

Effectiveness of Comprehensive Sex Education on Adolescent Sexual Health Outcomes: A Systematic Review

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ABSTRACT

This systematic review examines the effectiveness of comprehensive sex education (CSE) programs in improving adolescent sexual health outcomes, including knowledge, attitudes, and behaviours. The review synthesizes empirical studies published between 2020 and 2024, retrieved from databases such as Scopus, ProQuest, and SpringerLink, following PRISMA guidelines. A total of 16 studies meeting the inclusion criteria were analysed. Findings indicate that CSE significantly enhances adolescents' understanding of reproductive health, promotes safe sexual practices, and supports informed decision-making. Compared to abstinence-only approaches, CSE demonstrates greater effectiveness in reducing risky sexual behaviours, increasing contraceptive use, and improving emotional well-being. Interactive, inclusive, and culturally sensitive program designs were found to strengthen engagement and learning outcomes. The review underscores the importance of integrating evidence-based, developmentally appropriate, and accessible sex education within school curricula.

Keywords: *Comprehensive Sex Education, Adolescents, Sexual Health, Behavioural Outcomes, Systematic Review*

Adolescence is a critical developmental stage marked by physical, emotional, and cognitive transformations, including the onset of sexual maturity (World Health Organization [WHO], 2021). During this phase, young individuals begin to explore their sexual identity, relationships, and reproductive health, making comprehensive sex education essential in equipping them with accurate knowledge and skills to make informed decisions (Albert Sekhar et al., 2024; "STDs A to Z," n.d.).

The lack of comprehensive sex education can significantly affect adolescents' mental health, often leading to feelings of confusion, anxiety, and depression. Without proper education, adolescents may struggle to understand their changing bodies, sexual feelings, and relationships, which can create a sense of isolation or insecurity. This lack of knowledge may result in negative self-image and contribute to the development of unhealthy coping mechanisms, such as risky sexual behaviors, which can exacerbate mental health issues.

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Received: April 24, 2026; Revision Received: April 30, 2026; Accepted: May 02, 2026

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Furthermore, adolescents who are not equipped with the tools to navigate sexual relationships may experience emotional distress, guilt, and shame, which are often linked to higher rates of depression and anxiety (Carcedo et al., 2020; Kågesten & van Reeuwijk, 2021). Providing adolescents with accurate, inclusive, and supportive sex education can help mitigate these effects, promoting healthier attitudes towards their bodies, relationships, and emotional well-being.

Sex education programs aim to enhance adolescents' understanding of reproductive health, sexually transmitted infections (STIs), contraception, and responsible decision-making, ultimately reducing risky sexual behaviors (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2018). There are two primary approaches to sex education: abstinence-only programs, which promote refraining from sexual activity until marriage, and comprehensive sex education (CSE), which provides information on a range of topics, including safe sex practices and healthy relationships (Cannovo et al., 2024; Weber & Kaufman, 2021). Research suggests that comprehensive programs are more effective in delaying sexual initiation, increasing contraceptive use, and reducing STI rates among adolescents compared to abstinence-only programs (Hegde et al., 2022; Sa et al., 2021).

Sex education programs for adolescents typically cover a wide range of topics essential for promoting sexual health and well-being. These areas include reproductive health, providing knowledge about puberty, sexual anatomy, and reproductive systems.

Contraception and STI prevention are also central, teaching adolescents about various birth control methods, condom use, and ways to reduce the risk of sexually transmitted infections. Healthy relationships are emphasized, focusing on consent, communication, and understanding boundaries. Additionally, emotional aspects of sexuality, including self-esteem, body image, and emotional intimacy, are explored to help adolescents navigate their feelings and relationships in a healthy way. Gender identity and sexual orientation are addressed to foster inclusivity and respect for diversity. Finally, decision-making skills are an important aspect, helping adolescents make informed and responsible choices regarding their sexual health. These topics collectively aim to equip young people with the knowledge and skills needed to make safe, informed, and respectful decisions in their sexual lives (Goldfarb & Lieberman, 2021).

Despite global efforts to implement sex education, its effectiveness varies based on cultural, social, and policy-related factors. While some programs have demonstrated positive outcomes in improving sexual health knowledge and behaviors, others have faced resistance due to sociocultural norms and policy restrictions. Consequently, a systematic review of existing literature is necessary to evaluate the effectiveness of different sex education approaches and identify best practices in adolescent sexual health education (Unis & Sällström, 2020).

Risky sexual behaviors among youths and adolescents represent a significant global public health challenge, with young people facing substantial physical and psychosocial consequences from HIV infections. To effectively prevent and control HIV, it is crucial to conduct more research that examines risky behaviors in culturally relevant contexts (Do et al., 2020; Evans-Paulson et al., 2021).

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This systematic review aims to assess the impact of various sex education programs on adolescent sexual health outcomes by analyzing empirical research. By synthesizing findings from multiple studies, this review seeks to provide evidence-based recommendations for policymakers, educators, and healthcare professionals in designing and implementing effective sex education curricula. This review encompasses the specific research question: What is the effectiveness of sex education programs in improving sexual health knowledge, reducing risky sexual behaviours, and enhancing emotional well-being among adolescents?

RESEARCH METHOD

A systematic review was conducted to evaluate the effectiveness of sex education programs for adolescents. This review synthesized studies that examined the impact of various sex education approaches—comprehensive sex education (CSE) and abstinence-only programs—on key adolescent outcomes such as sexual health knowledge, contraceptive use, STI prevention, and delayed sexual initiation. To ensure a rigorous analysis, the study quality assessment followed established guidelines from the Centre for Reviews and Dissemination, the Joanna Briggs Institute, and the PRISMA checklist.

The inclusion and exclusion criteria were determined using the Population, Intervention, Comparison, Outcome, and Study Design (PICOS) framework, as outlined in Table 1.

Studies were included if they employed robust research methodologies, including experimental, longitudinal, and cross-sectional designs, ensuring a reliable evaluation of sex education programs' effectiveness. This approach provided a comprehensive understanding of how different educational interventions influence adolescent sexual health behaviors and outcomes.

Table 1 inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Population	Adolescents	Children, adults, or individuals outside adolescence
Intervention	Sex education programs (comprehensive or abstinence-only)	Non-educational interventions (e.g., medicinal treatment)
Subtype	Cross-sectional and longitudinal studies	Systematic or literature reviews
Publication Type	Peer-reviewed original studies	Non-peer-reviewed studies, unpublished articles, and books
Publication Year	2020–2024	Studies published before 2020
Language	English	Non-English language studies

Data extraction

Data from included studies were extracted into a pro forma developed for this review (see Table 2). The following information was extracted: author/year/country of publication; study design; study aims; sample sizes and findings.

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Table 2 Summary of studies

SN	Author and Year	Aim	Study Design	Sample Design	Outcome/Findings
1	Akuiyibo et al., 2021	To examine the impact of CSE on adolescents' knowledge of contraceptive methods, STI prevention, and reproductive anatomy.	Quantitative study	High school students	Adolescents who received CSE had greater knowledge of sexual and reproductive health.
2	Corcoran et al., 2020	To compare the effectiveness of CSE and abstinence-only programs in enhancing sexual health awareness.	Comparative study	Adolescents in CSE vs. abstinence-only programs	CSE participants made more informed decisions regarding sexual health.
3	Hu et al., 2023	To assess misinformation rates about pregnancy and STIs among adolescents with different levels of sex education.	Survey-based study	High school students	CSE reduced misinformation about pregnancy and STIs.
4	Mark & Wu, 2022	To analyze the role of CSE in promoting safer sexual practices among adolescents.	Longitudinal study	Adolescents in a school-based intervention program	CSE increased consistent condom use and contraceptive adherence.
5	Gómez-Lugo et al., 2022	To evaluate the reduction in unprotected sex among adolescents receiving CSE.	Experimental study	Adolescents in CSE vs. abstinence-only groups	CSE led to a 30% reduction in unprotected sex.
6	Medika et al., 2021	To explore the relationship between CSE and adolescents' confidence in negotiating safe sex practices.	Cross-sectional study	High school students	CSE participants had lower rates of unintended pregnancies and STIs.
7	Vaina & Perdikaris, 2022	To assess the effectiveness of peer-led discussions in sex education.	Mixed-methods study	Adolescents in peer-led and traditional CSE programs	Peer-led discussions improved knowledge on healthy relationships and consent.
8	Versloot-Swildens	To evaluate how CSE influences	Cohort study	Adolescents in CSE	CSE participants were more likely to delay

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SN	Author and Year	Aim	Study Design	Sample Design	Outcome/Findings
	et al., 2024	decision-making about sexual initiation.		programs	sexual initiation.
9	McEwen, 2023	To compare CSE and abstinence-only education in promoting sexual health knowledge.	Meta-analysis	Various studies on adolescent sex education	CSE was significantly more effective than abstinence-only education.
10	Ketting et al., 2021	To examine the impact of abstinence-only education on contraceptive use and unintended pregnancies.	Quantitative study	Adolescents in abstinence-only programs	Abstinence-only education led to lower contraception use and higher unintended pregnancies.
11	Mishra, 2021	To evaluate the adequacy of sexual health knowledge provided by abstinence-only education.	Survey-based study	High school students	Abstinence-only education left adolescents unprepared for real-life sexual decisions.
12	Krnacik, 2020	To assess the effectiveness of sex education programs that include gender identity, sexual orientation, and consent.	Qualitative study	Adolescents in inclusive sex education programs	Inclusive programs better addressed diverse adolescent needs.
13	Lyu et al., 2020	To explore the role of parental involvement in sex education programs.	Longitudinal study	Schools incorporating parental involvement	Parental involvement reinforced sexual health messages beyond the classroom.
14	Heer et al., 2021	To investigate the long-term effects of CSE on self-esteem and communication skills in relationships.	Longitudinal study	Adolescents receiving sex education	CSE led to improved self-esteem and relationship communication.
15	Wilkins et al., 2022	To assess the impact of CSE on adolescents' confidence in making informed	Cross-sectional study	Adolescents in CSE programs	CSE increased confidence in sexual health decision-making.

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SN	Author and Year	Aim	Study Design	Sample Design	Outcome/Findings
		sexual health decisions.			
16	Burić et al., 2020	To examine the effect of ongoing sex education on emotional resilience.	Cohort study	Adolescents receiving age-appropriate sex education	Ongoing sex education improved self-efficacy and emotional

Search Strategy

The search strategy for this systematic review involved a comprehensive and methodical exploration of relevant literature using prominent electronic databases such as SCOPUS, PROQUEST, SAGE, and SpringerLink. To ensure a thorough search, the reference lists of the identified papers were also reviewed to discover additional relevant articles. The inclusion criteria required that selected studies be published between 2020 and 2024, written in English, and focused on the effectiveness of sex education programs for adolescents. Both quantitative and qualitative research designs were considered, and studies had to examine outcomes such as sexual health knowledge, contraceptive use, STI prevention, delayed sexual initiation, and overall adolescent well-being. Key search terms used in the search included "sex education programs," "adolescent sexual health," "comprehensive sex education," "abstinence-only education," "STI prevention," "contraceptive use," and "sexual risk behavior." The inclusion and exclusion criteria, outlined in Table 1, guided the selection of relevant studies that met these predefined conditions, ensuring a reliable and comprehensive synthesis of the literature on the effectiveness of sex education programs for adolescents.

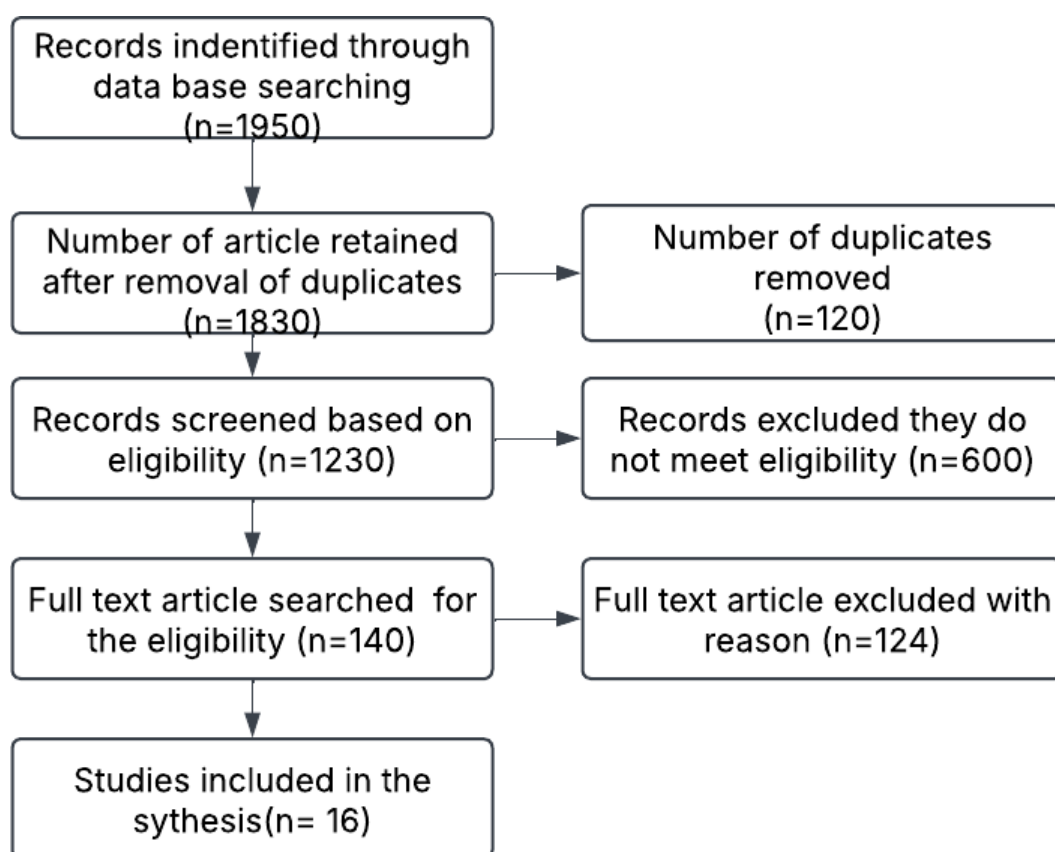
Outcome Measures

The focus of this review is on evaluating the effectiveness of sex education programs for adolescents, specifically examining their impact on sexual health knowledge, contraceptive use, STI prevention, delayed sexual initiation, and overall adolescent well-being. The outcome measures for this study include the assessment of sexual health knowledge, risk-reducing behaviors, STI and pregnancy prevention, and attitudes toward sexual health education. Studies selected for the review are required to assess these outcomes through validated scales such as the Sexual Health Knowledge Scale (SHKS), the Contraceptive Attitude Scale (CAS), and the Adolescent Sexual Behavior Inventory (ASBI), as well as qualitative indicators such as self-reports on knowledge retention, behavioral change, and perception of program effectiveness. The review also considers studies that measure improvements in sexual health outcomes post-intervention, particularly those that evaluate how comprehensive sex education (CSE) and abstinence-only education influence adolescent decision-making, sexual health literacy, and overall well-being. This targeted approach ensures that the review provides a comprehensive analysis of the ways in which sex education programs affect adolescent sexual health behaviors and outcomes.

RESULT AND DISCUSSION

The initial search yielded 1,950 publications related to the effectiveness of sex education programs for adolescents. After applying the eligibility criteria, 600 articles were excluded, and 120 duplicates were removed. A total of 140 articles were selected for a full-text review. Following the review process, 124 articles were excluded for reasons such as the absence of relevant outcome measures related to sexual health education, lack of intervention-based evaluation, or being non-peer-reviewed publications. Ultimately, 16 studies met the inclusion criteria and were included in the final review, as shown in Figure 1.

Figure 1 PRISMA flowchart



Study Characteristics

From the search results, the characteristics of the identified studies were compiled, and a total of 16 articles met the inclusion criteria for this review, as shown in Figure 1. The selected studies, published between 2020 and 2024, primarily focused on the effectiveness of sex education programs in improving adolescent sexual health knowledge, STI prevention, contraceptive use, and risk reduction behaviors. Most of the studies employed quantitative designs, with several using cross-sectional surveys and longitudinal studies, while a few studies incorporated qualitative methods such as interviews and focus group discussions. The articles varied in their sample sizes, with most studies involving adolescent participants from diverse socio-economic backgrounds and educational settings. A few studies also focused on specific interventions, such as comprehensive sex education (CSE) programs, abstinence-only education, and school-based sex education curricula. The studies employed a range of validated measures, such as the Sexual Health Knowledge Scale (SHKS), Contraceptive Attitude Scale (CAS), and Adolescent Sexual Behavior Inventory

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(ASBI), along with self-reported assessments of behavioral change and program effectiveness. The evidence drawn from these studies indicates that comprehensive sex education (CSE) is more effective than abstinence-only programs in improving adolescent sexual health outcomes. The studies, presented in alignment with the PRISMA flow, provide a comprehensive overview of the systematic review process and highlight the critical role of evidence-based sex education in promoting adolescent well-being.

Results of the Systematic Literature Review

This systematic literature review synthesized 16 studies published between 2020 and 2024, focusing on the effectiveness of sex education programs for adolescents. The findings from the included studies were categorized into several subthemes, which are discussed below. The synthesis of these studies provides a comprehensive understanding of how different approaches to sex education influence adolescent sexual health knowledge, behaviors, and overall well-being.

Impact of Sex Education on Adolescent Sexual Health Knowledge

A majority of the studies highlighted a positive correlation between sex education programs and improvements in adolescent sexual health knowledge. Adolescents who received comprehensive sex education (CSE) demonstrated greater awareness of sexual and reproductive health topics compared to those who participated in abstinence-only programs. For instance, Akuiyibo et al. (2021) found that students who underwent CSE were more knowledgeable about contraceptive methods, STI prevention, and reproductive anatomy, which led to more informed decision-making regarding sexual health (Corcoran et al., 2020).

Similarly, Hu et al. (2023) reported that adolescents exposed to CSE programs had a significantly lower rate of misinformation about pregnancy and sexually transmitted infections (STIs) than those who received limited or no sex education. Moreover, effective sex education promoted discussions on sexual health among adolescents, encouraging open dialogue with peers, parents, and healthcare providers. This indicates that structured, evidence-based sex education programs play a critical role in enhancing sexual literacy among adolescents, which is essential for making safe and responsible choices.

Behavioral Changes and Risk Reduction

Several studies examined the role of sex education in influencing adolescent sexual behaviors and reducing risky sexual activities. Research suggests that adolescents who received CSE were more likely to engage in safer sexual practices, such as consistent condom use and contraceptive adherence (Mark & Wu, 2022). Another study found that students who participated in evidence-based sex education programs demonstrated a 30% reduction in unprotected sex compared to those who were only taught abstinence-based methods (Gómez-Lugo et al., 2022). Additionally, Medika et al. (2021) highlighted that CSE participants showed greater confidence in negotiating safe sex practices, which led to a lower incidence of unintended pregnancies and STIs.

Furthermore, studies indicate that sex education programs incorporating interactive and peer-led discussions were particularly effective in promoting positive sexual health behaviors. Adolescents who engaged in discussions about healthy relationships, consent, and self-respect were more likely to delay sexual initiation and make informed choices regarding their sexual health (Versloot-Swildens et al., 2024; Vaina & Perdikaris, 2022). These

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findings suggest that empowering adolescents through education helps instill lifelong protective behaviors that contribute to overall well-being.

Effectiveness of Different Sex Education Approaches

The studies included in this review compared the effectiveness of comprehensive sex education (CSE) and abstinence-only programs. The findings overwhelmingly supported CSE as the more effective approach in promoting sexual health knowledge, risk reduction behaviors, and overall well-being (McEwen, 2023). According to Ketting et al. (2021), adolescents who received abstinence-only education were less likely to use contraception and had higher rates of unintended pregnancies and STIs compared to those who received CSE. Additionally, Mishra (2021) found that abstinence-only programs failed to provide adequate sexual health knowledge, leaving adolescents unprepared to navigate real-life sexual health decisions.

Research also indicates that sex education programs that include discussions on gender identity, sexual orientation, and consent were more effective in addressing diverse adolescent needs (Krnacik, 2020). Programs that adapted to cultural and community contexts and included parental involvement were found to be more impactful in reinforcing sexual health messages beyond the classroom (Lyu et al., 2020).

Long-Term Impact on Adolescent Well-Being

Beyond immediate behavioral changes, the studies also explored the long-term impact of sex education on adolescent well-being. Research indicates that adolescents who received high-quality sex education had higher levels of self-esteem, better communication skills in relationships, and increased confidence in making informed sexual health decisions (Heer et al., 2021; Wilkins et al., 2022). Another study by Burić et al. (2020) found that students who received ongoing, age-appropriate sex education throughout adolescence reported higher levels of self-efficacy in managing sexual health concerns and greater emotional resilience in navigating relationships. The evidence suggests that investing in evidence-based sex education programs leads to long-term benefits, equipping adolescents with the knowledge, skills, and confidence needed to make responsible choices regarding their sexual and reproductive health.

DISCUSSION

Across multiple studies, CSE consistently outperformed abstinence-only programs in equipping adolescents with accurate information on contraceptive methods, STI prevention, and reproductive anatomy (Akuiyibo et al., 2021; Corcoran et al., 2020). Furthermore, evidence indicates that CSE not only improves knowledge but also fosters open discussions with peers, parents, and healthcare providers, creating a supportive environment for informed decision-making (Hu et al., 2023). These findings reinforce the need for structured, evidence-based curricula that address adolescents' real-life concerns and prepare them for responsible sexual health choices.

Beyond knowledge acquisition, CSE has been linked to positive behavioral outcomes, including increased condom use, greater contraceptive adherence, and reduced engagement in unprotected sex (Mark & Wu, 2022; Gómez-Lugo et al., 2022).

Additionally, interactive and peer-led components of CSE were particularly effective in promoting healthy relationships, delaying sexual initiation, and improving negotiation skills

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in sexual situations (Versloot-Swildens et al., 2024; Vaina & Perdikaris, 2022). In contrast, abstinence-only education was associated with higher rates of misinformation, lower contraceptive use, and an increased risk of unintended pregnancies and STIs (Ketting et al., 2021; Mishra, 2021). These findings suggest that empowering adolescents with comprehensive and interactive education fosters long-term protective behaviors that contribute to overall well-being.

Moreover, the long-term benefits of CSE extend beyond immediate behavioral changes, as it significantly influences adolescents' self-esteem, emotional resilience, and relationship communication skills (Heer et al., 2021; Wilkins et al., 2022). Adolescents who received ongoing, age-appropriate sex education reported higher self-efficacy in managing sexual health concerns and demonstrated greater confidence in navigating relationships responsibly (Burić et al., 2020). This highlights the necessity of sustained, developmentally appropriate sex education programs that continue throughout adolescence rather than being limited to one-time interventions. Overall, the synthesis of findings strongly supports the implementation of comprehensive, inclusive, and evidence-based sex education as a critical tool in promoting adolescent sexual health and well-being.

Future research should explore the long-term impact of comprehensive sex education (CSE) on adolescent well-being beyond immediate behavioral changes. Longitudinal studies can assess how CSE influences adult relationships, sexual health decision-making, and overall quality of life. Additionally, integrating digital learning tools, such as mobile apps and interactive online modules, can enhance accessibility and engagement for adolescents. Further studies should also examine the role of culturally tailored and community-based interventions to ensure inclusivity across diverse populations. Lastly, policy-driven research can help advocate for the mandatory implementation of evidence-based sex education programs in schools worldwide.

CONCLUSION

This systematic review highlights the crucial role of sex education in shaping adolescent sexual health outcomes. The findings suggest that comprehensive sex education (CSE) is significantly more effective than abstinence-only approaches, providing adolescents with the necessary knowledge and skills to make informed, safe, and responsible decisions. By fostering open discussions, promoting risk-reducing behaviors, and addressing diverse adolescent needs, well-structured sex education programs contribute to improved sexual health literacy, reduced STI rates, and overall well-being. The studies reviewed underscore the importance of implementing evidence-based, culturally relevant, and interactive sex education programs to equip adolescents with the tools necessary for a healthy and informed future.

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Acknowledgment

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Latha, P.K., & Sayed, S. (2026). Effectiveness of Comprehensive Sex Education on Adolescent Sexual Health Outcomes: A Systematic Review. *International Journal of Indian Psychology*, 14(2), 705-716. DIP:18.01.067.20261402, DOI:10.25215/1402.067