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Effect of Health Education Videos on Knowledge and Attitudes of Teenage Pregnancy in Timor Leste

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Abstract
The high prevalence of adolescent pregnancy in Timor-Leste reflects vulnerabilities in adolescents' reproductive health, particularly limited knowledge and unfavorable attitudes toward sexuality, which increase engagement in premarital sexual behavior and the risk of unintended pregnancy. However, empirical evidence explaining the role of reproductive health status in linking these outcomes, as well as the effectiveness of video-based reproductive health education in low-resource settings, remains limited. This study aimed to evaluate the effectiveness of video-based reproductive health education in improving knowledge and attitudes toward teenage pregnancy among female adolescents. A quasi-experimental one-group pretest–posttest design was conducted among 96 female students aged 17–18 years at ESGP de Suai, Covalima, Timor-Leste, selected through simple random sampling. The intervention consisted of a 15 minute reproductive health education video addressing adolescent pregnancy, related risks, and prevention strategies. Knowledge (20 items) and attitudes (10 items) were measured using a validated questionnaire (Cronbach's $\alpha = 0.679$ and 0.520, respectively). Effectiveness was defined as a statistically significant improvement in post-intervention knowledge and attitude scores. Data were analyzed using the Wilcoxon signed-rank test and the Mann–Whitney U test. Significant improvements were observed in knowledge ($Z = -8.526$; $p < 0.001$) and attitudes ($Z = -8.532$; $p < 0.001$) after the intervention. No significant difference was found between the magnitude of improvement in knowledge and attitudes ($p = 0.850$). Video based reproductive health education effectively improves adolescents' knowledge and attitudes toward teenage pregnancy and represents a feasible intervention for adolescent reproductive health promotion in resource-limited settings.

Keywords: *reproductive health video, knowledge, attitude, teenage pregnancy*
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INTRODUCTION

Teenage pregnancy is a worldwide issue with recognized causes and significant health, social, and economic impacts on individuals, families, and communities. Worldwide, the birth rate for adolescents aged 10–14 years in 2023 was estimated at 1.5 per 1,000 females, with notably higher rates in Sub-Saharan Africa and Latin America and the Caribbean (WHO, 2024). In 2022, the Ministry of Health of Timor-Leste reported 4,640 cases of adolescent pregnancy, with the following breakdown: Bobonaro recorded 936 cases, Covalima 418 cases, Dili 511 cases, Ermera 822 cases, and Liquica 601 cases (Belarmino, 2022) .

Teenage pregnancy tends to be higher among adolescents with low education or low economic status, with slower progress in reducing first births among this group and other vulnerable groups,

thereby widening the gap (WHO, 2024) . Factors contributing to the risk of early pregnancy include age at first sexual intercourse, level of knowledge about reproductive health, lack of access to reproductive information, and family socioeconomic status. The findings of this study underscore the importance of reproductive health education and improved access to information to prevent early pregnancy (Putri et al., 2023) . The study Ningrum et al (2021) revealed that factors influencing knowledge and attitudes include educational level, age, experience, interest, media or information sources, social culture, economic status, and environment. The results of the study indicate that there is a significant relationship between the level of knowledge and attitudes of adolescents toward premarital sexual behavior. Low knowledge about reproductive health and negative attitudes are the main factors increasing the risk of premarital sexual behavior among adolescents. Based on several studies analyzed, it was found that the lower the knowledge and positive attitudes toward reproductive health, the higher the likelihood of adolescents engaging in premarital sexual behavior. Additionally, this behavior is also influenced by environmental factors, social and cultural factors, media exposure, and the lack of appropriate reproductive education (Andiani et al., 2022) .

Another study also revealed a significant relationship between adolescents' knowledge and attitudes toward reproductive health and premarital sexual behavior at SMPN 10 Batam. Most participants had good knowledge (78.0%) and exhibited premarital sexual behavior classified as good (80.5%), although negative attitudes toward reproductive health remained dominant (58.5%). Analysis using the chi-square test showed a p-value of 0.00 (<0.05) for the relationship between knowledge and premarital sexual behavior, and a p-value of 0.01 (<0.05) for the relationship between attitudes and premarital sexual behavior, confirming the existence of a significant relationship. These findings highlight the importance of improving knowledge and fostering positive attitudes to support responsible sexual behavior among adolescents (Mona, 2019) .

The impact of declining knowledge and attitudes regarding pregnancy poses a high risk for various pregnancy complications, such as eclampsia and infections, and because their reproductive organs are not yet fully mature, the likelihood of serious health problems during pregnancy and childbirth becomes greater. In addition, teenage pregnancy can cause mental health problems, such as stress, depression, and other psychological disorders. Adolescents who are not mentally prepared to become parents may struggle to cope with emotional stress and often face stigma from society, which can lead to social isolation and low self-esteem. Teenage pregnancy often forces individuals to discontinue their formal education, thereby reducing their opportunities to continue their education and obtain better jobs in the future. With lower levels of education and skills, pregnant teenagers tend to be trapped in a cycle of poverty, which has a negative impact on the quality of life of their children. From a social perspective, teenage pregnancy can cause instability within families, especially if parents do not provide support or if there is social pressure to marry. Young mothers may not be emotionally or financially ready to raise a child, which can have a negative impact on the child's development (Lewis et al., 2023) .

Timor-Leste is committed to ending child marriage by 2030, in line with the Sustainable Development Goals. The legal age for marriage is 17 years, but it can be lowered to 16 years with parental consent. The country has supported UN resolutions on child marriage and ratified important conventions, including the Convention on the Rights of the Child in 2003. However, child marriage remains prevalent, driven by poverty, tradition, and high rates of teenage pregnancy (Girlsnotbrides, 2024) .

The policy launched by the government of Timor-Leste in collaboration with Plan International Timor Leste is a program aimed at ending child marriage. The program is called "Let's Go Digital," which was launched in 2022. The program emphasizes the importance of education and awareness regarding children's rights, particularly those of girls, and provides digital skills to strengthen youth participation in ending the practice of early marriage. The program also seeks to promote gender equality and child protection in Timor-Leste (Tatoli, 2022) .

One of the strategies to prevent teenage pregnancy is through health education focused on adolescent reproductive health. It is expected that such education will support government initiatives

in reducing teenage pregnancy rates. The study's findings indicated a noticeable improvement in students' knowledge about reproductive health, especially in terms of preventing teenage pregnancies (Aryanti et al., 2020) . The role of midwives in addressing reproductive health issues among adolescents can be optimized through preventive efforts, particularly through communication, information, and education (KIE). Reproductive health KIE for adolescents has two main objectives: first, to increase adolescents' knowledge about reproductive health, and second, to encourage behavioral changes among the target group in various aspects of reproductive health. Achieving these two objectives is expected to support the ultimate goal of reproductive health services, which is to improve adolescent reproductive health (Harnanai et al., 2022) . Research findings indicate that providing communication, information, and education (KIE) using audiovisual media significantly improves adolescent girls' knowledge about reproductive health. Before receiving KIE, the average knowledge score was 89.33, which increased to 95.33 after receiving KIE, with statistical test results showing a p-value < 0.05. However, for attitudes, the initial average score was 88.85, which increased to 90.46 after the intervention. Although there was a small increase, statistical tests showed that the change in attitudes was not significant (p-value > 0.05) (Fajrin et al., 2024) .

Research indicates that the use of video media is more effective than leaflets in improving students' knowledge about unwanted pregnancy (Hindriarti et al., 2023) . The results of the study indicate that education through video media significantly improves students' knowledge and attitudes compared to the control group. The average knowledge increased from 5.9 to 10.7 after the intervention, and attitudes improved from 23.8 to 37.5 (Susanti et al., 2024) . Research findings indicate that animated video media is more effective than e-booklets in improving knowledge (48.51 vs 32.49) and attitudes (43.43 vs 37.58). Animated video media has a greater impact on changing the attitudes of adolescent girls toward preventing unintended pregnancy compared to *e-booklets* (Syam et al., 2023) .

Based on a preliminary study of ten adolescent girls at the Escola Secundari Geral Publico (ESGP) de Suai, Covalima, Timor-Leste, it was found that the knowledge of adolescent girls regarding adolescent reproductive health related to teenage pregnancy showed varying percentages among the participants, ranging from low to moderate. Participants with the highest scores on the knowledge variable were 70%, while the lowest score was 0%, assessed using the , a questionnaire with 20 questions about adolescent reproductive health. In general, most participants fell into the low category on the knowledge variable.

On the other hand, the attitude variable of female adolescents, assessed using a questionnaire with 10 questions related to adolescent reproductive health regarding teenage pregnancy, showed a dominance of negative categories, although there were two exceptions with very positive attitudes, each with a percentage of 95%. However, 8 participants who remained in the negative category indicated a gap between knowledge and attitude. It can be concluded that the majority of participants had a low to moderate level of knowledge, with attitudes that were mostly negative. This indicates the need for further efforts to improve participants' knowledge and attitudes toward teenage pregnancy.

The persistently high prevalence of adolescent pregnancy reflects structural and behavioral vulnerabilities in adolescents' reproductive health status, particularly deficits in knowledge, attitudes, and decision-making skills related to sexuality. Inadequate reproductive health status increases adolescents' susceptibility to premarital sexual behavior, which subsequently heightens the risk of unintended pregnancy. While prior studies have documented adolescent pregnancy and premarital sexual behavior as separate public health concerns, empirical evidence explaining the integrative role of reproductive health status in linking these outcomes remains limited. This gap underscores the critical need for effective reproductive health education as a preventive intervention capable of strengthening adolescents' knowledge and attitudes and mitigating risky sexual behavior. Accordingly, this study aims to evaluate the effectiveness of reproductive health education videos in improving knowledge and attitudes toward teenage pregnancy among female students, thereby contributing evidence to inform scalable, school-based reproductive health interventions.

METHODS

Research Design

This study adopted a quantitative quasi-experimental design with a one-group pretest–posttest format, in which no separate control group was included. The design aimed to assess within-group changes in knowledge and attitudes toward reproductive health among female students before and after a video-based educational intervention.

Population and Sample

The study population consisted of 646 female students enrolled at Escola Secundária Geral Pública (ESGP) de Suai, Covalima, Timor-Leste. The sample size of 96 participants was determined using the Slovin formula with a margin of error of 10%. Respondents were selected through simple random sampling. The sampling process was conducted in several steps. First, a list of all eligible female students aged 17–18 years was obtained from the school administration and served as the sampling frame. Second, students who met the inclusion criteria were identified. Each eligible student was then assigned a unique identification number. Third, simple random sampling was applied using a random number generator to select 96 participants from the sampling frame, ensuring that each student had an equal probability of being selected. Inclusion criteria included: (1) female students aged 17–18 years, (2) enrolled in ESGP de Suai, and (3) willing to participate by providing informed consent. Exclusion criteria included: (1) students absent during data collection, and (2) those with communication difficulties that might hinder questionnaire completion.

Intervention Procedure

Data collection was conducted using a one-group pretest–posttest design and involved three sequential stages: pretest assessment, intervention delivery, and posttest assessment.

Pretest Assessment : Prior to the intervention, all participants completed a structured questionnaire designed to assess baseline levels of reproductive health knowledge and attitudes toward adolescent pregnancy. The questionnaire was administered in a classroom setting under the supervision of the research team to ensure standardized instructions and independent responses.

Intervention Delivery: Following the pretest, participants received a video-based reproductive health education intervention. The intervention consisted of a 15-minute educational video focusing on adolescent pregnancy, including its causes, health and social risks, and prevention strategies. The video was delivered in Bahasa Indonesia and accompanied by subtitles to enhance comprehension and accommodate varying literacy levels. The video was shown once in a classroom environment using a projector and loudspeakers. Participants were instructed to watch the video attentively, and no discussion or interruption was allowed during the session to maintain consistency in exposure. The video content was adapted from previously published educational materials and underwent a content validation process involving public health and midwifery experts. This validation ensured the accuracy, clarity, and cultural appropriateness of the material for adolescent audiences in the study setting.

Posttest Assessment: Immediately after the completion of the video session, participants completed the same knowledge and attitude questionnaire used in the pretest. This approach allowed for a direct comparison of pre- and post-intervention scores to assess the immediate effects of the video-based education.

Research Instrument

Data were collected using a self-administered structured questionnaire, namely the Adolescent Reproductive Health Knowledge and Attitude Questionnaire, developed based on the Health Belief Model and adolescent reproductive health education frameworks. The instrument consisted of two domains: knowledge (20 multiple-choice items covering reproductive anatomy, causes and risks of teenage pregnancy, health consequences, and prevention strategies) and attitudes (10 items assessing perceptions toward early pregnancy and responsible reproductive health practices). Knowledge items were scored dichotomously (1 = correct, 0 = incorrect), yielding scores from 0–20, while attitude items were rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with higher scores indicating more favorable attitudes. Content validity was established through expert judgment, and internal consistency reliability testing showed Cronbach's alpha values of 0.679 for the knowledge domain and 0.520 for the attitude domain, which are considered acceptable for exploratory research.

Data Collection Procedure

Data collection followed these steps. Researchers first coordinated with school authorities and teachers to obtain permission. Participants were informed about the purpose of the study, assured of confidentiality, and asked to provide written informed consent. Questionnaires were administered prior to the intervention (pretest). The educational video was then presented in a controlled classroom environment. Immediately afterward, the same questionnaire was re-administered (posttest). All completed questionnaires were checked for completeness before data entry.

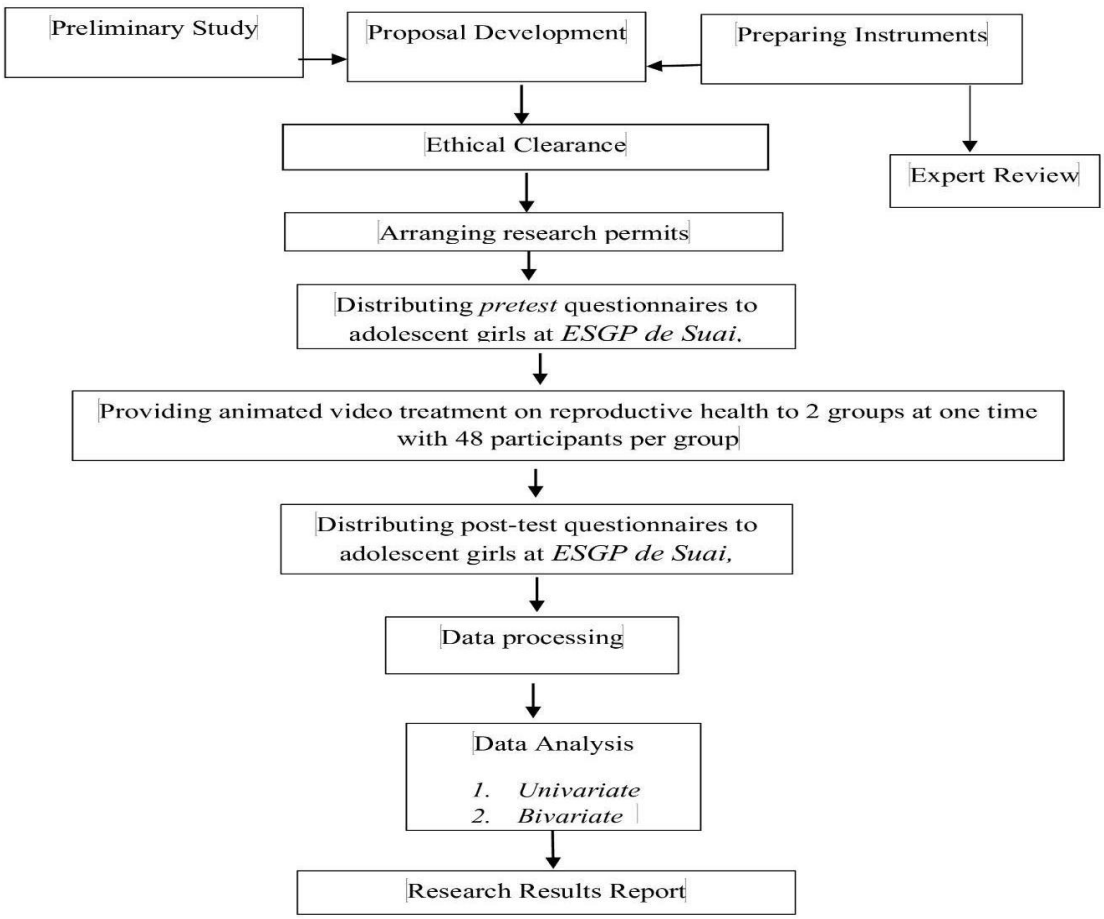

Figure 1. Research Flow

Data Analysis

Data were analyzed using SPSS software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participants' demographic characteristics and baseline scores. Given the one-group pretest–posttest design and the ordinal nature of the data, nonparametric statistical tests were applied. The Wilcoxon signed-rank test was used to assess differences in knowledge and attitude scores before and after the intervention within the same group. The magnitude of improvement for each domain was calculated as the difference between posttest and pretest scores. To compare the magnitude of improvement between the knowledge and attitude domains, the Mann–Whitney U test was employed. Effect sizes (r) were calculated to determine the strength of the intervention effect. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study received ethical approval from the Health Research Ethics Committee of Universitas 'Aisyiyah Yogyakarta (No. 4212/KEP-UNISA/II/2025) and was registered with the Indonesia Clinical Research Registry (INA-1A9A62C).

RESULTS

The results of the study on respondent characteristics based on student age, age at first menstruation, information sources, and parents' occupations are presented in the table 1:

Table 1 Characteristics of Respondents

Variable	Respondent Frequency	Valid Percentage (%)
Student Age		
17 Years	5	5
18	46	47.9
Parental income		
High	17	17
Low	7	82.3
Social and Cultural		
Open	63	65.6
Conservative	3	34.
Student environment		
Supportive	5	53.
Not Supportive	45	46.9
Source of Information		
Parents	2	24
Teacher	2	2
Friends	10	10.4
Health worker	26	27.1
Internet	35	36.5
Age at First Menstruation		
Early 10–14 years	71	74
Mid-15 to 17 years	25	2

Based on Table 1, it shows that the majority of respondents in this study were students aged 17 years (52.1%) and 18 years (47.9%). This indicates that they are in the late adolescent phase, which is a very important period in the development of knowledge and attitudes toward reproductive health. Most students come from families with low parental income (82.3%). This condition may affect the family's ability to provide access to information, health services, and control over children's education, especially regarding reproductive issues. From a socio-cultural perspective, the students' environment tends to be open (65.6%) compared to conservative (34.4%). An open environment generally supports communication between children and adults and increases openness about sensitive topics such as teenage pregnancy. The students' environment also shows a positive trend, with 53.1% of respondents reporting that they are in a supportive environment. However, the percentage of unsupportive environments (46.9%) is still quite high, indicating a need to strengthen the role of the community and schools in supporting adolescents. The main sources of information used by respondents were the internet (36.5%), followed by health workers (27.1%) and parents (24.0%). Friends and teachers were only minor sources, at 10.4% and 2.1%, respectively. This indicates that although information is available online, the role of educational institutions is still very minimal and needs to be improved.

Analysis of Students' Knowledge and Attitudes Regarding Reproductive Health and Teenage Pregnancy Before and After the Educational Video Intervention

Univariate analysis was used to describe the distribution of knowledge and attitude categories among respondents before and after the intervention. Table 2 shows the frequency distribution and percentage of knowledge and attitude categories in the pre-test and post-test.

Table 2: Frequency Distribution and Percentage of Knowledge and Attitude Categories Pre- and Post-Test (n = 96)

Variable	Category	Pre-test F	Pre-test %	Post-test F	Post-test %
Knowledge	Insufficient	44	45.8	0	0
	Sufficient	47	49.0	6	6.3
	Good	5	5.2	90	93.8
	Total	96	100.0	96	100.0
Attitude	Insufficient	35	36.5	0	0
	Sufficient	59	61.5	7	7.3
	Good	2	2.1	89	92.7
	Total	96	100.0	96	100.0

Before the intervention, most respondents demonstrated insufficient knowledge (45.8%). After the intervention, the majority of adolescents showed good knowledge (93.8%). Similarly, attitudes improved substantially from 36.5% negative attitudes before intervention to 92.7% positive attitudes after intervention. These findings indicate that the reproductive health education video was effective in improving both knowledge and attitudes related to adolescent pregnancy.

Analysis of Knowledge and Attitude Variables Most Influenced by the Educational Video Intervention

Wilcoxon Test

To test for significant changes in the knowledge and attitudes of respondents before and after the intervention, the Wilcoxon test was used. This test was chosen because the data were not normally distributed.

Table 3: Wilcoxon Test Results for Changes in Knowledge and Attitudes

Variable	N	Mean	Sum of Ranks	Z	*P-value*
Knowledge	96	48.50	4656.00	-8.526	<0.000
Attitude	96	48.00	4,560.00	-8.532	<0.000

Based on Table 4.4, it can be seen that the P-value obtained for knowledge and attitude is p < 0.000, indicating that there was a significant change after the respondents were given the reproductive health education video. In statistical tests, a p-value less than 0.05 indicates that the differences found are not merely coincidental but represent significant, real changes. In other words, the intervention implemented has resulted in significant changes in the respondents' knowledge and attitudes.

Additionally, the Z-score for knowledge is -8.526 and for attitude is -8.532. These Z-scores indicate that the changes observed are highly significant and deviate significantly from the mean value, meaning the results obtained are clear and reliable. Overall, it can be concluded that this educational video intervention is highly effective in improving respondents' knowledge and attitudes toward reproductive health.

Mann-Whitney Test

The Mann-Whitney test was used to test the difference in gain scores (improvement) between two groups. In this study, the data used were knowledge and attitudes before and after the intervention in two paired experimental groups.

Table 3. Results of the Mann-Whitney Test for Knowledge and Attitudes

Group	N	Mean Rank	Sum of Ranks	U Value	Z	*P-value*
Knowledge	96	97.24	9335.50	4,536.50	0.189	0
Attitude	96	95.76	9,192.50			

The results of the Mann-Whitney test indicate that the Asymp. Sig. (2-tailed) The p-value for knowledge is 0.856, which is greater than 0.05. Therefore, it can be concluded that there is no significant difference between knowledge and attitude regarding the changes in knowledge and attitude scores. Although there were changes in both variables, the differences were not large enough to be considered statistically significant. *The Mean Rank* for the knowledge variable is 97.22, while the attitude variable is 95.78, indicating that the knowledge variable has a slight advantage in terms of average rank. The Sum of Ranks for the knowledge group is 9333.00, while the attitude variable reaches 9195.00, indicating a higher total rank for the knowledge group. The U value of 4539.000 and the Wilcoxon W value of 9195.000 support that there is no substantial difference between the two variables. With a Z value of -0.182, this result confirms that the change between the knowledge and attitude variables is not large enough to be considered statistically significant.

DISCUSSION

Knowledge Before and After Receiving Reproductive Health Education Through Educational Videos

The present study indicates that reproductive health education delivered through educational videos effectively enhanced the knowledge of ESGP DE SUAI female students. The initially low level of knowledge observed among a substantial proportion of participants reflects limited access to structured and comprehensive reproductive health information prior to the intervention. This condition is commonly reported in adolescent populations, particularly in educational and socio-cultural contexts where reproductive health topics are not systematically integrated into formal learning. The notable improvement in knowledge following the intervention suggests that educational videos serve not merely as an information-delivery tool but as a pedagogically effective medium that facilitates a clearer understanding of reproductive health concepts through visual contextualization and simplified explanations.

This improvement underscores the effectiveness of audiovisual approaches in conveying reproductive health information, as the instructional content was designed to be clear, accessible, and contextually relevant to adolescents' lives. This medium aligns well with the learning preferences of Generation Z, who favor visual, concise, and flexible modes of information delivery. Videos further provide an immersive educational experience by engaging both auditory and visual senses simultaneously, thereby reinforcing retention. The materials incorporated interactive narratives, illustrative visuals, and simplified explanations, which facilitated a more concrete and meaningful understanding of reproductive health concepts.

The pre-test findings revealed that prior to the intervention, adolescents possessed limited knowledge of reproductive health. This was likely attributable to the absence of structured reproductive health instruction within the formal school curriculum and to prevailing cultural perceptions that render such topics taboo. Consequently, adolescents often turn to social media and other online platforms to obtain information, though such sources are not always reliable. Hence, the provision of credible, engaging, and digitally accessible educational content has become an urgent necessity (Mursiyah et al., 2022).

This study corroborates findings by Hartati et al (2025), who also reported a significant rise in adolescents' knowledge following exposure to video-based reproductive health education. In that study, participants initially exhibited low knowledge levels; however, the majority transitioned to the high-knowledge category post-intervention, with statistical results indicating $p < 0.05$. Similarly, Suseno et al (2021) documented that 60% of adolescents had insufficient knowledge prior to receiving video education, but post-intervention, 97% were classified as having good knowledge.

A major contributing factor to the initial knowledge deficit is the lack of reproductive health content within formal education curricula Nurbaya (2023). Video-based education addresses this gap by meeting adolescents' visual learning preferences and allowing them to regulate the pace of learning. This flexibility enhances independent study, which is a characteristic particularly valued by digital-native generations (Najatin & Hayati, 2024).

Moniz et al (2024)stressed that expanding adolescents' reproductive health knowledge is critical for preventing health-related problems. Adequate knowledge fosters informed decision-making and promotes healthier behaviors (Bi'i et al., 2021). Several strategies for health education—including mass

media campaigns via television, radio, audiovisuals, leaflets, and booklets—have been identified as effective approaches to improving adolescent health awareness (Auria et al., 2022).

Audiovisual media has been consistently shown to be effective in promoting knowledge, attitudes, and practices related to reproductive health (Setyandari & Rahayuningsih, 2023). When integrated with participatory methods such as group discussions, role-playing, and question-and-answer sessions, comprehension is further reinforced. Parental and community engagement likewise plays a critical role in supporting and sustaining the messages delivered through schools, thus promoting longer-term behavioral change (Dwijayani, 2019).

Najatin & Hayati (2024) further highlight that effective health promotion requires clear principles, strategies, and methods, accompanied by appropriate media selection. Video-based education allows adolescents to repeatedly access material, thereby consolidating memory. Possessing sufficient knowledge about reproductive health enables adolescents to avoid risk behaviors such as unprotected sexual activity and substance misuse. Furthermore, knowledge levels have been found to correlate closely with attitudes toward early marriage. Susanti et al (2024)reported that individuals with higher knowledge levels demonstrated lower acceptance of early marriage practices.

The World Health Organization WHO (2025) has also emphasized that improved reproductive health knowledge is associated with lower risks of sexually transmitted infections (STIs) and fewer instances of risky sexual conduct. Adolescents who are well-informed are more capable of postponing sexual initiation, resisting early marriage, and safeguarding reproductive health. Such knowledge also strengthens their capacity to resist negative peer influences. Eyiah-Bediako et al (2021) and Kiiru et al (2024) reported that adolescents equipped with reproductive health knowledge are better able to withstand peer pressure and make healthier choices. In contrast, antisocial peer groups increase the likelihood of risky behaviors, while prosocial peer support encourages healthier attitudes (Laursen & Veenstra, 2021).

The post-test results of this study further confirm that the majority of female students' knowledge improved to the good category after being exposed to the educational video. This outcome is consistent with findings by Letee et al (2024), who demonstrated that video-based reproductive health education significantly improved adolescents' knowledge ($p < 0.05$). Riana (2024) similarly noted that engaging media such as videos not only enhance comprehension but also reshape adolescents' perceptions of reproductive health issues, which were previously considered taboo (Sinaga, 2018)(Wahyuningsih & Fakhriyah, 2024).

Attitudes of ESGP DE SUAI Female Students Before and After Video-Based Reproductive Health Education

Prior to receiving counseling, the majority of female students exhibited negative or insufficient attitudes toward reproductive health (36.5%). Following the video intervention, however, 92.7% of participants demonstrated a significant improvement in attitudes, with results supported by a p-value < 0.000.

This positive shift is strongly associated with the delivery strategy, which emphasized both cognitive and affective dimensions. The videos effectively depicted the real consequences of risky behaviors such as early pregnancy, school dropout, and social stigma. By presenting narratives that closely paralleled adolescents' everyday realities, the intervention fostered emotional engagement and encouraged more responsible behavioral attitudes.

Pre-test results suggested that many adolescents undervalued or considered reproductive health discussions as taboo, which contributed to poor baseline attitudes. These findings are supported by

Suseno et al (2021), who reported that before video-based education, 50% of adolescent participants demonstrated poor attitudes, but after intervention, 72.1% demonstrated positive attitudes. Nurhamsyah (2019) explained that personal experiences play a crucial role in shaping attitudes; for example, adolescents who observe negative consequences of early pregnancy among peers often internalize these experiences, resulting in greater caution.

Hartati found similarly about substantial improvements in adolescents' attitudes after video-based reproductive health education, with results indicating $p < 0.05$ (Hartati et al (2025) . Peer influence also plays an essential role in shaping adolescent attitudes, as peers often serve as the primary confidants rather than parents or teachers (Fubam et al., 2022). Cultural norms additionally exert significant influence; in communities where early marriage is customary, only individuals with strong critical perspectives are able to reject such traditions (Mursit et al, 2018).

According to (Panjaitan et al., 2018), attitudes are formed through a combination of knowledge, beliefs, emotions, and behavioral inclinations. Suseno et al (2021) highlighted that improvements in knowledge frequently serve as precursors to positive changes in attitude. Murti & Winoto (2018) emphasized that once adolescents are able to comprehend and accept health-related information, their attitudes are more likely to shift in a positive direction.

Moniz et al (2024) also confirmed that interactive, engaging videos promote more favorable attitudes among adolescents. Asari et al (2023) added that videos can spark interest in subjects traditionally considered sensitive or taboo. Sinaga (2018) argued that visual media can reshape perceptions, particularly among Generation Z and Alpha, who have grown up immersed in digital technologies. These generations not only access information more extensively but also rely heavily on technology for learning, thereby making video-based interventions especially effective (Mursiyah et al., 2022)(Maesaroh et al., 2022).

Several other studies further underscore these findings. Wahyuningsih & Fakhriyah (2024) and Mona (2019) reported that audiovisual education improved both awareness and attitudes toward reproductive health. Nonetheless, contrasting results have also been observed. Jumini et al. (2023) reported that reproductive health videos shown to elementary school students did not significantly influence attitudes. Likewise, Andani et al (2024) found that while videos were superior to leaflets in increasing knowledge, this did not necessarily translate into attitudinal changes. Yuliasih et al (2025) further reported that both videos and e-leaflets were comparably effective in enhancing knowledge and attitudes, with no statistically significant difference observed ($p > 0.001$).

Analysis of the Relationship Between Intervention and Knowledge and Attitudes

Rather than rigidly separating the discussion by knowledge and attitude outcomes, the findings of this study indicate that video-based reproductive health education functions as an integrated intervention that simultaneously influences both cognitive and affective domains. Knowledge is defined as the result of learning processes through which individuals acquire information about a given object (Wilson, 2020). In this context, audiovisual media facilitate comprehension by combining visual and auditory stimuli, thereby making information easier to process particularly for adolescents who tend to prefer digitally oriented and visually engaging learning environments (Riana, 2024).

Consistent with the present findings, Nopyanti et al (2023) reported a substantial improvement in adolescents' reproductive health knowledge following video-based interventions. However, knowledge acquisition does not occur in isolation; it is shaped by sociocultural factors. Community norms and values play a significant role in influencing how reproductive health issues are perceived

and understood by adolescents. In addition, electronic media contribute to expanding access to information, while educational institutions remain critical sources of structured and reliable knowledge (Setyandari & Rahayuningsih, 2023).

Attitude, meanwhile, is defined as an individual's emotional predisposition to respond consistently to a particular object (Kamaruddin et al., 2024). In this study, students demonstrated more positive attitudes toward reproductive health after exposure to video-based educational interventions. This finding aligns with Rachmawati (2019), who emphasized that audiovisual media are particularly effective in shaping attitudes toward sensitive or previously neglected health topics.

The relatively comparable magnitude of improvement in knowledge and attitudes, as indicated by the Mann–Whitney test ($p > 0.05$), suggests a close relationship between adolescents' understanding of reproductive health concepts and their attitudinal changes. The absence of a statistically significant difference between these domains may be attributed to variations in the intervention approach, differences in students' levels of emotional engagement, or disparities in baseline knowledge. Furthermore, the lack of early and structured reproductive health education contributes to weak foundational knowledge and attitudes. Curricula that prioritize general academic subjects while omitting reproductive health education further exacerbate this gap.

As noted by Susanti et al (2024), knowledge acquisition strongly influences attitude formation, and exposure to information, whether through formal or informal channels, can lead to both immediate and longer-term behavioral changes among adolescents. Taken together, these findings suggest that video-based reproductive health education is an effective strategy for improving adolescents' knowledge and attitudes simultaneously. However, achieving sustained impact requires integration into school curricula, continuous parental involvement, and broader community support, particularly in sociocultural contexts such as Timor-Leste, where discussions of sexuality are often considered sensitive.

CONCLUSION

This study demonstrates that reproductive health education delivered through video media significantly improves both knowledge and attitudes toward teenage pregnancy among female adolescents at ESGP de Suai, Timor-Leste. The Wilcoxon test results indicate a statistically significant increase in knowledge and attitudes following the intervention ($p < 0.001$). However, the Mann–Whitney analysis revealed no significant difference in the magnitude of improvement between knowledge and attitude domains, suggesting that the video intervention influenced both outcomes to a comparable extent. The findings highlight the effectiveness of video-based health education within the sociocultural context of Timor-Leste, where access to structured reproductive health information remains limited, and discussions on sexuality are often considered sensitive. This study contributes empirical evidence supporting the use of audiovisual media as a practical and contextually appropriate educational strategy for adolescents in secondary school settings.

Nevertheless, this study has several limitations. The absence of a control group, the use of a single-session intervention, and the immediate posttest design limit the ability to assess long-term behavioral changes and causal inference. Future studies are recommended to employ controlled experimental designs and longitudinal follow-up to evaluate the sustainability of knowledge and attitude changes. Based on these findings, schools and health educators are encouraged to integrate video-based reproductive health education into regular learning activities as a complementary strategy to conventional instruction. Health professionals, particularly midwives, may utilize video media in school- and community-based programs to enhance adolescent reproductive health education in resource-limited settings.

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AUTHOR CONTRIBUTION
MWM: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing - Original Draft, and Writing - Review & Editing.
AWA: Conceptualization, Methodology, Writing - Original Draft, and Writing - Review & Editing, Supervision
YP: Conceptualization, Methodology, Writing - Original Draft, and Writing - Review & Editing, Supervision

ETHICAL CONSIDERATIONS
This study received ethical approval from the Health Research Ethics Committee of Universitas 'Aisyiyah Yogyakarta (No. 4212/KEP-UNISA/II/2025). All participants provided written informed consent prior to data collection. Confidentiality and anonymity were maintained throughout the study, and no personal identifiers were recorded.

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The authors declare that there is no conflict of interest related to the research, authorship, or publication of this article.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available from the corresponding author upon reasonable request. All shared data will be fully anonymized to protect participant confidentiality.

PROTOCOL REGISTRATION
This study was registered under the Indonesia Clinical Research Registry (INA-1A9A62C).

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