Section: Obstetrics and Gynaecology

Original Research Article

ASSESSING THE NEED AND ACCEPTABILITY OF ARTIFICIAL INTELLIGENCE–ENABLED CHATBOTS IN ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH COUNSELING-A CROSS SECTIONAL STUDY

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Received : 16/01/2026
Received in revised form : 03/03/2026
Accepted : 22/03/2026

Keywords:
Adolescent Health, Artificial Intelligence, Chatbot, Sexual and Reproductive Health, Needs Assessment, Digital Health tool.

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DOI: 10.47009/jamp.2026.8.2.203

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (2); 1108-1116

ABSTRACT

Background: Adolescents often face stigma, embarrassment, and limited access to reliable sources when seeking sexual and reproductive health (SRH) information. Artificial intelligence (AI)–enabled chatbots represent a promising digital health strategy to provide confidential, youth-friendly, and evidence-based SRH guidance. **Materials and Methods:** A cross-sectional survey was conducted among 400 adolescents aged 10–19 years recruited from schools, colleges, community centers, and youth clinics using stratified convenience sampling. A structured questionnaire assessed sociodemographic characteristics, SRH awareness, information-seeking behavior, barriers to accessing SRH guidance, digital access, and perceptions toward AI chatbots. Descriptive statistics and multivariable logistic regression were used to identify factors associated with willingness to use AI-based SRH chatbots. **Results:** A substantial proportion of adolescents reported unmet SRH information needs and reliance on informal or online sources. Stigma, embarrassment, and privacy concerns were common barriers to seeking SRH information. Most participants expressed positive attitudes toward AI chatbots, with high acceptability for features such as anonymity, accurate information, and non-judgmental interaction. Older age, higher education level, urban residence, and personal smartphone access were independently associated with greater willingness to use AI-based SRH chatbots. **Conclusion:** AI-enabled SRH chatbots demonstrate high acceptability among adolescents and may offer a scalable, confidential approach to addressing unmet SRH information needs. These findings support the development of youth-centered digital health tools to strengthen adolescent health services.

INTRODUCTION

Adolescence represents a critical transitional phase characterized by rapid biological, psychological, and social development. During this period, individuals begin to develop their understanding of sexuality, relationships, and reproductive health, making access to accurate sexual and reproductive health (SRH) information essential for informed decision-making and long-term well-being. Globally, adolescents constitute nearly one-sixth of the population, and their health behaviours during this formative stage can significantly influence future reproductive outcomes and overall health trajectories.[1] Despite this, adolescents often face substantial barriers when seeking SRH information, including stigma, social taboos, limited youth-friendly services, and fear of judgment from parents, teachers, or healthcare providers.[2]

In many low- and middle-income countries, including India, these barriers are further compounded by cultural sensitivities surrounding discussions of sexuality and reproductive health. Adolescents frequently report embarrassment, lack of privacy, and uncertainty regarding trusted sources of information, leading them to rely on peers or unverified online content for guidance.[3] Such reliance on informal sources may contribute to

misinformation, risky sexual behaviours, unintended pregnancies, and increased vulnerability to sexually transmitted infections (STIs).[4] Although school-based health education programs and adolescent health clinics aim to address these gaps, they often fail to fully meet adolescents' needs due to limited accessibility, lack of confidentiality, and insufficient opportunities for individualized counselling.[5]

With the rapid expansion of digital technology, adolescents are increasingly turning to online platforms for health-related information. The widespread availability of smartphones and internet connectivity has created new opportunities for delivering health education through digital interventions. Technology-based approaches, particularly those that ensure anonymity and accessibility, have shown promise in improving adolescent health literacy and engagement in sensitive health topics.[6] Among emerging digital health innovations, artificial intelligence (AI)–enabled conversational agents, commonly known as chatbots, have gained attention as scalable tools capable of delivering personalized health information in real time.

AI chatbots simulate human conversation through natural language processing and machine learning algorithms, enabling users to ask questions and receive instant responses through text or voice-based interfaces. In the context of sexual and reproductive health, chatbots can provide confidential, non-judgmental, and evidence-based guidance while overcoming many of the barriers associated with traditional service delivery models.[7] Several pilot interventions across different settings have demonstrated the potential of chatbot-based platforms to enhance access to SRH information, particularly among young people who may hesitate to seek help through conventional channels.[8] Furthermore, adolescents have been shown to respond positively to conversational digital interfaces that provide privacy, convenience, and a sense of emotional safety when discussing sensitive topics.[9]

Despite the growing interest in AI-driven health technologies, the successful implementation of such tools requires a thorough understanding of the needs, perceptions, and preferences of the target population. In the context of adolescent SRH, limited evidence exists regarding adolescents' attitudes toward AI-based chatbots, their willingness to adopt such tools, and the factors influencing acceptability and trust in digital health interventions. Assessing these aspects is essential to ensure that technological solutions are user-centered, culturally appropriate, and aligned with the realities of adolescent information-seeking behaviours.

Therefore, this study aimed to assess the perceived need for and acceptability of AI-enabled chatbots among adolescents for addressing sexual and reproductive health queries. In addition, the study explored adolescents' current sources of SRH information, barriers to seeking reliable guidance, and factors associated with willingness to adopt AI-based digital health tools. By generating empirical insights into adolescents' preferences and concerns, this research seeks to provide an evidence-informed foundation for the development of a youth-centered AI chatbot designed to support confidential and accessible SRH counselling.

MATERIALS AND METHODS

Study Design: Quantitative cross-sectional survey design to assess adolescents' sexual and reproductive health (SRH) information needs and evaluate the perceived acceptability of artificial intelligence (AI)–enabled chatbots as a potential digital health tool for addressing sensitive SRH queries.

Study Setting and Population: The study was conducted among adolescents aged 10–19 years, consistent with the World Health Organization's definition of adolescence. Participants were recruited from multiple community-based settings including schools, colleges, youth clinics, and community centres to capture a diverse adolescent population with varying educational backgrounds and access to health information.

Sampling Strategy and Sample Size: A stratified convenience sampling approach was adopted to ensure representation across key demographic variables. The required sample size was calculated using the formula for estimating a single population proportion:

n=Z2×p(1−p)/d2n = Z^2 \times p (1-p) / d^2n=Z2×p(1−p)/d2

Assuming a conservative prevalence estimate of 50%, with a 95% confidence level and 5% absolute precision, the calculated sample size was 428 participants. Considering feasibility and response completeness, 400 adolescents were included in the final analysis.

Inclusion and Exclusion Criteria

Inclusion Criteria

- Adolescents aged 10–19 years
- Able to read and understand the survey language
- Provided informed assent or consent, with parental consent obtained where required by institutional ethical guidelines

Adolescents with cognitive impairments or conditions that prevented meaningful participation in a questionnaire-based survey were excluded from the study.

Data Collection: Data were collected using a structured self-administered questionnaire. The questionnaire was developed following a review of existing literature on adolescent SRH information-seeking behaviour and digital health interventions.

The survey instrument included 6 domains:

1. Sociodemographic characteristics

Age, gender, educational status, and residential background.

2. Digital access and technology use

Smartphone access, internet availability, and prior exposure to digital health platforms.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

3. SRH awareness and knowledge sources

Familiarity with SRH concepts and primary sources of SRH information such as school education, parents, peers, healthcare providers, and online platforms.

4. Help-seeking behaviour and barriers

Participants were asked about their preferred sources for discussing SRH concerns and barriers encountered while seeking information, including embarrassment, stigma, fear of judgment, and privacy concerns.

5. Perception of AI chatbots

Awareness of chatbots, prior usage experience, and attitudes toward chatbot-based health information delivery.

6. Acceptability of AI chatbots

Acceptability was assessed using Likert-scale items evaluating comfort with technology, perceived trust in medically verified chatbots, preference for chatbot interaction over traditional counselling, and willingness to recommend or regularly use such tools.

Data Analysis: Data were analysed using descriptive and inferential statistical methods. Descriptive statistics were used to summarize participants' characteristics, information sources, and chatbot perceptions. Continuous variables were expressed as means and standard deviations, while categorical variables were summarized using frequencies and percentages. Associations between sociodemographic variables and willingness to use AI chatbots were examined using bivariate statistical tests, including chi-square tests for categorical variables and independent sample t-tests or ANOVA for continuous variables where applicable. To identify independent predictors of chatbot acceptance, multivariable logistic regression analysis was performed while adjusting for potential confounding factors such as age, gender, educational level, residential setting, and smartphone access. Results were expressed as adjusted odds ratios (AORs) with 95% confidence intervals.

Ethical Considerations: The study protocol received approval from the Institutional Ethics Committee prior to data collection. Participation was voluntary, and confidentiality and anonymity were strictly maintained. No personally identifiable information was collected during the survey process. Adolescents were provided with age-appropriate information regarding the purpose of the study, and informed assent or consent was obtained before participation. Where required, parental consent was obtained for minors in accordance with institutional ethical guidelines.

RESULTS

Participant Characteristics: A total of 400 adolescents participated in the study. Most respondents belonged to the 15–19-year age group, reflecting a higher representation of late adolescents. Female participants constituted the largest proportion of the study population, followed by male participants and a small proportion who preferred not to disclose their gender.

Educational distribution indicated that most participants were enrolled in higher secondary school or college. In terms of residence, many adolescents reported urban or semi-urban backgrounds, with a smaller representation from rural areas. Digital access was high among participants, with a significant proportion reporting personal smartphone ownership, while others accessed the internet through shared devices.

SRH Awareness and Information Sources: Levels of awareness regarding sexual and reproductive health varied across the study population. While many adolescents reported being somewhat familiar with SRH concepts, a smaller proportion indicated strong familiarity, and a minority reported limited or no prior exposure.

Schools and the internet emerged as the most common sources of SRH information, followed by friends and healthcare providers. Parents were less frequently cited as primary sources, reflecting persistent communication barriers within family settings.

Barriers to Seeking SRH Information: Participants reported multiple barriers to discussing SRH concerns. The most reported barriers included embarrassment, fear of judgment, shyness, and privacy concerns. Cultural restrictions and uncertainty regarding whom to approach for reliable guidance were also frequently reported. These findings highlight the continued influence of social stigma and communication gaps, which limit adolescents' access to trustworthy SRH information through traditional channels.

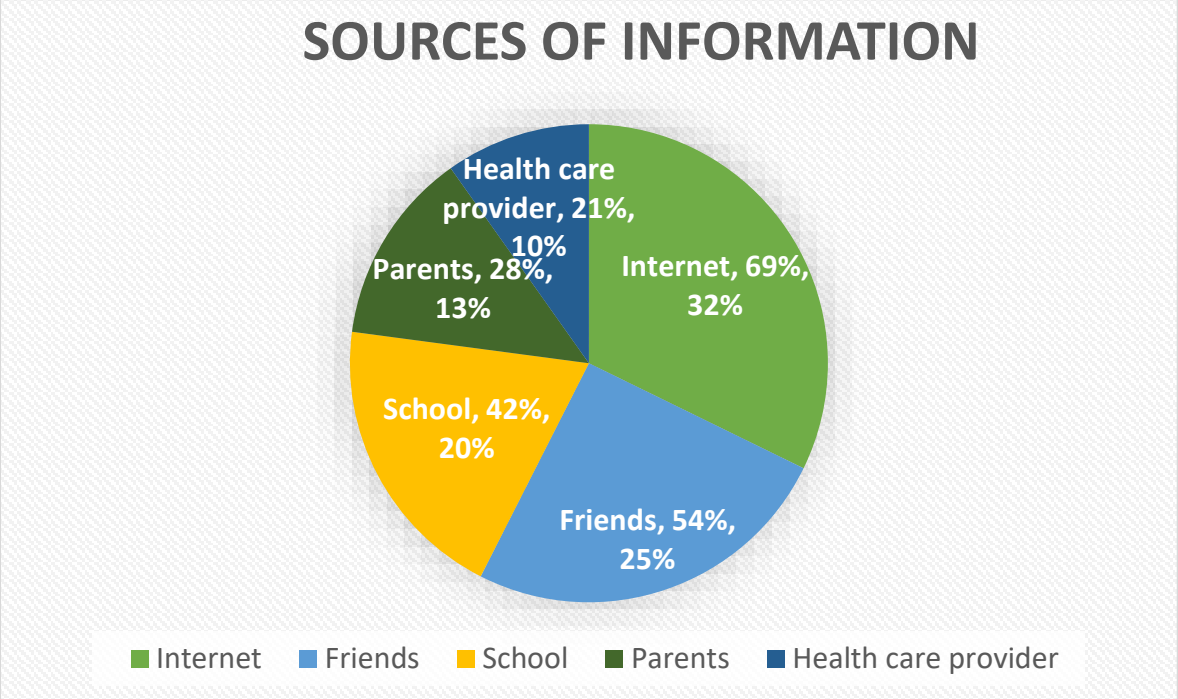
Perceptions and Acceptability of AI Chatbots: Awareness of chatbot technology varied among participants, although many adolescents had previously encountered chatbots through social media platforms or online services. Overall, acceptability of AI-based SRH chatbots was high. Most adolescents expressed willingness to use a chatbot for addressing sensitive health queries, particularly if the platform ensured confidentiality, accurate information, and non-judgmental responses. Likert-scale responses demonstrated a strong positive trend toward agreement across domains assessing comfort with technology, trust in medically verified chatbots, perceived safety, and likelihood of recommending the platform to peers.

Factors Influencing Willingness to Use AI Chatbots: Multivariable analysis indicated that older age, higher educational level, urban residence, and personal smartphone access were independently associated with greater willingness to use AI-based SRH chatbots. Among these factors, personal smartphone access demonstrated the strongest association, suggesting that digital accessibility plays a critical role in enabling the adoption of AI-driven health interventions among adolescents.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

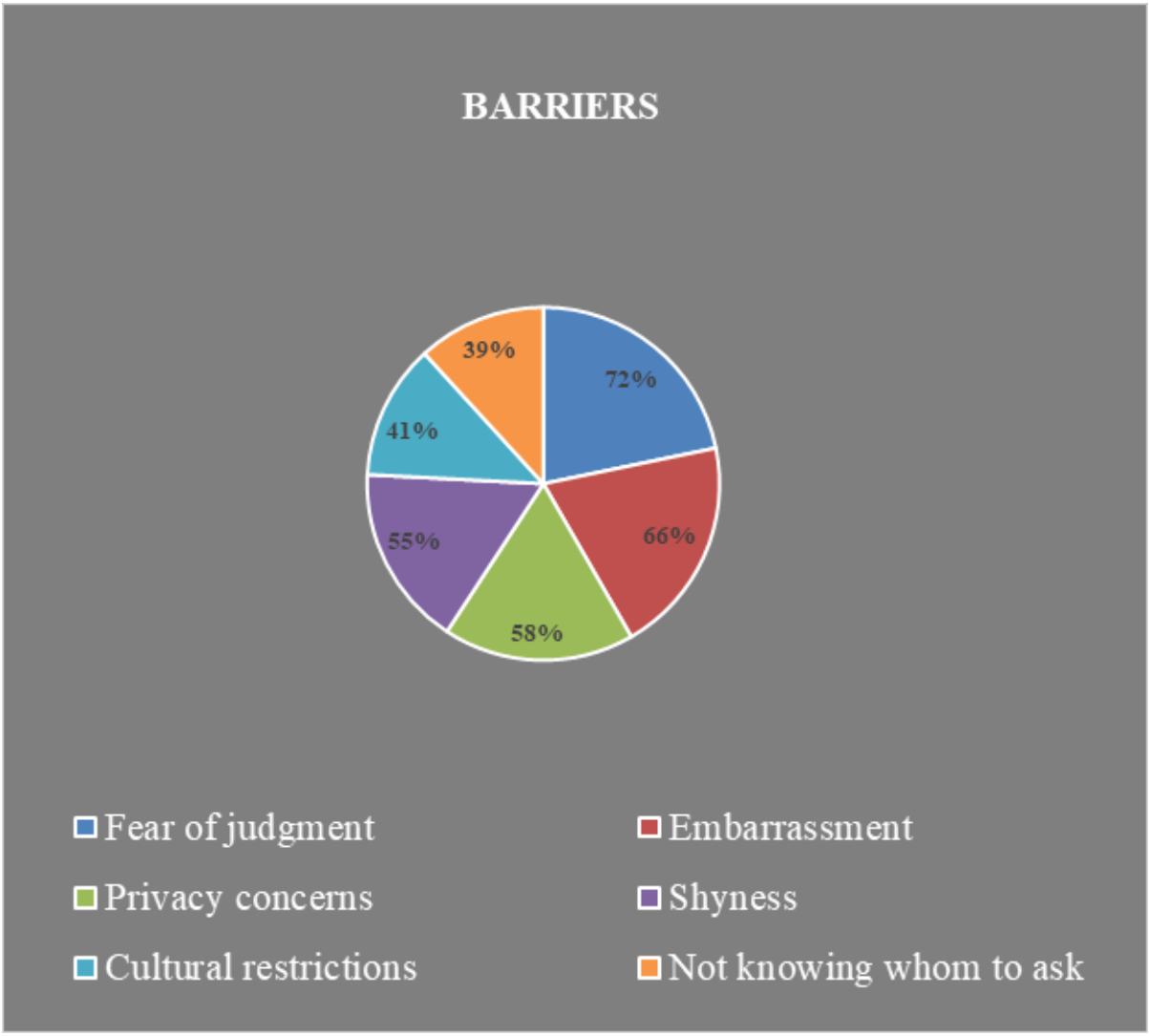
Table 1: Socio-demographic Characteristics, Digital Access, and Baseline SRH Awareness of Study Participants (N = 400)

Variable	Category	n (%)
Age	10–14 years	132 (33.0)
	15–19 years	268 (67.0)
Gender	Female	232 (58.0)
	Male	160 (40.0)
	Prefer not to say	8 (2.0)
Education	Middle school	96 (24.0)
	High school	148 (37.0)
	Higher secondary	96 (24.0)
	College	60 (15.0)
Residence	Urban	208 (52.0)
	Semi-urban	124 (31.0)
	Rural	68 (17.0)
Access to smartphone	Personal phone	268 (67.0)
	Shared phone	72 (18.0)
	Internet café	28 (7.0)
	No access	32 (8.0)
Familiarity with term SRH	Very familiar	96 (24.0)
	Somewhat familiar	148 (37.0)
	Heard of it	104 (26.0)
	Never heard	52 (13.0)
Received SRH information	Yes	228 (57.0)
	No	172 (43.0)

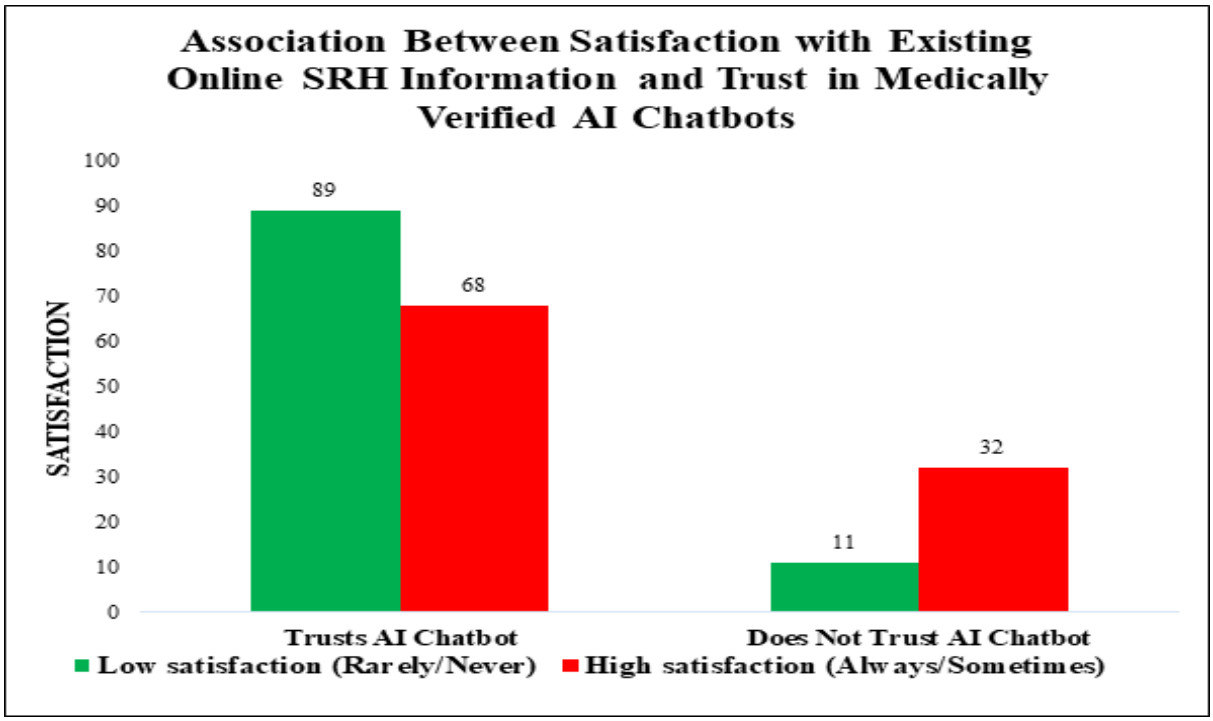


Original Figure 1: Sources of Sexual and Reproductive Health (SRH) Information Among Adolescents

ISSN (O): 2687-5365; ISSN (P): 2753-6556

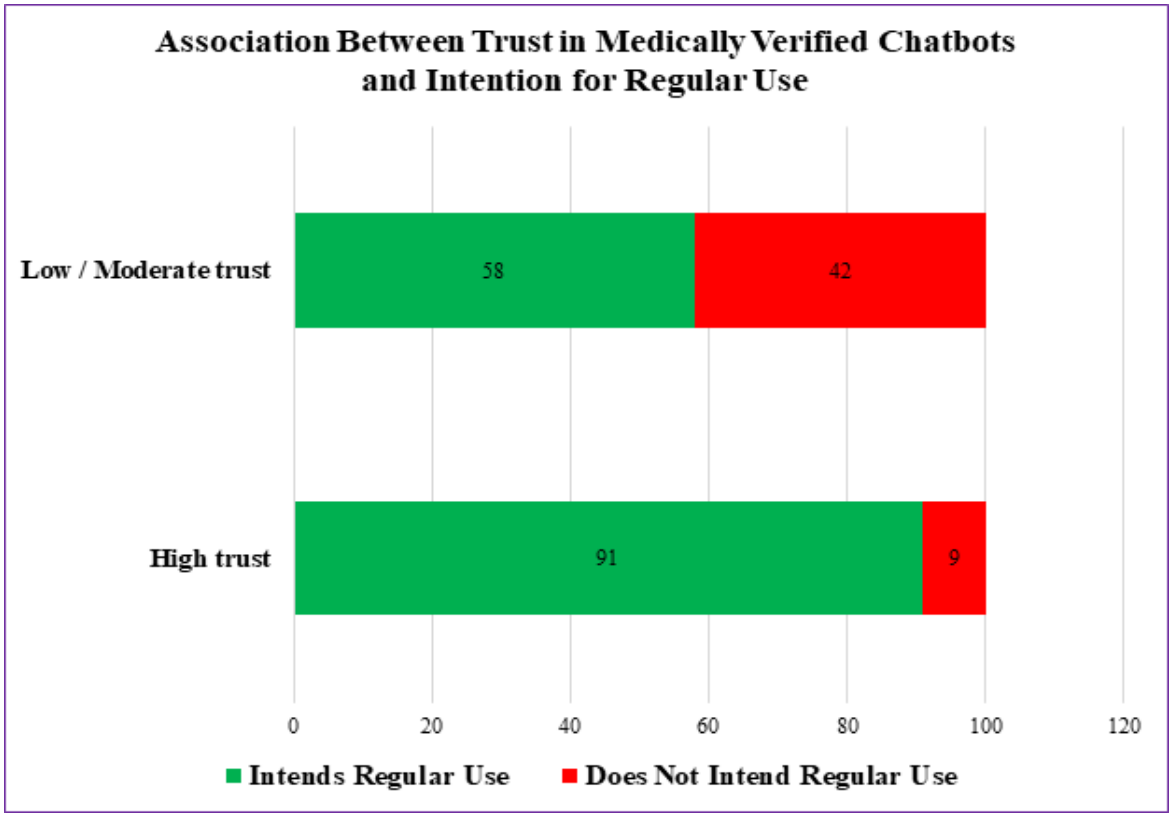


Original Figure 2: Perceived Barriers to Seeking Sexual and Reproductive Health Information Among Adolescents

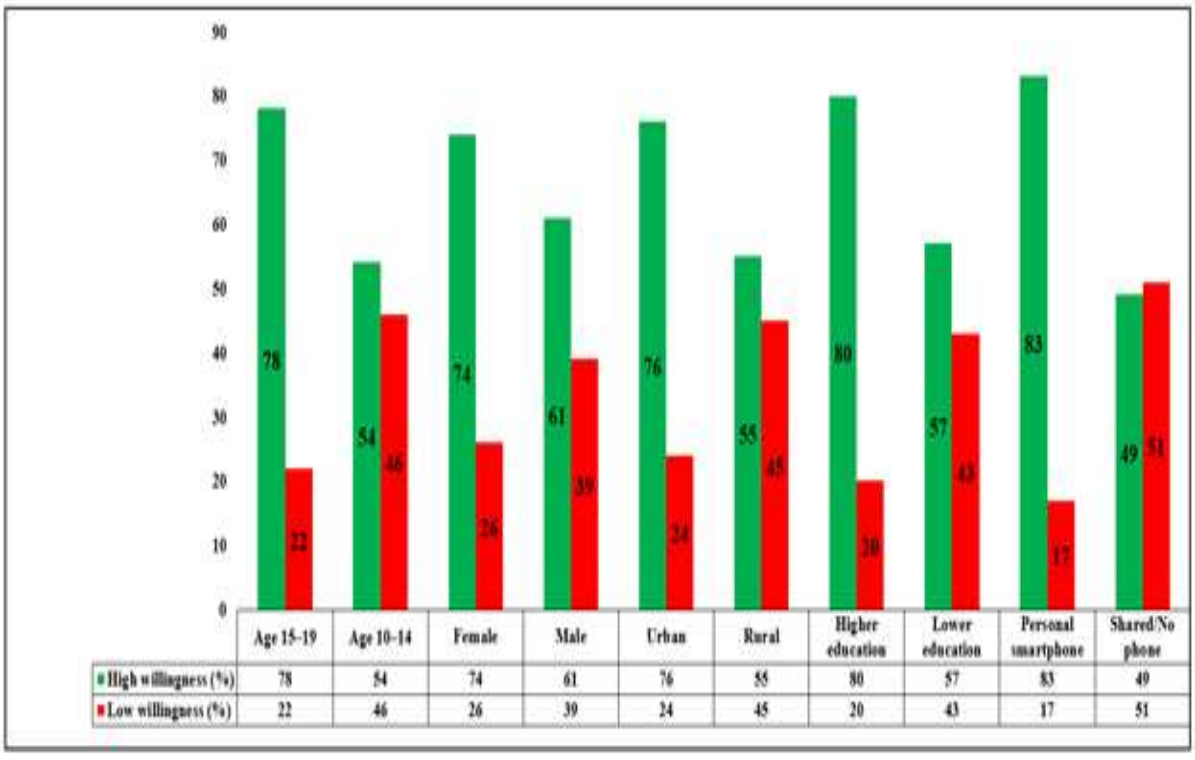


Original Figure 3: Association Between Satisfaction with Existing Online SRH Information and Trust in Medically Verified AI Chatbots

ISSN (O): 2687-5365; ISSN (P): 2753-6556



Original Figure 4: Association Between Trust in Medically Verified AI Chatbots and Intention for Regular Use



Original Figure 5: Socio-demographic and Digital Determinants of Willingness to Use an AI-Based SRH Chatbot

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 2: Acceptability of AI-Based SRH Chatbots Across Likert-Scale Domains (Heat-map representation of willingness and acceptability responses)

STATEMENT	STRONGLY DISAGREE N (%)	DISAGREE N (%)	NEUTRAL N (%)	AGREE N (%)	SRONGLY AGREE N (%)
I feel comfortable using technology	12 (3%)	20 (5%)	40 (10%)	168 (42%)	160 (40%)
I prefer a chatbot rather than a person for SRH queries	24 (6%)	36 (9%)	96 (24%)	144 (36%)	100 (25%)
A chatbot can offer safe, non-judgmental support	8 (2%)	16 (4%)	32 (8%)	184 (46%)	160 (40%)
I would trust a medically verified SRH chatbot	8 (2%)	12 (3%)	28 (7%)	176 (44%)	176 (44%)
I would recommend such a chatbot to my friends	12 (3%)	24 (6%)	68 (17%)	164 (41%)	132 (33%)
I would use it regularly if free and confidential	8 (2%)	16 (4%)	52 (13%)	156 (39%)	168 (42%)
WILLINGNESS TO USE AI CHATBOT	16 (4%)	24 (6%)	48 (12%)	136 (34%)	176 (44%)

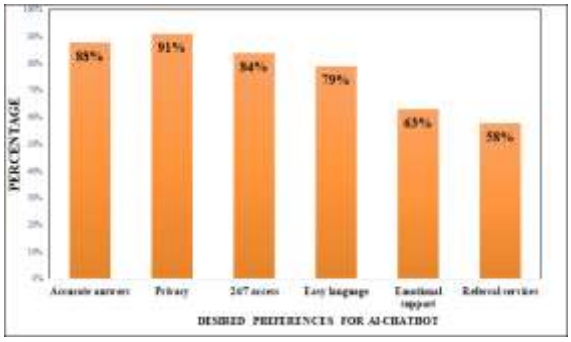


Figure 6: Desired Preferences in an AI-Chatbot Among Adolescent

DISCUSSION

The present study assessed adolescents' sexual and reproductive health (SRH) information needs and examined the acceptability of artificial intelligence (AI)–enabled chatbots as a potential digital tool for addressing sensitive health queries. The findings highlight three important observations: persistent barriers in adolescent SRH help-seeking behaviour, substantial reliance on informal or online sources for SRH information, and a high level of acceptability toward AI-driven chatbot interventions.

A considerable proportion of adolescents in this study reported gaps in access to reliable SRH information and expressed hesitation in discussing sensitive topics with parents, teachers, or healthcare providers. Barriers such as embarrassment, fear of judgment, privacy concerns, and cultural restrictions were frequently reported. These findings are consistent with global evidence demonstrating that stigma and sociocultural norms continue to restrict adolescents' ability to seek timely and accurate SRH guidance, particularly in low- and middle-income settings.[2] Adolescents often avoid traditional healthcare channels for sensitive issues, resulting in delayed care-seeking, misinformation, and potentially adverse reproductive health outcomes.[3]

The study also revealed that adolescents frequently rely on informal networks and online platforms to obtain SRH information. Schools and the internet emerged as the most cited sources, while parents and healthcare providers were less frequently approached. This pattern reflects the broader shift toward digital information-seeking behaviour among young people. Previous studies have similarly reported that adolescents increasingly turn to online resources for health-related information due to the perceived anonymity, convenience, and accessibility offered by digital platforms.[3,6] However, the quality and reliability of online information remain highly variable, raising concerns regarding misinformation and inaccurate health advice.[6]

Within this context, AI-enabled conversational chatbots have emerged as promising digital tools capable of addressing some of these challenges. Participants expressed strong agreement with statements indicating that chatbots could provide confidential, non-judgmental, and easily accessible information. Confidentiality, accuracy, and trustworthiness were identified as the most valued features of such platforms. These findings align with previous research suggesting that adolescents are more comfortable discussing sensitive topics through anonymous digital interfaces compared to face-to-face consultations.[5,9]

The high acceptability observed in this study may also reflect adolescents' increasing familiarity with conversational digital technologies. Chatbots are widely used across customer service, education, and mental health support platforms, making them an intuitive and accessible communication format for young users. In the context of SRH counselling, chatbots can offer several advantages, including 24-hour availability, standardized evidence-based responses, and the ability to reach large populations with minimal resource constraints.[7] Importantly, such tools can complement existing healthcare services by providing preliminary information and guiding adolescents toward appropriate professional care when necessary.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Another key finding of the study was the significant association between digital access and willingness to adopt AI-based SRH chatbots. Older adolescents, individuals with higher educational attainment, and those with personal smartphone access were significantly more likely to express willingness to use chatbot-based services. Smartphone access emerged as the strongest predictor of adoption, highlighting the central role of digital infrastructure in enabling technology-based health interventions. Similar trends have been observed in previous studies evaluating digital health tools among adolescents, where access to personal devices strongly influences engagement with online health platforms.[8]

The findings of this study also underscore the importance of medical credibility and trust in the acceptance of AI-driven health technologies. Participants indicated greater willingness to use chatbots that were medically verified and aligned with professional healthcare standards. This observation is consistent with previous research demonstrating that trust in digital health systems significantly influences user engagement and long-term adoption.[5] Ensuring clinician oversight, evidence-based content, and transparent data governance mechanisms will therefore be critical in the development and implementation of AI-enabled SRH interventions.

From a public health perspective, AI chatbots hold significant potential for expanding adolescent SRH services, particularly in resource-constrained settings. Digital platforms can overcome geographical barriers, reduce stigma associated with seeking SRH care, and provide scalable solutions to address the large unmet information needs among adolescents. The World Health Organization has increasingly recognized the role of artificial intelligence in strengthening sexual and reproductive health systems through innovative digital health strategies.[7] When integrated with existing health systems, chatbot-based interventions could complement traditional services and enhance the reach of adolescent health programs.

Nevertheless, certain limitations should be considered when interpreting the findings. The study relied on self-reported responses, which may be subject to social desirability bias, particularly when addressing sensitive topics. Additionally, the use of an online survey may have limited participation among adolescents with restricted digital access, potentially underrepresenting marginalized populations. Finally, the study focused on perceived need and acceptability rather than evaluating the actual effectiveness of chatbot-based interventions in improving SRH knowledge or health outcomes.

Despite these limitations, the study offers valuable insights into adolescents' readiness to engage with AI-based health technologies. As digital connectivity continues to expand globally, integrating AI-driven conversational platforms within adolescent health programs may represent a transformative approach to addressing persistent gaps in SRH information access. Future research should focus on developing and piloting chatbot prototypes, evaluating usability and clinical effectiveness, and exploring strategies for integrating such tools within existing community health systems.

CONCLUSION

The present study demonstrates that adolescents experience substantial barriers in accessing reliable sexual and reproductive health information, often due to stigma, embarrassment, and limited opportunities for confidential discussion. These barriers contribute to a reliance on informal sources and online platforms, which may not always provide accurate or evidence-based information. Within this context, the findings highlight a strong acceptability of AI-enabled conversational chatbots among adolescents as a potential digital solution for addressing sensitive SRH queries. Adolescents expressed clear preferences for platforms that ensure confidentiality, medical accuracy, ease of use, and non-judgmental interaction, indicating readiness to engage with technology-driven health support systems.

Importantly, the study identifies key determinants influencing the adoption of such tools, including age, educational level, urban residence, and personal smartphone access, emphasizing the critical role of digital accessibility in the implementation of AI-based health interventions.

The insights generated from this needs-assessment study provide an empirical foundation for the development of AI-enabled chatbot designed to offer adolescents confidential, evidence-based SRH guidance. By combining the advantages of artificial intelligence with youth-centered design principles, such platforms have the potential to bridge longstanding gaps in adolescent health information delivery.

From a public health perspective, integrating AI-driven chatbots within existing health systems could significantly enhance the reach of adolescent health services. When supported by community health workers, school health programs, and digital health initiatives, these tools may serve as scalable interventions capable of delivering reliable SRH information across diverse social and geographic contexts.

Ultimately, transforming artificial intelligence into an inclusive public health resource rather than a technological privilege will require careful attention to ethical governance, medical oversight, digital accessibility, and community integration. With appropriate safeguards and user-centered development, AI-based conversational platforms hold considerable promise for strengthening adolescent health literacy and advancing equitable access to sexual and reproductive health information.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556