



Assessing the Effectiveness of School-Based Health Education on Reproductive Health Knowledge

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Abstract

This study examined the effectiveness of a school-based reproductive health education program in improving adolescents' reproductive health knowledge and attitudes. A mixed-methods approach was employed, involving 400 high school students divided into intervention and control groups. Quantitative data were collected through pre-test and post-test assessments, while qualitative insights were obtained from student interviews and teacher discussions. The findings revealed a significant increase in reproductive health knowledge among students who participated in the program, particularly in the areas of contraception, sexually transmitted infections, menstrual health, gender equality, and healthy relationships. Participants also reported enhanced self-awareness, confidence, and positive attitudes toward reproductive health issues. However, cultural norms and socio-economic constraints continued to influence the application of knowledge beyond the classroom. The study highlights the effectiveness of comprehensive and interactive school-based reproductive health education in strengthening adolescent health literacy. These findings provide important implications for policymakers, educators, and health practitioners seeking to improve adolescent reproductive health outcomes through curriculum-based educational interventions.

INTRODUCTION

The increasing prevalence of reproductive health issues among adolescents globally highlights the need for effective educational interventions. Adolescents, especially in low- and middle-income countries, face significant challenges in accessing accurate information and appropriate services related to reproductive health. These challenges are compounded by societal taboos, limited healthcare access, and insufficient integration of reproductive health education into school curricula. In many settings, schools provide a crucial opportunity to address gaps in knowledge and promote healthy behaviors among young people, making school-based health education programs an essential tool for improving adolescent health outcomes (Nagy-Pénczes et al., 2022; Itriyeva, 2024; Suto et al., 2021; Szucs et al., 2022). With the rising concern over teenage pregnancies, sexually transmitted infections (STIs), and other reproductive health issues, there is a growing need to explore the role of

school-based programs in equipping students with the knowledge and skills necessary to make informed decisions about their sexual and reproductive health (Wilkins et al., 2022; Millanzi et al., 2022; Walker et al., 2022).

Recent studies have indicated that school-based reproductive health education can positively influence adolescents' attitudes and behaviors towards reproductive health. However, there remains a lack of consensus regarding the most effective methods for delivering this education and the specific content that should be prioritized (Olsen et al., 2021; Imran, 2023). Existing literature suggests that comprehensive sexual education programs that are culturally relevant, age-appropriate, and delivered in a supportive environment are most effective in enhancing students' reproductive health knowledge. For example, programs that incorporate both biological and socio-cultural aspects of reproductive health have been shown to result in improved knowledge, positive behavior change, and increased utilization of healthcare services among adolescents (McCallum et al., 2020; de Sousa et al., 2022; Obeagu et al., 2023). On the other hand, some studies have found that traditional approaches, which focus solely on abstinence or disease prevention, may fail to address the complex realities that adolescents face in their sexual lives (Jackson & Huebner, 2019; Matswetu & Bhana, 2024).

Despite the growing body of evidence on the effectiveness of school-based reproductive health education, gaps remain in understanding how these programs are implemented across different contexts and their specific impacts on adolescent populations. Many studies have focused on the effectiveness of these programs in Western countries, with fewer studies examining their effectiveness in non-Western contexts, particularly in Asia and Africa, where cultural norms and educational systems differ significantly. Furthermore, the variability in program design, content delivery, and assessment mechanisms makes it difficult to compare results across studies and draw generalizable conclusions about the most effective strategies for promoting reproductive health knowledge among adolescents (Narkarat et al., 2021; Janighorban et al., 2022; Mancone et al., 2024).

The key problem that this study aims to address is the lack of clarity regarding the specific components of school-based reproductive health education that lead to the most significant improvements in adolescents' reproductive health knowledge. While general consensus exists about the need for such programs, there is little understanding of the underlying mechanisms through which these programs achieve success or failure (Zhang et al., 2022). A critical gap in the literature is the insufficient attention to the evaluation and impact assessment of these programs, particularly in developing countries where resource constraints and cultural sensitivities may affect the implementation and success of school-based interventions.

One solution, based on previous research, is to incorporate a comprehensive, multi-component approach to school-based reproductive health education. Such an approach would integrate biological education about reproductive systems, contraceptive methods, and STI prevention with psychosocial education on gender equality, relationship dynamics, and consent (Bolin et al., 2021). Additionally, interactive teaching methods that foster critical thinking, communication, and decision-making skills have been shown to be more effective than traditional, lecture-based approaches (Amato et al., 2018; Cherukuri, 2025; Martinez & Gomez, 2025; Felemban et al., 2025). By employing diverse teaching strategies, including peer education, group discussions, role-playing, and multimedia tools, these programs can increase students' engagement and retention of information while addressing the varied learning needs of adolescents.

Empirical research indicated greater success of school based reproductive health education programmes embedded in broader curricular framework compared to programmes that are isolated and stand alone. For instance, adding reproductive health information to the mental health, substance use and nutrition content provides a complete paradigm that connects reproductive health knowledge to the everyday experiences of adolescents (Jenkins et al., 2021; Bune, 2024; Meherali et al., 2024; Musindo et al., 2023). Furthermore, it has been shown that involving parents, teachers, and community in the design and implementation of the program can foster a healthy setting that can support adolescent discussions about sensitive issues and seeking help (Gage et al., 2017; Gorbunova et al., 2025; Frazier & Doyle Fosco, 2024). Hence, it would be possible to promote sustainable and effective health education interventions in a community-based and interdisciplinary approach.

Although there is abundant published research on the general effectiveness of school-based reproductive health education, the literature lacks specific outcomes – particularly in terms of knowledge and behavioural change, and long-term health outcomes. Most of the studies so far have used self-report as their primary research method thus risking bias effects whereas few of them have applied stringent experimental or quasi experimental research methodology to clarify causal effects. Also, little is known about how other contextual factors such as socio-economic status, cultural beliefs, cultural attributes, school infrastructure, etc. may also moderate the efficacy of school-based intervention. It is against this background that the current research aims to fill in these gaps by trying to find out the effectiveness of a school-based reproductive health education programme in improving their reproductive health literacy, especially the contextual determinants of programme effects.

The significance of the present study is the evaluation of effectiveness of school based reproductive health education programme to upgrade the knowledge of adolescents in relation to reproductive health. The study attempts to contribute to the growing body of evidence that shows the significance of reproductive health education curriculum in the school by examining the program in connection to the understanding of the main concepts of reproductive health that students have including contraception, sexual health and healthy interpersonal relationships. What is unique about this question is that the target population in this instance – adolescents in a developing-country context – is a population that lives with dominant cultural values and resource constraints that could affect the planning and implementation of reproductive health education programs. In addition, the impact of factors such as the quality of programme implementation, involvement of the learners and instructional support on intervention effectiveness will be investigated. Proposed research will bring the practical information to the improvement of the reproductive health outcomes of adolescents, which is related to reproductive health programmes optimisation in schools.

METHODS

This study aims to assess the effectiveness of school-based reproductive health education on adolescents' knowledge of reproductive health. To achieve this, a mixed-methods approach was employed, combining quantitative and qualitative data collection methods to provide a comprehensive understanding of the impact of the program. The study design integrates pre- and post-intervention assessments to measure knowledge acquisition, as well as qualitative interviews to explore participants' perceptions and experiences. The methodology is designed to evaluate not only the direct outcomes of the intervention but also the contextual factors that may influence its success.

Study Design

The study adopts a quasi-experimental pre-post design with a control group, which allows for comparison between the intervention group and a group that does not receive the program. This design is chosen due to the practical limitations of randomly assigning participants to intervention and control groups in school settings, while still providing a strong basis for evaluating the effectiveness of the intervention. The pre-test assesses students' reproductive health knowledge before the intervention, while the post-test measures the same knowledge after the intervention. Additionally, a control group of students who do not participate in the intervention is assessed at both time points to account for any external factors that may influence students' knowledge, such as concurrent media exposure or peer discussions.

Participants and Setting

The study was conducted in a high school in a medium-sized city in Indonesia, where the school-based reproductive health education program is being implemented as part of the broader health curriculum. The target population for the study includes adolescents aged 15 to 18 years, as this age group is particularly vulnerable to reproductive health risks such as early pregnancy and sexually transmitted infections (STIs). A total of 400 students were recruited to participate in the study, with 200 students in the intervention group and 200 in the control group. Participants were selected using stratified random sampling to ensure that the sample was representative of the school's demographic characteristics, including gender, age, and socio-economic status. The intervention group received the reproductive health education program, while the control group continued with the standard curriculum without additional reproductive health education.

Intervention Description

The reproductive health education program was designed to provide students with comprehensive knowledge about reproductive health, including topics such as contraception, sexually transmitted infections, menstrual health, gender equality, and healthy relationships. The program was delivered over a period of four weeks, with two 60-minute sessions per week. The content of the program was developed based on national health guidelines and adapted to the local cultural context. The program incorporated a variety of teaching methods, including lectures, group discussions, role-playing activities, and multimedia presentations, to engage students and cater to different learning styles. Additionally, peer educators were involved in the delivery of the program to increase peer engagement and create a supportive learning environment.

The program was delivered by trained teachers who received professional development in reproductive health education before the study began. The curriculum was designed to be both informative and interactive, with a focus on promoting critical thinking, communication skills, and decision-making. The aim was not only to increase students' factual knowledge but also to encourage them to reflect on their attitudes and behaviors related to reproductive health. The program was evaluated in terms of its content, delivery, and student engagement, with feedback gathered from both students and teachers to assess its effectiveness.

Data Collection Methods

Data collection for the study was conducted in two phases: baseline (pre-intervention) and follow-up (post-intervention). Both quantitative and qualitative data were gathered to provide a comprehensive evaluation of the intervention's impact.

Quantitative data were collected using a structured questionnaire that assessed students' knowledge of reproductive health before and after the intervention. The

questionnaire was developed based on key learning objectives outlined in the reproductive health education program, ensuring that it aligned with the content taught during the sessions. The questionnaire included multiple-choice, true/false, and Likert scale questions, which covered topics such as contraceptive methods, sexually transmitted infections, menstrual health, and gender equality. The questionnaire was pre-tested with a sample of students outside the study group to ensure clarity and reliability of the questions.

The pre-test was administered to both the intervention and control groups prior to the start of the program, and the post-test was administered at the end of the intervention. The difference in knowledge scores between the pre- and post-test for the intervention group was compared to the change in knowledge scores for the control group to determine the effect of the intervention. The data were analyzed using paired t-tests to compare the mean scores for the intervention group and the control group, and independent t-tests were used to assess differences between the two groups.

In addition to the quantitative assessments, qualitative data were collected to explore students' perceptions and experiences of the reproductive health education program. Semi-structured interviews were conducted with a purposive sample of 20 students from the intervention group. These students were selected to represent a range of demographic characteristics, including gender, socio-economic status, and academic performance. The interviews focused on students' attitudes towards reproductive health education, their perceptions of the program's content and delivery, and how the program influenced their knowledge and behaviors. The interviews were conducted in a private setting to ensure confidentiality and encourage open and honest responses. All interviews were audio-recorded with the participants' consent and transcribed verbatim for analysis.

In addition to the student interviews, focus group discussions (FGDs) were held with teachers involved in delivering the program to gather their perspectives on the effectiveness of the intervention. The teachers were asked about their experiences with teaching reproductive health topics, the challenges they faced, and the feedback they received from students. These FGDs provided valuable insights into the implementation of the program and the factors that contributed to its success or limitations.

Data Analysis

Quantitative data were analyzed using SPSS version 26. Descriptive statistics were used to summarize the demographic characteristics of the participants, as well as the pre- and post-test scores. Paired t-tests were conducted to compare the pre- and post-test scores for the intervention and control groups, while independent t-tests were used to compare the changes in knowledge scores between the two groups. The level of statistical significance was set at $p < 0.05$.

Qualitative data from the interviews and focus group discussions were analyzed using thematic analysis. The transcripts were read multiple times to familiarize the researchers with the data, and initial codes were generated based on the themes that emerged from the responses. The codes were grouped into broader themes related to the effectiveness of the program, students' attitudes towards reproductive health, and the role of teachers in the intervention. The findings were then compared across different participant groups (students and teachers) to identify patterns and differences in perspectives.

RESULTS AND DISCUSSION

This section presents the findings of the study regarding the effectiveness of a school-based reproductive health education program in improving adolescents' reproductive

health knowledge. The results are organized into five major themes. First, the demographic characteristics of participants are described to establish baseline comparability between the intervention and control groups. Second, quantitative findings concerning overall knowledge improvement are presented. Third, topic-specific learning outcomes are examined. Fourth, qualitative findings from student interviews are reported to explore participant experiences and perceptions. Finally, teachers' perspectives and contextual factors influencing program implementation are presented.

Demographic Characteristics of Participants

A total of 400 students participated in the study, consisting of 200 students in the intervention group and 200 students in the control group. Participants were between 15 and 18 years old and represented diverse socio-economic backgrounds.

Table 1. Demographic Characteristics of Participants

Characteristic	Intervention Group (n=200)	Control Group (n=200)
Gender	50% Male, 50% Female	50% Male, 50% Female
Age	15–18 years	15–18 years
Socio-economic Status	30% Low, 40% Middle, 30% High	32% Low, 38% Middle, 30% High
Academic Performance	Average: 75%	Average: 74%

Source: Primary Data Processed by the Authors, 2025

As presented in Table 1, both groups demonstrated highly comparable demographic profiles. Gender distribution was balanced, and the age composition was identical across groups. Socio-economic status was relatively similar, with approximately one-third of participants originating from low-income households and the remainder distributed across middle- and high-income categories. Academic achievement levels were also nearly identical. These findings indicate that the intervention and control groups were equivalent at baseline, thereby providing a suitable basis for evaluating intervention outcomes.

3.2 Overall Improvement in Reproductive Health Knowledge

The primary objective of the study was to determine whether participation in the reproductive health education program improved adolescents' reproductive health knowledge. Knowledge was measured through standardized pre-test and post-test assessments administered before and after the intervention.

Table 2. Knowledge Scores Before and After the Intervention

Group	Pre-test Mean Score (%)	Post-test Mean Score (%)	Mean Difference (%)	p-value
Intervention Group	65.2	84.7	19.5	<0.001
Control Group	66.1	68.3	2.2	0.248

Source: Primary Data Processed by the Authors, 2025

Table 2 demonstrates a substantial improvement in reproductive health knowledge among students who participated in the educational intervention. The intervention group exhibited an increase from 65.2% during the pre-test to 84.7% during the post-test, representing a gain of 19.5 percentage points. Statistical analysis confirmed that this improvement was highly significant ($p < 0.001$).

By comparison, the control group showed only a minor increase from 66.1% to 68.3%, corresponding to a gain of 2.2 percentage points. This increase was not statistically significant ($p = 0.248$). The large difference between groups indicates that the reproductive health education program was effective in improving students' knowledge.

Topic-Specific Knowledge Improvement

To further explore learning outcomes, reproductive health knowledge was analyzed according to specific content areas included in the curriculum.

Table 3. Knowledge Improvement by Reproductive Health Topic

Topic	Pre-test (%)	Post-test (%)	Improvement (%)
Contraception	70	90	20
Sexually Transmitted Infections	60	80	20
Menstrual Health	75	85	10
Gender Equality and Healthy Relationships	55	75	20

Source: Primary Data Processed by the Authors, 2025

The results indicate that students experienced improvements across all instructional domains. Knowledge regarding contraception increased from 70% to 90%, while understanding of sexually transmitted infections improved from 60% to 80%. Menstrual health knowledge increased from 75% to 85%. The largest relative gain occurred in the domain of gender equality and healthy relationships, where scores increased from 55% to 75%.

These findings demonstrate that the educational program successfully addressed both biological aspects of reproductive health and broader social dimensions related to interpersonal relationships and gender awareness.

Students' Perceptions of the Educational Program

Qualitative interviews with twenty students provided deeper insight into participant experiences. Analysis revealed three major themes: increased self-awareness, expanded reproductive health knowledge, and positive perceptions of interactive learning methods.

Increased Self-Awareness and Confidence

Students consistently reported that participation in the program enhanced their awareness of reproductive health issues and increased confidence in discussing topics that had previously been considered sensitive.

One female participant explained:

"Before joining this program, I rarely thought about reproductive health because it was not something we discussed openly at home. Most of the information I received came from social media, and I often did not know whether it was accurate. Through the sessions, I learned that reproductive health is closely related to my future and my personal well-being. I now feel more responsible for taking care of myself and more confident when seeking information."

This statement indicates that the program contributed to both knowledge acquisition and personal empowerment. Students developed a stronger sense of responsibility toward their own health and became more confident in evaluating health information.

Another participant expressed a similar experience:

“At first, I felt embarrassed whenever reproductive health topics were mentioned. I thought these subjects were inappropriate to discuss openly. However, after participating in discussions and activities, I realized that everyone has similar concerns and questions. The program helped me understand that learning about reproductive health is important and necessary.”

This quotation suggests that the intervention reduced stigma associated with reproductive health discussions. Increased exposure to peer interaction helped normalize conversations surrounding sensitive issues.

A third participant emphasized the influence of the program on future decision-making:

“The biggest thing I learned is that reproductive health is not only about avoiding diseases. It is also about respecting ourselves, respecting other people, and making responsible choices. I think differently now and will be more careful when making decisions in the future.”

Collectively, these findings indicate that the educational program promoted self-awareness, confidence, and a broader understanding of reproductive health beyond biological knowledge.

Improved Understanding of Contraception and Sexual Health

Students frequently identified contraception and sexually transmitted infection prevention as the most valuable topics covered during the program.

One participant stated:

“Before the program, I thought contraception only meant condoms. During the lessons, I learned about many different methods and how they work. I did not realize there were so many options available.”

This response demonstrates a substantial expansion of contraceptive knowledge among participants.

Another student remarked:

“The sessions about sexually transmitted infections were very useful because I learned how diseases can spread and how they can be prevented. Before this, I had many misconceptions.”

The statement suggests that the intervention corrected misinformation and improved students' understanding of disease prevention.

A third participant added:

“I learned things that I had never been taught before. The information was practical and directly related to situations that young people may face.”

These responses indicate that the program successfully addressed critical knowledge gaps and provided information perceived as relevant to adolescents' lives.

Positive Response to Interactive Learning Methods

Students consistently highlighted the effectiveness of role-playing activities, group discussions, and peer-learning exercises.

One participant explained:

“The role-playing activities made the lessons feel realistic. Instead of only listening to explanations, we were able to practice situations and think about how we would respond. This helped me remember the information much better.”

This finding suggests that experiential learning methods facilitated knowledge retention and engagement.

Another participant commented:

“Group discussions allowed us to share ideas and ask questions without feeling embarrassed. Sometimes other students asked questions that I also wanted to ask.”

This quotation demonstrates how collaborative learning encouraged participation and reduced barriers to communication.

A third student stated:

“The classroom atmosphere was supportive and respectful. Because nobody laughed or judged others, I felt comfortable expressing my opinions.”

Overall, students viewed interactive learning methods as one of the strongest aspects

Teachers’ Perspectives and Contextual Factors

Focus group discussions with teachers provided additional insights regarding implementation and contextual influences.

Teacher Perspectives

Teachers reported observing substantial changes in student engagement throughout the intervention period.

One teacher explained:

“At the beginning, students were hesitant to participate. Many avoided eye contact and appeared uncomfortable discussing reproductive health. However, after several sessions, they became more willing to ask questions and engage in discussions.”

This observation suggests that familiarity with the educational environment gradually reduced discomfort and increased participation.

Another teacher stated:

“The interactive activities were particularly effective. Students became much more engaged during role-playing exercises and group discussions than during conventional lectures.”

This response highlights the value of participatory teaching approaches.

A third teacher commented:

“The training provided before implementation helped us feel prepared. However, ongoing professional development would be beneficial because reproductive health issues continue to evolve.”

These findings emphasize the importance of teacher preparation and continuous professional support.

Cultural and Socio-Economic Influences

Students and teachers identified cultural norms as a significant factor affecting program implementation.

One student noted:

“Even though I learned a lot during the program, discussing these topics outside school is still difficult because people in my community consider them sensitive.”

This finding indicates that social norms may restrict opportunities for applying newly acquired knowledge.

Another participant explained:

“My family does not usually talk about reproductive health. Sometimes it is difficult to share what I learned because these conversations are considered inappropriate.”

The statement illustrates how cultural expectations may limit communication regarding reproductive health.

A third participant highlighted socio-economic challenges:

“Now I know more about reproductive health services, but access can still be difficult because of financial limitations and lack of support.”

These findings suggest that while knowledge improved substantially, broader social and economic conditions may continue to influence health-related behaviors.

Advancing Adolescent Reproductive Health Literacy Through Comprehensive School-Based Education

The findings of this study demonstrate that school-based reproductive health education significantly enhances adolescents' reproductive health literacy, particularly in the domains of contraception, sexually transmitted infections, menstrual health, gender equality, and healthy relationships. Rather than merely increasing factual knowledge, the intervention contributed to broader cognitive and psychosocial development, including greater self-awareness, confidence, and willingness to engage in discussions regarding reproductive health. These findings reinforce recent evidence suggesting that comprehensive school-based health education remains one of the most effective strategies for improving adolescent health outcomes, particularly in settings where access to reliable reproductive health information remains limited (Itriyeva, 2024; Walker et al., 2022; Szucs et al., 2022).

The substantial improvement observed in the intervention group is consistent with previous studies demonstrating that comprehensive sexuality education produces stronger learning outcomes than traditional information-based approaches. McCallum et al. (2020) and Millanzi et al. (2022) found that educational programs integrating biological knowledge with behavioral and social competencies generate more sustainable learning outcomes among adolescents. Similarly, Nagy-Pénczes et al. (2022) reported that school interventions emphasizing active participation significantly improved students' health-related knowledge and decision-making abilities. The present study extends these findings by demonstrating similar effects within a developing-country context characterized by cultural sensitivities and resource constraints. This contextual focus represents an important contribution because evidence from non-Western educational settings remains comparatively limited.

A particularly noteworthy finding concerns the substantial increase in knowledge related to gender equality and healthy relationships. While reproductive health programs traditionally emphasize disease prevention and contraception, contemporary scholarship increasingly recognizes the importance of addressing relational, emotional, and social dimensions of adolescent development (Wilkins et al., 2022; Mancone et al., 2024). The observed improvement suggests that integrating discussions of gender respect, communication, and interpersonal boundaries may strengthen the overall effectiveness of reproductive health education. This finding aligns with recent research showing that adolescents benefit most when reproductive health curricula adopt a holistic framework that combines biomedical knowledge with social and emotional competencies (Suto et al., 2021; Wang & Yan, 2025).

The qualitative findings further highlight the value of interactive pedagogical approaches. Students consistently identified role-playing activities, peer discussions, and collaborative learning exercises as critical elements supporting knowledge acquisition and engagement. These findings correspond with recent educational research emphasizing the superiority of participatory learning environments over passive instructional models (Nordmann et al., 2022; Chasteen, 2024). Interactive learning encourages critical reflection, facilitates communication, and creates opportunities for adolescents to contextualize health information within their daily experiences. Consequently, the effectiveness of the intervention appears attributable not only to curriculum content but also to the pedagogical strategies employed during implementation.

Despite these positive outcomes, the study also revealed persistent cultural barriers affecting the application of reproductive health knowledge outside the classroom. Students frequently reported discomfort discussing reproductive health issues within family and community environments. Similar challenges have been documented across diverse cultural contexts where sexuality-related topics remain socially sensitive (Janighorban et al., 2022; Al-Naimi & Alistar, 2024). While educational interventions can improve knowledge and attitudes, behavioral translation often depends on broader social acceptance and supportive environments. This finding suggests that school-based interventions should be complemented by family and community engagement strategies to maximize long-term effectiveness.

Socio-economic disparities also emerged as an important contextual factor influencing reproductive health outcomes. Although students gained substantial knowledge, some participants reported limited access to reproductive health services and resources. This observation supports findings from de Sousa et al. (2022) and Obeagu et al. (2023), who argued that educational interventions alone may be insufficient when structural barriers restrict healthcare access. The relationship between knowledge acquisition and behavioral implementation therefore remains contingent upon broader social determinants of health. Consequently, reproductive health education programs should be integrated with accessible health services and referral mechanisms to ensure that adolescents can effectively utilize acquired knowledge.

Theoretically, this study adds to the theory on adolescent health literacy by providing evidence that reproductive health knowledge acquisition is not solely a function of exposure to information, but also of social interactions and context-relevance, as well as participatory learning processes. The results affirm multidimensional approaches to conceptualizing health literacy which view learning as a process of interplay between cognitive, behavioral, and socio-cultural aspects. In addition, the study provides empirical data from a developmental context that is not well represented in the literature: a developing country. Moreover the study adds empirical support for an underresearched reproductive health education context: that of a developing country.

In practical terms, the results offer important policy recommendations, suggestions for research, and guidance for health educators, teachers, and policymakers. The findings indicate that reproductive health education should be rolled into school curriculum systematically in a comprehensive and interactive manner. Teacher training, participation of colleagues, and tailoring of curriculum content seem to be crucial factors for effective implementation. Also, the partnership between school, families, health services, and community groups can foster the program's sustainability and effectiveness.

This study is novel in that it focuses on the educational outcomes as well as the contextual factors that determine program effectiveness in a developing-country context. This study also examines students' experiences, teacher views, and socio-cultural factors that impact education outcome concurrently with knowledge improvement, which most previous studies focused on. This holistic view gives a more holistic picture of the way reproductive health education functions in complex social structures.

There are a couple of caveats to be noted. First, the study was undertaken in one school, the results of which are not necessarily generalizable to other schools. Second, the length of time spent in the intervention was brief, and long-term behavioral effects were not assessed. Third, qualitative results were based on the self-reported perceptions of the participants, and this could be subject to social desirability bias. Longitudinal research designs, incorporation of several educational environments, and examination of the role of parental involvement, digital health education platforms and community-based partnerships in sustaining reproductive health education gains should be implemented in future studies. Additional research is needed to determine if knowledge change leads to measurable behavior and health change over time.

CONCLUSION

This study assessed the effectiveness of a school-based reproductive health education program in improving adolescents' knowledge and attitudes toward reproductive health. The results demonstrate that the intervention significantly increased students' understanding of key reproductive health topics, such as contraception, sexually transmitted infections, and gender equality. Notably, the program also fostered positive shifts in students' attitudes toward healthy relationships, gender respect, and reproductive health, indicating that educational interventions can be effective in changing adolescent behaviors and perspectives. However, the study also highlighted several challenges, particularly the cultural and socio-economic barriers that impede the full application of reproductive health knowledge outside of the school setting.

These factors suggest that while the program successfully provided students with critical information, additional efforts are required to ensure that adolescents can access the services and support needed to act on that knowledge. The findings of this research contribute to the body of knowledge by confirming that school-based reproductive health education can lead to significant improvements in adolescents' health knowledge and attitudes. However, the study also emphasizes the need for further research to explore the long-term impacts of such programs, particularly in diverse cultural and socio-economic contexts. Future studies could investigate how community engagement, parental involvement, and access to reproductive health services influence the outcomes of school-based programs.

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