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Review Article

Leveraging Artificial Intelligence to Address Adolescent Sexually Transmitted Infections: A Systematic Review

Erika Agung Mulyaningsih[1*], Niken Bayu Argaheni[2], Septiana Juwita[3]

[1]Department of Midwifery, STIKES Pemkab Jombang, Kabupaten Jombang, Jawa Timur 61471, Indonesia

[2] Department of Midwifery, Universitas Sebelas Maret, Kota Surakarta, Jawa Tengah 57126, Indonesia

[3]Departement of Development Counselling, Universitas Sebelas Maret, Kota Surakarta, Jawa Tengah 57126, Indonesia

**Corresponding Author's Email: rieka22@gmail.com*

ABSTRACT

Background: The integration of Artificial Intelligence (AI) into daily life provides a unique opportunity to address significant health concerns. In particular, the tech-savvy adolescent population could benefit from AI-enhanced access to reproductive health services, especially for the prevention, screening, and treatment of Sexually Transmitted Infections (STIs). **Objective:** This research aims to evaluate the impact of AI technology on improving adolescents' access to reproductive health services related to STIs. The study involves a systematic review of literature published from 2020 to 2024 across various databases. **Methods:** A systematic review methodology was employed, utilizing databases such as Google Scholar, PubMed, Semantic Scholar, Science Direct, and IEEE-XPLORE. Keywords used in the search included "artificial intelligence," "adolescents OR teenagers," and "sexually transmitted infections OR sexually transmitted diseases." **Results:** The review identifies AI as a pivotal tool in sexual education, particularly through the use of interactive and engaging chatbots. AI facilitates innovative educational interventions, allowing vulnerable and marginalized groups, including adolescents, to discuss and learn about sensitive topics like STIs. **Conclusion:** The study highlights the significant potential of AI in improving sexual health education for adolescents. The limited availability of research in this area underscores the importance of this study in advancing knowledge and addressing gaps in the application of AI for adolescent STI prevention and treatment.

Keywords: *Adolescent; Artificial Intelligence; Sexually Transmitted Infections*

INTRODUCTION

Sexually Transmitted Infections (STIs) remain a significant global health issue, particularly among adolescents (WHO, 2024). Over 1 million new STI cases occur daily worldwide, with many being asymptomatic (WHO, 2012). Each year, four major types of STIs—Trichomoniasis, Gonorrhea, Syphilis, and Chlamydia—affect approximately 374 million people. Additionally, Human Papillomavirus and Genital Herpes Simplex infections contribute to severe health outcomes, including cervical cancer, which results in approximately 311,000 deaths annually among women. The consequences of STIs extend beyond physical health, impacting sexual and reproductive well-being through stigma, infertility, increased HIV risk, and complications during pregnancy for both mothers and babies (WHO, 2024). Despite these challenges, sexual health issues often remain under-addressed, partly due to societal stigma and cultural barriers that deter teenagers from seeking help for reproductive health problems, including STIs.

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Technological advancements, particularly in artificial intelligence (AI), are evolving at an unprecedented pace. AI, a computer-based technology designed to perform tasks that typically require human intelligence, has become increasingly prevalent among today's generation (Healey, 2020). Notably, the adoption of AI is more common among children and teenagers compared to adults. Research indicates that four out of five teenagers aged 13-17 actively engage with generative AI tools, such as chatbots like GPT, while 40% of children aged 7-12 also use these technologies regularly (Adriani & Asyifa, 2022). These chatbots serve various purposes, ranging from educational inquiries to solving diverse problems.

One notable AI application, ChatGPT, has rapidly gained popularity among teenagers. Despite its launch on November 30, 2022, ChatGPT became one of the fastest-growing software applications by January 2023. The development of artificial intelligence (AI) continues to exert a significant impact on daily life, with various AI systems designed to facilitate problem-solving, including in the healthcare sector. In healthcare, AI is employed to assist in diagnosing conditions, recommending treatments, enhancing patient engagement and adherence to therapy, and reducing administrative burdens (Davenport & Kalakota, 2019). Given this context, the research aims to analyse the impact of AI technology on improving adolescents' access to reproductive health services, focusing on prevention, screening, and treatment of Sexually Transmitted Infections.

LITERATURE REVIEW

The use of AI in health topics can be explored from the perspectives of healthcare workers providing services and individuals accessing health information. Specifically, in the field of reproductive health and sexually transmitted infections (STIs), AI plays a significant role. This research focuses on how adolescents use AI to address STIs. AI is utilized by society, particularly by tech-savvy younger generations, even if they are not specifically aware of it. Several types of AI relevant to healthcare include machine learning, neural networks and deep learning, natural language processing, rule-based expert systems, physical robots, robotic process automation, diagnostic and treatment applications, patient engagement and adherence applications, administrative applications, and the implications for the healthcare workforce and ethical considerations. The primary challenge for AI in healthcare is not its capability but rather its integration into everyday clinical practice (Davenport & Kalakota, 2019).

The COVID-19 pandemic in 2020 significantly boosted the use of health-oriented chatbots, which serve as conversational interfaces to answer questions, recommend care options, check symptoms, and complete various tasks (Parviainen & Rantala, 2022). This surge underpins the decision to focus the journal search on the period from 2020 to 2024. Despite the short time frame, the study of AI has advanced rapidly. This research specifically examines the use of AI among teenagers.

METHODOLOGY

This study design uses a systematic literature review. Literature review is an essential feature of academic research. Fundamentally, knowledge advancement must be built on prior existing work (Xiao & Watson, 2019). A systematic literature review by accessing several databases, namely Google Scholar, PubMed, Semantic Scholar, Science Direct, and IEEE-XPLORE, during the 2020-2024 time period. Search using the keywords ‘artificial intelligence’ AND adolescents OR teenager AND ‘sexually transmitted infections’ OR ‘sexually transmitted diseases’. Search results are displayed in Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). A 27-item checklist and a four-phase flow diagram make up the PRISMA recommendations. This study used PRISMA for identification papers, screening suitable papers, eligibility, and inclusion criteria of the reports that fall under the purview of a review are described in the flow diagram. Inclusion criteria are ready free full text and in English full text. A 27-item list of recommendations covering subjects including title, country, year, abstract, introduction, methodology, findings, discussion, and finance is part of the checklist. The writers, reviewers and editors can use PRISMA items as a guide (Selçuk, 2019) (Figure 1).

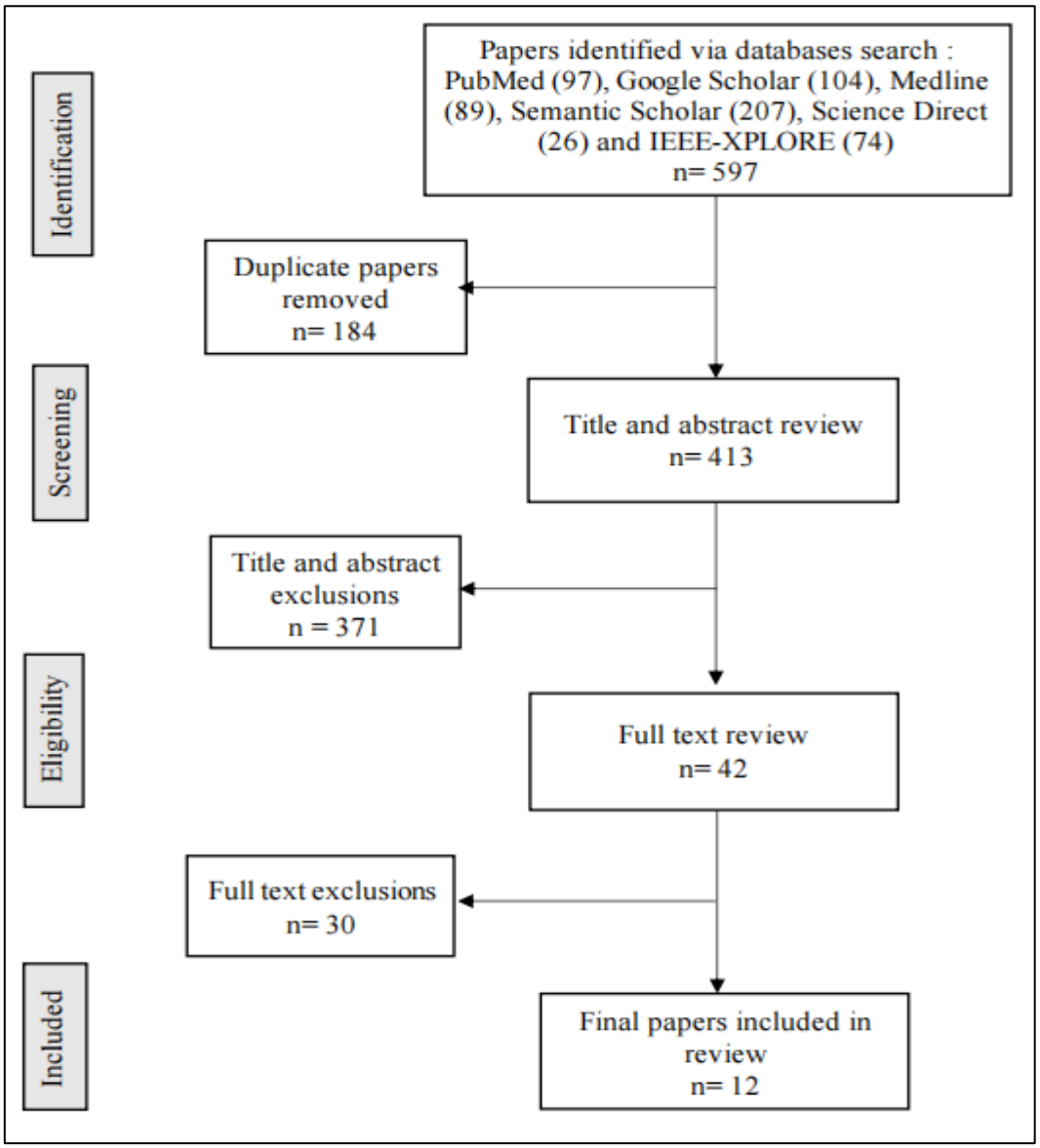

Figure 1: PRISMA

Due to the variability in methodology and statistical significance of the results, this review was unable to conduct a meta-analysis on the accuracy of AI integration in everyday life for addressing major health issues. Specifically, the tech-savvy adolescent population stands to benefit from AI-enhanced access to reproductive health services, particularly for the prevention, screening, and treatment of Sexually Transmitted Infections (STIs). Instead, the data was isolated and summarized independently. A table was used to extract and organize the study's aims, methodology, results, and the significance of the topic under consideration. The final extraction table is presented in Table 1.

Table 1: List of Selected Articles Based on the PRISMA

No	Author, Year, Country	Title	Methods	Population and Sample Characteristics	Study Conclusion
1	Mills *et al*. (2024) UK & USA	Chatbots That Deliver Contraceptive Support: Systematic Review	Systematic Literature Review	Identified 15 sources, including 8 original research articles and 7 literature	Study results found limited and conflicting evidence on chatbots to improve contraceptive knowledge, attitudes and behaviours. There was

				reviews. And 16 chatbots	considerable uptake of chatbots by adolescents on contraception
2	Mehta, Gupta & Kularathne (2023) India	The Role and Impact of Artificial Intelligence in Addressing Sexually Transmitted Infections, Nonvenereal Genital Diseases, Sexual Health, and Wellness	Narrative		In the fields of health and medicine, AI is experiencing extraordinary transformation and is helping in screening and diagnosing with a high level of accuracy. AI is creating a transformation of e-health services, including sexual education, with chatbots that are interactive and have language that empathizes with users. AI currently acts as a tool to help make decisions and the collection of big data improves real-time epidemiology, predictive analysis and more targeted interventions according to the population collected in big data. Despite its many advantages, as with any technological transformation, there are accompanying privacy issues and ethical dilemmas
3	Nadarzynski *et al*. (2021) UK	Barriers and facilitators to engagement with artificial intelligence (AI)-based chatbots for sexual and reproductive health advice: a qualitative analysis	Qualitative	40partisipan	The study highlighted the importance of understanding user perspectives on AI-led chatbots in sexual health and the factors influencing their engagement with such technology. The study also emphasised the need for future research to explore the impact of different chatbot designs, the accessibility of sexual health advice for individuals with limited digital literacy, and the influence of demographic characteristics on views towards health chatbots.
4	Nadarzynski *et al*. (2020) UK	Acceptability of artificial intelligence (AI)-enabled chatbots, video consultations and live webchats as online platforms for sexual health advice	Quantitative	257	The key findings regarding the preferences of sexual health service attendees for digital communication channels are as follows. Most participants preferred face-to-face consultations (70%) as the first point of contact for discussing sexual and reproductive health (SRH) issues, then a smaller percentage preferred telephone consultations (17%), live webchats (10%), and video consultations (3%) via platforms like Skype or FaceTime.

					While the majority of participants were willing to use video consultations (58%) and webchats (73%) for ongoing care, only 40% found an artificial intelligence (AI)-enabled chatbot platform acceptable for SRH advice. Younger age (<25 years), White ethnicity, past sexually transmitted infection (STI) diagnosis, smartphone ownership, and preference for an SRH smartphone application were associated with the acceptability of video consultations, webchats, or chatbots for SRH advice
5	Rice *et al*. (2021) US	A Peer-Led, Artificial Intelligence–Augmented Social Network Intervention to Prevent HIV Among Youth Experiencing Homelessness	Quantitative	713	The key findings of the study on using AI-augmented social networks for HIV prevention among homeless youth include: Significant reduction over time in condomless anal sex acts, with a significant time by AI arm interaction, indicating the effectiveness of the intervention in promoting safer sexual practices. Significant increase in HIV knowledge over time among Peer Change Agents (PCAs) in both the AI and Direct Contact (DC) intervention arms, highlighting the impact of the intervention on increasing awareness and knowledge about HIV prevention. Efficacy of the PCA model in promoting HIV knowledge and condom use among youth experiencing homelessness, emphasising the importance of peer-led interventions in addressing health disparities in this population. The role of youth as PCAs in bridging the gap between interventionists and their community, showcasing the potential for peer-led approaches to engage and empower marginalised populations in health promotion efforts.
6	Wilder *et al*. (2021) US	Clinical Trial of an AI-Augmented Intervention for	Quantitative	713	The results of the clinical trial conducted with 713 youth experiencing homelessness at drop-in centres showed that the

		HIV Prevention in Youth Experiencing Homelessness			group in the AI (Artificial Intelligence) intervention arm experienced statistically significant reductions in key risk behaviours for HIV transmission compared to the other groups. Specifically, the youth in the AI group showed improvements in adopting protective behaviours such as condom usage and regular HIV testing, leading to positive outcomes in terms of HIV prevention. The study compared interventions planned with the AI algorithm to interventions where the highest-degree nodes in the youths' social network were recruited as peer leaders (the standard method in public health) and to an observation-only control group. The findings indicated that the AI-optimised interventions were more effective in promoting behaviour change and reducing HIV risk behaviours among youth experiencing homelessness
7	Massa *et al*. (2023) Brazil	A Transgender Chatbot (Amanda Selfie) to Create Pre-exposure Prophylaxis Demand Among Adolescents in Brazil: Assessment of Acceptability, Functionality, Usability, and Results	Mixed method	The study involved adolescent men who have sex with men (AMSM) and transgender women (TGW) aged 15-19. The total number of participants in the study was not explicitly mentioned in the provided excerpts. However, the study was conducted in three Brazilian capital cities, Salvador, Belo Horizonte, and São Paulo. It involved individuals who were HIV-negative and at a greater risk of HIV infection.	The results of using the transgender chatbot (Amanda Selfie) to create demand for pre-exposure prophylaxis (PrEP) among adolescent men who have sex with men (AMSM) and transgender women (TGW) were as follows: Amanda Selfie interacted with a significant portion of the target population, reaching 61.1% of individuals reached by the demand-creation social support network (DCSSN). This interaction rate was higher than observed with other social media platforms like Instagram and Facebook/WhatsApp. The chatbot contributed to an increase in the number of PrEP uptake events by 2.4%, indicating a positive impact on promoting access to HIV prevention services The use of a transgender chatbot persona was well accepted and led to a slight increase in PrEP uptake, particularly among transgender women, significant as transgender women often face more barriers to accessing

					healthcare services independently Amanda Selfie helped one-sixth of the adolescents who contacted her to reach health services, demonstrating the potential of chatbots in facilitating access to healthcare services for vulnerable populations
8	Young, Crowley & Vermund, (2021) USA	Artificial Intelligence and Sexual Health in the USA	Naratif		In the USA, one in five people had a sexually transmitted infection and they has not received the attention required to prevent transmission to others. A consensus report from committee released in March 2021 with recommendation of embracing innovation to improve sexual health. One innovation is using artificial intelligence (AI) to enhance STI prevention and control. AI applications in health are growth so fast, it can be used as part of a solution to address STI epidemics and the other advantages are AI can analyse and predict the public sexual attitudes and behaviour
9	Marcus *et al*. (2020) USA	Artificial Intelligence and Machine Learning for HIV Prevention: Emerging Approaches to Ending the Epidemic. Cur rent HIV/AIDS reports.	Systematic review		AI through Machine Learninghas been used for causal inference in HIV prevention research. data is collected via smartphones and social media as well as delivering promotions for reducing HIV risk in real time as well as using AI chatbots to educate the public about HIV
10	Isaacs, Nazeema *et al*. (2024) South Africa	Are mHealth Interventions Effective in Improving the Uptake of Sexual and Reproductive Health	Scoping Review	EBSCOhost, Scopus, Proquest, and Cochrane, and included 12 articles.	Health interventions have been proven to be effective in increasing knowledge and attitudes of adolescents regarding sexual and reproductive health (SRH) issues in all categories of countries (poor to developed countries),

		Services among Adolescents? A Scoping Review			however, comprehensive and longitudinal studies are needed to find out how behavior changes with mHealth interventions. Increasing artificial intelligence (AI) makes it possible to strengthen mHealth interventions
11	Hu *et al*. (2024) USA	Building gender-specific sexually transmitted infection risk prediction model using CatBoost algorithm and NHANES data	The study utilised data from the National Health and Nutrition Examination Survey (NHANES) program to build male-based and female-based STI risk prediction models using the CatBoost algorithm.	Data was collected from 12,053 participants aged 18 to 59 years old, with general demographic characteristics and sexual behaviour questionnaire responses included as features.	Machine learning (ML) provides many benefits in the health sector, such as predicting diseases including STIs. The aim of this research was to create male- and female-based STI risk predictions based on the CatBoost algorithm by utilizing data from the National Health and Nutrition Examination Survey (NHANES) for training and validation.
12	Nadarrzynski *et al*. (2021) UK	Barriers and Facilitators to Engagement With Artificial Intelligence (AI)-Based Chatbots For Sexual And Reproductive Health Advice: A Qualitative Analysis.	Online interview	Participants 18-50 years who interact with a chatbot, offering advice on STIs and relevant services	The chatbot technology was seen as useful for anonymous sex education but less suitable for matters requiring empathy. Chatbots may increase access to clinical services, but their effectiveness and safety must be established. Future research should identify which chatbot designs and functions lead to optimal engagement with this innovation.

RESULTS AND DISCUSSION

The impact of using AI technology in increasing adolescents' access to reproductive health services, including prevention, screening, and treatment of Sexually Transmitted Infections (STIs), is a topic of growing interest in public health research. AI technology, such as chatbots and conversational agents, has the potential to improve access to sexual health information and services for adolescents in several ways:

Increased Accessibility

AI-based chatbots can provide a convenient and confidential platform for adolescents to access STI prevention, screening, and treatment information, which can be particularly beneficial for individuals who may feel uncomfortable discussing these topics face-to-face with healthcare providers. Adolescents can engage with chatbots anytime and from any location, overcoming barriers such as limited access to traditional healthcare services or concerns about privacy and confidentiality. This increased accessibility can empower adolescents to take control of their sexual health and seek guidance on STI prevention, screening, and treatment in a convenient and non-judgmental manner (Nadarzynski *et al*., 2021)

One study demonstrated that the group receiving the AI-augmented intervention experienced statistically significant reductions in key risk behaviours for HIV transmission compared to other groups. The Ai-optimised interventions led to improvements in the adoption of protective behaviours, such as condom usage and regular HIV testing, among the youth. This outcome highlights the effectiveness of using AI methods to enhance social network interventions for health promotion in vulnerable populations, such as youth experiencing homelessness (Wilder *et al*., 2021)

One study highlighted the importance of ensuring that digital transformation in SRH services is cost-effective, acceptable, easily accessible, and equitable for all populations. Policymakers and intervention developers were encouraged to consider the preferences and needs of service users to enhance the reach and effectiveness of digital SRH services. This approach could potentially bridge gaps in accessibility and cater to diverse populations seeking sexual health advice. While video consultations and live webchats were more acceptable to service users, AI chatbots faced challenges related to trust, privacy, and the perceived lack of human connection in the context of sexual health advice. (Nadarzynski *et al*., 2020)

The chatbot significantly expanded its reach, interacting with 61.1% of the target population within the demand-creation social support network, surpassing engagement rates observed on other social media platforms. PrEP uptake events increased by 2.4% due to the chatbot's contribution, indicating its effectiveness in promoting access to HIV prevention services among AMSM and TGW. Amanda Selfie facilitated access to healthcare services for one-sixth of adolescents who engaged with her, demonstrating its role in reducing barriers to seeking HIV prevention services. The transgender chatbot persona was well received and positively impacted PrEP uptake, particularly among transgender women. Its use effectively engaged users and promoted access to healthcare services by resonating with the target population (Massa *et al*., 2023).

24/7 Availability

AI technology allows for round-the-clock availability of sexual health information and support. Adolescents can access chatbots at any time, which can be crucial for addressing urgent concerns related to STIs. One of the key advantages of using AI technology, such as chatbots, in adolescent reproductive health services is the round-the-clock availability it offers. Unlike traditional healthcare services within specific hours, AI chatbots can provide support and information on STI prevention, screening, and treatment at any time of the day or night. This 24/7 availability is particularly beneficial for adolescents who may have urgent questions or concerns about their sexual health outside of regular clinic hours. By having access to AI chatbots that are always accessible, adolescents can receive immediate guidance and support when needed, leading to timely interventions and potentially reducing the risk of untreated STIs. The convenience of being able to engage with AI chatbots at any hour can encourage adolescents to seek help and information proactively, promoting a proactive approach to managing their sexual health. (Nadarzynski *et al*., 2021; Mamauag *et al.,* 2019)

Tailored Information

AI chatbots can be programmed to provide personalised information based on the user's age, gender, sexual orientation, and specific risk factors. This tailored approach can enhance the relevance and effectiveness of the information provided. For example, AI chatbots can offer personalised recommendations on safe sex practices, STI testing frequency based on risk factors, and information on available treatment options for specific STIs. By tailoring the information to the user's profile, chatbots can address the unique concerns and questions that adolescents may have regarding their sexual health. This personalised approach increases the relevance of the information provided and promotes engagement and trust in AI technology as a reliable source of support (Nadarzynski *et al*., 2021).

One study emphasised the significance of tailoring information and support through the transgender chatbot Amanda Selfie to promote access to pre-exposure prophylaxis (PrEP) among adolescent men who have sex with men (AMSM) and transgender women (TGW) in Brazil. The chatbot provided Customised reminders for pill-taking times, prescription renewals, and appointments, aiming to support

users in adhering to their PrEP regimen effectively. The chatbot created a safe space for discussing sensitive topics, enabling users to disclose intimate information and engage in conversations about potentially embarrassing or sensitive issues with confidentiality and without fear of judgment (Massa *et al*., 2023).

Symptom Checking and Guidance

Chatbots equipped with AI algorithms can assist adolescents in assessing their symptoms, providing guidance on whether they should seek further medical attention for STI screening and treatment. This functionality can be particularly beneficial for adolescents who may be unsure about the significance of their symptoms or hesitant to discuss them with healthcare providers. By engaging with AI chatbots for symptom checking, adolescents can receive immediate feedback on their symptoms and recommendations on the appropriate next steps, such as seeking in-person medical evaluation or scheduling an STI test. This real-time guidance can help adolescents make informed decisions about their sexual health and take timely action to address any potential concerns. Additionally, AI chatbots can offer educational information on common STI symptoms, transmission routes, and preventive measures, empowering adolescents to recognise signs of STIs and seek appropriate care (Nadarzynski *et al*., 2021).

Promotion of Preventive Measures

AI technology can be used to promote preventive measures such as safe sex practices, regular STI screenings, and vaccination against STIs like HPV. This proactive approach can help reduce the incidence of STIs among adolescents. By providing evidence-based information and guidance on preventive measures, AI chatbots can empower adolescents to make informed decisions about their sexual health and adopt behaviours that reduce their risk of STIs. Through interactive conversations, chatbots can educate adolescents on the benefits of preventive measures, address common misconceptions about STIs, and offer personalised recommendations based on individual risk factors. This proactive approach to promoting preventive measures can help adolescents develop a better understanding of how to protect themselves from STIs and make informed choices regarding their sexual activities (Nadarzynski *et al*., 2021).

One study mentioned that AI could substantially improve the impact of services offered to vulnerable communities, such as youth experiencing homelessness, by enhancing the design and delivery of behavioural health and prevention interventions (Rice *et al*., 2021). study underscored the significance of promoting preventive measures related to HIV prevention through the transgender chatbot Amanda Selfie to enhance access to pre-exposure prophylaxis (PrEP) among adolescent men who have sex with men (AMSM) and transgender women (TGW) in Brazil. Amanda Selfie served as an educational platform to inform users about the benefits, usage, and importance of PrEP, aiming to raise awareness and knowledge about this preventive measure among AMSM and TGW and incorporating videos explaining sexually transmitted infection (STI) prevention into Amanda's features aimed to broaden sexual health awareness and encourage users to adopt preventive measures beyond PrEP. Tailored guidance provided by the chatbot supported users in adhering to their PrEP regimen, managing appointments, and navigating daily life situations related to HIV prevention, empowering individuals to take proactive steps in safeguarding their sexual health—the choice of a transgender chatbot persona aimed to foster empathy and positive affirmation (Massa *et al*., 2023). AI can foster an improved approach to sexual health for individuals and society. A change in sexual health approach requires a fundamental change in the attitudes and language used by providers, individuals, and policymakers (Young, Crowley & Vermund, 2021).

Linkage to Services

AI chatbots can facilitate the linkage of adolescents to sexual health services, including clinics for STI testing and treatment. By providing information on nearby clinics and appointment scheduling, chatbots can help overcome barriers to accessing healthcare services. Through interactive conversations, chatbots can offer users directions to local clinics, information on appointment scheduling, and guidance

on available services, creating a seamless pathway for adolescents to seek necessary care. This linkage to services ensures that adolescents have access to essential sexual health resources and support, promoting timely interventions and preventive measures (Nadarzynski *et al*., 2021).

One study emphasised the crucial role of the transgender chatbot, Amanda Selfie, in linking users to healthcare services to promote access to pre-exposure prophylaxis (PrEP) among adolescent men who have sex with men (AMSM) and transgender women (TGW) in Brazil. Amanda Selfie was a facilitator in connecting AMSM and TGW to healthcare services by providing them with information, reminders, and guidance on initiating PrEP use as a vital bridge to essential healthcare resources for HIV prevention. The chatbot offered features allowing users to schedule appointments for PrEP services, empowering individuals to take proactive steps in accessing healthcare for HIV prevention. While Amanda Selfie significantly generated demand for PrEP, the study emphasised the importance of combining interactions with the chatbot and healthcare professionals. Following the initial chatbot interaction, human contact provided personalised support, logistics negotiation, and enhanced guidance on accessing healthcare services. The study demonstrated that Amanda Selfie contributed to increased PrEP uptake events, highlighting its potential to enhance service utilisation among AMSM and TGW. By offering a user-friendly platform and personalised support, the chatbot helped individuals overcome barriers and access healthcare services for HIV prevention (Massa *et al*., 2023).

Education and Awareness

AI technology can be a valuable educational tool, offering information on STIs, their transmission, prevention, and treatment options. It can contribute to increased awareness and knowledge among adolescents regarding sexual health. This educational approach not only empowers adolescents to make informed decisions about their sexual well-being but also promotes open dialogue and destigmatises discussions around sensitive issues (Nadarzynski *et al*., 2021).

One study mentioned education and awareness as key components of the intervention for preventing HIV among homeless youth. The efficacy of the PCA models in promoting HIV knowledge and condom use was evident, suggesting that peer-led approaches can effectively enhance education and awareness about HIV prevention. By engaging PCAs as agents of change, the intervention capitalised on the influence of peers in shaping behaviour and promoting health-seeking behaviours among youth experiencing homelessness. (Rice *et al*., 2021). The problem of STIs does not only lie in the disease itself, but the impact it causes is also psychologically detrimental. Transmission of STIs to partners is a form of sexual violence that can be experienced by adolescent women. So, awareness is needed to prevent STIs and AI can be useful for increasing knowledge and as a first step in getting answers to health problems.

Data Collection and Analysis

AI chatbots can collect data on user interactions, which can be analysed to identify trends in STI-related concerns among adolescents. This data-driven approach can inform public health interventions and service planning. Data analysis techniques, including thematic and quantitative assessments, can help researchers identify patterns, trends, and outcomes of chatbot usage in sexual health education and promotion. The thematic analysis identifies key themes and sub-themes in user feedback and responses, providing valuable insights into user perceptions, preferences, and experiences. Quantitative assessments, on the other hand, enable researchers to measure the impact of chatbot interventions on knowledge acquisition, behaviour change, and health outcomes among adolescents (Nadarzynski *et al*., 2021).

In one study, the transgender chatbot Amanda Selfie utilised AI technology to collect data on user interactions, preferences, and feedback related to HIV prevention and access to pre-exposure prophylaxis (PrEP) among adolescent men who have sex with men (AMSM) and transgender women (TGW) in Brazil. Through conversations with users, Amanda Selfie gathered data on user queries, responses, and interactions, providing valuable insights into user engagement and preferences. The chatbot's AI capabilities allowed for monitoring user engagement levels, including the frequency of

interactions and types of questions asked. By tracking user preferences and behaviours during interactions, such as topics of interest and preferred language and tone, the chatbot personalised the user experience and optimised engagement. Data collected from user interactions, including feedback and concerns raised, were likely analysed to evaluate the chatbot's performance, identify areas for improvement, and tailor content and functionality to meet user needs better. The study may have involved analysing the data collected from AI chatbot interactions to assess the effectiveness of Amanda Selfie in promoting PrEP uptake, increasing knowledge about HIV prevention, and facilitating access to healthcare services among AMSM and TGW, providing insights into the impact of the chatbot on user behaviour and outcomes (Massa *et al*., 2023).

Artificial Intelligence (AI) is being leveraged in various ways to enhance the diagnosis and treatment of sexually transmitted infections (STIs). AI technologies, such as image recognition and patient data analysis, are being used to improve STI screening and diagnosis accuracy and efficiency. By analysing images of symptoms and patient data, AI systems can assist healthcare providers in identifying STIs more effectively. AI is integrated into healthcare systems as a decision-support tool for primary healthcare providers. This integration helps in boosting real-time diagnostic accuracy, enabling healthcare professionals to make informed decisions promptly. AI enables personalised interventions for STI treatment by analysing individual patient data and tailoring treatment plans accordingly. This personalised approach can lead to more effective and targeted interventions for STIs (Mehta, Gupta & Kularathne, 2023).

One point for discussion could be the effectiveness and ethical considerations of using AI in sensitive areas such as sexual education for adolescents. While AI chatbots may offer engaging and accessible platforms for delivering information, how effective are they in providing accurate and comprehensive education about reproductive health and STIs? Additionally, what measures are in place to ensure that the information delivered by AI platforms is reliable, evidence-based, and culturally sensitive?

Another point for discussion could be the accessibility and inclusivity of AI-driven interventions. While technology can be empowering, there may be barriers to access for certain groups of adolescents, such as those with limited internet connectivity or digital literacy skills. How can AI interventions be designed to reach and engage vulnerable and hard-to-reach populations effectively? Furthermore, there may be concerns regarding privacy and data security when adolescents interact with AI platforms for sensitive topics like sexual health. How can AI developers and healthcare providers ensure the confidentiality and privacy of adolescents' information while still delivering personalised and effective support?

CONCLUSION

The development of AI provides many significant benefits for teenagers; not all teenagers can openly discuss the problem of sexually transmitted infections with health workers, but the existence of AI chatbots helps teenagers gain knowledge that can encourage teenagers to ask for help if problems with sexually transmitted infections occur. AI is also effective for developing and developed countries. However, more longitudinal studies are still needed to measure the impact of AI on adolescent reproductive health behaviour.

Conflict of Interest

The authors declare that they have no competing interests.

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