Telemedical Literacy and Reproductive Health Literacy in Adolescents in The Urban Area

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Article Info

Abstract

The Maternal Mortality Rate nationally has yet to gain the target of a drop of 183 per 100,000 live births. Telemedical literacy is an innovation to improve access to information and health services, including youth reproductive health. The study aims to analyze the correlation between telemedical literacy and reproductive health literacy in adolescents in the Middle Semarang Subdistrict. This observational study uses a cross-sectional design. The data from 200 teenagers chosen by consecutive sampling were collected through a self-administered online questionnaire and analyzed using a rank Spearman test. Binary Logistic Regression was used for multivariat analysis. The results showed that telemedical and reproductive health literacy were sufficient. Age and education correlate positively to both telemedical literacy and reproductive health literacy. Reproductive health literacy also associates with Telemedical literacy (P-value 0.001; OR=28.667). Government and private health institutions must increase reproductive health campaigns through online media.
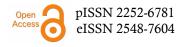
INTRODUCTION

Indonesia is one of the countries with the highest Maternal Mortality Rate in Southeast Asia. The figure is also far from the Sustainable Development Goals target to bring it down to 183 per 100,000 live births by 2024 and less than 70 per 100,000 live births by 2030 (Ministry of Health, 2020). While the infant mortality rate should still be lowered to less than 16 per 1000 live births in 2024, and death under five years old is expected to reach 18.8 per 1000 live births by 2030 (Ministry of Health of Republic Indonesia, 2019).

One of the factors affecting the increase in the Maternal and Infant Death Rate is the risk of 4 Too (Too young to give birth under the age of 21, too old to give birth above 35 years, too close to birth range less than three years and too many children more than 2). The percentage of mothers under 20 years of age and over 35 who die during childbirth is 33% of all maternal deaths (Ministry of Health, 2019). Based on these figures, there are age groups of adolescents who are at risk of death from pregnancy and childbirth.

Pregnancy in adolescence is one of the consequences of premarital sexual behavior. This behavior can be due to insufficient knowledge, negative attitudes, peers' influences, non-optimal parents' role, values, access to information, or other factors (Glanz, 2008). Several studies have

been done to analyze the factors that cause the emergence of adolescent risky sexual behavior toward the occurrence of high-risk pregnancy. A literature review conducted in 2022 found that internet and social media use was related to teen sexual behavior (Realita, 2022). Another study also mentioned that teen sexual behavior is related to the ease of access to information media (Fransiska, 2022). The role of online media today has a massive influence on youth sexual behavior, considering that in early 2022 internet users in Indonesia reached 77.02% of the total population (Asosiasi Penyedia Jasa Internet Indonesia, 2022). The development of digital technology accompanied by the massif of the use of internet media needs to be controlled with good information technology literacy to suppress and minimize the adverse effects. Telemedical literacy is becoming part of information technology literacy, a crucial competency helpful in improving reproductive health literacy, especially in adolescents.

The city of Semarang is one of the areas with a maternal death rate of 71.35 per 100,000 live births in 2020 (Semarang District Health office, 2021). As a city that continues to develop into a smart city in 2025, Kota Semarang is committed to facilitating all access to services and digitally-based information. The Central Semarang subdistrict was chosen as the research site because it is located in the middle of Semarang City, with various information access facilities available. This situation puts youths in the Central Semarang Subdistrict on the freedom of access to information, including telemedical and information about reproductive health online.

Based on that background, it is necessary to measure literacy abilities, including telemedical and reproductive health literacy. The research question is whether there is a connection between telemedical literacy and reproductive health literacy. The purpose of this study was to analyze the relationship between telemedical literacy and reproductive health literacy in the adolescent age group in the Central Semarang Subdistrict.

METHOD

This observational study uses a quantitative approach with a cross-sectional design. Data was collected through a survey with an electronic questionnaire using a Google form containing 19 questions on reproductive health literacy (a modification of the HLS-SF12 questionnaire) and four telemedicine literacy questions, which the researcher modified. HLS-SF12 was shown to be a valid and reliable tool for HL surveys in the general public in six Asian countries including In-

donesia (Duong *et al.*, 2019)a 12-item short-form HL questionnaire (HLS-SF12. Literacy questions include four competencies related to accessing, understanding, appraising, and applying health information (Sørensen *et al.*, 2012). The demographic variables measured include age, sex, occupation, education level, marital status, health insurance coverage, and the chosen health facility in numeric scale.

Previous research showed that reproductive health literacy in 25.8% of adolescents in urban areas had problems (Rahmadhani *et al.*, 2023). The sample size for the study was calculated based on previous research using Po = 25%, Pa = 15%, alpha 5%, and power 80% with the Lemeshow formula (Lemeshow, 1997).

$$n = \frac{\{Z_{1-\alpha} \sqrt{Po\,(1\text{-}Po)} + Z_{1-\beta} \sqrt{Pa\,(1\text{-}Pa)}\}^2}{(Pa\text{-}Po)^2}$$

The 200 participants were chosen by consecutive sampling based on the inclusion criteria: adolescents aged 10-24 years, living in Central Semarang District, and willing to be involved in research. Enumerators have visited every house in which there are teenagers who fit the inclusion criteria in the Central Semarang District area. Data collection is stopped when the number of samples collected is sufficient. The Pearson Product Moment Test has tested the instrument's reproductive health literacy and telemedicine literacy variables for validity. The item question is valid if r value > r table 0,138. Then, the variable is reliable if Cronbach's Alpha > 0,6. Cronbach's Alpha value of reproductive health literacy was 0,983 and 0,967 for telemedicine literacy. The validity and reliability test used the primary data.

Data was collected through interviews with enumerators the research team had previously trained. The enumerators used Google Forms as instruments for direct interviews. The collected data is cleaned first before processing. The literacy score on each item is 1 for very difficult, 2 for difficult, 3 for easy, and 4 for very easy choices. All items in each variable are then analyzed descriptively. The question about maternal and child health is divided into Accessing (items no. 1-5), Understanding (items no. 6-10), Appraising (items no. 11-15), and Applying (items no. 16-19).

Several variables were analyzed by cross-tabulation. It was bivariate analyzed using a correlation test rank-spearman test. Confounding factors of this study were controlled by conducting multivariat analysis (binary logistic regression). Unfortunately in this study, no category stratifica-

tion was carried out on the demographic variables of participants, so the possibility of bias is high. This study was conducted under the supervision of the udinus ethics committee with the number 135/EA/KEPK-Fkes-UDINUS/X/2021.

RESULT AND DISCUSION

The mean age of the partisipants was 16.06 years old (SD 3.12) with an age range 12-24 years old. The mean age of this participant was 16.06 years old (SD 3.12), with an age range of 12-24 years old. Based on developmental psychology theory, most participants are in the teenage range, which usually starts at 13 and ends at 17 and 18 (Hurlock, 2002). Adolescence is a transition from childhood to adulthood. Adolescents experience significant physical, psychic, emotional, and social changes during this period. All of these changes require mental adjustment concerning the formation of youth's attitudes, interests, values, and sexual roles and behaviors (Hurlock, 2002). The influence of the peer group has a large proportion in every teenager's decision-making regarding sexual behavior (Arimbi Prashintya Simawang, Khairunnisa Hasan, Anisya Febriyanti and Alvionita, 2022). The peer group's influence on a large portion of this sexual behavior would be at risk of unintended adolescent pregnancy. The majority participants (84.5%) are fall within the age group of under 20 years. Unintended pregnancy in adolescence has risks associated with reproductive health. In some previous studies, pregnancies less than 20 years of age were at low birth weight risk and contributed to infant mortality and maternal mortality rates (Nurhayati, 2020).

This condition places women as a vulnerable group in the context of prospective mothers and needs special attention. Most of these research participants were female with Senior High School education levels. Although most are students, a small proportion (2.5%) are married, and 7.1% are at high risk of pregnancy complications. Unfortunately, this study did not ask about the status of pregnancy and the history of parity. So it is not yet known high risk of pregnancy complications in participants who have been married at less than 20 years of age.

In terms of health care funding, this research participation has no substantial concern be-

Table 1. Statistics Descriptive of Participants' Socio-Demographic (n=200)

Variables	N (%)
Sex	
Male	43(21.5)
Female	157(78.5)
Education	
Not school	3 (1.5)
Junior High School	85(44)
Senior High School	98(49)
Undergraduate	14(7)
Occupation	
Student	160(80)
Worker	26(13)
Unemployment	14(7)
Marital Status	
Married	5(2.5)
Unmarried	195(97.5)
Primary Health Care Unit	
Primary Health Care	151(75.5)
Hospital/ Secondary Health Care	8(4)
Private Clinics	41(20.5)
Health Insurance Coverage	
Member	172(86)
Non member	28(14)

cause most (86%) have been registered as registered beneficiaries of the national health insurance system. A significant proportion (75.5%)of the respondents indicated a preference for the local Public Health Center as their preferred health facility for health maintenance and accessing medication. Based on the study on reproductive health satisfaction in Lampung shows that the vast majority of women aged 20-50 use National Health Guarantee, and they are satisfied with women's health services (Agustanti, 2022). Although their condition is relatively safe from the health funding side, the risk of reproductive problems from other causes remains to be anticipated. Previous studies on maternal and infant mortality risk factors mentioned several determinants such as maternal age, parity, social and economic status, birth weight, innate disease, birth range, antenatal care, participation in family planning programs, maternity complications, husband support, and access to health facilities (Manurung, 2022; Astikah et al., 2022).

Most of this study's participants felt the ease of accessing information about health care on telemedical sites. Even so, about 23-30% of participants still find it challenging to access, understand, evaluate, and apply health care information on online media.

In this era of digitalization, it is increasingly easy for people to access all the information they want. In early 2022, Indonesian internet users reached 210 million out of 272.68 million Indonesians, or about 77.02%, up from 73.7% in quarters II to 2020 (Asosiasi Penyedia Jasa Internet Indonesia, 2022). By age, 99.16% of the population aged 13-18 already use the internet. Whereas in the age group of 19-34 years, 98.64% of that number already use the internet (Asosiasi Penyedia Jasa Internet Indonesia, 2022). This vast internet access will encourage more and more people to have good literacy, including telemedical and reproductive health literacy. Unfortunately, participants in this study also still needed to reach maximum literacy (percentage above 90%).

This condition is reflected in the measurement results of the reproductive health literacy of the participants of this study. The vast majority (5.5% - 61%) of participants find it easy to access, understand, evaluate, and apply information about reproductive health. The Indonesian Internet Service Providers Association reports that the internet usage of the majority of Indonesians is

Tabel 2. The table's content of reproductive health literacy

Item	Very Difficult	Difficult	Easy	Very Easy
Find information about MCH	9(4.5)	59(29.5)	118(59)	14(7)
Find information about marriage	8(4)	59(29.5)	116(58)	17(8.5)
Find information about pregnancy	7(3.5)	59(29.5)	115(57.5)	19(9.5)
Find reproductive organ information	8(4)	56(28)	122(61)	14(7)
Find information about contraception	9(4.5)	62(31)	113(56.5)	16(8)
Understanding MCH information	9(4.5)	65(32.5)	115(57.5)	11(5.5)
Understanding information about marriage	9(4.5)	66(33)	112(56)	13(6.5)
Understanding information about pregnancy	8(4)	67(33.5)	114(57)	11(5.5)
Understanding reproductive organ information	8(4)	63(31.5)	117(58.5)	12(6)
Understanding information about contraception	11(5.5)	69(34.5)	111(55.5)	9(4.5)
Providing an assessment of MCH	9(4.5)	69(34.5)	111(55.5)	11(5.5)
Providing an assessment of marriage	7(3.5)	67(33.5)	116(58)	10(5)
Providing an assessment of pregnancy	6(3)	69(34.5)	115(57.5)	10(5)
Providing an assessment of reproductive organ	7(3.5)	65(32.5)	117(58.5)	11(5.5)
Providing an assessment of contraception	8(4)	69(34.5)	114(57)	9(4.5)
Postponing marriage	6(3)	60(30)	120(60)	14(7)
Preventing high-risk pregnancy	7(3.5)	69(34.5)	114(57)	10(5)
Caring reproductive health	4(2)	67(33.5)	115(57.5)	14(7)
Using contraceptive device	8(4)	68(34)	113(56.5)	11(5.5)

Note. MCH : Maternal and Child Health; Accessing (1-5), Understanding (6-10), Appraising (11-15) and Applying (16-19).

more for social media (Asosiasi Penyedia Jasa Internet Indonesia, 2022). Educations to maximize the improvement of telemedical literacy and reproductive health literacy need to be done through social media to be more precise targets. The education material is recommended to contain some items in Table 2 with low percentage scores on easy options or items with high percentage scores on challenging and complicated options.

Table 2 shows that more than 50% of participants find it easy to access, understand, and assess information about maternal and child health, marriage, pregnancy, reproductive organs, and contraception. Likewise, in postponing marriage, preventing high-risk pregnancy, caring for repro-

ductive health, and using contraceptive devices, more than 50% of participants perceived easy to very easy to apply that behavior.

There are pros and cons to the use of contraceptives in adolescents. Some people consider that adolescents do not need a good understanding of contraceptives. There are public concerns that teenagers may abuse contraceptives for premarital sexual behavior. This condition can be seen from two sides. First, adolescents have good literacy about preventing unintended pregnancy, sexually transmitted disease, and HIV & AIDS. Second, more and more adolescents tend to behave against norms in society (Soegondo, Thelman and Santano, 2023).

There is a significant relationship between

Table 3. Summarize of rank-spearman test result

Independent Var	Dependent Var	p-value	cc	Interpretation
Sex		0.055	-0.136	Not correlated
Age		0.001	0.266	Correlated
Education		0.001	0.243	Correlated
Occupation	Telemedical	0.270	-0.078	Not correlated
Marital Status	Literacy	0.880	0.011	Not correlated
PHC Unit		0.313	0.072	Not correlated
Health insurance coverage		0.031	-0.152	Correlated
Sex		0.213	-0.088	Not correlated
Age	Reproductive	0.004	0.201	Correlated
Education	Health Literacy	0.017	0.169	Correlated
Occupation		0.520	-0.046	Not correlated
Marital Status		0.086	-0.122	Not Correlated
PHC Unit		0.922	-0.007	Not correlated
Health insurance coverage		0.842	-0.014	Not correlated
Telemedical Literacy		0.001	0.653	Correlated

age (P-value 0.001), education level (P-value 0.001), and health insurance coverage (P-value 0.031) with telemedical literacy. Similarly, age (P-value 0.004), an education level (P-value 0.017), and telemedical literacy (P-value 0.001) significantly correlated with reproductive health literacy. The strength of the relationship between telemedical literacy and reproductive health literacy is in the strong category (0.51-0.75).

Some earlier studies found that age and education correlate with a person's literacy. The observational studies of hypertensive sufferers by Sahroni et al. in 2019 revealed significant correlations between age (β =-6.1, SE=1.8, p=0.01), education (β =12.5, SE=2.7, p<0.001), and in-

come (β=9.1, SE=2.2, p<0.001) (Sahroni, Anshari and Krianto, 2019). Similarly, the 2022 Tutik Revelationningsih study also mentioned that age (p=0.038%<0.05), education (p=0,000<0.05), and employment (p=0,043<0.05) affect public health literacy levels (Wahyuningsih, 2022). Physical, mental, emotional, and social development increases as a person ages. The older a person is, the ability to access the information he needs will improve. They will also find it easier to understand and evaluate accurate and accountable health information. Even with the highest literacy level, applying the information in everyday life is easy.

Based on some of those studies, it is not

just age that affects a person's health literacy ability. Education also plays an essential role in a person's health literacy level. The higher a person's education will make systematic and responsive thinking ability also, the better. A person with good literacy will quickly meet health information needs in healthcare, disease prevention, and health promotion (Sørensen et al., 2012).

To prevent maternal and infant deaths caused by high-risk pregnancies in the adolescent age group, they need to improve health literacy, especially reproductive health. A 2022 study by Princess Nur Tamalla concluded that health literacy affects adolescent pregnancy treatment behavior (Tamalla and Azinar, 2022).

Tabel 3 informs that a good level of repro-

Table 4. The Binary Logistic Regression Result of Telemedical Literacy (n=200)

| Predictor | Telemedical Literacy | | | |
| | P Value | OR | 95% CI | |
			Lower Bound	Upper Bound
Sex	0.124	0.412	0.133	1.274
Age	0.294	1.765	0.611	5.104
Education Level	0.831	0.785	0.085	7.244
Covered by health insurance	0.776	0.800	0.171	3.740
RH Literacy	*0.001	28.667	8.927	92.053

Note: *<0.05

ductive health literacy were 28.667 times more likely than teenage with low level of reproductive health literacy to have telemedical literacy (OR 28.667; 95% CI 8.927-92.053). While the variables of sex, age, education level, and insurance coverage did not significantly influence telemedical literacy.

Telemedical services enable remote physician-patient interaction. Patients can consult about their health conditions, prescribe drugs, provide drugs online, and ask questions about health, including reproductive health (Prawiroharjo, Pratama and Librianty, 2019). Adolescents often feel embarrassed to consult regarding their reproductive health because most people consider this taboo. With telemedical services, adolescents become more accessible and confident to ask and discuss reproductive health issues (Agustina, 2018).

One that needs to be noted in improving adolescent telemedical access is choosing the right source of information about reproductive health. Recently, many internet sites have provided irresponsible information and content. Misinformation can result in improper decision-making. If they choose the wrong treatment, the impact can be severe and endanger safety. In addition to internet sites, social media is one of the digital platforms most often accessed by teenagers. Social media also sometimes provides information about adolescent reproductive health. Unfortunately, people with non-health education backgrounds can also upload health content without going through information validation. Based on

previous studies, social media use correlates with adolescent premarital sex (Realita, 2022).

Adolescents who lack good reproductive health literacy will easily trust the available information, which eventually endangers their health. Not a few teenagers then spread inaccurate information to their friend groups through smartphone applications. As a result, more teenagers will quickly understand the wrong information. Various parties need to synergize to improve adolescent reproductive health literacy to minimize multiple risks. The limitation of this study is that category stratification is not carried out on gender variables, education level, and other demographic variables, so it is possible to be biased. Case-control design may need to be done to discover more about factors associated with telemedicine literacy in urban adolescents.

CONCLUSION

Adolescent telemedical literacy will determine the level of reproductive health literacy. It means that the more often someone accesses health information online, the better reproductive health literacy. In this study, the age variable and variable education determined telemedical literacy and adolescent reproductive health literacy. Although the correlation between telemedical and reproductive health literacy is very close, further research must explore the types of health information/medical information teenagers often access online. Teenagers may have access to health information in general, not explicitly studying reproductive health information. Teenagers

need to be careful in accessing reproductive health information online, especially in choosing the right keywords and sources/information provider sites, as they can lead to pornographic screening. Health installations, educational institutions, and reproductive health research agencies need to increase and socialize sites that contain the content of sexual health learning and youth reproduction that can be held accountable. The ease of access and availability of such sources of information will further improve their telemedical and reproductive health literacy. More vital literacy will increase healthy behavior and lower maternal and infant mortality risk in high-risk adolescents under 20 years old.

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