


Exploring the Effectiveness of GOLTEEN Website-Based Application in Enhancing Adolescent Sexual Behavior Knowledge

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ABSTRACT

Introduction: A survey conducted by the Ministry revealed that approximately 62.7% of Indonesian adolescents have engaged in sexual activity before marriage. **Objective:** This study aims to assess the effectiveness of the GOLTEEN application in enhancing adolescents' knowledge of sexual behavior. **Methods:** A pre-experimental design was utilized, with 37 students from a senior high school in Jakarta participating. Participants completed pre-test and post-test surveys to evaluate their knowledge levels before and after exposure to the GOLTEEN application. Statistical analyses, including the Wilcoxon test, were employed to determine the significance of any observed changes in knowledge. **Results:** The study found a statistically significant improvement in knowledge scores after the intervention ($p < 0.001$). Participants demonstrated a substantial increase in their understanding of sexual behavior following their engagement with the GOLTEEN application. Notably, all respondents showed improvement in their knowledge levels, with no participants exhibiting a decrease in their scores. **Conclusion:** The findings suggest that the GOLTEEN application serves as an effective instrument for promoting sexual health education among adolescents. By harnessing web-based applications such as GOLTEEN, educators and health practitioners can disseminate critical information and elevate awareness regarding sexual behavior among youth more effectively. This underscores the significance of integrating technology-driven methodologies within public health interventions and educational programs designed to address pivotal issues related to adolescent sexual health.



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INTRODUCTION

Adolescence is a pivotal period marked by physical, psychological, and social transformations, often accompanied by the exploration of sexuality (Agung et al., 2022; Hastuti et al., 2023). However, this developmental stage also presents challenges, particularly concerning the comprehension and management of sexual behaviors (Cao et al., 2015). In Indonesia, as in many other countries, adolescents navigate the complexities of sexual relationships amidst societal norms, peer influences, and limited access to comprehensive sexual education (Cahyaningtyas et al., 2020). Premarital sex, specifically, remains a prevalent concern owing to its implications for reproductive

health, sexually transmitted infections (STIs), and societal repercussions (Cao et al., 2015).

Addressing adolescent sexual behavior requires multifaceted interventions encompassing education, awareness, and access to accurate information (Martin et al., 2020). Traditional health promotion initiatives have used various channels, including media education programs, to disseminate information on sexual health to young people (Agung et al., 2022; Widman et al., 2018). In Indonesia, several media education initiatives have been established, such as televised public service announcements, school-based sex education programmes, and online platforms dedicated to adolescent sexual health (Ahma et al., 2021; Agung et al., 2022). However, despite these efforts, gaps persist in reaching and engaging adolescents effectively, particularly in remote or marginalized communities. Furthermore, existing media education programs may not always be tailored to the specific needs and preferences of adolescents, or may lack interactivity and user engagement features (Bonoto et al., 2017; Macharia, 2022). In this context, digital interventions such as website-based applications offer a promising avenue for enhancing adolescent sexual health education by providing accessible, interactive, and culturally relevant content (Ahma et al., 2021).

The GOLTEEN website-based application has emerged as a notable intervention in this context, designed to enhance adolescent knowledge and understanding of sexual behavior. By harnessing digital technology, GOLTEEN aims to provide adolescents with comprehensive information on reproductive health, contraception, consent, and STI prevention. By engaging with content, interactive features, and a user-friendly interface, GOLTEEN seeks to empower adolescents to make informed decisions regarding their sexual health.

Although media education initiatives have made significant strides in addressing adolescent sexual health in Indonesia, gaps remain in reaching and engaging all segments of the adolescent population (Kholifah et al., 2017). Traditional media channels may not always be effective in reaching adolescents, particularly those in remote or marginalized communities, whereas existing programs may lack interactivity and user engagement features. In contrast, digital interventions such as the GOLTEEN website-based application offer a promising platform for delivering targeted, interactive, and culturally relevant sexual health education to adolescents across Indonesia.

By evaluating the effectiveness of the GOLTEEN website-based application in enhancing adolescent sexual behavior knowledge, this study aims to contribute to the development of evidence-based interventions that address the specific needs and preferences of Indonesian adolescents. Through these findings, this research endeavors to inform ongoing efforts to improve adolescent sexual health outcomes in Indonesia and beyond.

The phenomenon of risky sexual behavior among adolescents has recently increased, particularly among younger individuals, such as junior high school students in Jakarta. According to recent data from the Indonesian Ministry of Health, the prevalence of premarital sex among adolescents is concerning; a survey revealed that approximately 62.7% of Indonesian adolescents engage in sexual activity before marriage (Kågesten et al., 2021). Additionally, statistics from the National Population and Family Planning Board (BKKBN) indicate that 51% of female teenagers aged 15-19 have already initiated sexual intercourse (BKKBN 2020). While numerous studies have explored sexual behavior among high school students, research specifically targeting junior high school students remains limited. This study focuses on junior high

school students in West Jakarta, who are in early adolescence (ages 15-17)—a developmental stage marked by relatively immature cognitive development. As the first study addressing sexual behavior among junior high school students in this region, it is crucial to examine the relationship between sexual knowledge and sexual attitudes and their influence on sexual behavior in this age group, especially given the rising incidence of risky sexual behaviors among early adolescents. Findings from this study indicate a significant association between sexual knowledge, attitudes toward sexuality, and their sexual behavior ([Djohan et al., 2021](#)).

This research aims to address this gap by exploring the effectiveness of the GOLTEEN website-based application in enhancing adolescent sexual behavior knowledge in senior high schools in Jakarta. GOLTEEN, derived from the words 'Golden' and 'Teenager,' signifies 'Golden Teenagers.' This web-based application is designed to enhance knowledge regarding sexual behavior. By conducting a rigorous evaluation of the intervention's impact on knowledge acquisition and behavioral intentions, this study sought to contribute empirical evidence to the field of adolescent sexual health promotion. Through its findings, this study endeavors to inform future interventions, policies, and practices aimed at improving adolescent sexual health outcomes in Indonesia.

METHODS

The research methodology employed in this study aimed to evaluate the impact of the GOLTEEN website-based application on adolescent sexual behavior knowledge among students attending senior high school in Jakarta in 2023. This investigation utilized a pre-test and post-test design, whereby participants' sexual behavior knowledge was assessed before and after their interaction with the GOLTEEN application, without a control group.

Inclusion criteria for the research sample included students aged 15-19 years old who were enrolled in senior high school and provided consent from their parents or guardians. The exclusion criteria were students who had previously accessed or received formal sexual education through similar digital platforms or interventions.

To calculate the sample size, statistical power and precision levels were considered. With a confidence level of 95% and an estimated effect size based on prior research, a sample size of 37 participants was determined to provide sufficient statistical power to detect meaningful changes in sexual behavior knowledge following exposure to GOLTEEN. This number meets the minimum sample requirements recommended for pre-experimental research ([Perneger et al., 2015](#)). It is adequate to ensure the reliability of the results and to capture the variability in responses among adolescents regarding their knowledge of sexual behavior.

Participants who met the inclusion criteria were recruited from a senior high school in Jakarta. Upon enrollment, participants were provided with access to the GOLTEEN website-based application, ensuring that they had the necessary technological resources, such as smartphones or computers, and internet connectivity to engage with the application. Before accessing the GOLTEEN application, participants completed a pre-test survey to establish their baseline level of sexual behavior knowledge. The questionnaire, developed by the researcher, consisted of 17 statements, including 2 positive statements and 15 negative statements regarding sexual behavior (definitions, factors, aspects, and impacts). The questions were evaluated using a Guttman scale, which is suitable for assessing the gradation of attitudes. The questionnaire underwent rigorous testing for validation and reliability, with results indicating its effectiveness in accurately assessing adolescent sexual

behavior knowledge.

Subsequently, participants were given the opportunity to explore the GOLTEEN application at their pace. The application offers comprehensive information on sexual health tailored to adolescents and is presented in an engaging and user-friendly format. Participants were encouraged to interact with the application's content and utilize its features to enhance their understanding of sexual behavior. Participants were provided with guidance on using the GOLTEEN application through a WhatsApp group, where they received a direct link and a QR code that led them to the application page. They were instructed to open and study the content of the application over a period of three days, dedicating a minimum of 30 minutes each day to this activity. The researchers closely monitored participants' engagement with the application, with assistance from one of the teachers, to ensure that they effectively utilized the resources provided. After a specified period of exposure to the GOLTEEN application, the participants completed a post-test survey, which mirrors the pre-test survey. The post-test survey aimed to assess any changes in the participants' sexual behavior knowledge following their interaction with the GOLTEEN application.

Data collected from the pre- and post-test surveys were analyzed using the Wilcoxon signed-rank test to determine significant differences in participants' knowledge scores before and after exposure to the GOLTEEN application. This non-parametric test is suitable for paired data and is employed to assess the magnitude and significance of any observed change in knowledge. It accounts for the ordinal nature of the data and is robust against violations of normality assumptions, making it appropriate for analyzing the pre-post intervention scores in this study.

Ethical considerations were carefully considered throughout the study. Ethical approval was obtained from the institutional review board of Universitas Respati Indonesia (reference number 194/SK). KEPK/UNR/IV/2023. Informed consent procedures were strictly followed to safeguard the participants' confidentiality and autonomy. Furthermore, the participants were offered access to resources and support to address any queries or concerns regarding sexual health that might arise during the study.

Ultimately, this study's findings have the potential to inform sexual health education efforts targeting adolescents in Indonesia and beyond. By assessing the impact of GOLTEEN application on adolescent sexual behavior knowledge, this study seeks to contribute to the development of evidence-based interventions aimed at improving sexual health outcomes among young people.

RESULTS

Table 1. Frequency Distribution of Respondent Characteristics Based on Gender and Exposure to Adolescent Sexual Behavior Information

Variables	Total (n=37)	Percentage (%)
Sex		
Male	12	32.4
Female	25	67.6
Exposure to information		
Ever received information	13	35.1
Never received information	24	64.9

Table 1 displays the distribution of respondents' characteristics based on gender and exposure to information regarding adolescent sexual behavior at Senior High School in Jakarta in 2023. Out of the total sample size of 37 respondents, 12

(32.4%) were male and 25 (67.6%) were female. Regarding exposure to information on adolescent sexual behavior, 13 respondents (35.1%) reported having received such information, whereas 24 respondents (64.9%) did not.

Table 2. Adolescent Knowledge Level Regarding Sexual Behavior with the Provision of GOLTEEN Application

Knowledge	Total	Min-Max	Mean	Standard Deviation (SD)	Mean diff	p-value*
<i>Pre-test</i>	37	33-73	61.95	9.631	26.85	<0.001
<i>Post-test</i>	37	73-100	88.84	11.613		

*Wilcoxon Test

Table 2 presents the distribution and statistical analysis of adolescent knowledge scores concerning sexual behavior before and after using the GOLTEEN application. The pre-test scores, measured among 37 respondents, ranged from 33 to 73, with a mean of 61.95 and a standard deviation of 9.631. After implementing the application, the post-test results, also from 37 respondents, showed an improved knowledge range of 73 to 100, with a mean of 88.84 and an increased standard deviation of 11.613. The mean difference between pre-test and post-test scores was 26.85, indicating a considerable improvement in knowledge levels. Analysis using the Wilcoxon test revealed a p-value of less than 0.001, signifying a statistically significant increase in adolescent knowledge about sexual behavior following the intervention. This finding suggests the GOLTEEN application effectively enhances adolescent knowledge on this topic in the sampled population at Jakarta Senior High School.

DISCUSSION

The findings of this study highlight the critical role digital platforms, such as mobile applications, play in delivering sexual health education to adolescents. One possible explanation for the observed correlation is the accessibility and convenience offered by digital platforms. Mobile applications like GOLTEEN provide adolescents with a discreet and user-friendly way to access comprehensive information on sexual health whenever they need it. This ease of access encourages increased engagement and active learning, leading to improved knowledge levels.

This study highlights the potential of digital platforms like GOLTEEN as scalable and accessible tools for sexual health education among adolescents. By leveraging a web-based approach, GOLTEEN aims to provide reliable and age-appropriate information, empowering young individuals to make informed decisions regarding their sexual health. Such platforms can play a crucial role in bridging knowledge gaps and supporting healthy behavioral development in a manner that is both engaging and widely reachable ([Sewak et al., 2023](#); [Bennett et al., 2023](#)).

Policymakers and educators should consider incorporating such applications into educational curricula, particularly in areas with limited access to traditional health resources ([Hubert et al., 2021](#)). To successfully implement similar digital tools in other contexts, stakeholders could foster collaborations among schools, health departments, and technology developers to create content that is accessible, user-friendly, and culturally relevant. Furthermore, educators should prioritize training staff to effectively use these tools and leverage their interactive features to help adolescents develop informed attitudes and behaviors regarding sexual health ([Hubert et al., 2021](#); [Santoso & Siswantara, 2020](#)).

Technology-based interventions enhance access to accurate information, foster

greater engagement, and improve knowledge retention among young individuals. (Gibbs et al., 2022). It is important to recognize certain limitations of this study that may impact the generalizability of the results. Firstly, the absence of a control group restricts our ability to confidently attribute the observed improvements in knowledge solely to the GOLTEEN application. Additionally, the relatively small sample size may not adequately represent the diversity of adolescent populations. A larger and more varied sample could provide insights that are more representative of broader adolescent groups.

The GOLTEEN application's web-based format offers distinct advantages over traditional media. Unlike printed materials or in-person sessions, web-based applications can reach a broader audience, including adolescents in remote or underserved areas where access to comprehensive sexual health resources may be limited. Digital platforms allow for real-time updates and content customization based on user feedback and emerging trends (Bonoto et al., 2017). This flexibility ensures that the information remains relevant, accurate, and responsive to the changing needs of adolescents, thereby enhancing its effectiveness as an educational tool (Liverpool et al., 2020).

Moreover, culturally specific content is essential for ensuring the relevance and acceptability of sexual health education tools. In Indonesia, addressing local beliefs, customs, and communication styles may improve engagement and help reduce the stigma surrounding sexual health topics. Future research could examine how culturally tailored content influences knowledge retention and behavioral change, particularly among diverse adolescent subgroups across various regions of Indonesia or in similar cultural contexts.

The interactive features of GOLTEEN, such as quizzes, multimedia resources, and gamified modules provide engaging and immersive learning experiences that resonate with digital-native adolescents. Through gamification and social networking elements, GOLTEEN encourages active participation and peer interaction, both of which are essential for enhancing knowledge retention and promoting positive behavioral changes (Guse et al., 2012).

It is important to acknowledge that the success of health promotion media, including mobile applications, depends on factors such as content quality, usability, cultural relevance, and reach. Future research should examine the underlying mechanisms that link digital interventions to knowledge improvements, aiding the development of more effective and culturally relevant interventions (Widman et al., 2018).

In summary, while this study provides insights into the effectiveness of the GOLTEEN application in enhancing adolescent knowledge of sexual health, limitations such as the lack of a control group and the small sample size suggest that future studies with larger, more diverse samples and controlled designs are necessary. This study offers a foundation for further exploration of technology-based approaches, with a focus on scaling up and adapting such interventions to meet the cultural and educational needs of diverse adolescent populations.

CONCLUSION

In conclusion, the results of this study highlight the potential of mobile applications, such as GOLTEEN, to promote sexual health education and improve knowledge levels among adolescents. Future research should explore the long-term impact of digital interventions on adolescents' attitudes, behaviors, and overall sexual health outcomes. The findings suggest that GOLTEEN application, as a form of health

promotion media, played a significant role in enhancing adolescents' knowledge of sexual behavior. This observation aligns with previous research indicating that well-designed digital interventions have the potential to positively influence health-related knowledge and behaviors among young individuals.

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AUTHOR CONTRIBUTIONS STATEMENT

GNS: investigator, conceptualized and designed this research, performs data analysis (software) and interpret the results, writing original draft manuscript

AT: investigator, conceptualized, interpret the results, reviewed and revised the manuscript.

TF: investigator, performs data analysis (software) and interpret the results.

EP: investigator, reviewed and revised the manuscript.

All authors have approved the final manuscript and agree on all that has been done.

CONFLICT OF INTEREST

The all authors have no conflicts of interest to disclose.

DATA ACCESS STATEMENT

To access information data, please contact the corresponding author.

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The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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