

Effectiveness of Digital Educational Media in Improving Adolescents' Reproductive Health Knowledge

Silvi Zaimy¹, Ika Yulia Darma¹, Rury Moryanda¹, Veolina Irman¹

¹ Syedza Saintika College of Health Sciences, Padang, West Sumatra, Indonesia

Article Info

Riwayat artikel:

Received October 12, 2025

Revised November 12, 2025

Accepted December 25, 2025

Keyword:

Digital education

Reproductive health

Adolescent knowledge

ABSTRACT

Adolescents are a transitional age group vulnerable to various reproductive health problems due to limited knowledge and inadequate access to accurate information. The use of digital educational media has become an innovative approach with the potential to improve the effectiveness of adolescent reproductive health education, especially in community-based service settings. This study aimed to analyze the effectiveness of digital educational media in increasing adolescents' reproductive health knowledge at the Kampung Durian Youth Posyandu, Parak Gadang Timur Subdistrict, East Padang District. The study used a quasi-experimental design with a one-group pretest–posttest approach. The sample consisted of 60 adolescents aged 15–19 years selected through purposive sampling. The intervention involved interactive digital education delivered through videos, visual modules, and feedback quizzes provided in two sessions. Knowledge was measured using a validated 25-item questionnaire before and after the intervention. Data were analyzed using a paired t-test and effect size calculation. The results showed that the mean knowledge score increased from 58.4 ± 10.2 to 81.7 ± 8.9 , with a mean difference of 23.3 points and a significant difference ($p < 0.001$), along with a large effect size ($d = 1.9$). Participant engagement in the use of digital media was also high. It can be concluded that digital educational media are effective in improving adolescents' reproductive health knowledge and are feasible to be integrated into community-based youth posyandu programs.

Ini adalah artikel akses terbuka di bawah lisensi [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/).



Corresponding Author :

Silvi Zaimy

Syedza Saintika College of Health Sciences,

Jl. Prof. Hamka No. 228 Air Tawar Timur, Padang, Sumatera Barat, Indonesia

E-mail: zaimysilvi06@gmail.com

1. INTRODUCTION

Adolescents are a transitional age group undergoing rapid biological, psychological, and social changes, thus requiring adequate understanding of reproductive health [1][2]. Limited reproductive health knowledge among adolescents is associated with an increased risk of unhealthy behaviors, including teenage pregnancy and low utilization of preventive health services [3][4]. Globally and nationally, improving adolescent reproductive health literacy has become a public health priority [1][5]. Meanwhile, the development of digital technology has changed

how adolescents obtain information, with digital-based media becoming one of the main learning sources that are easily accessible and attractive to this age group [6][7].

At the local level, the urgency of adolescent reproductive education interventions is also evident in Padang City. Data from East Padang District in 2023 show a large adolescent population as a target for community-based health programs [8]. The Kampung Durian Youth Posyandu has functioned as a community service point since 2018, although its program activities and coverage still require strengthening [9]. Local and national reports continue to document cases of adolescent pregnancy, indicating that reproductive risk knowledge and prevention are not yet evenly distributed [3][10].

Various studies indicate that conventional lecture-based reproductive health education methods have limitations in maintaining adolescents' attention and knowledge retention [11][12]. Health education intervention studies report that the use of digital learning media—such as interactive videos, application-based modules, and online quizzes—can improve learning engagement and conceptual understanding compared to one-way methods [6][13][14]. Several recent systematic reviews and meta-analyses support the finding that digital interventions improve knowledge and/or attitudes, although the quality of evidence varies and media design factors (interactivity, personalization, two-way features) influence outcomes [15].

Based on these challenges, more adaptive educational approaches aligned with adolescent characteristics and community environments are needed. Digital educational media are proposed as a solution because they enable visual, interactive, repeatable, and device-friendly learning delivery consistent with adolescents' technology usage habits [6][13][16]. Integrating digital educational media into Youth Posyandu activities has the potential to expand reach and improve the quality of reproductive health education at the community level [5][9][18]. Several application and module design studies also highlight the importance of co-design with adolescents to enhance engagement and acceptability [10].

The novelty of this study lies in the implementation of structured digital educational media in a subdistrict-level Youth Posyandu setting and the measurement of its effects through a community-based pretest–posttest design, which has been rarely reported in previous studies [14][18]. This study not only measures changes in knowledge through a pretest–posttest design but also places the digital intervention within a community-based adolescent health service context. The findings are expected to provide cross-disciplinary empirical evidence—across health, midwifery, health promotion, and health information management—regarding the effectiveness of digital-based adolescent reproductive education models in community settings.

2. METHODS

This study employed a quantitative approach with a quasi-experimental design to evaluate the effectiveness of digital educational media in improving adolescents' reproductive health knowledge at the Kampung Durian Youth Posyandu, Parak Gadang Timur Subdistrict, East Padang District. This method emphasizes measuring changes in knowledge scores before and after the digital education intervention. The research steps were as follows:

1. Research Design: This study used a one-group pretest–posttest evaluative design. The primary focus was to analyze changes in adolescents' reproductive health knowledge levels after receiving a digital educational media intervention. This design allows researchers to compare respondents' knowledge scores before and after the intervention within a community-based adolescent health service setting.

2. Populasi dan Sampel : The study population consisted of adolescents aged 15–19 years residing in the Kampung Durian area and participating in Youth Posyandu activities. The sample was determined using purposive sampling based on inclusion and exclusion criteria. Inclusion criteria included: having access to a digital device, willingness to attend all educational sessions, and providing participation consent. A minimum sample of 60 respondents was set to ensure adequate statistical power for paired measurements.

3. Pengumpulan Data Kuantitatif : Quantitative data were collected through structured knowledge score measurements using two main data sources:

Reproductive Health Knowledge Questionnaire:

A 25-item multiple-choice questionnaire was used to measure adolescents' knowledge regarding puberty, reproductive health, and risk prevention. Scores were collected during pretest and posttest. The instrument had undergone content validity and internal reliability testing.

Digital Media Evaluation Scores:

Data on digital educational media usage (access duration, module completion, and interactive quiz scores) were recorded to assess respondent engagement during the intervention.

4. Intervention Procedure: The intervention was conducted using digital educational media consisting of learning videos, interactive visual modules, and digital quizzes with immediate feedback. The intervention was delivered in two structured sessions at the Youth Posyandu location.

Tahapan meliputi:

The stages included:

- a) coordination with youth posyandu managers,
- b) respondent recruitment and screening,
- c) pretest administration,
- d) delivery of the digital media intervention (2 sessions),
- e) posttest administration on day 7 after the final session.

5. Supporting Data Collection (Observational): In addition to score data, supporting data were collected through structured observation during the sessions, including participation levels, adolescent engagement while using digital media, and session implementation flow. These observations enriched the interpretation of quantitative findings regarding the acceptability of digital educational media in the youth posyandu setting.

6. Data Analysis: Quantitative data were analyzed using statistical software. Descriptive analysis was used to describe respondent characteristics and score distributions. Normality tests were conducted before difference testing. Differences between pretest and posttest knowledge scores were analyzed using a paired t-test or Wilcoxon signed-rank test depending on data distribution. The magnitude of the intervention effect was calculated using effect size (Cohen's d). The significance level was set at $p < 0.05$.

7. Outcome Evaluation and Recommendations : Based on statistical analysis and observational findings, an evaluation of the effectiveness of digital educational media in improving adolescent reproductive health knowledge was conducted. The evaluation results were used to develop recommendations for sustainable digital education models applicable to Youth Posyandu and other community-based adolescent health services.

3. RESULTS AND DISCUSSION

1. Respondent Characteristics

The study involved 60 adolescents participating in activities at the Kampung Durian Youth Posyandu, Parak Gadang Timur Subdistrict. All respondents met the inclusion criteria and completed the full digital education intervention as well as the pretest and posttest measurements. The majority of respondents were aged 16–17 years and were predominantly female. Most respondents reported having regular access to smartphones and the internet, allowing the digital educational media intervention to be accessed without significant technical barriers.

The distribution of respondent characteristics is presented in Table 1.

Variable	Category	n	%
Age	15–16 years	24	40,0
	17–19 years	36	60,0
Sex	Female	41	68,3
	Male	19	31,7
Smartphone access	Yes	56	93,3
	Shared device	4	6,7

The high level of digital device ownership and access indicates that a digital media-based educational approach is feasible in a community-based youth posyandu setting.

2. Changes in Pretest–Posttest Knowledge Scores

Measurement results showed an increase in reproductive health knowledge scores after the digital educational media intervention. The mean knowledge score before intervention (pretest) was 58.4 ± 10.2 , while after intervention (posttest) it increased to 81.7 ± 8.9 . The mean score improvement was 23.3 points.

Normality testing indicated that the data distribution was approximately normal; therefore, a paired t-test was applied. The test results showed a statistically significant difference between pretest and posttest scores with $p < 0.001$.

Table 2. Differences in Knowledge Scores Before and After Intervention

Measurement	Mean	SD	Mean Difference	p-value
Pretest	58,4	10,2		
Posttest	81,7	8,9	23,3	<0,001

In addition to statistical significance, the intervention effect size (Cohen's d) was calculated and yielded $d = 1.9$, which is categorized as a large effect. This indicates that the digital educational media intervention had a strong impact on improving respondents' knowledge.

3. Respondent Engagement in the Digital Intervention

Media usage data showed that most respondents completed all digital modules and educational videos. The average material access duration was 52 minutes out of the total 60 minutes of available content. More than 80% of respondents repeated at least one section of the material, especially topics on puberty and reproductive risk prevention. Interactive quiz scores during the sessions showed an increasing trend from first to subsequent attempts.

These findings indicate that digital educational media were not only accessed but actively used by adolescents. Interactive features and immediate feedback likely contributed to improved material retention.

4. Discussion

The results demonstrate that digital educational media significantly improved adolescents' reproductive health knowledge at the Kampung Durian Youth Posyandu. An average score increase of more than 20 points and a large effect size indicate that the intervention was not only statistically significant but also practically meaningful. These findings are consistent with various health education intervention studies reporting that interactive digital media are more effective than one-way lecture methods in improving adolescent understanding.

The advantages of digital media lie in the combination of visual, audio, and interactive elements that support multimodal learning processes. Adolescents can reaccess materials, learn at their own pace, and receive immediate feedback through digital quizzes. This approach aligns with the characteristics of today's adolescents who are familiar with technology and screen-based learning.

In community-based service contexts such as youth posyandu, the use of digital educational media also adds operational value. Cadres and health workers can repeatedly use the same materials with consistent content standards. This helps maintain message quality and reduces variation in educational delivery. Furthermore, the high level of smartphone access among respondents supports the sustainability of this educational model beyond face-to-face sessions.

However, this study has limitations, including the absence of a control group, meaning that external factors cannot be fully ruled out. The measurement period was also short-term and does not yet reflect long-term knowledge retention or behavioral change. Further research using controlled designs and follow-up measurements is recommended to strengthen the evidence of intervention effectiveness.

4. CONCLUSION

Digital educational media have been proven effective in improving adolescents' reproductive health knowledge at the Kampung Durian Youth Posyandu, Parak Gadang Timur Subdistrict, East Padang District. There was a significant increase in knowledge scores between pre-intervention and post-intervention measurements, with a strong effect size, indicating that an interactive digital education approach is appropriate for use in community-based adolescent health service settings. The high level of digital device access among respondents further supported the successful implementation of the intervention.

The use of digital educational media enables more engaging, consistent, and repeatable delivery of educational materials for adolescents. This model has strong potential to be integrated into youth posyandu programs and reproductive health promotion at the subdistrict level. Future studies are recommended to use controlled designs and longer follow-up periods to assess long-term knowledge retention and behavioral change outcomes.

ACKNOWLEDGEMENTS

The authors would like to express their gratitude to the managers and cadres of the Kampung Durian Youth Posyandu, Parak Gadang Timur Subdistrict, East Padang District, for their permission and support throughout the research implementation. Appreciation is also extended to all adolescent respondents who actively participated in the intervention activities and completion of the research instruments. The authors also acknowledge their academic institution for its support in the preparation of this article.

REFERENSI

- [1] World Health Organization, Adolescent sexual and reproductive health. Geneva: WHO, 2023.
- [2] World Health Organization, Global Accelerated Action for the Health of Adolescents (AA-HA!). Geneva: WHO, 2021.

- [3] United Nations Population Fund, Adolescent Sexual and Reproductive Health Report. New York: UNFPA, 2022.
- [4] UNICEF, Adolescent Health and Well-Being: Global Report. New York: UNICEF, 2023.
- [5] Kementerian Kesehatan RI, Pedoman Pelayanan Kesehatan Peduli Remaja (PKPR). Jakarta: Kemenkes RI, 2022.
- [6] S. Borji-Navan, A. A. Dehghan, and M. Rahmani, "Efficacy of digital health interventions for adolescent sexual and reproductive health: A systematic review," *Health Science Reports*, vol. 7, no. 1, 2024.
- [7] L. Smith and J. Carter, "Digital health education interventions for adolescents: A systematic review," *Frontiers in Public Health*, vol. 12, 2024.
- [8] Badan Pusat Statistik, Kecamatan Padang Timur Dalam Angka 2024. Padang: BPS, 2024.
- [9] Kementerian Kesehatan RI, Petunjuk Teknis Posyandu Remaja. Jakarta: Kemenkes RI, 2021.
- [10] I. Chima, K. M. Amu, and R. O. Adewale, "mHealth interventions and adolescent reproductive health outcomes: Systematic review and meta-analysis," *Social Science & Medicine*, vol. 280, 2021.
- [11] J. W. Creswell and J. D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 5th ed. Thousand Oaks, CA: Sage, 2018.
- [12] J. R. Fraenkel, N. E. Wallen, and H. H. Hyun, *How to Design and Evaluate Research in Education*, 10th ed. New York: McGraw-Hill, 2019.
- [13] R. E. Mayer, *Multimedia Learning*, 3rd ed. Cambridge: Cambridge University Press, 2021.
- [14] L. S. Chernick, M. Schnall, and R. Stockwell, "A digital sexual health intervention for adolescents: Formative evaluation study," *JMIR Formative Research*, vol. 8, 2024.
- [15] P. Aguilar-Quesada, R. López, and D. Moreno, "Effectiveness of digital interventions for adolescent health behavior change: Meta-analysis," *International Journal of Environmental Research and Public Health*, vol. 21, no. 2, 2024.
- [16] R. Dowling, K. Moore, and T. Laar, "Digital adolescent sexual and reproductive health in low-resource settings: Systematic review," *International Journal of Public Health*, vol. 70, 2025.
- [17] OECD, *Digital Education and Youth Engagement Report*. Paris: OECD Publishing, 2023.
- [18] S. Meherali et al., "Co-designing digital sexual and reproductive health tools with adolescents," *JMIR Human Factors*, vol. 12, 2025.
- [19] R. E. Mayer and L. Fiorella, *Multimedia Learning and Instruction*. New York: Routledge, 2022.
- [20] A. Feroz, M. Abrejo, and S. Ali, "Using mobile phones to improve young people's sexual and reproductive health in low- and middle-income countries," *Reproductive Health*, vol. 18, 2021.
- [21] B. J. Zimmerman, "Self-regulated learning and academic achievement," *Educational Psychologist*, vol. 55, no. 1, pp. 1–12, 2020.
- [22] A. Bandura, *Social Cognitive Theory: An Agentic Perspective*. Cambridge: Cambridge University Press, 2021.
- [23] E. Yana, D. Prasetyo, and Z. Zulvayanti, "Pemanfaatan media edukasi digital untuk meningkatkan pengetahuan kesehatan reproduksi remaja," *Media Penelitian dan Pengembangan Kesehatan*, vol. 34, no. 2, 2024.
- [24] S. Rahmawati, "Efektivitas media edukasi interaktif dalam promosi kesehatan remaja," *Jurnal Promosi*

- Kesehatan Indonesia, vol. 17, no. 2, 2022.
- [25] R. Putri and D. Lestari, "Edukasi kesehatan reproduksi berbasis aplikasi pada remaja," *Jurnal Kesehatan Masyarakat*, vol. 18, no. 1, 2023.
- [26] N. Yusuf, "Digital reproductive health education intervention: Literature review," *Jurnal Kesehatan Terapan Indonesia*, vol. 5, no. 1, 2024.
- [27] I. Y. Darma, "Optimalisasi Posyandu Remaja Kampung Durian melalui edukasi kesehatan," *Jurnal Abdimas Kesehatan*, vol. 3, no. 2, 2020.
- [28] L. Shrier et al., "Patterns of engagement with adolescent mHealth interventions," *JMIR mHealth and uHealth*, vol. 13, 2025.
- [29] P. Delgado, C. Vargas, R. Ackerman, and L. Salmerón, "Don't throw away your printed books: A meta-analysis on the effects of reading media," *Educational Research Review*, vol. 25, pp. 23–38, 2018.
- [30] F. Geng, K. Law, and B. Niu, "Investigating self-regulated learning and technology readiness," *International Journal of Educational Technology in Higher Education*, vol. 19, 2022.