anemia prevalence was decreased after the intervention (Bairwa *et al.*, 2017). Moreover, in rural areas in India, the direct observer who monitors the iron supplementation among pregnant women is effective in improving adherence by counting adherence rate from the difference in the number of pills given and the number of remaining pills (Bilimale, 2010).

These research findings support the previous studies of involving community volunteers in the weekly monitoring and distribution of IFA using intervention and control groups (Kamau *et al.*, 2019). However, this research also shows effectiveness using the total population or only the intervention group. This study design without a control group has the limitation mentioned in the book section which states that, through a control group, the researcher can observe and make conclusions that changes that happened in the intervention group are because of the treatment, not other factors (Joy *et al.*, 2005). This study finds that home visits by CHWs to form health behavior or medication adherence is one form of social support theory implementation (Glanz & Rimer, 2008).

Daily iron supplementation can reduce the incidence of anemia among them as well as reduce the risk of low birth weight among babies (Imdad *et al.*, 2012). Thus, it is important to prevent anemia through iron supplementation and monitor adherence (Bangun *et al.*, 2021). The adherence score toward iron supplementation can increase the hemoglobin by 18.4% or every adherence score improvement will increase the hemoglobin of 0.02 (Krismawati, Widjanarko and Rahfiludin, 2022). Additionally, taking iron pills is essential for increasing the level of hemoglobin in pregnant women with anemia and the closest people have an important role in improving adherence towards iron supplementation (Cahya Skania, Dasuki and Utami, 2020). Thus, the family is also crucial to be involved in home visit activities as in this research, and the closest people also include CHW as the nearest neighbor with health concerns.

The printed media used in this research was as successful as other research for influencing adherence to iron supplementation among pregnant women. In Tempuran, research in Indonesia showed that leaflets and WhatsApp were effective health promotion media to improve adherence and it was also measured by MMAS-8 (Aliva, Rahayu and Margowati, 2021). Moreover, counseling with brochures also improved the adherence to iron supplementation among pregnant women in Lumajang regency, which was also measured with MMAS-8 (Pratama, Puspasari and Christianty, 2019).

In addition, the lack of reminder mechanisms was the major reason for low adherence, and raising community awareness could be the solution (Lyoba *et al.*, 2020). Regular health education and monitoring through weekly home visits by the CHW or cadre could be one of the reminder mechanisms to deliver health education about the benefits of iron supplementation. Research findings in Uganda showed pregnant women who received health education about the goals of iron folic acid and the danger of in-adherence toward it, obtained sufficient counseling and explanation about side effects were significantly related to adherence to taking iron folic acid (Nimwesiga, Murezi and Taremwa, 2021). Counseling in this research is done privately through weekly home visits. However, other research suggested counseling with interactive methods in small groups of pregnant women every two weeks for three months was effective in improving the knowledge, attitude, and practices among pregnant women (Permatasari *et al.*, 2021).

Qualitative Analysis

Based on quantitative analysis results from MMAS-8 questions about daily IFA intake to seek the adherence rate, it showed a significant difference before and after the intervention. This finding also showed the effectiveness of intervention in improving adherence among pregnant women. Better adherence was also analyzed using qualitative methods to explore whether the knowledge or perceived benefit among pregnant women played an important role. According to the FGD, as shown in Figure 3, there were several main findings from meetings among mothers and families. They can explain the importance of consuming IFA. This finding underlines the other research result that stated that knowledge about IFA benefits was the reason for IFA adherence among pregnant women (Ministry of Health of Indonesia, 2018; Nimwesiga, Murezi and Taremwa, 2021).

"...It is important so that mother can be saved, our midwife told so. I also feel comfortable with my body, if it is not then I will return the vitamin to the midwife"
(R, Pregnant Woman, 10th May 2023)

"...Home visits by cadre help us to know what the function of consuming medicine, then the baby also be healthy" (Y, Husband, 10th May 2023)

Social support can improve the knowledge or awareness that influences health behavior including medication adherence (Glanz & Rimer, 2008). Meanwhile, regarding the family, as they gained more knowledge about the vitamin, they played an important role in supporting the pregnant women in improving their adherence. Other studies found family support and close persons can increase medication adherence and the important role of involving family members in improving IFA adherence (Wiradnyani *et al.*, 2016; Cahya Skania, Dasuki and Utami, 2020).

"...My husband always waiting for me to drink the vitamin at night"
(A, Pregnant Woman, 10th May 2023)
"...I will be waiting for her to drink the vitamin. Sometimes we argue..."
(S, Husband, 10th May 2023)

The satisfaction is also stated by mothers and families, they are also hopeful for the continuity or sustainability of the program. A study found the importance of scaling up activity for direct observation through community volunteers when handling anemia among vulnerable groups.

"...Please continue this activity, once a week is good..."
(S, Pregnant Woman, 10th May 2023)
"...Yes, let's continue weekly home visits by cadre Mam. I feel pity for the next pregnant woman if it is stopped"
(Y, Husband, 10th May 2023)

The process of FGD is shown in Figure 3:



Fig 3. FGD after the intervention phase

The quantitative stated difference in adherence rate before and after the intervention. The study also found no correlation between the level of education and adherence rate in the post-test, which means even pregnant women with low education levels can also improve the adherence rate through this intervention. It is argued by Wiradnyani and Singh's studies that the level of education determines adherence, but supports Wiradnyani's other finding that family support is an important determinant among less educated pregnant women (Wiradnyani *et al.*, 2016; Singh *et al.*, 2020).

Meanwhile, in the qualitative study results as triangulation for quantitative study findings, qualitative analysis showed the mother took the IFA after the intervention or the visit from CHW. This study also found that the knowledge of IFA benefits and family support is crucial to improve adherence. Thus, community empowerment not only can improve the mother's adherence but also knowledge of IFA's benefits and family support among mothers. These findings support the previous study that found the perceived benefit of IFA and family support is determined by adherence to IFA (Triharini *et al.*, 2018).

Moreover, the mothers and families were satisfied and hoped for continuity which implies to support community involvement in improving IFA intake among pregnant women. It also proves the consistent finding between data from the survey and from the FGD.

CONCLUSIONS

This research is limited to the intervention group only or without the control group but takes the sample as the total population. Its result supported previous researchers that indicated the importance of health education and monitoring through weekly home visits for pregnant women by CHW as a form of social support that can influence knowledge, family support, and health behavior of adherence. The effectiveness of the intervention is regardless of the level of education of pregnant women. Community Health Workers (CHW) health education and monitoring through weekly home visits, and motivating pregnant

women and their families effectively improve the adherence to take iron supplementation among pregnant women. It is suggested to maintain the continuity of both activity and budget, to scale up, to use a control group, and to include iron supplementation monitoring in all kinds of pregnant women's health programs, health education media, and CHW training materials. According to the positive impacts, community empowerment is a strength for maternal health improvement.

ACKNOWLEDGMENTS

Thank you for the Samya Stumo Fellowship for Global Health, the Kabupaten Probolinggo government, CHW, health workers, and the community of Tongas.

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Impact Of Maternal Education On Birth Weight and Gestational Age In West Java: A 2022 Study

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ABSTRACT

Background: Infant development is greatly influenced by maternal health. Maternal factors such as level of education and age impact self-care during pregnancy, resulting in heterogeneity of birth weight and gestational age. **Objective:** This study analyzes the association between maternal level of education and age with birth weight and gestational age. **Methods:** A cross-sectional study with simple random sampling was performed by using medical records at Dr. Hasan Sadikin General Hospital Bandung from 1st January to 31st December 2019. Subjects were mothers who delivered single live-born and infants without congenital anomalies at Dr. Hasan Sadikin General Hospital Bandung. Data analysis represents the proportion between groups and the Mann-Whitney test ($p < 0.05$) to observe the association between variables. **Results:** A total of 1574 birth data encounter the criteria in this study. Types of delivery, abnormality of amnion fluid, IUGR, PROM, and pregnancy complications didn't differ between high- and low-risk groups of mothers. High-risk maternal age (<20 and >35 years old) was associated with gestational age (preterm birth, $c=36.59$ weeks; $p=0.036$). Maternal level of education wasn't associated with gestational age and birth weight, also maternal age wasn't associated with birth weight ($p > 0.05$). **Conclusion:** High-risk maternal age (<20 and >35 years old) was associated with gestational age (preterm birth), however, a low level of education (no education, elementary school, and junior high school) wasn't shown to be related. Birth weight wasn't affected by maternal age and level of education. Further studies that account for socioeconomic aspect in regards of education level and birth weight and gestational age are necessary.

Keywords: Birth Weight, Gestational Age, Maternal Age, Maternal Level of Education.

INTRODUCTION

Infant development in the uterus is a crucial period that can determine birth outcomes in the future. Maternal health can affect infant development (Mayer and Joseph, 2013). Mothers who realize how important the health of the baby and themselves try to obtain information about pregnancy (Birmeta, Dibaba and Woldeyohannes, 2013). Antenatal care is a form of health service that can promote maternal and fetal health. It contains nutritional counseling, assesses maternal and fetal health, and gives supplements (e.g., folic acid and iron tablets) to prevent adverse outcomes in infants. Mother's role in preparing their pregnancy is an essential factor. Awareness of maternal and fetal health is affected by factors such as the maternal level of education and age.

Education can affect health quality (Vikram and Vanneman, 2020). Education

amongst mothers assists to obtain health information and increased involvement in making decisions in need of healthcare, for example, antenatal care. (Acharya *et al.*, 2010) Research in Italy reports that maternal level education was associated with low birth weight (LBW) and preterm birth (PTB), the higher the level of education, the lower the incidence of LBW and PTB. (Cantarutti *et al.*, 2017) As reported by WHO and UNICEF, the incidence of LBW in the world reached 20.5 million in 2015. In Indonesia, according to Indonesian Nutrition Status Survey, the incidence of LBW reaches 6% of the total newborn babies in Indonesia (Kementerian Kesehatan Republik Indonesia, 2022). It is estimated that, globally, there are 15 million cases of PTB every year.

Mothers with young (<20 years old) and advanced age (>35 years old) tend to undergo LBW and preterm birth. This is due to maternal age, which can influence their quality of reproductive organs. If not

optimal, it will result in poor birth outcomes. (Goisis *et al.*, 2017) (Wong *et al.*, 2020) The prevalence of early-age marriage (<18 years old) in Indonesia reached 11.21% in 2018 (Hakiki *et al.*, 2020). That is what accounts for the majority of pregnancies at young ages. Retrospective research in Taiwan states that LBW and preterm birth are affected by maternal age (Weng, Yang and Chiu, 2014).

A child's well-being is a fundamental marker of progression toward the achievement of the Sustainable Development Goals (SDGs). Optimal conditions of the mother for preparing the birth of a healthy child reflect the capacity of the health system to prevent and manage complications during pregnancy and childbearing that had been performed effectively. The purpose of this research study is to observe the association between the maternal level of education and age to birth weight and gestational age to better understand the possible factors that may cause their occurrences. This study is expected to provide new information for physicians in educating the general public about how education and maternal age might affect pregnancy and birth, especially in populations with low education level, which is often assumed by public to have a limited health resource and information.

METHODS

This cross-sectional study was conducted at Dr. Hasan Sadikin General Hospital Bandung from 1st January to 31st December 2022. This study uses medical records in the Department of Pediatrics, Division of Neonatology at Dr. Hasan Sadikin General Hospital Bandung. Subjects were data of mothers who delivery from 1st January to 31st December 2022. The inclusion criteria were mothers who deliver single live-born babies and infants without congenital anomalies. The

exclusion criteria were stillbirth infants, twin babies, infants with congenital anomalies, and infants whose data were inaccessible. The sample was selected by simple random sampling.

Figure 1. Diagram of inclusion and exclusion criteria

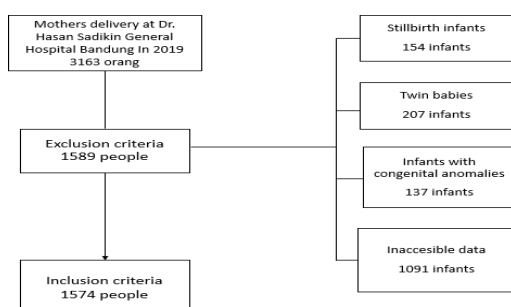
This research study was approved by the Research Ethical Committee of Faculty of Medicine Universitas Padjadjaran no.1091/UN6.KEP/EC/2023 and Ethical Committee of Dr. Hasan Sadikin General Hospital Bandung no. LB.02.01/X.2.2.1/25748/2023.

The data selected according to the inclusion and exclusion criteria will be analyzed by univariate and bivariate analysis. The univariate analysis is used to observe the patient's characteristics. It consists of parity, types of delivery, history of premature rupture of membrane (PROM), IUGR (Intrauterine Growth Restriction), and pregnancy complications (preeclampsia, eclampsia, gestational diabetes, and chronic hypertension). Characteristics of patients were presented as number (%). Independent variables in this study are the maternal level of education and age. Maternal level of education is classified into low (no education, elementary school, and junior high school) and high (senior high school, vocational, undergraduate, and postgraduate). Maternal age is classified into low-risk (20-35 years old) and high-risk (<20 and >35 years old). Dependent variables are birth weight and gestational age. The bivariate analysis is used to observe both independent and dependent variables which will further be analyzed by the Mann-Whitney test to differentiate between two variables if the data do not have normal distribution. This study is statistically significant if p-value <0.05. The data were processed by software IBM® SPSS 26.

RESULTS AND DISCUSSION

Out of 3163 data, 1589 were excluded, leaving 1574 data to be analyzed. The data excluded are stillbirth babies, twin babies, infants with congenital anomalies, and inaccessible data.

Table 1. Characteristics of Mothers Delivery at Dr. Hasan Sadikin General Hospital Bandung In 2022



	Maternal Age		<i>p</i> value	Maternal Level of Education		<i>p</i> value
	High-Risk (n=472)	Low-Risk (n=1102)		High (n=954)	Low (n=620)	
Parity, n (%)						
Nulliparous	174 (36.9%)	469 (42.6%)	0.001	437 (45.8%)	206 (33.2%)	0.001
Primiparous	88 (18.6%)	364 (33.0%)		297 (31.1%)	115 (25.0%)	
Multiparous	210 (44.5%)	269 (24.4%)		220 (23.1%)	259 (41.8%)	
Types of Delivery, n (%)						
Spontaneous Vaginal Delivery	239 (50.6%)	543 (49.3%)	0.224	468 (49.1%)	314 (50.6%)	0.768
Vacuum Extraction/Forceps Delivery	11 (2.3%)	45 (4.1%)		33 (3.5%)	23 (3.7%)	
Sectio Caesarea	222 (47.0%)	514 (46.6%)		453 (47.5%)	283 (45.6%)	
Abnormality of Amnion Fluid, n (%)						
None	471 (99.8%)	1093 (99.2%)	0.374	946 (99.2%)	618 (99.7%)	0.412
Polyhydramnion	0 (0.0%)	1 (0.1%)		1 (0.1%)	0 (0.0%)	
Oligohydramnios	1 (0.2%)	8 (0.7%)		7 (0.7%)	2 (0.3%)	
IUGR, n (%)						
None	468 (99.2%)	1079 (97.9%)	0.083	936 (98.1%)	611 (98.5%)	0.516
Yes	4 (0.8%)	23 (2.1%)		18 (1.9%)	9 (1.5%)	
PROM, n (%)						
None	429 (90.9%)	989 (89.7%)	0.486	860 (90.1%)	558 (90.0%)	0.924
Yes	43 (9.1%)	113 (10.3%)		94 (9.9%)	62 (10.5%)	
Complication in Pregnancy, n (%)						
None	409 (86.7%)	985 (89.4%)	0.266	848 (88.9%)	546 (88.1%)	0.863
Preeclampsia/Eclampsia	54 (11.4%)	103 (9.3%)		92 (9.6%)	65 (10.5%)	
Others	9 (1.9%)	14 (1.3%)		14 (1.5%)	9 (1.5%)	

Analysis results on patient's characteristics show maternal age was associated with parity ($p=0.001$). The majority of the data are 210 people (44.5%) were multiparity in high-risk and 469 people (42.6%) were nulliparity in low-risk. Mostly, mothers were delivered by spontaneous vaginal delivery (50.6% in high-risk; 49.3% in low-risk). Abnormality of amnion fluid, PROM, IUGR, and pregnancy

complications mostly occur in low-risk age ($p>0.05$). We found 259 people (41.8%) in low level education group were multiparity and 437 people (45.8%) were nulliparity in high level group ($p=0.001$). Types of delivery in two groups mostly delivered by spontaneous vaginal delivery. Characteristics of patients are shown in Table 1.

Table 2. Association between Maternal Level of Education and Age with Gestational Age

	Gestational Age						<i>p</i> value
	Mean	Median	95% CI		Min	Max	
			Lower Bound	Upper Bound			
Maternal Level of Education							
High	36,76	37,00	36,61	36,92	26	42	0,776
Low	36,76	37,00	36,57	36,96	26	42	
Maternal Age							
High-Risk	36,59	37,00	36,37	36,82	27	41	0,036
Low-Risk	36,84	37,50	36,69	36,98	26	42	

Table 2 shows that maternal age was associated with gestational age ($p=0.036$). However, maternal level of education wasn't associated with gestational age ($p=0.776$).

Table 3. Association between Maternal Level of Education and Age with Birth Weight

	Birth Weight						<i>p</i> value
	Mean	Median	95% CI		Min	Max	
			Lower	Upper			
			Bound	Bound			
Maternal Level of Education							
High	2594,59	2600,00	2557,56	2631,62	300	4400	0,326
Low	2620,17	2650,00	2573,25	2667,09	700	4600	
Maternal Age							
High-Risk	2577,15	2600,00	2523,72	2630,59	700	4600	0,175
Low-Risk	2616,45	2610,00	2581,81	2651,09	300	4400	

Discussion

The representation of maternal age and level of education are 1102 people (70%) low-risk age (20-35 years old) and 954 people (60.6%) high level of education (senior high school, vocational, undergraduate, and postgraduate).

Gestational age as a fundamental component of antenatal care becomes the main key in the management of pregnancy complications (Cunningham *et al.*, 2014). The adherence of antenatal visits is influenced by the maternal level of education (Arthur, 2012). Research of the population in Italy states there was a significant association between maternal level of education with preterm birth, the higher the level of education, the lower the incidence of PTB (Cantarutti *et al.*, 2017). In this study, we found no association between maternal level of education and gestational age. Pregnancy complications (preeclampsia or hypertension) can mediate PTB; however,

this study wasn't included in the analysis, thus further research is needed (Cantarutti *et al.*, 2017). As reported by research in French Guiana mothers with hypertension or preeclampsia tend to undergo PTB by 83.6% (Leneuve-Dorilas *et al.*, 2019).

A cohort study in Canada reports that maternal age can affect PTB. The distribution pattern of maternal age who undergo PTB was following 'U' shaped.¹⁶ Mothers of young age (20- 24 years old) tend to undergo PTB (aOR 1.08) and spontaneous PTB (aOR 1.09). However, mothers with advanced age (>35 years old) have a higher risk of iatrogenic PTB (aOR 1.15) as a result of certain medical conditions (Fuchs *et al.*, 2018) (Khalil *et al.*, 2013). The findings of risk factors such as diabetes mellitus, preeclampsia, placenta previa, PROM, and chronic hypertension cause infant must be delivered immediately, thus preterm birth can occur (Leneuve-Dorilas *et al.*, 2019), (Fuchs *et al.*, 2018), (Khalil *et al.*, 2013),



(Jiang *et al.*, 2018). Previous studies noted that PTB often occurs in young (<20 years old) and advanced age (>35 years old) due to pregnancy complications (Fuchs *et al.*, 2018) (Khalil *et al.*, 2013). Our study suggests a significant association between maternal age and gestational age which are in line with those previous studies. We found PROM and other pregnancy complications mostly occur in mothers with low-risk age (20-35 years old), which is, therefore, inconsistent with the previous study which reports increased susceptibility to pregnancy complication in high-risk maternal age (Fuchs *et al.*, 2018). However, this may be due to a higher proportion of participants in the low-risk maternal age group.

Birth weight is a sensitive health indicator in the baby because it is related to the baby's health (Gelfand *et al.*, 2012). Variations in birth weight occur as a result of factors especially maternal factors, that might affect pregnancy. Other factors include nutritional status during pregnancy, body mass index (BMI) before conception, weight gain during pregnancy, and hemoglobin concentration (Khoushabi and Saraswathi, 2010), (STAMNES KOEPP *et al.*, 2012), (Sekhavat, Davar and Hosseinidezoki, 2011). These four things are related to nutrition that will be received by the babies. If nutrition deficiency in babies occurs, the baby tends to undergo IUGR and, finally, LBW can occur.

According to this study, there wasn't a significant association between maternal age and birth weight. This is in contrast with the previous study that suggest significant association between maternal age and birth weight (Gelfand *et al.*, 2012). The significant association related to parity and ethnic/race of the mother. Mothers with more than one parity have experience in their previous pregnancy; therefore, they are more aware in their next pregnancy (Muula, Siziya and Rudatsikira, 2011). It is necessary to do further research related to maternal parity which can be confounding bias in this study.

Research in Malawi reports that maternal level of education had an association with LBW (Muula, Siziya and Rudatsikira, 2011). A higher level of education can increase socioeconomic status. Increased socioeconomic status makes mothers easily able to access

healthcare, thus LBW can be prevented (Acharya *et al.*, 2010), (Branco da Fonseca *et al.*, 2014). The result in this study is inconsistent with the previous study, this might be because socioeconomic status wasn't studied in regard to education level status. A study in Nepal found a correlation between caste and risk of small-for-gestational age babies (Hazel *et al.*, 2022). Higher economic status, along with higher level of education, may result in mothers being more resourceful in aiding their pregnancy and be more open to information regarding pregnancy, such as information about healthy diet, recommended lifestyle and exercise, and regular pregnancy check-ups in health facilities. Unfortunately, these factors were not studied in our study, thus, affecting our results.

Limitations in this study where that issues caused by nutritional status, BMI before conception, weight gain during pregnancy, nutritional status, hemoglobin concentration, socioeconomic status, support during pregnancy and pregnancy complications such as urinary tract infection weren't studied, which basically can affect birth weight and gestational age. Therefore, further research that accounts for all these factors is necessary.

CONCLUSIONS

High-risk maternal age (<20 and >35 years old) was associated with gestational age (preterm birth), although a low level of education (no education, elementary school, and junior high school) wasn't shown to be related. Birth weight wasn't affected by maternal age and level of education. Further research that accounts for socioeconomic status, nutritional status, and other complications that might occur in regard of maternal age and maternal level of education may be needed to better explain their correlation with birth weight and gestational age.

ACKNOWLEDGMENT

Thank you to the Department of Pediatric, Faculty of Medicine Universitas Padjadjaran and Dr. Hasan Sadikin General Hospital Bandung for supporting this study.

Funding Acknowledgment

The authors received no specific grants from any funding agency in the public, or not-for-profit sectors.

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Digital Transformation in Antenatal Care in Indonesia: The Effectiveness of The 'Bundaqusehat' Application

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ABSTRACT

Background: Antenatal care (ANC) is recognized as an essential component of maternal health aimed at reducing maternal and fetal morbidity and mortality. Antenatal care has undergone a digital transformation through mobile health (mHealth), but research specifically discussing mHealth solutions for antenatal care in Indonesia is still limited. **Purpose:** This study aims to evaluate the effectiveness of the web-based application Bundaqusehat in supporting antenatal services. **Methods:** The research design was a quasi-experimental pretest-posttest with a control group, and the research participants included 30 pregnant women from two Health Centers (intervention group) and one Health Center (control group). Data collection was conducted using a structured questionnaire administered before and after the intervention. Statistical analysis used the T-test, with a significance set at $p < 0.05$. **Results:** The analysis showed significant improvements in pregnant women's knowledge ($p = 0.001$), satisfaction ($p = 0.002$), attitude ($p = 0.002$), behavior ($p = 0.001$), adherence to iron tablet consumption ($p = 0.030$), and fetal movement monitoring ($p = 0.041$). The intervention group showed greater adherence to the recommended antenatal practices than the control group. **Conclusion:** The Bundaqusehat application demonstrates significant potential in enhancing the quality of antenatal care, highlighting the critical role of digital health solutions. Future research should focus on refining and optimizing these digital interventions to maximize their positive impact.

Keywords: Antenatal Care, Midwives, Pregnant Women, Service Quality, Web-Based Apps.

INTRODUCTION

In 2020, complications related to pregnancy and childbirth caused around 800 pregnant women to die every day worldwide, which is equivalent to one death every two minutes (Organization, 2023). This incident mostly occurred in low- and middle-income countries (LMIC), which had a maternal mortality ratio (MMR) of 239 deaths per 100,000 live births, compared to developed countries with an MMR of 12 deaths per 100,000 live births (Amin, Haswita and Nuraeni, 2025). In Indonesia, the Maternal Mortality Rate (MMR) is 189 deaths per 100,000 and is far from the Sustainable Development Goals (SDGs) target in 2023, which is 70 deaths per 100,000 live births (Afifah *et al.*, 2022). According to the World Health Organization, maternal death is the death of a woman that occurs during pregnancy or within 42 days after delivery caused by factors related to the pregnancy and its management, except those caused by

accidents or other external events (Sutrisno and REI, 2022).

The main causes of maternal death in Indonesia are obstetric complications, such as hemorrhage and hypertension during pregnancy. Hemorrhage accounts for 28-32% of maternal deaths, while hypertension, including eclampsia, contributes to 24-25% (Sari and Nurwati, 2023); (Novitasari, 2022); (Podungge *et al.*, 2023). Other significant contributors include infections, obstructed labor, and unsafe abortions (Sari and Nurwati, 2023); (Novitasari, 2022). Non-obstetric causes, such as chronic diseases and infections, also contribute to approximately 32% of maternal deaths (Novitasari, 2022).

Antenatal care (ANC) is globally recognized as an important aspect of maternal health, aiming to reduce maternal morbidity and mortality. ANC provides prevention, health promotion, screening, and diagnosis of diseases in pregnant women. Pregnancy complications can be detected during pregnancy with

intensive monitoring at antenatal care visits (Morón-Duarte *et al.*, 2019). To improve ANC services, the Indonesian government has introduced several initiatives, including the 'Making Pregnancy Safer' program, which focuses on encouraging husbands to actively support their wives during pregnancy and childbirth (Rani, 2022). The frequency of ANC visits is crucial in reducing maternal mortality risk, as regular ANC is associated with better knowledge and management of high-risk pregnancies (Sari and Nurwati, 2023); (Komariyah, 2009).

Digital transformation in healthcare services, particularly through mobile health (mHealth) for antenatal services, marks a significant shift in how healthcare is delivered and accessed. mHealth applications, which can be easily downloaded to smartphones, play a pivotal role by providing remote access to healthcare services, thus enhancing convenience and accessibility for pregnant women (Eşiyok, Uslu Divanoğlu and Çelik, 2023); (Vidal-Alaball *et al.*, 2023) this transition faces challenges such as reliance on legacy technology, regulatory issues, and security concerns (Sushanta *et al.*, 2023).

Previous studies have shown that mHealth interventions have significantly improved the uptake and quality of ANC services in various LMICs, including Pakistan, Tanzania, Nigeria, and Ghana. These interventions have enhanced the frequency of ANC visits and adherence to WHO recommendations, leading to better maternal and fetal health outcomes (Jabeen and Mohammad, 2023); (Nuhu *et al.*, 2023); (Osanyin *et al.*, 2022); (Paduano *et al.*, 2022). In West Jakarta, maternal health conditions face significant challenges with high maternal mortality rates. The implementation of mHealth has shown promise in improving the quality of ANC services, ensuring continuity of care, and addressing issues faced by pregnant women (Fatimah, Erwandi and Prasetyo, 2022); (Herwansyah *et al.*, 2022); (Delmaifanis, Siregar and Prabawa, 2021); (Susanti *et al.*, 2022).

Despite these advancements, there have been limited studies specifically addressing the integration of comprehensive mHealth solutions tailored for antenatal care in Indonesian settings. Most existing research focuses on specific aspects of maternal health or isolated

features of mHealth applications without evaluating a holistic solution. Additionally, many studies highlight the challenges of implementing these technologies, such as technological barriers, limited digital literacy, and the need for supportive infrastructure.

Therefore, this research intends to fill this gap by evaluating the effectiveness of the web-based application Bundaqusehat in supporting antenatal services provided by midwives in Indonesian settings. The web-based application Bundaqusehat provides various assistance that can help with antenatal services. Unlike previous studies that often address isolated features, Bundaqusehat integrates multiple functionalities, including digital health records, risk detection, visit reminders, health promotion, and teleconsultation. Bundaqusehat also provides a fetal movement monitoring feature that helps pregnant women monitor their fetus' movements. This research aims to enhance service quality, promote maternal health, and improve knowledge, satisfaction, and compliance among pregnant women with antenatal services.

METHODS

This study employed a quasi-experimental pretest-posttest design with a control group to evaluate the effectiveness of the web-based application Bundaqusehat for antenatal services. The research was conducted from March to September 2022. Participants in this study were 60 pregnant women at the Community Health Center with the number of respondents in each group being 30 pregnant women. The intervention group used the Bundaqusehat application, whereas the control group received standard antenatal care without the use of the application. The Bundaqusehat application features several functionalities, including health records, risk detection, reminders, health promotion, Q&A, teleconsultation, and fetal movement monitoring.

Data collection involved administering structured questionnaires before and after the intervention to measure changes in knowledge, satisfaction, attitude, behavior, adherence to iron tablet consumption, and fetal movement monitoring. The

questionnaire has been tested for validity and reliability before being used in the study to ensure the accuracy and consistency of the data collected. The results confirmed that the questionnaire was both valid and reliable.

The pretest established baseline data, while the post-test assessed the impact of the intervention. The T-test was used in statistical analysis to compare pre-test and post-test results between the intervention and control groups, with the significance level set at $p < 0.05$. This approach aligns with recent methodological recommendations for evaluating health interventions (Creswell and Creswell, 2017). The research received ethics approval from the Research and

Community Service Ethics Commission under approval number Ket-108/UN2.F10.D11/PPM.00.02/2022.

RESULTS AND DISCUSSION

Characteristics of Respondents

The characteristics of the respondents consisted of 60 pregnant women with 30 participants each in both groups. The variables studied in the characteristics of respondents included age, education, employment, and pregnancy history of women.

Table 1. Characteristics of Respondents

Variable	Intervention Group		Control Group		p-value
	n	%	n	%	
Age					
18-20 Years	5	16.7	4	13.3	0.313
21-35 Years	18	60	23	76.7	
> 35 Years	7	23.3	3	10	
Education					
Elementary School	2	6.7	4	13.3	1.00
Junior High School	12	40	10	33.3	
Senior High School	13	43.3	15	50	
University	3	10	1	3.3	
Occupation					
House Wife	22	73.3	21	70	0.92
Employee	5	16.7	5	16.7	
Other	3	10	4	13.3	
Pregnancy					
1	8	26.7	8	26.7	1.00
2	10	33.3	13	43.3	
3	6	20	7	23.3	
4	6	20	2	6.7	

In the intervention group, most pregnant women were aged 21-35 years with a percentage of 60% and in the control group 76.7%. Most respondents had a history of their last education at the high school level with a percentage of 13.3% in the intervention group. Similar to the intervention group, the majority of respondents in the control group were also at the high school level with a higher percentage of 15%. In the employment category, the majority of respondents in the intervention group were housewives with a percentage of 73.3%, and in the control group with a lower percentage of 70%. The majority of respondents in the intervention group were in their 2nd pregnancy with a percentage of 33.3% and in the control group with a larger percentage (43.3%). Based on the

characteristics of the variables age, education, occupation, and pregnancy, the distribution in the two groups did not show any significant differences.

Knowledge, Satisfaction, Attitude, and Behavior of Pregnant Women

Table 2 shows that the knowledge of pregnant women in the intervention group had an average pretest of 19.70 and a posttest of 26.86, indicating an increase after the intervention. The results of the analysis obtained a p-value of 0.001 (> 0.05) on the knowledge of pregnant women in the intervention group, indicating a significant increase in the knowledge of pregnant women after being given an intervention using the web-based application Bundaqusehat.

Table 2. Mean Scores and p-value of Knowledge, Satisfaction, Attitude, and Behavior of Pregnant Women in Control and Intervention Groups

Variable	Time	Mean	SD	p-value	Effect Size
Knowledge (Intervention)	Pre	19.70	1.80	0.001	2.681
	Post	26.86	3.32		
Knowledge (Control)	Pre	20.00	2.00	0.083	
	Post	20.20	2.33		
Satisfaction (Intervention)	Pre	71.60	9.41	0.002	0.481
	Post	76.20	9.68		
Satisfaction (Control)	Pre	71.60	9.41	0.039	
	Post	71.80	9.68		
Attitude (Intervention)	Pre	24.76	3.13	0.002	0.481
	Post	26.86	3.32		
Attitude (Control)	Pre	26.10	3.82	0.003	0.198
	Post	26.80	3.19		
Behavior (Intervention)	Pre	34.13	4.22	0.001	0.477
	Post	36.06	3.85		
Behavior (Control)	Pre	35.10	3.82	0.005	0.304
	Post	36.26	3.79		

This research indicates a significant increase in knowledge scores among pregnant women in the intervention group after using the web-based application. The effect size of 2.681 suggests a substantial impact, underscoring the application's effectiveness in enhancing maternal knowledge. The control group, however, showed minimal change, highlighting the importance of the digital intervention in improving antenatal education. This study's findings align with previous research, showing that digital interventions can significantly improve maternal health knowledge and outcomes. Digital ANC and PregeX have demonstrated success in addressing mental health and promoting behavioral changes, respectively (Janani & Prabha, 2023; Tendean, 2023).

Features that support increasing knowledge are health promotion materials displayed in the form of videos and images/leaflets that provide important information related to pregnancy. Q&A also plays a role because cases or complaints asked by participants, it is possible that other pregnant women also experience the same thing. Researchers believe that the consistent positive outcomes across different applications and settings emphasize the need for integrating digital strategies into antenatal care to enhance maternal knowledge effectively. This integration is important to improve maternal and fetal health outcomes.

The intervention group reported a significant increase in satisfaction,

showing a moderate improvement in their perception of the quality of antenatal care. On the other hand, although the data showed a slight increase in satisfaction in the control group, it was not significant. This could be due to different factors, such as the facilities owned by health facilities and the staff's attitude. This is also supported by the medium effect size value which highlights the added value of web-based applications in increasing patient satisfaction. These findings align with previous research showing the efficacy of digital tools in antenatal care. For example, the 'SwasthGarbh' app improves the quality of antenatal care and health outcomes (Sharma *et al.*, 2022). Similarly, the PregeX app was found to be effective in promoting healthy practices during pregnancy (Janani & Prabha, 2023). In addition, telehealth interventions have effectively managed mental health problems in pregnant women, which is important for maternal and fetal well-being as a whole (Tendean, Dewi and Wirasto, 2021). These results highlight the potential of digital applications to significantly enhance patient satisfaction and care quality in antenatal settings. Future research should optimize these digital interventions to maximize their impact.

The average pretest score of the attitude of pregnant women towards antenatal care in the intervention group was 24.76 and the posttest score was 26.86, indicating an increase after the intervention. Meanwhile, in the control group, the average pretest and posttest

scores were not much different. The results of the analysis obtained a p-value of 0.002 (<0.05) which indicates a significant increase in the attitude of pregnant women towards maternal services after providing the intervention.

The intervention group showed significantly improved attitudes post-intervention, compared to the control group, indicating a more pronounced positive impact on pregnancy care attitudes. The application provided accessible, reliable, and personalized information, enhancing pregnant women's knowledge and confidence. Digital interventions like health education apps have proven effective in improving self-care and preventive measures knowledge during the COVID-19 pandemic (Setyowati *et al.*, 2022). For example, apps improving nutritional knowledge about chronic energy deficiency (Lestari *et al.*, 2021) and supporting pregnancy and parenting (Deave *et al.*, 2019) significantly boosted maternal attitudes and behaviors, underscoring their public health potential.

The average pretest behavior score in the intervention group was 34.13, while the posttest score was 36.06. Statistical analysis using the t-test showed a significant increase in the behavior of pregnant women towards maternal services after receiving intervention with a p-value of 0.002 (<0.05).

Both groups showed significant behavioral improvements, with the intervention group demonstrating a larger effect size compared to the control group. This highlights the intervention's effectiveness in promoting better

childbirth-preparatory behaviors. Mobile health (mHealth) applications enhance pregnant women's health knowledge and behavior. For instance, the Baby Buddy app increased first-time mothers' confidence and healthcare communication (Deave *et al.*, 2019). The Mobile for Mothers app improved maternal health practices among rural Indian women (Choudhury and Choudhury, 2022). Similarly, mHealth apps showed potential in promoting positive behaviors like weight management and dietary improvements (Musgrave *et al.*, 2019), as evidenced by increased maternal health knowledge and dietary diversity in Maharashtra (Rooshenas *et al.*, 2022) and improved self-care among working Korean pregnant women (Lee, Choi and Jung, 2022). Researchers believe these technological solutions should be integrated into standard prenatal care to enhance maternal health outcomes globally.

Adherence to Iron Tablet Consumption and Fetal Movement Monitoring

Table 3 presents the level of compliance with iron tablet consumption among pregnant women in both groups. In the intervention group, 27 respondents (90%) always consumed iron tablets, while 3 respondents (10%) consumed them frequently. Meanwhile, in the control group, 19 respondents (63.3%) always consumed iron tablets. The analysis revealed a p-value of 0.030 (<0.05), showing a significant increase in adherence to iron tablet consumption.

Table 3. Adherence to Iron Tablet Consumption and Fetal Movement Monitoring of Pregnant Women in Control and Intervention Groups

Group	Often		Always		Total	p-value	OR
	n	%	n	%			
Iron Tablet Consumption							
Control	11	36.7	19	63.3	30	0.030	5.211
Intervention	3	10	27	90	30		(91.278-21.237)
Fetal Movement Monitoring							
Control	12	40	18	60	30	0.041	4.33
Intervention	4	13.3	26	86.7	30		(1.2-15.6)

The intervention group showed higher adherence to iron tablet consumption, indicating a strong link between the intervention and improved

adherence. Technological interventions, such as mobile apps and SMS reminders, significantly enhance compliance in taking iron tablets, addressing iron deficiency



anemia in pregnancy. For example, SMS reminders improved knowledge and adherence among pregnant women (Prihanti *et al.*, 2022), while phone call reminders increased compliance and hemoglobin levels (Sontakke *et al.*, 2022). The Permitasi app also boosted knowledge and compliance regarding anemia (Fertimah, Widyawati and Mulyani, 2022). These findings underscore the critical role of technology in improving iron supplementation adherence and reducing anemia risks. Researchers believe that integrating such technological solutions into standard prenatal care could substantially improve maternal health outcomes and should be prioritized in healthcare strategies.

The level of compliance of pregnant women in monitoring fetal movements in both groups showed that 26 respondents (86.7%) always monitored their fetal movements and 4 respondents (13.3%) monitored them periodically in the intervention group. In the control group, 18 respondents (60%) always monitored their fetal movements. The analysis revealed a p-value of 0.041 (<0.05), indicating a significant increase in adherence to fetal movement monitoring. The intervention group demonstrated significantly higher adherence to fetal movement monitoring, underscoring the web-based application's effectiveness.

Mobile applications improve compliance in monitoring fetal movements by addressing forgetfulness and lack of proper counting knowledge, crucial for preventing stillbirth (Skalecki *et al.*, 2023); (Yudianti *et al.*, 2022). For example, the "Kick Count" app helps women track fetal movements daily, enhancing familiarity and consistency (Yudianti *et al.*, 2022). Digital health solutions increase maternal awareness and timely reporting of decreased fetal movements (DFM) (Skalecki *et al.*, 2023). However, user engagement remains challenging, influenced by education, income, and insurance (Brusniak *et al.*, 2020). Researchers believe that integrating advanced features like multi-point IMU sensing can enhance accuracy and user compliance, ultimately improving maternal and fetal health outcomes (Du *et al.*, 2021); (Zikri, Purbohadi and Kurnianti, 2021). Integrating such technologies into standard prenatal care practices is crucial

for enhancing overall pregnancy monitoring and health outcomes.

Several studies have highlighted various applications with different purposes, often used separately from antenatal care services. The Bundaqusehat application offers comprehensive features and is integrated into antenatal care by midwives, making it the main novelty of this study. This application benefits both midwives and pregnant women. To date, government-developed applications are generally designed to facilitate healthcare providers, while applications created by private entities or the community are not directly connected to healthcare providers or facilities. As a result, the health information or promotion received by pregnant women does not come directly from healthcare professionals, and healthcare providers cannot effectively monitor the condition of pregnant women.

Increasing knowledge, attitudes and behavior of pregnant women will greatly affect the habits of pregnant women in pregnancy care and their responses in dealing with various problems or complaints during pregnancy. This positive behavior will have an impact on the health of pregnant women and the outcome of their pregnancy.

Developing the web-based Bundaqusehat application offers a unique advantage over similar applications in Indonesia. This web-based platform is highly suitable for Indonesia's diverse conditions, as users, especially pregnant women or midwives, do not need to download the application. This allows it to be accessed on various devices, from simple to advanced ones, without relying on memory capacity. This aligns with previous qualitative research findings, which revealed that people are reluctant to use applications due to insufficient memory on their devices (Delmaifanis, Siregar and Nur, 2023).

Although the Bundaqusehat application is not the only factor that causes increased knowledge, changes in attitudes, and compliance, other factors include direct health education by officers and other sources of information. However, ANC equipped with the Bundaqusehat application results in much better satisfaction and behavioral changes (Masoi and Kibusi, 2019); (Murthy *et al.*, 2020). For digital health implementation to run well, the government needs to

complete infrastructure throughout Indonesia and improve digital capabilities for officers and the community.

Strengths and limitations of this study

The Bundaqusehat application is ideal for supporting digital transformation in antenatal care services due to its comprehensive features and ability to facilitate direct interaction between pregnant women and midwives or doctors. This enhances pregnant women's trust in the information provided while preventing the spread of false information often encountered on social media. This application addresses time constraints for healthcare providers in delivering health education, making antenatal services more effective. However, this study's limitations are that it was conducted in Jakarta, where the infrastructure is more advanced, internet connectivity is reliable, Wi-Fi access is widely available, and digital literacy among the population is generally high. This significantly differs from conditions in remote areas in Indonesia, which still face challenges in access to technology and connectivity. In addition, the relatively small sample size and relatively short intervention time are also limitations. Therefore, broader trials and longer intervention times are needed in the future.

CONCLUSIONS

The study's findings underscore the substantial impact of digital interventions on maternal health knowledge, satisfaction, attitudes, behaviors, and adherence to antenatal care practices. The significant increase in knowledge scores and patient satisfaction in the intervention group compared to minimal changes in the control group highlights the effectiveness of web-based applications in enhancing antenatal education. Improvements in attitudes and behaviors towards pregnancy care, along with higher adherence to iron tablet consumption and fetal movement monitoring, further support the utility of digital tools in promoting healthy practices during pregnancy. These results align with existing research demonstrating the efficacy of digital applications in improving maternal and fetal health outcomes. Integrating these technological solutions into standard prenatal care is crucial for

optimizing maternal health globally, addressing both mental and physical health needs. Future research should focus on refining and optimizing these digital interventions to maximize their positive impact, ensuring accessibility and effectiveness for diverse populations. This study emphasizes the transformative potential of digital strategies in advancing public health and enhancing antenatal care quality.

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The Effect of Health Promotion through Video Media on HIV/AIDS Stigma among Adolescents

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ABSTRACT

Background: HIV/AIDS is both a health and social issue, as its spread is heavily influenced by people's behaviors and knowledge. According to WHO data from 2022, 20 million adolescent females and 17.4 million adolescent males were infected with HIV. Meanwhile, data from the Indonesian Ministry of Health (Kemenkes RI) in 2022 reported that 741 adolescents were diagnosed with HIV. In its efforts to combat HIV/AIDS, the Indonesian Ministry of Health is committed to achieving the "3 Zeroes" targets: zero new HIV infections, zero stigma and discrimination, and zero AIDS-related deaths. Video serves as a medium for delivering information and messages, which focuses on promoting health programs by prioritizing education, engaging health information, and effective communication. **Aims:** This study aims to investigate the effect of health promotion using video media on HIV/AIDS stigma among adolescents. **Method:** This study employed quantitative method with pre-experimental design. The sample consisted of 38 respondents selected through purposive sampling. A video about HIV/AIDS and a questionnaire were used as instruments. This study utilized a one-group pretest-posttest design with the Wilcoxon statistical test. **Result:** The results showed that health promotion through video media had a significant effect on reducing HIV/AIDS stigma among adolescents. The p -value is $0.000 < 0.05$, which indicated that the (H_0) was rejected, and the (H_a) was accepted. **Conclusion:** There was a reduction in stigma following the health promotion using video media.

Keywords: Health Promotion, Video Media, HIV/AIDS Stigma

INTRODUCTION

Human immunodeficiency virus (HIV) is a virus that attacks the human immune system while acquired immunodeficiency syndrome (AIDS) is a group of disease symptoms resulting from the weakening of the immune system due to HIV infection (UNAIDS, 2019).

Based on WHO 2022 data, there are 39.0 million people infected with HIV/AIDS and 630 HIV-related deaths worldwide. As many as 20 million adolescent girls and 17.4 million adolescent boys are infected with HIV. The National Narcotics Agency (BNN) reports that in 2022 there were 62,856 HIV infections in humans and 741 people diagnosed with HIV among adolescents. According to the DIY Health Office in 2022, there were 6,214 people infected with HIV and 1,966 people with AIDS. In addition, Sleman Regency had 1,360 HIV-infected cases. The Sleman Health Office recorded 188 HIV infections in the first half of 2023. Of these, 41 people already had AIDS.

The high rate of HIV and AIDS infection is certainly inseparable from the

problem of discrimination against people with HIV, which often hampers efforts to reduce the incidence of HIV and AIDS. Stigma itself leads to discrimination, which is the assessment of a person based on their HIV status, both certain and estimated, or their health status (Mardhatillah *et al.*, 2021).

Adolescents are 1.5 times more likely to be stigmatized than adults. One of the factors that influence the occurrence of stigma towards PLWHA among adolescents is knowledge (Rahmawati, 2019). Stigma toward PLWHA among adolescents is caused by the assumption that HIV/AIDS is caused by deviant behavior, promiscuity, and drug abuse. Many people, especially adolescents, act as if they do not want to be friends with people living with HIV because they believe that HIV/AIDS can be transmitted through close proximity, even without having sexual intercourse (Sagitha, 2020).

One of the biggest obstacles to HIV/AIDS prevention in Indonesia is the high level of stigma and discrimination against people living with HIV/AIDS. These barriers will affect the success of the

prevention process, treatment adherence, care, and support for PLWHA. In general, the impact of community stigma leads to feelings of shame and burdened by the condition, in addition to the impact of negative emotional responses such as low self-efficacy and social isolation behavior (Kurniawan, 2019). Seeing the facts that have been described previously, it is important to convey information related to HIV/AIDS and stigma against PLWHA to adolescents from the beginning, where the early adolescent age group is in the junior high school education period which has an age ranging from 13-15 years. In this short period, students experience significant development in their lives, namely physical, social, behavioral, intellectual and moral and are considered the age group most affected by the environment (Ministry of Education and Culture 2016).

One alternative health promotion media that can be used is through HIV/AIDS video media. Video is a medium for delivering information and messages that will refer to the socialization of programs in the health sector, by prioritizing education, information and attractive health communication (Jatmika *et al.*, 2019). Therefore, video media public service advertisements (PSAs) are prosocial messages made with the intent and purpose of raising awareness or influencing to change attitudes or behavior toward a particular problem or cause (Fulton, 2014).

The advantage and effectiveness of using electronic media is that the presentation is attractive, so people will be more focused in paying attention to the delivery of information (health promotion). Electronic media also can be durable and make presentations easier if the topic of conversation needs to be repeated (Widyaningtyas, 2019). concluded that there is a difference between leaflets and videos as health promotion media for HIV and AIDS. Video media is more effective when used as a health promotion tool in various aspects of the health sector. According to research conducted by Yuniastuti (2021), the effective time in using video media for learning is around 5 to 7 minutes.

In the HIV/AIDS response, the Indonesian Ministry of Health is committed to overcoming HIV/AIDS by targeting three zeros, namely no new HIV infections, no stigma and discrimination, and no AIDS

deaths by implementing the STOP program (Suluh, Temukan, Obati dan Pertahankan) (Sabhita *et al.*, 2022).

Efforts to prevent the spread of HIV/AIDS in adolescents can be done by providing reproductive health knowledge, so that adolescents can have a positive attitude toward preventing the transmission of HIV and AIDS (BKKBN, 2015). Most of the prevention and control programs for HIV/AIDS in adolescents focus on improving cognitive factors, including knowledge, covering issues of sexual knowledge, pregnancy, HIV and other sexually transmitted infections (STIs) including prevention methods, perceptions of HIV and STI risks and attitudes toward people with HIV/AIDS (Kirby, 2011).

This research is supported by research (Yuniartin, 2024) showing that there is a significant decrease in community stigma before and after the intervention, with a p-value of 0.001 (<0.05), which indicates that providing health education through animated videos has an impact on community stigma related to HIV / AIDS.

METHODS

Pre-experiment research is what this study is. One Group Pretest-Posttest Design is the format used in this study. Finding out how video media health promotion affected HIV/AIDS stigma among teenagers in class VIII at SMP Negeri 1 Depok Sleman Regency in 2024 was the aim of this research. This research sample technique uses purposive sampling technique, where sampling is based on certain characteristics. As for the inclusion criteria, these are class VIII students, students who are present at school and who are willing to become respondents while the exclusion criteria are students of the PIK-R Management. According to (Arikunto, 2006), if the population is known and the number of subjects is large or more than 100, it can be taken between 10%-15% or 20%-25% or more depending on the ability of the researcher in terms of time, energy and funds. So that this study uses a minimum sample size of the total population of 192 people, then the sample size to be taken is as much as 20%, so the number of samples in the study was 38 respondents. This research design procedure is carried out by measuring the dependent variable from one group of

subjects (pretest), where the subject is given treatment within a certain time (exposure); the second measurement is carried out (posttest) and the pretest measurement results are compared with the posttest results (Sony, 2017). Respondents were given treatment in the form of video media viewing with a duration of seven minutes. The data collection tool in this study used a questionnaire which was tested for validity and reliability by the researcher. The validity test was conducted on 30 respondents with 18 statement items stating that all statements were valid where r count $\geq r$ table, namely ≥ 0.361 and Cronbach's alpha value of 0.956. Data analysis used Wilcoxon statistical test.

RESULTS AND DISCUSSION

Respondents' Characteristic

Table 1. Characteristics of respondents based on gender and age at SMP Negeri 1 Depok in 2024 (n=38)

No	Characteristics	Respondent (N)	Percentage (%)
1	Gender		
	Male	18	4.37
	Female	20	52.63
	Total	38	100
2	Age		
	13 y. o	18	47.37
	14 y. o	20	52.63
	Total	38	100.0

Source: Primary Data, July 2024

Table 1. shows that the characteristics of the 38 respondents were mostly female, totaling 20 respondents (52.63%) and most of the respondents were 14 years old, totaling 20 respondents (52.63%). Gender is one of the factors that influence stigma. This is because women are more at home than men, making it difficult to get all sources of health information, especially HIV/AIDS (Yuniartin, 2024). This study is in line with research from (Baroya, 2017) that women are twice as likely as men to stigmatize and discriminate against people with HIV/AIDS.

Table 2: Distribution of HIV/AIDS stigma among adolescents before and after intervention with video media at SMP Negeri 1 Depok

No	Category Stigma	Pretest		Posttest	
		N	%	N	%
1	High	10	26.32	0	0.00
2	Medium	22	57.89	4	10.53
3	Low	6	15.79	34	89.47
	Total	38	100.0	38	100.0

Source: Primary Data, July

Based on Table 4.2, stigma in adolescents before and after being given HIV/AIDS video media health promotion has decreased. Pretest research results obtained the highest number in the moderate stigma category totaling 22 respondents (57.89%), while in posttest research the most stigma was low stigma totaling 34 respondents (89.47%).

Stigma is a negative trait attached to a person's personality due to environmental influences. Stigma itself leads to discrimination, which is the assessment of a person based on their HIV status, both certain and estimated, or their health status (Mardhatillah *et al.*, 2024). HIV/AIDS has caused various responses in the community who are afraid of being infected, causing stigma and discrimination, resulting in high cases of HIV and AIDS (Airlangga, 2019).

The lack of knowledge about HIV/AIDS has led to the emergence of bad labeling, resulting in discrimination against ODHA. Stigmatization and discrimination against PLWHA lead to a decrease in the physical and mental quality of ODHA (Syukaisih and Oktaviany, 2022).

Stigma against ODHA among adolescents is caused by the assumption that HIV/AIDS is caused by deviant behavior, promiscuity, and drug abuse. Many people, especially teenagers, act as if they do not want to be friends with people living with HIV because they believe that HIV/AIDS can be transmitted through close contact, even without having sexual intercourse (Sagitha, 2020)

This knowledge can be obtained by adolescents through various channels of information, one of which is through social media. Social media is a useful channel for delivering various information, including health information, disease prevention messages, and health promotion (Budiman *et al.*, 2020). Compared to getting information sources from parents, adolescents generally prefer social media such as types of social networking media (Facebook, Line, WhatsApp, Twitter) sharing media (YouTube, Instagram) and

others as a source of sexual information. This is because they think that social media will provide a more interesting picture of sexual wants and needs than through parents (Solehati et al., 2019).

The right strategy in HIV/AIDS prevention is to provide accurate information about the characteristics of the disease, how it is transmitted, and how one can reduce the risk. Health education media that can be used is video media. In addition to being a medium for entertainment and communication, video media can also be used as an educational medium that is easy for people to understand, from children to adults (Tanof, Manurung and Purnawan, 2021).

Efforts to reduce the rate of spread of HIV/AIDS among adolescents is by providing health promotion. Through

health promotion about HIV/AIDS, adolescents will get the right information about HIV/AIDS. In providing health promotion for adolescents, the selection of appropriate methods and media is needed. The media to be used in this health promotion is audiovisual media in the form of videos (Maya et al., 2024). The use of video media has an impact on education and health by using the target's sense of hearing and vision. Then the message conveyed through the video is fast and easy to remember and can develop the imagination of adolescents (Yuandari and Rahman, 2022).

Table 3. Wilcoxon test analysis of the effect of video media health promotion on HIV/AIDS stigma in Class VIII adolescents at SMP Negeri 1 Depok

		Ranks		
		N	Mean Rank	Sum of Ranks
Posttest - Pretest	Negative Ranks	0 ^a	.00	.00
	Positive Ranks	38 ^b	19.50	741.00
	Ties	0 ^c		
	Total	38		

Source: Primary Data, July 2024

Test Statistics^a

	Posttest - Pretest
Z	-5.374 ^b
Asymp. Sig. (2-tailed)	.000

Based on Table 3. above, it can be explained that the results of the rank data analysis are that all respondents experienced an increase in the posttest score. The results of the statistical analysis of the Wilcoxon signed-rank test show the results of the p value <0.000, α <0.05 so that H_a is accepted. This shows that there is an effect of video media health promotion on HIV/AIDS stigma among adolescents in Class VIII SMP Negeri 1 Depok.

Video media is one of the preferred media when delivering information about the prevention and transmission of HIV/AIDS. The advantage and effectiveness of using this electronic media is an interesting presentation, so that people will be more focused on paying attention to the delivery of information (health promotion). (Widyaningtyas, 2019) Video media is more effective when used as a

health promotion tool in various aspects of the health sector.

Educational media with video has its own advantages, namely being able to display moving images that other learning media do not have, the concept of the story is packaged as a subject matter in learning and the material used, can be long and difficult to convey orally. But presented in the form of films and videos, it is easy for students to understand (Stüwe and Wegner, 2020). This was evident in this study when health education delivered through video media could be accepted more easily, resulting in a significant increase in knowledge. As a health worker, it is important to be able to see the opportunities of health education videos as an appropriate intervention in increasing public knowledge about health in various age groups (Aisah et al, 2021).

This study is in line with research (Putri et al., 2022) that video is one of the

preferred media when delivering information about HIV/AIDS prevention and transmission.

CONCLUSION

The stigma of Class VIII adolescents at SMP Negeri 1 Depok before being given video media health promotion on HIV/AIDS was mostly in the moderate stigma category as many as 22 respondents (57.89%).

The stigma of Class VIII adolescents at SMP Negeri 1 Depok after being given video media health promotion on HIV/AIDS is mostly stigma in the low stigma category as many as 34 respondents (89.47%) which shows that there is a change and decrease in adolescent stigma after being given HIV/AIDS video media health promotion.

There is an effect of video media health promotion on HIV/AIDS stigma among adolescents in Class VIII SMP Negeri 1 Depok in 2024 with a p value = 0.000, $\alpha < 0.05$ so that H_a is accepted and H_0 is rejected.

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Capacity Building of Village Midwives to Improve Knowledge about Self-Medication at Omben Public Health Center, Sampang Regency, East Java Province

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ABSTRACT

Background: Pregnancy is a physiological phase that needs to be prepared as well as possible. Sometimes when feeling complaints or symptoms of illness, pregnant women decide to take medication. However, most pregnant women do not know the safe use of drugs during pregnancy. This can certainly affect the health of the mother and the fetus in her womb. Therefore, it is necessary to provide information about self-medication so that pregnant women have sufficient knowledge of the right and safe drug consumption patterns. Based on these problems, this community empowerment program (PKM) is carried out to increase the capacity of village midwives. For this purpose, the study employed a quasi-experimental method. A total of 25 village midwives participated in the research. The program that will be carried out includes providing self-medication materials and communication methods, and training on how to make an RTL (follow-up action plan). After that, village midwives were taught to apply the snakes and ladders media as a means of delivering educational materials to pregnant women. **The results** of the activity show that there was an increase in the knowledge of village midwives after participating in the community empowerment program, leading to the conclusion that this snakes and ladders media can make it easier for pregnant women to understand the right self-medication during pregnancy so that pregnant women have additional knowledge and benefits in managing themselves regarding the right drug consumption.

Keywords: Omben East Java, Pregnant women, Quasi-experimental, Self-medication, Village midwife.

INTRODUCTION

Pregnancy, childbirth, and breastfeeding are physiological processes for women that need to be prepared and maintained as well as possible. When pregnant, the health of the mother and fetus is an important requirement for the development of both parts of the unit (Nasriyah and Ediyono, 2023). Even during the pregnancy and up to breastfeeding phase, a mother can experience complaints or disorders in her health. This causes the mother to have to take certain drugs or supplements to overcome these complaints. However, not all drugs consumed are safe for the mother and the baby she is carrying. Drugs can also cause unwanted effects on the fetus during pregnancy (Mangun, 2024).

Drugs consumed by pregnant women need special attention, because the

effects of the drug can affect the fetus. When in the placenta, drugs undergo a biotransformation process, where drugs can be beneficial and can also be detrimental. This biotransformation process can then form reactive compounds that are teratogenic/dysmorphogenic which can damage the fetus during growth (Ministry of Health of the Republic of Indonesia, 2006).

Some drugs can pose a risk to the health of the mother and the fetus she is carrying. The use of drugs in pregnant women in the first trimester is known to be riskier and can cause birth defects (teratogenic). This is because the first trimester is the development stage of the entire main body (except the central nervous system, eyes, teeth, external genitalia and ears) (Masikki and Fadhli, 2022). Therefore, exposure to drugs can permanently disrupt the formation of

these organs. The greatest risk at this stage is pregnancy aged 3-8 weeks. Meanwhile, in the second and third trimesters of pregnancy, drugs can affect the growth and functional development of the fetus or have toxic effects on fetal tissue. The effects of drugs given before birth can cause side effects at birth or in neonates after birth (Prest and Tan, 2003). According to (Ratri *et al.*, 2015), mothers' knowledge regarding the use of drugs during pregnancy is still very lacking. So it is necessary to provide education to increase the knowledge of pregnant women. Self-medication (swamedication) is the most common effort made by the community to treat complaints or symptoms of illness before they decide to seek help from a health service center (Lutfitasari *et al.*, 2021). Self-medication is an alternative for the community to increase the affordability of treatment. Self-medication is often done by the community when experiencing complaints or symptoms of minor illnesses such as fever, pain, dizziness, cough, influenza, stomach ulcers, worms, diarrhea, skin diseases, and others. The selection of the type of drug needs to pay attention to the symptoms or complaints of the disease and special conditions such as pregnancy, breastfeeding and others (Ifianti, 2022).

Knowledge about the use of over-the-counter drugs is very important for pregnant women. Choosing the wrong drug will have fatal consequences and can endanger the mother and her fetus (Nurlaila Hidayati, 2022). Therefore, it is necessary to increase the knowledge of pregnant women on how to choose good and correct drugs, one of which is by involving village midwives.

The role of village midwives is very important in efforts to increase the knowledge of pregnant women regarding self-medication. Village midwives are considered capable of conveying important information about how to use over-the-counter drugs safely for pregnant women because they have the knowledge to provide counseling to pregnant women properly (Muzdalia *et al.*, 2022). For this reason, it is necessary to strengthen the abilities of village midwives by holding counseling and training.

Sampang Regency, located on Madura Island, especially Omben District, is an important point for this training and counseling activity. It is known that the

lack of knowledge of pregnant women in the Omben area is still quite high (Masroah, Hidamansyah and Jayanti, 2024). For this reason, the Omben Health Center, Sampang Regency is the target of this program, because in this area there is still a need to provide information to pregnant women so that their knowledge about self-medication increases. For this reason, this program and research aims to provide a solution by increasing the knowledge and skills of village midwives in terms of self-medication in the Omben District Health Center area. It is hoped that with this program, village midwives will find it easier to communicate with pregnant women in their area. When village midwives are able to communicate well, knowledge about self-medication can be conveyed clearly so that pregnant women can know the procedures for safe drug consumption during pregnancy.

METHODS

The method used is quasi-experimental. The implementation of this activity is a collaboration between teams of lecturers from the Faculty of Public Health, the Faculty of Pharmacy, and the Faculty of Social and Political Sciences at Airlangga University. This activity was conducted over a period of three months, from July to September 2019. The subjects in this activity are 25 village midwives in Omben Sampang. Before the training, the village midwives were asked to fill out a questionnaire first (pre-test) to measure their initial knowledge of self-medication, then after the training and education about communication and self-medication using snakes and ladders as a media, they were given the same questionnaire as the pre-test and (post-test) in order to evaluate their knowledge and to spot if there was an improvement after the treatment. Additionally, the participants were also asked to develop a follow-up action plan (RTL) after completing training. The stages of community service activities consist of:

1. Planning the implementation of community service.
2. Coordination with the Omben Health Center Management.
3. Preparing for the implementation of capacity building for Village Midwives.
4. Conducting a pre-test before capacity building.

5. Implementing of capacity building for village midwives.
6. Conducting the “snakes and ladders” self-medication game as an educational media.
7. Evaluating capacity building activities through a post-test.
8. Developing a follow-up action plan (RTL) by participants.

The purpose of this activity is to equip village midwives with adequate knowledge about the concepts, benefits, risks, and limitations of self-medication, enabling them to serve as reliable sources of information for the community and prevent the misuse or overuse of medication that could harm health. Another goal is to train village midwives to communicate health information on self-medication effectively and clearly, tailored to the needs of pregnant women, breastfeeding mothers, and families.

The capacity building activities were conducted using the lecture method delivered by the community service team. The materials presented included communication procedures, materials on self-medication, and explanations about the snakes and ladders game material. Communication procedures need to be understood by village midwives effectively in order to convey health messages to the community. Afterward, the self-medication material was explained in detail. The community, especially pregnant women, needs to understand how to perform safe and effective self-medication during their pregnancy. To make the information on self-medication easier to understand, it was delivered through an interactive medium, namely the snakes and ladders game.

RESULTS AND DISCUSSION

Self-medication is a self-medication effort, usually done to overcome complaints and minor illnesses that are widely experienced by the community, such as fever, pain, dizziness, cough, influenza, stomach ulcers, worms, diarrhea, skin diseases and others. Self-medication is an alternative taken by the community to increase the accessibility of community treatment, requiring integrated guidelines so that medication errors do not occur. Pharmacists as one of the health professions should act as

information providers (drug informers), especially for drugs used in self-medication. Drugs that are included in the over-the-counter and limited over-the-counter drug groups are relatively safe to use for self-medication (self-medication) (Agustina, Nosa and Fauziah, 2023). It is known that the Village Midwife Capacity Building activity related to self-medication at the Omben Health Center, Sampang Regency, East Java Province was attended by 25 village midwives and coordinating midwives at the Health Center. The midwives received training on self-medication, especially for pregnant women using the snakes and ladders media which can be applied and applied to pregnant women in their respective areas. Through this, the activity is emphasized to provide an understanding to midwives that the snakes and ladders media will make it easier for health workers, especially midwives, to provide education about self-medication to the community.

The Village Capacity Building Activity to Increase Knowledge about Self-medication is divided into two activities. The first is self-medication training for village midwives in the Omben Health Center area. All village midwives who participated in this activity numbered 25 people and all respondents were female. Second, the activity carried out was the Village Midwife Practice in using the snakes and ladders media to increase knowledge about self-medication, which was attended by village midwives, cadres, and representatives of pregnant women.

Pre-Test and Post-Test Results

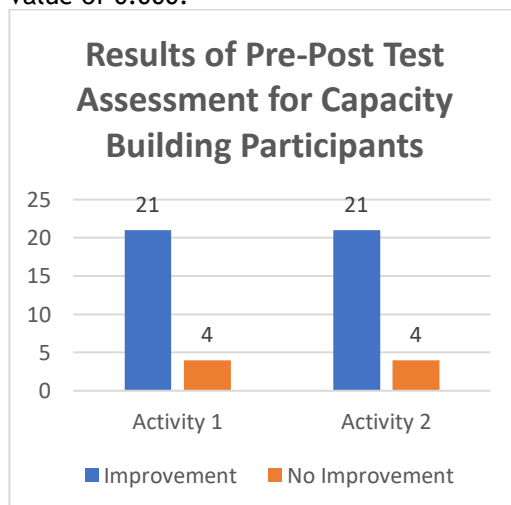
The pre-test and post-test activities were carried out using a questionnaire with several lists of questions given to respondents. Based on the results of the pre-test and post-test, it was known that there was an increase in midwives' knowledge about self-medication in conditions before and after training. Based on the records, it is known that 95% of participants stated that the training provided ease in the explanation process related to self-medication. In addition, the activities were arranged in a very engaging and interactive manner, designed like a game. This unique approach included elements such as challenges, teamwork, and rewards, making the activities both fun and educational. Participants were actively involved, which helped maintain

their interest and enthusiasm throughout. The game-like structure not only encouraged competition but also fostered cooperation among participants, ensuring the activities were dynamic and far from boring. These features made the experience enjoyable and memorable for everyone involved.



Picture 1. Practice with game snakes and ladders.

Based on the results of the pre-test and post-test of 25 midwives, it can be seen the graph 1 that there was an increase in the average score, both in activity one (1) and activity 2 (2). In supporting participants, outside the village midwife, it was also found that there was an increase in the average post-test score compared to the pre-test score in activity one (1) and activity two (2). There was an improvement in the average results of the pre and post-tests. The pre-test score was 79.2, and the post-test score was 94. After calculations and analysis, it was found that there was a significant difference between the pre-test and post-test scores with a p-value of 0.000.



Graph. 1 Result of Pre and Post-Test

Knowledge Improvement Activities about Self-medication using Snakes and Ladders and Follow-up Plans (RTL)

The activity began with the provision of material related to self-medication delivered orally, then continued with practice using snakes and ladders media. This activity also divided participants into three groups for the application of using snakes and ladders media accompanied by tutors in each group. After the groups were formed, participants prepared each snakes and ladders media package and discussed the jargon of each group. Next, participants in each group practiced using the snakes and ladders media based on the guidebook and mentoring and tutoring. After practicing using the snakes and ladders media, they were also given material on compiling a follow-up action plan (RTL) which is expected to be carried out by midwives in each region. RTL written and agreed upon by the participants includes the use of snakes and ladders media to increase community knowledge regarding self-medication. In addition, the village midwives are also committed to being tutors in the use of the media. Then, in addition to the two previous things, the village midwives were also committed to advocating to the village head with the aim of getting support in implementing increased knowledge about self-medication and being able to explain to village officials that self-medication is not intended to "kill" stalls that sell medicine, but to provide additional education related to the world of health.

Monitoring the commitment of village midwives is conducted through observation, evaluation of activity implementation, as well as feedback from participants. Reflective discussions with midwives are also used to identify challenges and provide solutions to ensure the program's sustainability.

Discussion

Capacity-building activities aim to enhance the knowledge and skills of individuals or groups relevant to their roles and responsibilities. In this context, capacity-building programs for village midwives on self-medication have proven effective in improving their knowledge, particularly in educating communities about the safe and responsible use of

medications. This aligns with previous research emphasizing the importance of training or capacity-building for healthcare workers to enhance their ability to deliver quality healthcare services (Majamanda *et al.*, 2022). In this regard, capacity-building efforts focus not only on technical aspects but also on empowering healthcare workers to serve as reliable sources of information for the community.

Other studies have also highlighted that training-based approaches can significantly improve the knowledge and skills of healthcare workers in delivering quality services, which is particularly relevant in the context of self-medication (Ruhmel *et al.*, 2022). Meanwhile, research conducted by (Hikmah *et al.*, 2023) revealed that education delivered through interactive methods, such as games, significantly improved participants' understanding. Interactive media has proven effective in capturing participants' attention and facilitating the delivery of critical health information, such as the proper use of medications. The study reported that game-based learning methods enhanced participant engagement and motivation, ultimately helping them better understand and retain the information provided (Hikmah *et al.*, 2023).

This increase in knowledge is crucial, given that self-medication is a common means for communities to independently access healthcare. However, without adequate knowledge, self-medication poses risks, including irrational drug use that may harm health. For instance, improper medication dosages or indications can exacerbate health conditions or lead to dangerous side effects. Research conducted by (Rudini *et al.*, 2024) found that training on self-medication improved community understanding and independence in practicing self-medication safely and appropriately. This research supports our findings, showing that, with increased knowledge, village midwives are better equipped to provide accurate information to the community, particularly to pregnant women, who often require specific guidance on medication use.

CONCLUSIONS

Through the results of the research conducted, it can be concluded that, first,

the training participants consisted of village midwives, cadres, and pregnant women. All village midwives became tutors and used the snakes and ladders media to improve community knowledge about self-medication. Second, the results of the pre-post test showed that participants' knowledge regarding self-medication had increased. Third, the commitment of participants in improving knowledge about self-medication using the snakes and ladders media can be seen from the follow-up action plan (RTL) which was prepared while simultaneously providing counseling to residents regarding self-medication using the snakes and ladders media aid.

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Mental Health of Adolescents in the Strawberry Generation: A Bibliometric Analysis

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ABSTRACT

Background: Basic Health Research (2018) recorded that more than 31 million people aged 15 years and above experience mental health disorders, with more than 19 million experiencing emotional disorders and 12 million depression. Adolescent mental health is an important issue in psychosocial development, especially in the digital era. The Strawberry Generation, which refers to today's teenagers, faces social and digital pressures that can cause stress, anxiety, and depression. **Aims:** This study aims to assess global research trends in adolescent mental health for the strawberry generation based on the emergence of terms in text data. **Methods:** A literature review using bibliometric analysis is used to answer the research objectives. **Results:** This study uses the Google Scholar, Scopus, and PubMed databases to analyze research between 2019 and 2024; the result is 500 journal articles. Results show that in the last 5 years, the trend of adolescent mental health research has had good stability with minor fluctuations. A significant increase occurred in 2020, while 2021 showed a mild decrease. From 2022 to 2024, the number of articles remained relatively stable although there was a slight decrease in 2024 due to the data being collected in August 2024. This stability suggests that the topic continues to receive consistent attention over a long period. **Conclusion:** Bibliometric analysis highlights increased publications on social media's impact on adolescent mental health but notes limited research with a lack of longitudinal methods; digital platforms like survey apps can aid periodic data collection for deeper long-term studies.

Keywords: Good health, Mental disorder, Mental health, Strawberry generation, Well-being.

INTRODUCTION

Adolescent mental health is a fundamental aspect of individual development that is often a major focus of public health research and practice. In the generation known as the “strawberry generation”—a group of adolescents born between the late 1990s and early 2010s—mental health challenges have become increasingly complex and specific. The term “strawberry generation” is used to describe adolescents who are growing up in a fast-paced, connected digital environment, facing pressures that previous generations have not experienced (Reid *et al.*, 2001).

The strawberry generation is a term that was first used as a “label” for Taiwanese people born after 1981. This term is intended for a generation that

“easily” wilts “like strawberries” that physically look exotic but are easily crushed when stepped on or bumped (Bemme and Kirmayer, 2020). The strawberry generation in Indonesia includes Gen Z and Gen Millennials with an age range of 20-34 years (Claretta, Rachmawati and Sukaesih, 2022). Statistics Center data in 2023 stated that the number of millennials in Indonesia aged 20-34 reached 24 percent. This strawberry generation often needs *self-healing*, self-esteem, and *work-life balance* to maintain their mental health (Martuti and Dharin, 2023).

The current mental health condition of adolescents can also be influenced by social media, according to (Wilson and McDarby, 2023) the use of social media (Facebook) has affected the mental health of adolescents in the last 15 years.



Individuals now receive information about social networks through feeds on social media that are more relevant to their lives. The content on the platform includes videos and can be easily accessed using a smartphone. This is what makes social media more exciting and has a bad effect on mental health (Wilson and McDarby, 2023).

Based on data (UNICEF (United Nations Children's Fund), 2021) the general picture of mental health in adolescents aged 10-19 years is caused by two things, namely anxiety and behavioral disorders in children. In adolescents aged 10-19 years, anxiety and depression disorders include around 40% of mental disorders, followed by behavioral disorders 20.1% and hyperactivity disorders due to lack of attention 19.5%. The effects of this anxiety disorder has caused an increase in the percentage of the seriousness of adolescents aged 13-15 years thinking about attempting suicide, in women by 4.8% in 2007 to 6.2% in 2015 and men by 3.2% in 2007 to 4.0% in 2015. Research by Grace, Tandra, and Merry (2021) shows that there are limitations in understanding mental health, so it is necessary to provide socialization regarding the importance of mental health with activities that can provide an effective understanding of mental health (Claretta, Rachmawati and Sukaesih, 2022).

In 2018, Basic Health Research found that more than 31 million people aged 15 years and over experienced mental health disorders. Of that number, more than 19 million were emotional disorders and more than 12 million were depressed (Wiradimadja, 2020). This supports the idea that Gen Z is not a resilient enough generation. The healthy mental health of adolescents in the strawberry generation is very important in efforts to realize optimal mental health levels for each individual, especially in improving the quality of productive age. The purpose of this study is to provide direction for hot topics and identify research trends related to adolescent mental health in the strawberry generation.

METHODS

Bibliometric analysis is a method used to determine research trends related to adolescent mental health in the strawberry generation. Bibliometrics is a

quantitative research method that is used to explore patterns, trends, and relationships in scientific publications (Hertinjung *et al.*, 2024). An examination of the academic literature on adolescent mental health in the strawberry generation provides important insights into the current state of research.

This study uses a literature review method with bibliometric analysis to answer the research objectives. Bibliometrics is a statistical analysis of books, articles, or other scientific publications. Conducting bibliometric analysis can use data on the number and authors of scientific publications and articles and citations in them which aim to measure the output of individuals or research teams, institutions, and countries, identify national and international networks, and map the development of new fields of science and technology (Hertinjung *et al.*, 2024). Bibliometrics are useful for evaluating and mapping the research of a researcher, research organization, and country over some time. Bibliometrics is also known as *Scientometrics* (Herawati, Utami and Karlina, 2022).

The literature study uses inclusion and exclusion criteria. The inclusion criteria used were original articles related to all research designs, open access, full-text papers, and articles published in journals between 2019 and 2024. The exclusion criteria are case reports, reviews, no outcome data, and inaccessible (closed access). Articles that do not meet the criteria will be excluded from the source data.

The topic of mental health, particularly in the strawberry generation of adolescents, has high urgency due to the high prevalence of mental disorders, the challenges of the digital age, and the far-reaching social impact. More in-depth and targeted research can help create more effective and relevant interventions to support adolescent mental health in the future.

The first step in conducting a bibliometric analysis is to systematically collect relevant scientific publications. The collection of publications is done using a *reference application manager*, namely *Harzing's Publish or Perish* (PoP), to find out the condition of citation distribution from a source. *Google Scholar*,

Scopus, and PubMed metadata from reputable international and national journals are synchronized into source data. The stages in bibliometric analysis begin with collecting articles related to the title study using *Publish or Perish* (PoP). Furthermore, data was processed and analyzed using Mendeley with the main checking criteria being abstract and keywords.

The article search in the PoP application uses the keyword “*Adolescent Mental Health for Strawberry Generation*” with the period of 2019-2024. Article searches were conducted on August 10, 2024. The selection of the Google Scholar database as a source of article data collection is based on easy access to article searches and the number of articles obtained is more with free access facilities. The maximum search for articles allowed in the Google Scholar database is 1000 articles. Scopus and PubMed are based on searching for reputable international journals. This study used 500 articles. Then information is obtained in the citation metrics section which displays complete quantitative data related to the search results of related journals. The data collected from the search results from PoP will be stored in the form of RIS (research information systems) files and then the data will be analyzed using the VosViewer application.

In the next stage regarding the visualization of article data in the form of networks, the VoSViewer application was used. VoSViewer software was used to analyze publication trends regarding strawberry generation and its influence on adolescent mental health. The output of data processing is in the form of network visualization, overlay visualization, and density visualization. The network visualization map is used to see the relationship and cluster of research themes related to the keywords used. Overlay visualization is used to identify the year theme-related research was conducted. Meanwhile, density visualization was utilized to analyze the research theme, which is still rarely researched.

RESULTS AND DISCUSSION

This study aims to identify research trends and co-authorship on the research topics and the extent to which

teenagers who are part of the strawberry generation experience mental health issues. This objective is achieved through analysis of bibliometrics with the help of PoP and VosViewer devices, while data were obtained from the Google Scholar, Scopus, and PubMed databases which were then exported to Mendeley. Based on the results of the bibliometric analysis, it will display several pieces of information,: 1) Data analysis of citations from PoP, 2) Study trends of mental health over the past five years (2019-2024), 3) Networked research on mental health in the strawberry generation, 4) Related research clusters.

Here is the table description:

Table 1. Citation Data Metrics

Publication years	: 2019-2024
Citation years	: 5 (2019-2024)
Papers	: 500
Citations	: 10,707
Cites/year	: 2,141.40
Cites/paper	: 21.41
Cites/author	: 5,893.68
Papers/author	: 309,05
Author/paper	: 2.43
h-index	: 42
g-index	: 98
hl norm	: 29
hl annual	: 5.80
hA-index	: 26
Paper with ACC > =1,2,5,10,20 :	253,196,123,62,33

Table 1 describes that during the 5-year final, there are several 500 articles relevant with the keywords “*Adolescent Mental Health for the Strawberry Generation*” having paper, abstract, and keywords displayed in the Google Scholar, Scopus, and PubMed databases. The total number of citations from all articles is 10,707 with an average per year of 2,141.40, and the average citations per paper is 21.41. The average h-index owned by each author is 42, with the number quoted highest being 98.

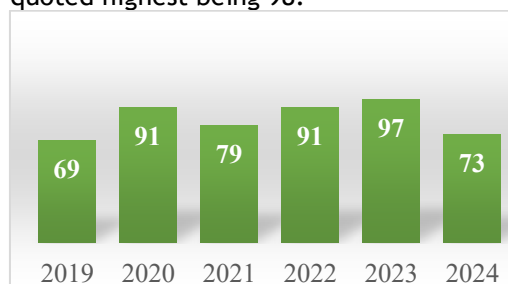


Figure 1. Research Trends of Adolescent Mental Health for Strawberry Generation

The trend of research developments on “*Adolescent Mental Health for the Strawberry Generation*” is shown in Figure 1 which experienced quite significant changes. The graph shows a trend where related research from 2021 will peak in 2023. However, the research figures for 2024 are still uncertain, because this data collection was carried out in August 2024, so it remains to be confirmed whether there will be an additional amount of study concerning analysis of trends in *Adolescent Mental Health for Strawberry Generation* in the last five years.

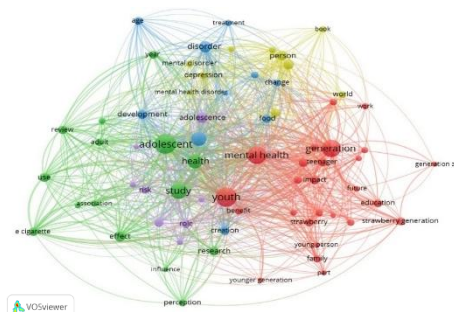


Figure 2. Network Visualization of Networks between Research Topic Adolescent Mental Health for the Strawberry Generation.

Network between topics found based on study of adolescent mental health especially in the strawberry generation. The number of topics found was 500 articles from 2019 to 2024. Bibliometric analysis was carried out by visualizing. The structure of the network of relationships between research keywords with the help of *VosViewer software* can be seen in Figure 2 which shows the results from processed keywords mapping. This displays the picture in detail and the cluster section provides a general overview and insight. Each circle represents a keyword which often appears, and the size of the circle depends on the topic related to the article.

All research themes related to adolescent mental health, especially those occurring in the strawberry generation, are grouped into five main

clusters with different colors, namely red, green, blue, yellow, and purple. Each color has similarities that can be checked in the section ‘items’ on *VosViewer*. The five clusters with their respective topics appearing based on color are *mental health*, *generation*, *youth* (round red), *adolescent* (round green), *child* (round blue), *person* (round yellow), and *adolescence* (purple round). In addition, it appears that network visualization shows the relationship between issues in studies, starting from popular issues to less popular issues, so that they can be used as proposals for further research.

In visualization Figure 2, the size of the circle shows the keywords that stand out with those used more having a big size circle. There are the topics *mental health*, *generation*, *youth*, and *adolescence*. Circles with small size and distance link show that the issue still seldom appears and connections are weak with the main keywords so that it is possible to do further research.

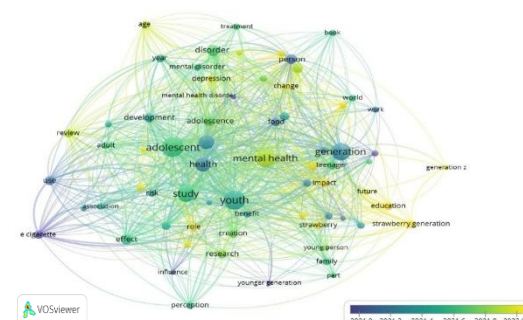


Figure 3. Visualization of Research Trends Overlay Based on Keywords

Based on the visualization above, it shows that the yellow circles indicate the topics. It indicates that the topic of research on adolescent mental health is recent.

Bringing up the words “*Adolescent Mental Health for Strawberry Generation*” and then processing with *VosViewer*, there are five groups or clusters. Based on the results of item analysis on the *VosViewer software*, the five clusters are mental health, youth, generation, adolescent, health, effect, child, and disorder. The cluster grouping can be seen in Table 2 following.

Table 2. Cluster Identification

Cluster	Total Item	Most frequent keywords (occurrences)	Keyword
1	26	Mental health (369), youth (365), generation (357), impact (97).	Benefit, community, covid, education, experience, family, future, future generation, generation, generation Z, impact, mental health, parent, part, relationship, school, strawberry, strawberry generation, student, teen, teenager, time, work, young person, young generation, youth.
2	15	Adolescent (475), health (250), effect (150), use (131).	Adolescent, adult, e-cigarette, effect, health, influence, new generation, perception, research, review, study, use, year, young adult.
3	10	Child (242), disorder (161), development (111), food (97).	Age, case study, change, child, creation, development, disorder, food, nutrition, treatment.
4	10	Person (130), life (105), depression (82), mental illness (73).	Anxiety, book, depression, life, mental disorder, mental health disorder, mental illness, person, quality, world.
5	8	Adolescence (127), consumption (97), role (95), risk (80).	Addition, adolescence, adolescent, Canada, consumption, obesity, risk, role

Discussion

Based on the visualization and topic grouping from *VosViewer*, it appears that the mental health condition of adolescents in the last two years cannot be separated from generation. The strawberry generation is known to be weaker than the previous generation (Claretta, Rachmawati and Sukaesih, 2022). The high expectations from the surrounding environment such as family, friends, and society can create pressure to achieve a certain standard in life. Pressure in terms of social expectations and academic achievement affects the emotional stability of adolescents so they often feel anxious and afraid of failing to achieve the expected achievements (Putri *et al.*, 2024).

According to Hongell-Ekholm, Londen, and Fagerlund (2024), mental health problems in adolescents caused by academic achievement pressure can be controlled by using Study with Strength, which is included in the school curriculum. This positive psychology intervention can support adolescents' well-being and personal growth positively. This is in line with the results of research conducted by Alam and Mohanty (2024) which states that handling good psychological constructs

within the educational environment can foster students' hope, life satisfaction, and self-esteem and have long-term effects on students' well-being and academic achievement.

Concerns about the cost of living in the strawberry generation are one of the factors that disrupt the mental health of adolescents, this is according to research conducted by Saila Nur Kamilah (2024) which states that high inflation will hurt Generation Z who are just starting their careers and have limited income. So they must have the ability to achieve financial stability and manage personal finances more wisely. According to Razak, Wirawan, Alwi, Lukman, and Jalal (2024), the entrepreneurial readiness of strawberry generation students can be achieved by implementing entrepreneurship education that is strengthened by digital business literacy and financial literacy.

The results of the item analysis on the *VosViewer software* from the five clusters show that the factors influencing adolescents' mental health in the strawberry generation are *mental health, youth, generation, adolescent, health, effect, child, and disorder*. Mental health itself includes stress and anxiety (Rapee *et*



al., 2019). Stress and anxiety of the strawberry generation are associated with various factors, including social change, the influence of social media, and a lack of understanding of mental health (Rautela, Sharma and Panackal, 2024). They tend to be susceptible to stress and emotional pressure, are easily over-anxious, feel tied, and have difficulty dealing with pressure and challenges. This stress and anxiety can result in depression and mental disorders (Putri *et al.*, 2024).

The use of social media is one of the factors for mental health problems in adolescents (Ivie *et al.*, 2020). Based on the results of research conducted by Boer, Stevens, Finkenauer, de Looze, & van den Eijnden (2021), social media is one of the factors for the decline in adolescent mental health in the strawberry generation. Through the random intercept cross-lagged panel model, it shows that there is a direct unidirectional relationship between the problem of intensive social media use / social media use intensity (SMU) and mental health. Problems in high school are associated with decreased mental health one year later, but not vice versa. This is not in line with the results of research from Marciano, Ostroumova, Schulz, and Camerini (2022), which states that not all types of digital media use have adverse consequences on adolescent mental health. Specifically, face-to-face communication, self-disclosure in the context of online friendships, and positive and humorous online experiences reduced feelings of loneliness and stress.

In some cases, the stress and anxiety of the strawberry generation can result in suicidal tendencies, as shown by a survey that found that 1 in 12 months. This tendency is associated with complex pressures, including the presence of social media which can affect young people's self-confidence and make them more vulnerable to stress and anxiety (Panjaitan, 2024).

CONCLUSIONS

Bibliometric analysis shows that there has been a significant increase in the number of publications discussing adolescent mental health conditions such as anxiety, depression, and adolescent behavioral disorders resulting from intense exposure to social media. This trend reflects the growing concern regarding

social media's role in the strawberry generation's psychological well-being. Bibliometric analysis also reveals limitations in the literature. Many studies focus on a specific country or culture, so the results may not be fully generalizable to the global adolescent population. In addition, some studies still lack longitudinal methodologies that can provide insights into changes in mental health over time. Therefore, digital platforms such as survey apps can be utilized for periodic data collection to support deeper, long-term research.

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Improving Medical Wellness with Halal and Thayyib Certification in Traditional Health Services: A Literature Review

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ABSTRACT

Background: Halal and thayyib certifications are generally used to certify that food products adhere to Islamic rules. "Halal" refers to what is permitted or halal in Islam, whereas "Thayyib" emphasizes goodness, safety, and responsible sourcing. However, certification can be applied to a variety of commodities and services, including traditional health services. Traditional healing services must be developed in a complete manner that respects cultural variety, stimulates collaboration among many healing traditions, assures quality and safety standards, and prioritizes community involvement and empowerment. **Aims:** This study examines thayyib and halal certification as a means of improving traditional health service promises and achieving medical wellness. **Method:** The present study employs a literature review methodology, drawing on national and international journals published between 2019 and 2023. The journal sources consulted for this research encompass PubMed, Google Scholar, Elsevier, and Research Gate. **Result:** The findings indicate that common beliefs about moral sourcing, religious compliance, and holistic health promotion underpin the association between halal and thayyib certification and medical health. Providers can deliver services that prioritize the safety, quality, and well-being of people as well as the community as a whole while still adhering to religious restrictions by incorporating this accreditation into their medical operations. **Conclusion:** In summary, the relationship between medical wellness and certifications for halal and thayyib highlights the value of cultural sensitivity, quality control, and comprehensive health promotion in healthcare services. Integrating this credential into medical practice allows healthcare professionals to serve a variety of patient populations better and advance inclusive, moral, and sustainable healthcare.

Keywords: Halal certification, Thayyib, Traditional Health Services, Medical Wellness

INTRODUCTION

The term "halal lifestyle" is gaining popularity in the modern world. This style of living violates aspects of Islamic Sharia, particularly Muslims' responsibility to use and consume only halal products. It has potential for building a halal lifestyle for a variety of things that society needs (Mursidah and Fartini, 2023). Halal and thayyib certifications are most commonly related to food goods, ensuring they adhere to Islamic requirements. "Halal" refers to what is allowed in Islam, whereas "thayyib" emphasizes goodness, safety, and ethical sources. However, the concept of certification can be extended beyond merely food to include other items and services, including traditional health services.

Traditional healing services must be developed using a comprehensive approach that respects cultural variety,

stimulates collaboration among different healing traditions, assures quality and safety standards, and prioritizes community involvement and empowerment. Communities can provide more comprehensive and culturally sensitive healthcare services by leveraging the abundance of traditional healing traditions and integrating them with modern healthcare systems (Patwardhan *et al.*, 2023).

The connection between halal and thayyib certification and medical health is rooted in religious principles, ethical sources, and holistic health practices. Halal certification guarantees that products and services adhere to Islamic law, including healthcare practices. For Muslim patients, halal-certified medical services offer reassurance that these services align with their religious beliefs. Additionally, thayyib certification focuses on integrity, safety, and ethical resources.

In the medical context, this certification ensures that services are not only permissible but also of high quality, safe, and free from harmful substances or practices (Firdayani and Sholichah, 2023)

Moreover, medical health encompasses a broad spectrum of services designed to enhance overall well-being, including preventive care, alternative therapies, and lifestyle interventions. Halal and thayyib certified medical services align with Islamic principles of healthy living, which emphasize physical, mental, and spiritual health. These certifications reflect cultural sensitivity and inclusivity, catering to the specific needs and preferences of Muslim patients. This approach can build trust and engagement within Muslim communities, promoting better access to health services. This research aims to explore halal and thayyib certification as a means to enhance traditional health service guarantees and achieve medical wellness.

METHODS

This study employs a literature search approach that draws on national and international journals published between 2019 and 2023. The following terms are used in the literature: medical wellness, halal certification, thayyib, and health services. A study and analysis of various literatures were conducted to determine the development of halal and thayyib certified traditional health services in Indonesia. Meanwhile, the journal sources used include PubMed, Google Scholar, Elsevier, and Research Gate. The process of sorting literature involves establishing keywords and search criteria. The main keywords were “medical health,” “halal certification,” “thayyib,” and “health services.” The researchers then assessed the method, the results, and the discussion’s relevance to the research issue. Meanwhile, descriptive analysis was employed. Researchers describe their main findings from each categorized literature and then address the findings’ significance for enhancing medical health through halal and thayyib certification.

RESULTS AND DISCUSSION

No	Authors, Year	Title	Methods	Results
1	(Wahyudi et al., 2023)	<i>Halal Certification of Drugs and Food in Normative and Health Review</i>	Literature review	The certification of food and medicine items as halal is crucial for Muslim customers and advantageous for producers of food and medicine. The products in question that fall under the category of halal are any and all types of items that are created using materials that are approved by the Shari'a for use, everyday use, or eating.
2	(Yuanitasari, Sardjono and Susetyo, 2021)	<i>The Government's Role in Indonesian Halal Industry to Protect Muslim Consumer</i>	Normative law	The government, or state, is required to participate in halal certification in order to safeguard Muslim consumers and promote social welfare, as a result of the numerous rules and regulations that effectively manage the interests (almasalah) of Muslim consumers. By handling halal certification for business actors through digital application-based data integration, processes will be accelerated and new laws pertaining to the Ciptaker Law regarding halal certification will be created.
3	(Hasan, 2019)	<i>The Importance of Halal Certified Products in Samarinda City : in the light of Maqasid Al-Syari'ah</i>	Sociology legal theory combined with empirical normative research	In Samarinda, halal certification is at the hajjiyah level, meaning that it is necessary. The absence of halal certification in Samarinda City does not necessarily result in errors, although it may complicate matters. As a result, Samarinda City's halal certification requirement is crucial since Muslim customers want it.

No	Authors, Year	Title	Methods	Results
4	(Rahman, 2023)	<i>Obligation to Register Halal Certification of Pharmaceutical Products as Guarantee of Halal Products Based on the Perspective of Maqashid Al Syariah</i>	Normative-juridical approach	Maqashid sharia on the requirement that pharmaceutical products register for halal certification as maslahah, or goodness and welfare in delivering benefits. Despite the fact that using pharmaceuticals in a health facility requires registration and halalness consideration.
5	(Ruhana, 2021)	<i>Research on Halal Certification in Indonesia</i>	Literature review	Publications about developments in halal certification in Indonesia have multiplied dramatically. The most searched-for keyword subjects include Indonesia, items, and halal. The literature suggests that the implementation of halal certification in Indonesia faces four main challenges, which are infrastructure, technical, regulatory, and interrelationship-related.

DISCUSSION

The Urgency of Halal and Thayyib Certification

Indonesia is a Muslim majority country (Hasan, 2019). With the development of food and beverage processing technologies, complicated manufacturing procedures, and a wide variety of components in cosmetics and medications, it is becoming harder and harder to verify whether a product is halal. Determining what food is halal and what is haram has become more difficult due to recent developments in science and technology. The halal label is necessary due to the growing distribution of processed food items. It covers the supply of ingredients, processing, storage, packaging, distribution, sales, and product presentation in addition to the raw materials. Consequently, it is necessary to have adequate knowledge of Islamic legal principles or norms (Yuanitasari, Sardjono and Susetyo, 2021).

According to (Wahyudi *et al.*, 2023) halal certification of a product is very important for Muslim consumers. A halal certificate, in the form of a fatwa from the MUI certifying that a food product conforms with the relevant provisions of Islamic law, is issued by the Halal Product Guarantee Organizing Agency (BPJPH) via the Indonesian Ulema Council (MUI). The MUI halal certificate is a prerequisite that must be satisfied in order to receive a halal label; in other words, the inclusion of a

halal label on food product packaging is dependent upon the MUI halal certificate.

Meanwhile, incorporating halal and thayyib certification into traditional health services can provide several benefits (Warto and Samsuri, 2020).

1. Religious Compliance: Understanding that their medical care is in line with Islamic teachings can give Muslim patients comfort and a sense of religious fulfillment.
2. Quality Assurance: According to the thayyib principles, certification guarantees that the services are safe, of the highest caliber, and devoid of any harmful or outlawed chemicals.
3. Customer Confidence: By showcasing a dedication to moral and open business procedures, certification can boost customer confidence and trust, both among Muslims and non-Muslim patients.
4. Market Expansion: Healthcare providers can reach the expanding market of Muslim customers who value upholding Islamic principles in all facets of their lives by providing halal and thayyib certified healthcare services.
5. Worldwide Recognition: Possessing a halal certification can help traditional healthcare services become more reputable and competitive in areas

with sizable Muslim populations or where it is highly prized.

Ultimately, incorporating halal and thayyib certification into traditional healthcare can serve as a way to improve the quality, accessibility, and cultural relevance of healthcare, meeting the specific needs and preferences of Muslim patients while promoting broader ethical principles and sustainable practices (Warto and Samsuri, 2020).

How to Improve Traditional Healthcare Coverage

Indonesia has provided sufficient regulatory mechanisms for guaranteed halal products, ranging from the Minister of Religious Affairs' Regulation to the Law. Regrettably, there has been a glitch in the halal certification process. The organization's preparedness and sound halal governance did not seem to promote the increase in public knowledge of halal and the business actors' desire for halal certificates (Ruhana, 2021).

Conventional healthcare centers are facilities that organize and provide healthcare services. Medical practitioners in their field treat patients using methods and treatments that are based on information and skills that have been passed down through the generations. The services offered by the health industry lack a clear relationship between the customers' (i.e., patients') health and that of the employees. Basic individual rights, which are related to the right to self-determination and include the right to know one's own health status, the right to consent to or refuse medical treatment, and the right to seek a second opinion, are distinct from basic social rights, which are supplied by health services for patients (Rastiti *et al.*, 2025).

Efforts to broaden traditional health service coverage include a number of steps aimed at improving access, quality, and safety. Several attempts can be made in this area, including the following:

1. Recognition and Integration:
Increase the official recognition of traditional health practices within the national health system. Traditional health practices can be integrated into modern health systems, increasing community accessibility and care options.
2. Regulation and Standardization:

Create an appropriate regulatory framework for traditional healthcare procedures, such as licensing requirements, patient safety rules, and quality standards. Standardization is also necessary to assure the consistency and quality of care.

3. Education and Training:

Investigate education and training programs for traditional health practitioners to improve their competence in safe and effective techniques. This may also involve education in medical ethics, patient care, and practice administration.

The Relationship between Medical Wellness and Halal and Thayyib Certification

The term "medical wellness" was invented in 1959 by American physician Halbert Dunn, who described a certain state of health as an all-encompassing sense of well-being that sees people as being dependent on their surroundings for their physical, mental, and spiritual well-being. High levels of health are what Dunn refers to as an exceptional state of personal fulfillment (Dewi, 2023). The relationship between halal and thayyib certification and medical wellness has many aspects, including:

- Cultural Sensitivity and Inclusivity:
Certifications for halal and thayyib guarantee that goods and services adhere to ethical purchasing practices and Islamic dietary guidelines. In the context of medical care, providing halal and thayyib certified services shows inclusion and cultural awareness while attending to the needs of Muslim patients who follow these moral and dietary rules (Islami, 2023)
- Quality and Safety Assurance: While thayyib certification places an emphasis on completeness, safety, and ethical sourcing, halal certification confirms that goods and services adhere to Islamic dietary regulations. This certification, when applied to medical health services, gives customers peace of mind that the offerings are safe, high-quality, and devoid of dangerous materials or procedures (Pebriani, Setiawan and Bayinah, 2023).

- **Holistic Health Promotion:** Promoting holistic health and well-being, which takes into account elements of mental, spiritual, and physical health, is the main goal of medicine. Medical services that are certified as halal and thayyib adhere to the tenets of Islamic teachings, encourage healthy lives, and accommodate the demands of people from a variety of cultural backgrounds (Ambushe *et al.*, 2023).
- **Building Confidence and Trust:** A certification in service delivery denotes accountability, transparency, and honesty. Healthcare service providers can gain the faith and confidence of Muslim clients and non-Muslims who respect morality and openness by providing halal and thayyib certified medical services (Vian, 2020).
- **Market Differentiation and Accessibility:** Providing halal and thayyib certified medical healthcare services can help service providers stand out in the marketplace and make themselves more accessible to Muslim patients looking for healthcare options that are appropriate for their cultural background in areas with sizable Muslim populations or where halal certification is highly valued (Fitrianingrum and Aruny, 2021).

It is crucial to remember that halal and haram refer to more than just food and drink; when using medicinal items, one must also consider their idolatry in order to receive treatment. The aspects of drug idolatry should also be considered when using drugs. The Qur'anic mandate to exclusively eat halal food serves as the foundation for every Muslim's attention to detail and deliberate consumption of halal food (Rahman, 2023).

In general, the correlation between medical wellness and certification in halal and thayyib highlights the significance of cultural sensitivity, quality control, and comprehensive health promotion in the provision of healthcare services. Providers can better serve the needs of different communities and advance inclusive, moral, and sustainable healthcare by incorporating this accreditation into their medical practices.

CONCLUSION

The study found that halal and thayyib certifications and medical health are linked by common principles such as ethical sourcing, religious compliance, and holistic health promotion. Integrating this accreditation into medical health practices allows clinicians to provide services that not only follow religious requirements but also prioritize the safety, quality, and well-being of people and the community as a whole. Halal and thayyib certifications contribute significantly to the improvement of traditional health services to obtain medical wellness. Halal certification ensures that products and services adhere to Islamic law, assuring Muslim customers that the services they get are consistent with their religious beliefs and practices. Meanwhile, thayyib certification stresses integrity, safety, and ethical resource management, assuring that the services offered are not only compliant but also of high quality, safe, and devoid of dangerous materials or procedures.

According to a review of the literature, medical services can become more inclusive and sensitive to cultural differences if they are certified as halal and thayyib. Increased trust and engagement within Muslim communities can result from this, which can promote easier access to healthcare. This health service can provide a holistic and all-encompassing approach to medical well-being by integrating the health principles recommended by Islamic teachings, which include physical, mental, and spiritual health.

Recommendations for future researchers are to compare the health outcomes of patients who receive certified traditional health services with those who are not certified. For the government, to develop policies and regulations that support halal and thayyib certification in the traditional health sector. Furthermore, the government and non-governmental organizations can collaborate to create and enhance guidelines and requirements for thayyib and halal certification in conventional healthcare services. In addition, people in the community need to learn more about the benefits of thayyib and halal in relation to health services. They should take care to select

conventional health services that have received halal and thayyib certification and participate actively in research and development projects pertaining to traditional health services that are certified halal and thayyib, or make other contributions.

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