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The effect of health education on the level of adolescents' knowledge of reproductive health

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ABSTRACT

Adolescent reproductive health knowledge remains a global concern; WHO reports approximately 21 million pregnancies annually among adolescents aged 15–19 years, most of which are unintended. In Timor-Leste, the adolescent fertility rate reaches 33.8 births per 1,000 women aged 15–19, and students' reproductive health knowledge at São José Operario Balide School, Dili, remains low. This study aim to analyze the effect of reproductive health education on adolescents' knowledge before and after the intervention at São José Operario Balide School, Dili, Timor-Leste. This quantitative study employed a pre-experimental one-group pretest–posttest design. A sample of 70 eleventh-grade students aged 15–19 years was selected from a population of 180 students using proportional stratified random sampling. The intervention consisted of reproductive health education delivered through lectures supported by PowerPoint media. Knowledge was measured using a 25-item Guttman-scale questionnaire and analyzed with the Wilcoxon Signed Rank Test, as the data were not normally distributed (Kolmogorov–Smirnov, $p < 0.05$). Before the intervention, most respondents had poor knowledge (50%), followed by fair (33%) and good (17%). After the intervention, the good category increased to 46%, fair to 36%, while the poor category decreased to 19%. The Wilcoxon test yielded $Z = -5.032$ with $p = 0.000$ ($p < 0.05$), indicating a significant difference in knowledge scores before and after the education. Reproductive health education delivered through lectures supported by PowerPoint media significantly improved adolescents' knowledge, providing a basis for strengthening sustainable school-based reproductive health education programs.

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Introduction

Reproductive health is defined as a state of complete physical, mental, and social well-being in all matters relating to the reproductive system, its functions, and processes, rather than merely the absence of disease or infirmity. Furthermore, *sexual and reproductive health and rights* (SRHR) emphasize access to comprehensive information and health services as fundamental components of human dignity, rights, and well-being. The SRHR perspective is essential because it contributes not only to the prevention of reproductive health problems but also to gender equality, individual empowerment, and broader social development (WHO, 2025).

Adolescence is a critical developmental stage characterized by profound physical, psychological, emotional, and social changes. During this period, adolescents experience puberty, develop their personal identity, and become increasingly interested in interpersonal and sexual relationships. However, inadequate

knowledge of reproductive health may expose adolescents to various health risks, including early marriage, unintended pregnancy, sexually transmitted infections (STIs), and other physical and psychological health problems (Yuniarti et al., 2024). These challenges are particularly evident in developing countries, where limited access to accurate reproductive health information, insufficient school-based reproductive health education, and persistent sociocultural taboos surrounding sexuality hinder adolescents from acquiring appropriate knowledge (UNFPA, 2021).

Adolescent reproductive health remains a major global public health concern. According to the World Health Organization (WHO, 2024), approximately 21 million pregnancies occur annually among girls aged 15–19 years worldwide, with the majority occurring in developing countries. Most of these pregnancies are unintended and are closely associated with inadequate reproductive health knowledge and limited access to reproductive health information and services. In Timor-Leste, the adolescent fertility rate is 33.8 births per 1,000 women aged 15–19 years. Approximately 4.3% of females within this age group have already begun childbearing, while in Dili, around 3% of adolescent girls aged 15–19 years have experienced childbirth (Timor-Leste Population and Housing Census, 2024). These findings highlight the urgent need to strengthen preventive and promotive reproductive health education among adolescents.

Reproductive health education has been widely recognized as an effective strategy for improving adolescents' knowledge, fostering positive attitudes, and promoting healthy behaviors. Schools represent an ideal setting for implementing such interventions because they provide access to large adolescent populations within a structured learning environment. Well-designed educational programs can improve adolescents' understanding of pubertal development, reproductive hygiene, prevention of sexually transmitted infections (STIs) and HIV, healthy relationships, consent, and avoidance of risky sexual behaviors. School-based reproductive health education has also been shown to correct misconceptions and promote more positive perceptions regarding reproductive health (Zayani & Susanto, 2024).

One of the globally recommended approaches is Comprehensive Sexuality Education (CSE), a curriculum-based educational process that addresses the cognitive, emotional, physical, and social dimensions of sexuality. CSE aims to equip children and adolescents with the knowledge, skills, attitudes, and values necessary to protect their health and well-being, establish safe and respectful relationships, and understand their rights and personal dignity as well as those of others (Gray et al., 2025). Consistent with this perspective, Kim et al., (2023) reported that CSE programs significantly improved knowledge related to sexuality and reproductive health, demonstrating that structured reproductive health education can serve as an effective public health intervention with measurable educational outcomes.

Previous studies consistently demonstrate the effectiveness of reproductive health education in improving adolescents' knowledge. Educational interventions delivered through videos and e-leaflets significantly improved reproductive health knowledge, attitudes, and practices among university students (Yuliasih et al., 2025). Similarly, interactive learning approaches substantially increased sexual and reproductive health knowledge (Sari et al., 2025). Other studies have reported positive outcomes from social media-based educational models (Wulandari et al., 2025), curriculum-based reproductive health education (Boti Sidamo et al., 2023), and web-based educational interventions (Ünlü Suvari & Kaydırak, 2025). Furthermore, pre-test–post-test educational models, peer mentoring, and direct health education interventions have all been shown to significantly enhance adolescents' reproductive health knowledge (Dian et al., 2025; Y. H. S. Putri et al., 2025; Yang et al., 2025). Evidence from recent scoping reviews also indicates that school-based reproductive health interventions consistently improve adolescents' knowledge, attitudes, contraceptive use, and pregnancy prevention outcomes (Myat et al., 2024).

Despite the growing body of evidence supporting reproductive health education, most previous studies have been conducted among university students or adolescents outside Timor-Leste and have primarily employed educational media such as videos, e-leaflets, interactive learning, social media, peer mentoring, or web-based platforms. Research specifically examining the effectiveness of lecture-based reproductive health education supported by PowerPoint presentations among senior high school students in Timor-Leste remains limited. The lecture method remains a practical educational approach because it enables educators to deliver standardized information efficiently to large groups while incorporating visual and printed materials to enhance students' understanding and knowledge retention.

Preliminary observations at São José Operario School, Balide, Dili, indicated that students' reproductive health knowledge remains relatively low, particularly regarding pubertal changes, reproductive hygiene, prevention of sexually transmitted infections, and healthy sexual behaviors. In addition, structured reproductive health education programs have not yet been optimally implemented within the school. Grade

XI students were selected as the study population because they represent middle-to-late adolescents, a developmental stage characterized by increasing challenges related to identity formation, interpersonal relationships, and decision-making. Therefore, this study aimed to examine the effect of reproductive health education on adolescents' reproductive health knowledge before and after the educational intervention among Grade XI students at São José Operario School, Balide, Dili, Timor-Leste.

Literature Review

Knowledge

Knowledge is the result of acquiring information, understanding, and skills through education, learning, observation, and experience. It includes both theoretical understanding and the ability to apply information in real situations (Rincón Uribe et al., 2021). Knowledge may be empirical, derived from experience and observation, or rational, derived from reasoning and intellectual processes (Octaviana & Ramadhani, 2021).

Knowledge consists of six cognitive levels: knowing, understanding, application, analysis, synthesis, and evaluation. These levels reflect an individual's ability to recall, explain, apply, organize, combine, and assess information (Prasetyorini & Kustriyani, 2022). Knowledge is influenced by education, access to information, mass media, sociocultural and economic conditions, environment, and personal experience (Yusuf & Hamdi, 2021). Supportive family and school environments may improve access to accurate information, whereas stigma and cultural taboos may limit adolescents' reproductive health knowledge (R. D. Putri et al., 2022).

Adolescent Reproductive Health

Reproductive health refers to complete physical, mental, and social well-being in matters related to the reproductive system, functions, and processes. It also includes the right to obtain accurate information, access quality services, and make reproductive decisions without discrimination, coercion, or violence (UNFPA, 2019; WHO, 2018).

The scope of reproductive health includes reproductive anatomy and physiology, puberty, menstrual health, contraception, unintended pregnancy prevention, sexually transmitted infections, HIV, healthy relationships, consent, and gender-based violence prevention (UNESCO, 2018). Adolescent reproductive health knowledge therefore includes understanding pubertal changes, reproductive hygiene, risky sexual behavior, sexually transmitted infections, HIV/AIDS, and responsible relationships.

Adolescence

Adolescence is a transitional stage between childhood and adulthood characterized by physical, cognitive, emotional, and social changes (Dewinda et al., 2024). During this stage, adolescents experience sexual maturation, develop abstract thinking, seek independence, and explore personal identity and social relationships (Mustari et al., 2024).

The WHO generally defines adolescents as individuals aged 10–19 years (Brindis et al., 2023). Adolescence may be divided into early adolescence aged 10–13 years, middle adolescence aged 14–17 years, and late adolescence aged 18–19 years (Izzani et al., 2024). From a psychological perspective, adolescence is closely related to identity formation and the development of autonomy (Ragita & Fardana, 2021).

Reproductive Health Education

Reproductive health education is a systematic learning process aimed at improving knowledge, attitudes, and skills related to sexual and reproductive health. Comprehensive Sexuality Education is one recommended approach because it is curriculum-based, scientifically accurate, and appropriate to adolescents' developmental stages.

Reproductive health education aims to increase accurate knowledge, reduce misconceptions, support healthy decision-making, and encourage appropriate use of health services. Curriculum-based education has been shown to significantly improve students' reproductive health knowledge (Dewi et al., 2023). Structured educational activities delivered through lectures, discussions, and audiovisual media can also improve adolescents' understanding of reproductive health issues (Nurhayati, 2023).

Effect of Education on Reproductive Health Knowledge

Education provides accurate and structured information that helps adolescents correct misconceptions and improve their understanding of puberty, reproductive hygiene, sexually transmitted infections, HIV/AIDS, healthy relationships, and unintended pregnancy. Educational interventions influence knowledge through attention, comprehension, retention, and recall.

Previous research indicates that reproductive health education significantly improves adolescent knowledge, especially when delivered using interactive methods and appropriate visual media (Nurhayati, 2023). Increased knowledge may subsequently contribute to healthier attitudes and behaviors.

Lecture Method and PowerPoint Media

The lecture method is an educational approach in which information is presented verbally to a group. It remains widely used in school-based health education because it is efficient, easy to implement, and suitable for large groups. However, lectures may result in passive participation and limited interaction. Therefore, they should be supported by question-and-answer sessions, discussions, and visual media. Effective lectures should use age-appropriate material, simple language, clear communication, limited duration, and visual support (Centers for Disease Control and Prevention, 2022). Lecture-based reproductive health education has been associated with significant improvements in adolescent knowledge, particularly when combined with visual media (BMC Public Health, 2020; Journal of Adolescent Health, 2021).

PowerPoint is a visual learning medium that presents information through text, images, diagrams, graphics, and animation. Its use may improve attention, clarify complex reproductive health concepts, and support information retention. In this study, PowerPoint is used as supporting media for lecture-based reproductive health education.

Conceptual Framework

This study assumes that reproductive health education delivered through lectures and supported by PowerPoint can improve adolescents' reproductive health knowledge. Reproductive Health Education through Lectures and PowerPoint → Adolescent Reproductive Health Knowledge. The independent variable is reproductive health education delivered through lectures and PowerPoint, while the dependent variable is adolescents' reproductive health knowledge.

Hypotheses

H_1: Reproductive health education delivered through the lecture method and supported by PowerPoint significantly affects adolescents' reproductive health knowledge at São José Operario School, Balide, Dili, Timor-Leste.

H_0: Reproductive health education delivered through the lecture method and supported by PowerPoint does not significantly affect adolescents' reproductive health knowledge at São José Operario School, Balide, Dili, Timor-Leste.

Method

This study employed a quantitative approach using a pre-experimental one-group pretest–posttest design to evaluate changes in adolescents' reproductive health knowledge following a reproductive health education intervention. In this design, participants completed a pretest before receiving the educational intervention and a posttest after the intervention, allowing changes in knowledge to be measured within the same group (Creswell & Creswell, 2017).

The study was conducted at São José Operario School, Balide, Dili, Timor-Leste, between February and June 2026. The study population comprised 180 students aged 15–19 years. The required sample size was calculated using the Slovin formula with a 10% margin of error, resulting in 64 participants. To anticipate possible dropouts, the sample size was increased by 10%, yielding a final sample of 70 respondents. Participants were selected using proportional stratified random sampling, followed by simple random sampling within each class to ensure proportional representation and equal selection opportunities (Sugiyono, 2024; Swarjana & Skm, 2022).

The independent variable was reproductive health education delivered through the lecture method supported by PowerPoint presentations, whereas the dependent variable was adolescents' reproductive health knowledge. Potential confounding variables included age, sex, previous exposure to reproductive health education, previous information sources, sociocultural and economic background, environmental factors, and personal experience. To minimize the influence of age, the study was limited to Grade XI students aged 15–19 years.

Data were collected using a structured questionnaire adapted from Salbilla, (2025). The instrument consisted of 25 true–false items covering reproductive anatomy, puberty, menstruation, pregnancy, early marriage, risky sexual behavior, sexually transmitted infections, HIV/AIDS, and substance abuse. Each

correct response was scored as one point and each incorrect response as zero. Total scores were categorized as good (19–25), moderate (14–18), and poor (0–13). The questionnaire was administered twice to the same participants: before the educational intervention (pretest) and immediately after the intervention (posttest).

Descriptive statistics were used to summarize respondents' characteristics and knowledge scores. Continuous variables were presented as mean ± standard deviation for normally distributed data or median and interquartile range for non-normally distributed data, while categorical variables were summarized as frequencies and percentages. The normality of the pretest–posttest difference scores was assessed using the Shapiro–Wilk test. Paired *t*-test was applied for normally distributed data, whereas the Wilcoxon signed-rank test was used when the normality assumption was not met. Statistical significance was established at a *p*-value of <0.05.

Ethical approval was obtained from the Research Ethics Committee of Universitas 'Aisyiyah Yogyakarta before data collection. All participants received information regarding the study objectives and procedures and provided written informed consent prior to participation. Participant privacy and confidentiality were maintained throughout the study, and all procedures adhered to the principles of autonomy, justice, beneficence, and non-maleficence.

Results and Discussions

Respondent Characteristics

A total of 70 Grade XI students from São José Operario School, Balide, Dili, Timor-Leste participated in this study. Most respondents were 16 years old (55.7%), followed by 17 years (25.7%), 15 years (14.3%), and 18 years (4.3%). No respondents were aged 19 years. Based on sex, 37 respondents (52.9%) were female and 33 (47.1%) were male. The detailed characteristics of the respondents are presented in Table 1.

Table 1. Characteristics of the Respondents (n = 70)

Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	15	10	14.3
	16	39	55.7
	17	18	25.7
	18	3	4.3
	19	0	0.0
Sex	Female	37	52.9
	Male	33	47.1

Reproductive Health Knowledge Before and After the Educational Intervention

The distribution of respondents' reproductive health knowledge before and after the intervention is presented in Table 2. Before the educational intervention (pretest), half of the respondents (50.0%) had poor knowledge, while only 17.1% demonstrated good knowledge. Following reproductive health education delivered through the lecture method supported by PowerPoint, the proportion of respondents with good knowledge increased to 45.7%, whereas the proportion with poor knowledge decreased to 18.6%.

Table 2. Distribution of Reproductive Health Knowledge Before and After the Educational Intervention (n = 70)

Knowledge Level	Pretest, n (%)	Posttest, n (%)
Good	12 (17.1)	32 (45.7)
Moderate	23 (32.9)	25 (35.7)
Poor	35 (50.0)	13 (18.6)
Total	**70 (100.0)**	**70 (100.0)**

Normality Test

The Kolmogorov–Smirnov test showed that both pretest and posttest knowledge scores were not normally distributed ($p < 0.001$). Therefore, hypothesis testing was performed using the Wilcoxon Signed-Rank Test (Table 3).

Table 3. Kolmogorov–Smirnov Normality Test Results

Variable	Test Statistic	*n*	*p*-value	Interpretation
Pretest knowledge	0.203	70	< 0.001	Not normally distributed
Posttest knowledge	0.198	70	< 0.001	Not normally distributed

Effect of Reproductive Health Education on Knowledge

The Wilcoxon Signed-Rank Test demonstrated a statistically significant difference between pretest and posttest knowledge scores ($Z = -5.032$, $p < 0.001$), indicating that reproductive health education significantly improved adolescents' reproductive health knowledge (Table 4).

Table 4. Wilcoxon Signed-Rank Test Results

Comparison	*n*	*Z*	*p*-value	Interpretation
Pretest vs. Posttest	70	−5.032	< 0.001	Significant difference

The Wilcoxon analysis showed that 33 respondents experienced an increase in knowledge scores (positive ranks), none experienced a decrease (negative ranks), and 37 respondents had unchanged scores (ties), indicating a positive effect of the educational intervention on adolescents' reproductive health knowledge.

Discussion

Reproductive Health Knowledge Before and After the Educational Intervention

The present study demonstrated a significant difference in adolescents' reproductive health knowledge before and after the educational intervention. Before the intervention, 50.0% of participants were classified as having poor knowledge, 32.9% as having moderate knowledge, and only 17.1% as having good knowledge. Following the intervention, the proportion with good knowledge increased to 45.7%, while the proportion with poor knowledge decreased to 18.6%. The Wilcoxon Signed-Rank Test demonstrated a statistically significant difference between pretest and posttest knowledge scores ($Z = -5.032$, $p < 0.001$).

The relatively low level of baseline knowledge indicates that adolescents in the study setting may still have limited access to comprehensive and accurate reproductive health information. The thesis identifies education, exposure to information and mass media, social and cultural factors, environmental conditions, and individual experience as factors that may influence adolescents' knowledge. These factors are particularly relevant to reproductive health because adolescents may obtain information from different sources, including school, family, peers, the internet, and social media, with varying levels of accuracy and completeness.

The finding is consistent with the evidence cited in the thesis that health education can improve adolescents' knowledge. Nurhayati (2023), for example, reported that reproductive health education was associated with improved adolescent knowledge. The thesis also cites Kim et al. (2023), whose meta-analysis found that comprehensive sexuality education programmes can produce meaningful improvements in knowledge and other adolescent sexual and reproductive health outcomes. These findings support the interpretation that structured reproductive health education can provide adolescents with information that may not otherwise be obtained consistently through informal sources.

The intervention in the present study was delivered through a lecture supported by PowerPoint. This approach allowed information to be presented systematically and visually across several reproductive health domains. The educational material covered reproductive health, reproductive anatomy, puberty, menstruation, pregnancy, early marriage, risky sexual behaviour, sexually transmitted infections, HIV/AIDS, and substance use. The structured presentation of these topics may have facilitated the acquisition of basic factual knowledge, particularly among students who had limited prior exposure to reproductive health education.

The findings are also compatible with the theoretical basis presented in the thesis. Lecture-based education is described as an efficient method for delivering information to groups and can be combined with visual media such as PowerPoint. However, the thesis also recognises that lecture-based approaches may have limitations because interaction can be restricted and their effects on long-term behavioural change may be limited. Therefore, the present findings should primarily be interpreted as evidence of improvement in the short-term cognitive outcome of knowledge, rather than evidence of sustained behavioural change.

Internal Validity Considerations

Although a statistically significant increase in knowledge was observed, several threats to internal validity should be considered. The study used a pre-experimental one-group pretest–posttest design without a control

group. Consequently, the observed difference between pretest and posttest scores cannot be attributed with complete certainty to the educational intervention alone. The thesis itself acknowledges that the absence of a control group prevents determination of whether the increase in knowledge was entirely attributable to the intervention or was partly influenced by other factors.

One important threat is the testing effect. The same questionnaire was administered during the pretest and posttest. Participants may therefore have remembered some of the questions or become familiar with the wording and response format during the first assessment. Their posttest performance could consequently reflect both newly acquired knowledge and familiarity with the assessment instrument. This possibility is explicitly recognised in the thesis, which states that repeated use of the same questionnaire may produce a recall or testing effect. Because the posttest was administered immediately after the educational intervention, the possibility of short-term recall is particularly relevant.

Maturation should also be considered as a potential threat to internal validity. The participants were adolescents aged 15–19 years, a developmental period characterised by continuing cognitive, psychological, and social changes. The thesis describes adolescence as a transitional developmental period involving physical, cognitive, and psychosocial changes, including increasing capacity for abstract thinking and decision-making (Mustari et al., 2024). Nevertheless, the contribution of maturation to the present findings was probably limited because the posttest was conducted immediately following the intervention. However, without a control group, maturation cannot be completely distinguished from intervention-related learning.

Another potential threat is history, particularly exposure to reproductive health information outside the intervention. The thesis explicitly acknowledges that participants could have been exposed to information through the internet, social media, peer-group discussions, or health information obtained outside the school environment. Such exposure may have contributed to changes in knowledge independently of the educational session. This is particularly relevant for adolescents because social media and other information sources may influence reproductive health knowledge and sexual health-related outcomes (Yusuf & Hamdi, 2021).

Instrumentation represents another consideration. The knowledge outcome was measured using a 25-item questionnaire with a Guttman-type response format. The questionnaire was adapted from Salbilla (2025) and addressed several reproductive health domains. Although the same instrument was used at both measurement points, adaptation of an existing instrument and repeated administration may introduce measurement-related considerations. Therefore, interpretation of the magnitude of the observed change should take into account the psychometric evidence available for the instrument.

Overall, these internal validity considerations do not negate the observed statistical difference but indicate that the result should be interpreted as a significant pretest–posttest change in observed reproductive health knowledge, rather than definitive evidence that the intervention alone caused the change. A controlled or randomised design would provide stronger evidence of causality.

External Validity and Generalisability

The findings should also be interpreted cautiously with respect to external validity. The study included 70 Grade XI students aged 15–19 years from São José Operario School in Balide, Dili, Timor-Leste. The sample was drawn from a population of 180 students within the school using proportional stratified random sampling. Although random sampling within the school can reduce selection bias at the institutional level, the sampling frame was restricted to a single school.

Consequently, the participants may not be fully representative of adolescents in other schools or geographical areas of Timor-Leste. Adolescents living in rural areas, attending schools with different educational characteristics, or coming from different socioeconomic and cultural backgrounds may have different levels of reproductive health knowledge and different access to health information. The thesis identifies education, information and mass media, social and cultural factors, environment, and experience as factors that may influence knowledge. These contextual factors may therefore influence the generalisability of the findings.

Setting-specific factors are particularly relevant. The educational environment of São José Operario School, including the students' previous exposure to reproductive health education, school-based communication, teacher support, peer interactions, and access to information, may differ from those of other schools. Similarly, sociocultural attitudes towards sexuality and reproductive health may vary across communities. Therefore, the magnitude of improvement observed in this study should not automatically be assumed to occur to the same extent among all adolescents in Timor-Leste.

The findings nevertheless provide useful context-specific evidence for school-based reproductive health education in Dili. The thesis recommends that reproductive health education be integrated into school learning and extracurricular activities and be implemented on a continuing basis in collaboration with health professionals and relevant institutions. Future studies involving several schools across different municipalities and including both urban and rural populations would improve the representativeness and external validity of the evidence.

Validity and Reliability of the Knowledge Measurement Instrument

The reproductive health knowledge outcome was assessed using a 25-item questionnaire with a Guttman-type response format. The instrument was adapted from Salbilla (2025), whose work is cited in the thesis as the source of the reproductive health knowledge questionnaire. The questionnaire covered reproductive health concepts including reproductive anatomy, menstruation, pregnancy, early marriage, risky sexual behaviour, sexually transmitted infections, HIV/AIDS, and substance use.

Regarding instrument validity, the thesis states that the research process included questionnaire instrument validation and identifies instrument validation as part of the methodological procedures undertaken by the researcher. The thesis also indicates that the instrument was adapted from a previous instrument developed by Salbilla (2025). Thus, the instrument was not developed without reference to previous measurement work. However, the present thesis/manuscript does not provide sufficient detail regarding the specific validation procedure or report the corresponding psychometric coefficients. Therefore, the extent to which the adapted instrument demonstrates validity specifically among adolescents in the Timor-Leste setting cannot be fully evaluated from the reported information.

An additional issue concerns test–retest reliability. The present study administered the same questionnaire at pretest and posttest, but the thesis does not report a test–retest reliability coefficient. Consequently, the temporal stability of the knowledge instrument cannot be quantitatively assessed from the reported results. This is important because changes in scores between two administrations may reflect both genuine changes in knowledge and characteristics of the measurement process. The absence of a reported test–retest coefficient should not be interpreted as evidence that the instrument is necessarily unreliable; rather, it indicates that this aspect of the instrument's psychometric performance was not reported in the present study.

Because the questionnaire uses dichotomous responses, future studies should report reliability statistics appropriate for binary items and provide explicit evidence of measurement stability. In particular, future validation studies could report internal consistency using an appropriate coefficient for dichotomous items and test–retest reliability using an appropriately justified coefficient. Such reporting would strengthen the interpretation of pretest–posttest changes and provide greater confidence that observed differences represent genuine changes in reproductive health knowledge.

Implications and Directions for Future Research

The findings have practical implications for school-based reproductive health promotion. The increase in the proportion of students with good knowledge and the corresponding decrease in the proportion with poor knowledge suggest that structured reproductive health education may be useful for addressing knowledge gaps among adolescents. The findings are also consistent with the broader evidence cited in the thesis regarding the effectiveness of comprehensive sexuality education in improving adolescent knowledge.

However, the intervention should not be considered sufficient on its own to establish sustained reproductive health outcomes. The thesis acknowledges that the study measured short-term cognitive changes immediately after the intervention and did not evaluate long-term outcomes. Future studies should therefore include delayed posttests to determine whether knowledge gains are retained over time and should consider outcomes beyond knowledge, including attitudes, self-efficacy, health-seeking behaviour, and other relevant reproductive health behaviours.

Future research should also employ a stronger design, such as a quasi-experimental study with a comparison group or a randomised controlled trial, as recommended in the thesis. Such designs would reduce threats from testing effects, maturation, history, and other confounding factors. In addition, multicentre studies involving schools from different municipalities and socioeconomic and cultural contexts would strengthen external validity.

Finally, future research should provide more complete psychometric reporting for the adapted reproductive health knowledge questionnaire, including the specific validation procedures and test–retest reliability coefficient. This would directly address the measurement limitation identified in the present study

and strengthen the methodological basis for evaluating reproductive health education among adolescents in Timor-Leste.

Conclusions

This study included 70 Grade XI students aged 15–19 years from São José Operario School, Balide, Dili, Timor-Leste, comprising 37 females (52.9%) and 33 males (47.1%). Before the intervention, 35 participants (50.0%) had poor reproductive health knowledge, 23 (32.9%) had moderate knowledge, and 12 (17.1%) had good knowledge. Following reproductive health education delivered through a lecture supported by PowerPoint, the proportion of participants with good knowledge increased to 45.7%, while the proportion with poor knowledge decreased to 18.6%. The Wilcoxon Signed-Rank Test demonstrated a statistically significant pretest–posttest difference ($Z = -5.032$, $p < 0.001$), with an estimated effect size of $r = 0.60$, indicating a large magnitude of change in observed knowledge scores.

However, these findings should be interpreted cautiously because the one-group pretest–posttest design without a control group limits causal inference. The observed improvement may have been influenced by testing effects resulting from the repeated administration of the same questionnaire, maturation, and exposure to reproductive health information from other sources, including the internet, social media, peers, or health professionals. In addition, although participants were selected using proportional stratified random sampling within the school, the sample was drawn from a single school, which limits the representativeness and generalisability of the findings to adolescents in other schools and geographical or sociocultural settings in Timor-Leste. Overall, the findings indicate that school-based reproductive health education using a lecture supported by PowerPoint was associated with a substantial short-term improvement in observed reproductive health knowledge among the participating adolescents. The intervention addressed reproductive health, reproductive anatomy, puberty, menstruation, pregnancy, early marriage, risky sexual behaviour, sexually transmitted infections, HIV/AIDS, and substance use. However, the present study did not establish whether the observed knowledge gains were sustained over time or translated into changes in reproductive health attitudes or behaviours. Future research should employ a controlled quasi-experimental or randomised controlled design with a larger and more diverse sample from multiple schools and geographical areas. Replication should explicitly report the intervention duration, number and frequency of sessions, educational content and delivery procedures, participant demographic characteristics, and follow-up schedule. Delayed posttest assessments should also be incorporated to evaluate knowledge retention. These methodological improvements would strengthen causal inference, reproducibility, and generalisability of evidence regarding school-based reproductive health education among adolescents in Timor-Leste.

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