Original Article

The Effectiveness of Digital-Based Preconception Education in Improving Adolescent Girls' Reproductive Knowledge

Sri Rezeki[1], Desi Handayani Lubis[2], Suhartini[3], Pratiwi Lumbantobing[4], Herlia Sumardha Nasution[3]

[1] Mitra Husada Medan College, Medan, North Sumatera, Indonesia
[2] Flora Medan College, Medan, North Sumatera, Indonesia
[3] Haji North Sumatera College, Medan, North Sumatera, Indonesia
[4] Senior Medan College, Medan, North Sumatera, Indonesia

ARTICLE INFO

Article History

Submit : November 25, 2025
Accepted : June 23, 2026
Published : July 1, 2026

Correspondence

Sri Rezeki; Mitra Husada Medan College, Medan, North Sumatera, Indonesia

Email:

srirejeki64044@gmail.com

Citation:

Rezeki, S. ., Lubis, D. H. ., Suhartini, S., Lumbantobing, P. ., & Nasution, H. S. . (2026). The Effectiveness of Digital-Based Preconception Education in Improving Adolescent Girls' Reproductive Knowledge. Journal of Applied Nursing and Health, 8(2), 1164–1173. https://doi.org/10.55018/janh.v8i2.491

ABSTRACT

Background: Adolescent reproductive health literacy is an important determinant of future maternal and neonatal outcomes. However, limited reproductive health knowledge among adolescents remains a major public health concern, particularly in areas with restricted access to reproductive health information. Digital-based preconception education offers a promising strategy to enhance adolescents' reproductive health knowledge through accessible and engaging learning media. This study aimed to evaluate the effectiveness of digital-based preconception education in improving reproductive health knowledge among adolescent girls.

Methods: This study employed pre pre-experiment one-group pretest–posttest design involving 70 adolescent girls aged 15–19 years in Bangun Rejo Village. Respondents were selected using purposive sampling based on inclusion criteria, including smartphone ownership and active social media use. The intervention consisted of structured digital-based preconception education delivered through educational videos for approximately 30–45 minutes. Data were collected using a validated reproductive health knowledge questionnaire administered before and after the intervention. Data analysis was performed using descriptive statistics and the Wilcoxon Signed-Rank Test at $\alpha < 0.05$.

Results: Before the intervention, most respondents had a moderate level of knowledge (67.1%), whereas after the intervention, the majority demonstrated a good level of knowledge (90%). Statistical analysis revealed a significant improvement in reproductive health knowledge following the digital-based preconception education intervention ($p < 0.001$).

Conclusion: Digital-based preconception education is effective in improving reproductive health knowledge among adolescent girls and may serve as an accessible and practical strategy for strengthening adolescent reproductive health promotion.

Keywords: Adolescent Girls; Digital Media; Health Education; Preconception Care.

Implications for Practice:

- Integrating reproductive knowledge and preparedness into routine preconception care can support safe, clinical, and non-pharmacological reproductive health management during the preconception period.
- Incorporating these interventions into local adolescent reproductive health policies can enhance midwives' capacity to provide affordable, evidence-based preconception care within the primary healthcare system.
- Incorporating standardized training on reproductive knowledge and preparedness into midwifery education can strengthen practical competencies, particularly in resource-constrained low- and middle-income countries (LMICs), where low-cost interventions are essential.

Introduction

Adolescence is a transitional phase toward adulthood characterized by rapid biological, psychological, and social changes. It also represents a crucial stage in the development of reproductive health awareness and preconception behaviors that may influence the quality of pregnancy and the future health of offspring (Padhani et al., 2024). Adolescent reproductive health is not only related to the physical condition of the reproductive organs but also encompasses mental, social, and behavioral readiness, including the ability to make responsible sexual decisions, use contraception appropriately, and plan a healthy pregnancy at an appropriate age (Vieira Martins et al., 2023). A study by Nshutiyukuri et al. (2025) reported that inadequate reproductive health knowledge and literacy among adolescents remain serious public health concerns, particularly in areas with limited access to information. This condition contributes to high rates of unintended pregnancies, anemia, adverse pregnancy outcomes such as low birth weight and prematurity, and increased maternal and infant morbidity and mortality.

Adequate reproductive health knowledge plays a crucial role in encouraging adolescents to develop healthier behaviors as part of preconception preparation. Increased knowledge is associated with healthier reproductive attitudes and practices, including the prevention of unintended pregnancies and sexually transmitted infections (STIs) (Murdiningsih et al., 2020). Various educational programs have demonstrated that structured educational interventions can improve adolescents' knowledge, attitudes, and even reproductive behaviors in the short term (Jumhati et al., 2025). To date, efforts to improve reproductive health knowledge have primarily relied on conventional methods, such as lectures, leaflets, and booklets, which have consistently been shown to increase adolescents' awareness and understanding of reproductive health (Setyandari & Rahayuningsih, 2023).

The advancement of digital technology has created new opportunities for adolescent reproductive health education across platforms such as social media, mobile applications, websites, animations, and educational games. These media can deliver information in an interactive, engaging, and easily accessible manner while maintaining user privacy (Ciluvai & Maheswari, 2024). Several studies have demonstrated that digital interventions, ranging from content on Instagram, TikTok, and YouTube to health applications and educational games, can improve adolescents' reproductive health knowledge, attitudes, and certain behaviors. This effectiveness is attributed to formats that align with gadget-use habits and the characteristics of Generation Z, who tend to prefer short, visual, and interactive content (Muhlisa et al., 2023).

From a midwifery perspective, the preconception period is considered a critical phase for assessing and managing

various biomedical, behavioral, and social risk factors that may affect maternal and infant health. Evidence suggests that maternal conditions before and during early pregnancy significantly influence pregnancy outcomes, childbirth, and the health status of future generations (Dewi & Teja, 2022). Maternal health programs are increasingly shifting their focus from pregnancy care alone to earlier preventive interventions, beginning in adolescence. This shift reflects the understanding that adolescents' health status, including nutrition, personal hygiene, lifestyle, and sexual behavior, determines their readiness for the preconception period and has long-term implications for reproductive health and offspring outcomes (Irfan et al., 2023).

In midwifery, reproductive health readiness is understood as a holistic condition encompassing physical, psychological, cognitive, and preventive behavioral aspects, all of which are interrelated in determining pregnancy success and offspring quality. Physical readiness includes adequate nutritional status, freedom from anemia, and the absence of infectious diseases such as HIV and sexually transmitted infections, as well as favorable premarital and preconception screening outcomes indicating optimal health before pregnancy. Psychological readiness refers to the ability to adapt to changing roles, emotions, and responsibilities as a partner and future parent, thereby contributing to healthy marital adjustment and parenting (Siregar et al., 2023). Furthermore, knowledge and attitudes regarding reproductive health, pregnancy, and risk prevention, such as premarital sex, unintended pregnancy, and STIs, serve as the foundation for responsible reproductive behaviors beginning in adolescence (Sari et al., 2025). Therefore, research examining the impact of digital-based preconception education on adolescent girls' reproductive health knowledge is highly relevant to supporting evidence-based midwifery practice and strengthening health behavior interventions.

Although previous studies have examined reproductive health education among adolescents, limited evidence specifically investigates digital-based preconception education that integrates reproductive readiness outcomes among adolescent girls in rural Indonesian settings. Therefore, this study seeks to address this gap by evaluating the effectiveness of a digital-based preconception educational intervention on reproductive health knowledge and readiness. This study aimed to evaluate the effectiveness of digital-based preconception education in improving reproductive health knowledge among adolescent girls.

Methods

Study Design

This study used a single-group pretest-posttest design without a control group. A one-group pretest–posttest design was selected because the study aimed to evaluate the preliminary effectiveness of a digital educational intervention in a community setting, where establishing a control group was impractical. However, the absence of a comparison group is acknowledged as a methodological limitation. Subjects were observed before and after the intervention. One group was pre-tested before receiving a specific treatment, and after treatment, measurements were taken again to determine the treatment's effect. Causality testing was conducted by comparing the pre-test and post-test results.

Participants

Respondents were adolescent girls aged 15–19 living in Bangun Rejo Village. Inclusion criteria included owning a smartphone and actively using social media.

Instruments

The research instrument, a questionnaire on reproductive health knowledge among adolescent girls, was tested before use in the main study to ensure it had high accuracy and consistency.

Intervention

The intervention consisted of digital preconception education delivered through smartphone-accessible educational videos. The intervention was delivered in a single structured educational session lasting approximately 30–45 minutes. Educational content included reproductive organ health, menstrual health, anemia prevention, healthy nutrition, personal hygiene, sexually transmitted infection prevention, risks of early pregnancy, healthy pregnancy planning, and preconception preparation.

The educational materials were developed in line with adolescent reproductive health and preconception care guidelines and adapted to adolescents' digital media preferences. Respondents received the intervention after completing the pretest questionnaire. Posttest assessment was conducted after participants completed the educational session to evaluate changes in reproductive knowledge and readiness.

Data Collection

Data were collected by trained enumerators who underwent a two-day training program on measurement techniques, documentation, and ethical procedures. Quality control was maintained through double-entry verification and random data checks by the principal investigator. To ensure data integrity, all instruments were standardized, and observations were recorded consistently at the same time each day. Incomplete or missing data were verified directly with participants during follow-up visits; none were found in the final data set.

Data Analysis

Data were analyzed using SPSS version 26. Descriptive statistics were used to summarize respondent characteristics and outcome variables. Since the data were not normally distributed, inferential analysis was conducted using the Wilcoxon Signed-Rank Test to compare reproductive knowledge and readiness scores before and after the intervention. Statistical significance was determined at the 95% confidence level ($\alpha < 0.05$). The hypothesis was accepted when $p < 0.05$, indicating a significant difference between pretest and posttest scores.

Ethical Considerations

Ethical approval was obtained from the Health Research Ethics Committee of STIKES Kendal with approval number 018/EC/KEPK_STIKES_KENDAL/I/2026 dated January 28, 2026.

Results

Table 1 illutrates that the characteristics of the 70 adolescent respondents who participated in this study. The majority of participants were 17 years old (26 participants (37.2%), and the minority were 15 years old (7 participants (10%). Based on Table 2, the majority of respondents had sufficient knowledge before the education (47 respondents (67.1%) and after the education (63 respondents (90%). Table 1 shows the effectiveness of digital-based preconception education in improving reproductive knowledge among adolescent girls. The analysis demonstrated a mean difference of 0.733 between pre-test and post-test scores, indicating an increase in respondents' knowledge after the educational intervention. The standard deviation was 0.944, reflecting the variability of score changes among participants, while the standard error was

0.172. Statistical testing revealed a highly significant difference between pre-test and post-test knowledge scores ($p < 0.001$). Furthermore, the 95% confidence interval (0.381–1.086) did not include zero, confirming that the intervention had a positive and statistically significant effect on increasing reproductive knowledge among adolescent girls.

Table 1. Characteristic of Respondents

Variable	Category	n (%)
Age	15 years	7 (10.0)
	16 years	15 (21.4)
	17 years	26 (37.2)
	18 years	22 (31.4)
Knowledge before education	Poor	18 (25.7)
	Moderate	47 (67.1)
	Good	5 (7.2)
Knowledge after education	Poor	0 (0.0)
	Moderate	7 (10.0)
	Good	63 (90.0)
Effectiveness of digital-based preconception education	Mean ± SD	0.733 ± 0.944
	p-value	<0.001
	95% CI	0.381–1.086

Discussion

The findings of this study demonstrated that digital-based preconception education significantly improved adolescent girls' reproductive health knowledge after the intervention. Before the educational intervention, most respondents had a moderate level of knowledge, whereas after receiving digital-based education, the majority shifted to the good knowledge category. The significant difference identified through the Wilcoxon test suggests that digital preconception education may be an effective educational strategy for improving reproductive health literacy among adolescent girls. These findings indicate that digital educational approaches can facilitate adolescents' understanding of reproductive health concepts and preparation for future reproductive life.

The increase in knowledge among adolescents in this study aligns with the finding that adolescents are a generation very familiar with digital technology, especially smartphones, and prefer short messages, videos, and interactive media over brochures or traditional printed materials (Murariu et al., 2025). Various studies have shown that digital health education interventions (applications, social media, games, e-learning modules, and interactive videos) can improve adolescents' knowledge, attitudes, and, at times, health behaviors, including reproductive health (Muhlisa et al., 2023; Rumdari et al., 2025). Digital media provides easy and flexible access, allows repeated exposure to material, and increases engagement through audiovisual stimulation and interactive features, which have been shown to improve learning outcomes and knowledge retention compared to non-interactive text or video materials (Setiyorini et al., 2025). This mechanism, the closeness of adolescents to digital technology, and the characteristics of digital media that are interesting and easily accessible, can explain why respondents' posttest scores increased significantly after receiving digital-based preconception education.

The majority of respondents in this study were aged 17–18 years, representing late adolescence, a developmental stage characterized by increased cognitive maturity and stronger critical thinking. Adolescence is marked by advancing cognitive abilities, including the development of more abstract thinking and complex reasoning, which can support understanding of health concepts and decision-making. Health literacy in young people depends on skills to seek, process, and act on information, and is influenced by

cognitive and psychological factors as well as age and educational stage (Pozuelo & Kilford, 2021). Tailored reproductive and sexual health education that matches adolescents' developmental stage, uses age-appropriate, engaging media (such as booklets, school-based sessions, web-based or smartphone programs), and aligns with their everyday information habits has repeatedly been shown to improve knowledge, attitudes, and sometimes behaviors (Setyandari & Rahayuningsih, 2023).

The findings of this study align with previous evidence demonstrating the effectiveness of digital-based reproductive health education for adolescents. A scoping review by Padhani et al. (2024) found that various preconception and behavioral interventions among adolescents and young adults improved knowledge, preventive behaviors, and maternal, perinatal, and child health outcomes, although evidence for adolescents is limited. Similarly, another review reported that smartphone-based reproductive health education interventions, apps, websites, videos, and games generally improved adolescents' knowledge and attitudes toward sexual and reproductive health (Putri et al., 2025). This consistent finding reinforces the point that digital media, particularly audiovisual and interactive formats, are a promising educational strategy for promoting reproductive health in adolescents.

Beyond increasing knowledge, various reviews show that adolescent reproductive health education, including digital-based education, not only improves literacy but also awareness and preventative behaviors related to unwanted pregnancies, sexually transmitted infections, and the safe use of contraception and reproductive health services (Rumdari et al., 2025). Digital interventions through apps, SMS, games, and online platforms have been shown to expand access to information on healthy reproductive behaviors, such as STI/HIV prevention, pregnancy planning, and aspects of hygiene and reproductive health. However, long-term effects on behavior vary (Nolan et al., 2020). The concept of adolescent reproductive readiness is multidimensional, encompassing cognitive readiness (knowledge and understanding), behavioral readiness (risk-prevention practices), psychological readiness (independence, self-efficacy), and health/nutrition readiness related to healthy pregnancies and the prevention of complications (Gamelia et al., 2023).

The effectiveness of digital-based education in this study may also be explained through learning theory perspectives. Educational media that integrates audiovisual elements can improve attention, motivation, and memory retention because they present information simultaneously across multiple sensory modalities, resulting in better learning performance than presentations delivered through a single sense when the information received is congruent (Li & Deng, 2023). Various reviews and studies on digital health interventions indicate that adolescents find video, animation, game, social media, and web platforms engaging, accessible, and relevant to their daily lives. This is associated with improved knowledge, attitudes, and behaviors related to health, including reproductive health. Digital health also allows repeated exposure and active engagement (e.g., through quizzes, comments, or two-way interactions), which strengthens message internalization (Alhassan et al., 2025; Huang et al., 2022).

Interpretation of these findings should be made cautiously. The present study used a one-group pretest–posttest design without a control group, limiting the ability to establish definitive causal relationships between the intervention and outcomes. In addition, the relatively localized sample and

short observation period may restrict generalizability and long-term interpretation. Nevertheless, this study provides preliminary evidence supporting the role of digital-based preconception education as an accessible approach for improving reproductive health knowledge among adolescent girls.

Implications and limitations

The findings suggest that digital-based preconception education may serve as an accessible and practical strategy to improve adolescent girls' reproductive knowledge and readiness. Since adolescents are highly engaged with digital technology, integrating reproductive health education through digital media may increase access to information and encourage active learning. Midwives and healthcare providers may utilize digital educational platforms as complementary tools for adolescent reproductive health promotion programs in schools and primary healthcare settings.

However, this study has several limitations. First, the study used a one-group pretest–posttest design without a control group, limiting the ability to establish causal relationships. Second, the sample was limited to adolescent girls in a single village, limiting generalizability. Third, the intervention duration was relatively short and did not assess long-term retention of knowledge and readiness. Future studies using randomized controlled designs with larger and more diverse samples are recommended.

Relevance to Practice

The findings of this study are relevant to midwifery and adolescent health promotion practices. Midwives and reproductive health educators may incorporate digital-based preconception education into adolescent counseling programs to improve reproductive literacy and preparedness before marriage or pregnancy. The use of digital media, such as educational videos and social media-based platforms, may increase adolescents' engagement and accessibility to reproductive health information. This strategy may also support preventive reproductive healthcare by promoting informed decision-making from adolescence.

Conclusion

This study demonstrates that digital-based preconception education is effective in enhancing reproductive health knowledge among adolescent girls. The findings highlight the importance of integrating digital educational interventions into adolescent health programs to support early preparation for healthy reproductive outcomes. Digital media provides an accessible and engaging platform that aligns with adolescents' daily technology use, making it a valuable approach for strengthening preconception health promotion and preventive reproductive healthcare strategies.

Funding

This research received no external funding.

CrediT Authorship Contributions Statement

Sri Rezeki: Conceptualization, Methodology, Supervision

Desi Handayani Lubis: Software, Validation

Suhartini: Formal Analysis, Writing - Review & Editing

Pratiwi Lumbantobing: Investigation, Resources

Herlia Sumardha Nasution: Data Curation, Project Administration

Conflicts of Interest

There is no conflict of interest.

Acknowledgments

The authors would like to express their deepest gratitude to STIKes Mitra Husada Medan and its Research and Community Service Unit for their invaluable support during the implementation of this research. They also express their deepest gratitude to the Head and staff of Bangun Rejo Village for their permission and assistance throughout the research process. They also express their deepest appreciation to the adolescents who volunteered as respondents, as well as to the members of the research team for their valuable contributions in data collection, analysis, and preparation of the final report.

References

Alhassan, R. H. A. H., Haggerty, C. L., Fapohunda, A., Affan, N. J., & Anto-Ocrah, M. (2025). Exploring the Use of Digital Educational Tools for Sexual and Reproductive Health in Sub-Saharan Africa: Systematic Review. JMIR Public Health and Surveillance, 11, e63309. https://doi.org/10.2196/63309

Ciluvai, J., & Maheswari, U. (2024). Comparative Analysis of Social Media-Based Interventions for Adolescent Reproductive Health Education. African Journal of Reproductive Health/La Revue Africaine de La Santé Reproductive, 28(3), 81–91.

Dewi, N. W. E. P., & Teja, N. M. A. Y. R. (2022). Edukasi Skrining Prakonsepsi Dengan Video Animasi Pada Wanita Usia Subur. JURNAL Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM), 5(8), 2758–2767. https://doi.org/10.33024/jkpm.v5i8.6757

Gamelia, E., Anies, A., Widjanarko, B., & Shaluhiyah, Z. (2023). Risk Sexual Behavior, Sexually-Transmitted Infections and Adolescent Pregnancy Prevention Interventions. Journal of Public Health in Africa. https://doi.org/10.4081/jphia.2023.2672

Huang, K.-Y., Kumar, M., Cheng, S., Urcuyo, A. E., & Macharia, P. (2022). Applying Technology to Promote Sexual and Reproductive Health and Prevent Gender Based Violence for Adolescents in Low and Middle-Income Countries: Digital Health Strategies Synthesis from an Umbrella Review. BMC Health Services Research, 22(1), 1373. https://doi.org/10.1186/s12913-022-08673-0

Irfan, I., Risyati, L., & Handayani, F. (2023). Pemberdayaan Remaja dalam Optimalisasi Peningkatan Kesehatan Reproduksi. Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM), 6(3), 1001–1010. https://doi.org/10.33024/jkpm.v6i3.8596

Jumhati, S., Chairy, A., & Chadaryanti, D. (2025). The Effect of Peer Group Education on Adolescent Girls' Knowledge and Attitude Towards Reproductive Health and Unwanted Pregnancy Prevention. Jurnal Pemberdayaan Komunitas MH Thamrin, 7(1), 198–208. https://doi.org/10.37012/jpkmht.v7i1.2665

Li, J., & Deng, S. W. (2023). Facilitation and Interference Effects of the Multisensory Context on Learning: a Systematic Review and Meta-Analysis. Psychological Research, 87(5), 1334–1352. https://doi.org/10.1007/s00426-022-01733-4

Muhlisa, Amiruddin, R., Moedjiono, A. I., Suriah, Hadju, V., Salmah, U., & Hidayanty, H. (2023). Effectiveness of Health Education for Teenagers in the Digital Era: A Review. Malaysian Journal of Medicine and Health

Sciences, 19(5), 399–406. https://doi.org/10.47836/mjmhs.19.5.45

Murariu, A., Bobu, L., Geleţu, G. L., Stoleriu, S., Iovan, G., Vasluianu, R.-I., Foia, C. I., Zapodeanu, D., & Baciu, E.-R. (2025). The Impact of Mobile Applications on Improving Oral Hygiene Knowledge and Skills of Adolescents: A Scoping Review. Journal of Clinical Medicine, 14(9), 2907. https://doi.org/10.3390/jcm14092907

Murdiningsih, M., Rohaya, R., Hindun, S., & Ocktariyana, O. (2020). The Effect of Adolescent Reproductive Health Education on Premarital Sexual Behavior. International Journal of Public Health Science (IJPHS), 9(4), 327. https://doi.org/10.11591/ijphs.v9i4.20444

Nolan, C., Packel, L., Hope, R., Levine, J., Baringer, L., Gatare, E., Umubyeyi, A., Sayinzoga, F., Mugisha, M., Turatsinze, J., Naganza, A., Idelson, L., Bertozzi, S., & McCoy, S. (2020). Design and Impact Evaluation of a Digital Reproductive Health Program in Rwanda Using a Cluster Randomized Design: Study Protocol. BMC Public Health, 20(1), 1701. https://doi.org/10.1186/s12889-020-09746-7

Nshutiyukuri, C., Uwingabire, F., Musabwasoni, M. G. S., Rutayisire, J. B., Rutayisire, R., Benimana, I., Kaberuka, G., Bazakare Ishimwe, L., Kyame, K. B., Mutabazi, L., & Mukeshimana, M. (2025). Perceived Factors Contributing to Teenage Pregnancy and their Perceived Effects on Teenage Females Health in Eastern Province of Rwanda. Women's Health, 21. https://doi.org/10.1177/17455057251325044

Padhani, Z. A., Rahim, K. A., Tessema, G. A., Avery, J. C., Damabi, N. M., Castleton, P., Salam, R. A., Meherali, S., & Lassi, Z. S. (2024). Exploring Preconception Health in Adolescents and Young Adults: Identifying Risk Factors and Interventions to Prevent Adverse Maternal, Perinatal, and Child Health Outcomes–A Scoping Review. PLOS ONE, 19(4), e0300177. https://doi.org/10.1371/journal.pone.0300177

Pozuelo, J. R., & Kilford, E. J. (2021). Adolescent Health Series: Adolescent neurocognitive development in Western and Sub-Saharan African contexts. Tropical Medicine & International Health, 26(11), 1333–1344. https://doi.org/10.1111/tmi.13656

Putri, Y., Maryati, I., & Solehati, T. (2025). Interventions to Improve Sexual and Reproductive Health Related Knowledge and Attitudes Among the Adolescents: Scoping Review. Risk Management and Healthcare Policy, Volume 18, 105–116. https://doi.org/10.2147/RMHP.S490395

Rumdari, R., Setyowati, S., Budiati, T., & Rachmawati, I. N. (2025). Digital Support Education on Risky Adolescent Reproductive Health Behaviors: A Systematic Review. Indonesian Journal of Global Health Research, 7(2), 1075–1086. https://doi.org/10.37287/ijghr.v7i2.5869

Sari, J., Rezeki, S., & Batubara, Z. R. (2025). The Effect of Health Education Through Video on Reproductive Health Knowledge Among Female Adolescents at MTS Al Ulum, Medan Area District. Benih: Journal of Midwifery, 4(02), 464–475.

Setiyorini, A., Nisman, W. A., & Sitaresmi, M. N. (2025). Digital Game Interventions

to Improve Adolescent Reproductive Health Knowledge, Attitudes, and Self-Efficacy: A Systematic Review and Meta-Analysis. American Journal of Sexuality Education, 20(3), 429–459. https://doi.org/10.1080/15546128.2024.2358223

Setyandari, F., & Rahayuningsih, F. B. (2023). The Effectiveness of Reproductive Health Education to Increase Knowledge among Adolescents. Malahayati International Journal of Nursing and Health Science, 6(6), 458–463. https://doi.org/10.33024/minh.v6i6.13062

Siregar, N. Y., Pratiwi, S. I., Longgupa, L. W., Nurfatimah, N., Sitorus, S. B. M., & Ramadhan, K. (2023). Pengaruh Edukasi Kesehatan Reproduksi Dengan Media Booklet Terhadap Peningkatan Pengetahuan Tentang Persiapan Masa Prakonsepsi. Jurnal Bidan Mandiri, 1(2), 11–23.

Vieira Martins, M., Karara, N., Dembiński, L., Jacot-Guillarmod, M., Mazur, A., Hadjipanayis, A., & Michaud, P.-A. (2023). Adolescent Pregnancy: An Important Issue for Paediatricians and Primary Care Providers—A Position Paper from the European Academy of Paediatrics. Frontiers in Pediatrics, 11. https://doi.org/10.3389/fped.2023.1119500