

# **Digital technology as a source for sexual and reproductive health information seeking among adolescent and young adults**

By

**Dr. Ankita Sharma**

PG/22/008

PGDM [Hospital and Health Management equivalent to MBA]

INTERNSHIP TRAINING

At

IPE GLOBAL LIMITED



Under The Guidance Of

Dr. Anandhi Ramachandran



International Institute of Health Management Research, New  
Delhi, India

2024

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**2024**

July 20, 2024

**TO WHOMSOEVER IT MAY CONCERN**

This is to certify that **Ankita Sharma** has completed her internship in "Health, Nutrition and WASH" department with IPE Global Limited.

**Ankita Sharma** has worked with us from **April 01, 2024, to July 15, 2024** at **New Delhi office**. She has worked well as part of the team and was sincere, hardworking and result oriented.

Wishing her success for future endeavors.

Best wishes  
For IPE Global Limited



**Kavita Fadnis**  
Vice President - Human Resources

Corporate & Regd. Office:

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**IPE GLOBAL LIMITED**

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## **TO WHOMSOEVER IT MAY CONCERN**

This is to certify that Dr. Ankita Sharma student of PGDM (Hospital & Health Management) from the International Institute of Health Management Research, New Delhi has undergone internship training at “IPE Global Limited” from April to July 2024. The Candidate has successfully carried out the study designated to her during the internship training and her approach to the study has been sincere, scientific, and analytical. The Internship is in fulfilment of the course requirements.

I wish her all success in all his/her future endeavours.

Dr Sumesh Kumar

Associate Dean, Academic and Student Affairs

IIHMR, New Delhi

**Dr. Anandhi Ramachandran**

**Mentor**

**IIHMR, New Delhi**

## Certificate of Approval

The following dissertation title “Digital technology as a source for sexual and reproductive health information seeking among adolescent and young adults: A Narrative Review” at “IPE Global Limited” is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of PGDM (Hospital & Health Management) for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
Dr. Puneet Chahal	Puneet Chahal
Dr. Sumant Swain	20/10/24 [Signature]
_____	_____

## **Certificate from Dissertation Advisory Committee**

This is to certify that Dr. Ankita Sharma, a graduate student of the PGDM (Hospital & Health Management) has worked under our guidance and supervision. She is submitting this dissertation titled “Digital technology as a source for sexual and reproductive health information seeking among adolescent and young adults” at “IPE Global Limited.” in partial fulfilment of the requirements for the award of the PGDM (Hospital & Health Management). This Dissertation has the requisite standard and to the best of our knowledge, no part of it has been reproduced from any other dissertation, monograph, report or book.

Dr. Anandhi Ramachandran  
Mentor  
IIHMR, New Delhi



**Organisation Mentor**  
Neha Bhalla  
(Sr. Manager- Health and Nutrition Wash)  
IPE Global Limited

**INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT  
RESEARCH,**

**NEW DELHI**

**CERTIFICATE BY SCHOLAR**

This is to certify that the dissertation titled “Digital technology as a source for sexual and reproductive health information seeking among adolescent and young adults: A Narrative Review” and submitted by Ankita Sharma Enrolment No. PG/22/008 under the supervision of Dr. Anandhi Ramachandran for the award of PGDM (Hospital & Health Management) of the Institute carried out during the period from 04/03/2024 to 04/06/2024 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.



**Signature:**

**Place: New Delhi, India**

FEEDBACK FORM  
(Organization Supervisor)

Name of the Student: Ankita Sharma

Name of the organisation: IPE Global Limited

Area of Dissertation: Sexual & Reproductive Health

Attendance: 100%

Objectives met: Detailed Research, Proposal writing, Stakeholder analysis

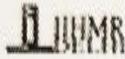
Deliverables: Proposal writing, Assessment plan, Concept Note

Strengths: Good Research skills, dedicated Stakeholder analysis, quick learner

Suggestions for Improvement: Good performer, aim for excellence.

Date: 15/July/2024  
Place: Delhi

  
Signature of the Officer-in-Charge  
(Internship)



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**CERTIFICATE ON PLAGIARISM CHECK**

Name of Student (in block letter)	Dr./Mr./Ms.:		
Enrolment/Roll No.	PG/22/	Batch Year	2022-2024
Course Specialization (Choose one)	Hospital Management	Health Management	Healthcare IT
Name of Guide/Supervisor	Dr./Prof.: Anandhi Ramachandran		
Title of the Dissertation/Summer Assignment	Digital Technology as a solution for sexual and reproductive health information seeking among AYA.		
Plagiarism detects software used	"TURNITIN"		
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Name: Ms. Anika Sharma

Signature:

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## Ankita Sharma D 1

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### ORIGINALITY REPORT

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## **Acknowledgments**

Completing a dissertation is a significant opportunity for professional growth and learning. I feel fortunate to have had the opportunity to undertake my project at IPE Global Limited. The knowledge and experience I gained from the professionals in the organization have been invaluable.

I would like to express my heartfelt gratitude to the academic fraternity at IIHMR Delhi for establishing such a dedicated system that provides students like me with the opportunity to pursue their areas of interest and enhance their knowledge. The support and guidance provided by the faculty and staff at IIHMR DELHI have been invaluable throughout my academic journey. Their commitment to providing quality education and fostering a learning environment has greatly contributed to my personal and professional growth. I would like to extend my sincere gratitude to my mentor Dr. Anandhi Ramachandran for his invaluable guidance, expertise, and support throughout this research project.

I am particularly thankful to Dr. Neha Bhalla and Vinayak Sarolia for their in-depth discussions and guidance. Their timely support, inspiration, and unconditional assistance played a crucial role in shaping my study.

I would also like to express my appreciation to my colleagues and the entire staff at IPE Global Limited for their attention to my work and their assistance. Their support significantly contributed to the success of my project. I am sincerely thankful to everyone involved.

## **Organization Overview**

### **Who We Are**

It has its origin in India and has its subsidiary offices in five countries, namely Bangladesh, Ethiopia, Kenya, Philippines and United Kingdom; the group comprises of different companies of integrated, innovative and quality consulting services all over different sectors.

To its clients, IPE Global LLP is a reliable business partner, which unites economists, chartered accountants, sociologists, officials from the public sector, educators, urban planners and architects, environmentalists, scientists, and program and project managers who are searching for clear solutions to the complicated problems of the world. IPE Global has a team of over 1200 professional staff members and over 1000 empanelled consultants for different projects taking place in over different regions of the world.

We are proud, that in the last 25 years IPE Global completed over 1200 projects in over 100 countries of five continents. These are coupled by the Group and multinationals, bilateral and multilateral agencies, governments, corporates and non- government organizations in to set the development agenda for a sustainable development and equitable growth. The management and technology consulting genius of IPE Global resides in its offices spread worldwide and aids various global development sector clients to respond to the challenges by offering solutions that are applicable to the organization's complex.

Among them, each company of the IPE Global's group company is quite autonomous – Triple Line Consulting Limited from UK, IPE Global (Africa) Limited for Africa, SAMRIDH Impact Solutions Private Limited which is a blended finance vehicle and IPE Global Centre for Knowledge and Development which is a not-for-profit company.

### **Core Values**

- **Integrity-** To honour our commitment and act with responsibility in all our relationships.
- **Innovation-** To address development issues by looking beyond the obvious, experimenting, and stimulating creativity.
- **Passion-** To excel through quality, to delight our clients, and enjoy our work.

- **Perseverance-** To hold on when the problem appears too challenging, to try again differently, to not let go, to not give up.
- **Learning-** To learn from our experiences, to encourage new ideas and try new possibilities.

### **What We Believe**

IPE Global is committed to impacting lives with a human touch. We are a group which partners with governments, businesses, and leaders in the society to create a better world for all.

IPE Global business model integrates people, technology, and innovation to create value for all our stakeholders. Through our integrated services and futuristic enablers, we focus on Human Development, Inclusive Growth & Resilience, and Good Governance, to bring to the table bespoke solutions.

IPE Global is an ISO-certified organization with a focus on quality and integrity to empower growth and drive positive change for people & planet.

## Abstract

# Digital technology as a source for sexual and reproductive health information seeking among adolescent and young adults: A Narrative Review

### **Introduction**

India has embraced the digital revolution, significantly impacting the health sector. Traditional healthcare services now face new challenges due to technological advancements and rising public expectations for high-quality medical care. Digital health features like mHealth, telemedicine, AI, and robotics have become integral to adolescents' and young adults' lives, offering multiple points of access to information and communication channels. Adolescence, a critical transition from childhood to adulthood, greatly influences long-term health and wellbeing. With India having the world's largest adolescent population, prioritizing their health, particularly sexual and reproductive health (SRH), is crucial. According to WHO, sexual health encompasses physical, emotional, mental, and social well-being in relation to sexuality, requiring a positive and respectful approach to sexual relationships. Youth often face embarrassment and privacy concerns when discussing SRH with adults, making digital technology an essential tool for accessing confidential SRH information. Despite advancements, there's a lack of clarity regarding the effectiveness of digital health interventions and their contextual significance. This study reviews digital interventions used by Indian adolescents to access SRH information and examines their perceptions of digital privacy.

### **Rationale**

Adolescents and young adults (AYA) in India encounter various SRH challenges, including limited information access, cultural taboos, and healthcare barriers. Digital technology offers discreet and convenient solutions, yet the complexity of its role necessitates a comprehensive literature review to understand its full implications. This study aims to evaluate digital interventions utilized by Indian youth to access SRH information and their perceptions of digital privacy.

### **Objectives Primary Objective**

Identify the use of digital technology by Indian adolescents and young adults (AYA) to access SRH information.

### **Methodology**

**Study Design:** Literature-based secondary research

**Population:** Adolescents and young adults in India

**Search Strategy:** Comprehensive searches in electronic databases (e.g., PubMed, Google Scholar) using keywords such as "Digital technologies AND SRH," "AYA AND SRH," "Digital technology AND Adolescents," "SRH AND India," "Online SRH AND India."

**Inclusion Criteria:** Studies involving digital technology and/or adolescents and young adults (10-24) in India, including qualitative, quantitative, or mixed-method designs from the past ten years.

**Exclusion Criteria:** Non-English studies, blogs, white papers, news reports, editorials, and opinion papers, and studies on non-electronic interventions or irrelevant populations.

**Period of Study:** 2010 to April 2024

## **Results**

Studies misaligned with the study's objectives or with vague results were excluded. The literature highlights the effective use of digital technologies in improving SRH outcomes among adolescents, especially in urban and resource-constrained settings. Game-based interventions, social media, and AI-driven chatbots like SnehAI show promise in engaging youth and providing accurate SRH information.

## **Discussion**

### Use of Digital Technology for SRH

Digital interventions, such as mobile apps, social media campaigns, and AI chatbots, have significantly improved SRH knowledge and behaviors among adolescents. These technologies ensure anonymity and safety, crucial for discussing sensitive topics.

### Benefits

Digital technologies provide safe, anonymous platforms for SRH information, enhance knowledge through social media, and engage youth through game-based interventions. mHealth interventions have proven effective in low- and middle-income countries by increasing access to SRH services.

### Challenges

Challenges include confidentiality risks, socio-cultural barriers, poor network connectivity, limited device access, and digital literacy issues. Addressing these barriers is essential for the successful implementation of digital SRH interventions.

## **Conclusion**

Digital technology offers promising solutions for SRH challenges among Indian adolescents and young adults. While benefits are evident, overcoming barriers is crucial for maximizing the effectiveness of digital interventions in improving SRH outcomes. Further research and careful design of digital health programs are necessary to address these challenges and enhance the accessibility and impact of SRH information for youth.

# **Digital technology as a source for sexual and reproductive health information seeking among adolescent and young adults: A Narrative Review**

## **1. INTRODUCTION**

India today has reached at a significant place in world in terms of digitization and health sector has accepted this new era with same enthusiasm. In recent years, the traditional ways of health care service have faced fresh hurdles caused by advancement of technology and the public's increasing expectations for best medical care. Furthermore, emerging digital technologies present the opportunity for significant growth in the capabilities of diverse diagnostic and treatment methods (1). There are many features of digital health currently in use like, mHealth, Telemedicine, AI, Robotics etc.

In recent years, digital technology has become an integral part of the lives of adolescents and young adults, offering multiple point access of information and communication channels. (2) The world of digital technology is not just a feature to today's adolescents and young adults; it is a part of their lifestyle. Adolescence acts as crucial transition period from childhood to adulthood that affects the health and wellbeing of an individual in the latter part of life. The impact of teenage years manifest itself in both physical and mental forms. The knowledge and information gained at young age impact majority of decisions of individuals (2). Considering that youths make up almost a quarter of the global population, prioritizing this demographic is crucial and unavoidable, especially for India, which has the highest proportion of adolescents worldwide (3)

According to WHO, “Sexual health is a state of physical, emotional, mental, and social wellbeing in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination, and violence”. Sexual and reproductive health (SRH) holds significant importance for adolescents and young adults. Equipping them with accurate information and fostering positive attitudes during this period would ensure reduced vulnerabilities and improved health outcomes in their later lives (4). Feelings of embarrassment and concerns about privacy and confidentiality when discussing sexual and reproductive health (SRH) matters with adults contribute to the difficulties for youth in accessing comprehensive and highquality information (5). In the evolving landscape of recent literature, there is evidence towards a shift in the way adolescents seek information, with a tendency to now obtain sexual and reproductive health (SRH) information from traditional mass media towards social media platforms.(2). Adolescents are particularly drawn to mobile phones due to their characteristics of privacy, convenience, and accessibility. (5)

Despite the rapid advancement of digital technologies in the healthcare sector over the past decade, there still exists a lack of clarity and consistency regarding which program strategies

yield specific outcomes, as well as the significance of contextual factors.(6) Digital health interventions are health services delivered electronically through formal or informal care to improve health outcomes at the individual or population level. This includes mhealth, digital platforms, Apps, chatbots and wearable devices.

The study will include use of information and communication technologies, such as the Internet, web, smartphone applications, and e-health, to meet the needs of targeted population.

## **2. RATIONALE**

Adolescents and young adults (AYA) in India face various SRH challenges, including limited access to accurate information, cultural taboos surrounding discussions about sexuality, and barriers to accessing healthcare services. Digital technology offers new avenues for addressing these challenges, enabling young people to access SRH information and services discreetly and conveniently. However, the role of different types of digital technology used to access SRH information and services in India remains complex and multifaceted, necessitating a comprehensive review of existing literature to understand its implications fully. This study aims to review the current literature on digital interventions utilized by adolescents and young adults in the country to access sexual and reproduction health related information. It will further elaborate the perception of youth regarding privacy of digital information.

## **3. OBJECTIVES**

### *Primary Objective*

To Identify the use of digital technology by adolescents and young adults (AYA) in India to access sexual and reproductive health related information.

## **4. METHODOLOGY**

- **STUDY DESIGN:** Literature based Secondary Research
- **POPULATION:** Adolescents and Young adults of India
- **SEARCH STRATEGY:** A comprehensive search will be conducted in electronic databases (e.g., PubMed, Google scholar, research gate, Springer articles) using relevant keywords Digital technologies AND SRH”, “AYA AND SRH”, “Digital technology AND Adolescents”, “SRH AND India”, “Online SRH AND India”.
- **INCLUSION CRITERIA:** Studies involving digital technology and/or adolescents, young adults (10-24), in Indian context will be included. All types of studies including qualitative, quantitative, or mixed-method designs will be included. Past ten years studies will be included.
- **EXCLUSION CRITERIA:** Studies which are not in English language will be excluded. Blogs, white paper, news reports, editorial and opinion papers will be excluded. Studies that conducted nonelectronic and electronic interventions on individuals other than targeted population will be excluded.
- **PERIOD OF STUDY:** Starting from 2010 till April 2024

## 5. RESULTS

Studies which do not align with the objective of the study and had vague and inconclusive results were excluded.

The search terms used initially from different sources yielded 415 publications.

After removal of duplicates = 198 studies

After inclusion criteria and time filter ( post 2010) = 98 studies

After reading titles and abstract = 19 Full articles reviewed.

S.no	Author	Title	Objective	Result
1	Goh, Kunshan; Contractor, Sana; Van Belle, Sara	A Realist-Informed Review of Digital Empowerment Strategies for Adolescents to Improve Their Sexual and Reproductive Health and Well-being	The study aimed to understand how digital empowerment strategies work to improve adolescent health and well-being, particularly in urban resource-constrained settings.	The review found that digital technologies enable adolescents to access health information and services independently, ensuring anonymity and safety. When adolescents receive tailored information, they can make informed decisions, improving their health outcomes by enhancing their sense of agency. The review identified two main gaps: the lack of theoretical focus on the urban environment and the sociodevelopmental stages of the adolescents targeted by these programs.
2	McCammon, E; Bansal, S; Hebert, L; Yan, S; Sparrow, A; Hill, B; Gilliam, M	A game-based intervention to improve youth sexual and reproductive health in New Delhi, India	The study aimed to evaluate the effectiveness of a game-based intervention in improving youth sexual and reproductive health in New Delhi, India.	The study found that game-based interventions significantly improved adolescents' knowledge and attitudes towards sexual and reproductive health, increasing the use of condoms and contraception. It also highlighted the importance of providing a safe space for discussing sensitive topics.
3	Rajani, N.; Akhila, A.	Social Media—Impact on Sexual and Reproductive Knowledge of Adolescents in South India	The study aimed to investigate the impact of social media on the sexual and reproductive knowledge of adolescents in South India.	The study found that frequent social media use significantly improved adolescents' knowledge of sexual and reproductive health, highlighting social media's potential as an effective tool for enhancing health knowledge among adolescents.

4	Shankar, Lalita; Dixit, Anvita; Howard, Susan	A Design-Led Theory of Change for a Mobile Game App (Go Nisha Go) for Adolescent Girls in India: Multimix Methodology Study	The study aimed to describe the development of a designed Theory of Change (ToC) for a mobile game app (Go Nisha Go) that aims to improve sexual and reproductive health	The study developed a Theory of Change (ToC) for the Go Nisha Go mobile game, hypothesizing that girls who engage with the game's immersive and challenging elements will learn to make informed decisions about sexual and reproductive health. The ToC includes four learning pathways: DISCOVER, PLAY, DECIDE, and ACT, built on the pillars of evidence, engagement, and evaluation.
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			outcomes among adolescent girls in India.	
5	Bacchus, Loraine J.; Reiss, Kate; Church, Kathryn; Colombini, Manuela; Pearson, Erin; Naved, Ruchira; Smith, Chris; Andersen, Kathryn; Free, Caroline	Using Digital Technology for Sexual and Reproductive Health: Are Programs Adequately Considering Risk?	The study aimed to discuss the potential risks of digital interventions in sexual and reproductive health (SRH) and highlight the importance of considering these risks in the design and implementation of such interventions.	The study found that digital interventions in SRH pose risks such as confidentiality breaches, unintended disclosure, and perpetuation of harmful gender norms. It emphasizes careful risk management in designing and implementing these interventions, providing recommendations for mitigation.
6	Ippoliti, Nicole B.; L'Engle, Kelly	Meet us on the phone: mobile phone programs for adolescent sexual and reproductive health in low-to-middle income countries	The study aimed to review the effectiveness of mobile phone programs in improving adolescent sexual and reproductive health in low-to-middle income countries.	The study found that mobile phone programs can be effective in improving adolescent sexual and reproductive health, particularly in low-to-middle income countries. The programs can provide access to information, support, and services that may not be available through traditional channels.
7	Wang, Hua; Gupta, Sneha; Singhal, Arvind; Muttreja, Poonam; Singh, Sanghamitra; Sharma, Poorva; Piterova, Alice	An Artificial Intelligence Chatbot for Young People's Sexual and Reproductive Health in India (SnehAI): Instrumental Case Study	The study aimed to examine the functional affordances of SnehAI, an AI-driven chatbot designed for social and behavioral changes in India, and to investigate user engagement patterns.	The study found that SnehAI demonstrated strong evidence across 15 functional affordances, such as accessibility, interactivity, and scalability. It effectively engaged users, particularly young men, with 8.2 million messages exchanged over 5 months. The chatbot acted as a trusted friend and mentor, providing a safe space for discussing sensitive topics.
8	Senbekov, Maksut; Saliev, Timur; Bukeyeva, Zhanar; Almabayeva, Aigul; Zhanaliyeva, Marina; Aitenova, Nazym; Toishibekov, Yerzhan; Fakhradiyev, Ildar	The Recent Progress and Applications of Digital Technologies in Healthcare: A Review	The study aimed to review recent progress and applications of digital technologies in healthcare.	The study found that digital technologies have made significant progress in healthcare, including telemedicine, electronic health records, and artificial intelligence. These technologies have improved patient outcomes, increased access to healthcare services, and enhanced healthcare efficiency.
9	Saha, Ananya; Dixit, Anvita; Shankar, Lalita; Battala, Madhusudana; Khan, Nizamuddin; Saggurti, Niranjan; Ayyagari, Kavita; Raj, Aparna; Howard, Susan	Study protocol for an individually randomized control trial for India's first roleplay-based mobile game for reproductive health for adolescent girls	The study aimed to develop and evaluate the effectiveness of a roleplay-based mobile game for reproductive health among adolescent girls in India.	The study found that the mobile game was effective in improving knowledge and attitudes of adolescent girls towards reproductive health. The game also increased the use of condoms and other forms of contraception.
10	Saha, Ria; Paul, Pintu; Yaya, Sanni; Banke-Thomas, Aduragbemi	Association between exposure to social media and knowledge of sexual and reproductive health among adolescent girls: evidence from the UDAYA survey in Bihar and Uttar Pradesh, India	The study aimed to examine the association between exposure to social media and knowledge of sexual and reproductive health among adolescent girls in Bihar and Uttar Pradesh, India.	The study found that exposure to social media was significantly associated with better knowledge of sexual and reproductive health among adolescent girls. The study highlights the potential of social media as a tool for improving adolescent health knowledge.

11	Chakraborty, Srilekha	Talking about gender and sexual reproductive health rights of adolescents and youth in Jharkhand	The study aimed to discuss the importance of talking about gender and sexual reproductive health rights of adolescents and youth in Jharkhand.	The study found that discussing gender and sexual reproductive health rights is crucial for improving the health and well-being of adolescents and youth in Jharkhand. The study highlights the need for a comprehensive approach to addressing the sexual and reproductive health needs of this population.
12	Isaacs, Nazeema; Ntinga, Xolani; Keetsi, Thabo; Bhembe, Lindelwa; Mthembu, Bongumenzi; Cloete, Allanise; Groenewald, Candice	Are mHealth Interventions Effective in Improving the Uptake of Sexual and Reproductive Health Services among	The study aimed to examine the effectiveness of mHealth interventions in improving the uptake of sexual and reproductive health services among adolescents.	The study found that mHealth interventions can be effective in improving the uptake of sexual and reproductive health services among adolescents. The interventions included text messaging, mobile apps, and online platforms. The study highlighted the potential of mHealth interventions in addressing the sexual and reproductive health needs of adolescents, particularly in low- and middle-income countries.
		Adolescents? A Scoping Review		
13	Kanesathasan, Anjala; Cardinal, Laura J; Pearson, Erin; Gupta, Sreela Das; Mukherjee, Sushmita; Malhotra, Anju	Catalysing Change Improving Youth Sexual and Reproductive Health Through Disha, an Integrated Program in India	The program aims to address the broader context of young people's sexual and reproductive health in India.	The program has been effective in improving youth knowledge and attitudes towards sexual and reproductive health. It has also been successful in addressing specific issues such as puberty, attraction to others, reproductive systems, and family planning.
14	Singh, Salam Michael; Garg, Shubhmoy Kumar; Misra, Amitesh; Seth, Aaditeshwar; Chakraborty, Tanmoy	SUKHSANDESH: An Avatar Therapeutic Question Answering Platform for Sexual Education in Rural India	The study aimed to develop and evaluate an avatar-based question answering platform called SUKHSANDESH to provide sexual education to rural youth in India.	The study found that the SUKHSANDESH platform was effective in providing accurate and culturally sensitive sexual health information to rural youth. The avatar-based interface helped overcome barriers such as stigma and lack of access to information.
15	Feroz, Anam Shahil; Ali, Naureen Akber; Khoja, Adeel; Asad, Armish; Saleem, Sarah	Using mobile phones to improve young people sexual and reproductive health in low and middle-income countries: a systematic review to identify barriers, facilitators, and range of mHealth solutions	The study aimed to identify the range of mHealth solutions that can be used for improving young people's sexual and reproductive health in low- and middle-income countries (LMICs) and highlight facilitators and barriers for adopting mHealth interventions.	The review found that mHealth interventions can be effective in improving access to sexual and reproductive health services and information for young people in LMICs. The most common mHealth applications were client education and behaviour change communication, data collection and reporting, and financial transactions and incentives. The review also identified barriers such as decreased technological literacy, inferior network coverage, and lower linguistic competency.
16	Laar, Alexander S.; Harris, Melissa L.; Khan, Md N.; Loxton, Deborah	Views and experiences of young people on using mHealth platforms for sexual and reproductive health services in rural low- and middle-income countries: a qualitative systematic review	The study aimed to qualitatively explore the experiences and perceptions of young people's use of mobile phone platforms for sexual and reproductive health services in rural low- and middle-income countries.	The study found that young people in rural low- and middle-income countries have positive views on using mHealth platforms for sexual and reproductive health services, citing convenience, privacy, and affordability as key benefits. However, they also expressed concerns about poor and limited network and electricity connectivity, limited access to mobile phones and mobile credit due to cost, influence from sociocultural norms and beliefs, and language and literacy skills constraints.
17	Ames, Heather MR; Glenton, Claire; Lewin, Simon; Tamrat, Tigest; Akama, Eliud; Leon, Natalie	Clients' perceptions and experiences of targeted digital communication accessible via mobile devices for reproductive, maternal, newborn, child, and adolescent health: a qualitative evidence synthesis	The study aimed to explore clients' perceptions and experiences of targeted digital communication via mobile devices on topics related to reproductive, maternal, newborn, child, and adolescent health.	The study found that clients' experiences of targeted digital communication were mixed. Some felt that these programs provided them with feelings of support and connectedness, while others pointed to problems such as poor access to cell networks and the internet, language issues, and cost of messages. Clients also had preferences for different delivery channels and message content.

18	Rea, Samantha; Zynda, Aaron; Allison, Bianca; Tolleson-Rinehart, Sue	Adolescent Perceptions of Technology-Based Sexual and Reproductive Health Services: A Systematic Review	The study aimed to systematically review the literature on adolescent perceptions of technology-based sexual and reproductive health services.	The study found that adolescents have mixed views on technology-based sexual and reproductive health services, citing both benefits and barriers. The benefits included increased access to information and services, while the barriers included concerns about privacy, confidentiality, and stigma.
19	Tirado, Veronika; Chu, Josephine; Hanson, Claudia; Ekström, Anna Mía; Kågesten, Anna	Barriers and facilitators for the sexual and reproductive health and rights of young people in refugee contexts globally: A scoping review	The study aimed to identify the barriers and facilitators for the sexual and reproductive health and rights of young people in refugee contexts globally.	The study found that barriers to sexual and reproductive health and rights for young people in refugee contexts include cultural norms, lack of access to services, limited knowledge, and gender-based violence. Facilitators include community engagement, comprehensive sexuality education, and youthfriendly services that are accessible, confidential, and nonjudgmental. Addressing these barriers and strengthening the facilitators requires a multi-stakeholder approach involving refugees, service providers, and policymakers.

### **Role of Digital Technology to Change Sexual Health–Related Attitudes and Behaviors**

The review of literature on the use of digital technology by adolescents and young adults (AYA) in India reveals a promising trend towards leveraging technology for positive changes in sexual health-related attitudes and behaviors. The study, "A Realist-Informed Review of Digital Empowerment Strategies for Adolescents to Improve Their Sexual and Reproductive Health and Well-being," provides the evidence that digital empowerment strategies are effective, especially in urban resource-constrained settings. These strategies include the use of mobile apps, social media campaigns, and online platforms that offer confidential advice and information, which are crucial for adolescents who may not have access to traditional sources of SRH information.(6)

The study, "A game-based intervention to improve youth sexual and reproductive health in New Delhi, India," demonstrates the potential of game-based interventions to engage youth in learning about SRH. The study shows that when SRH education is delivered in a format that is entertaining and interactive, it can lead to better retention of information and more positive behavioral changes.(7)

### **Providing Knowledge and Information**

The provision of knowledge and information on sexual and reproductive health through digital technology has been a significant focus of the reviewed studies. Rajani, N., and Akhila, A. (2020) in their study, "Social Media—Impact on Sexual and Reproductive Knowledge of Adolescents in South India," highlight the influence of social media on the SRH knowledge of adolescents. The study suggests that social media, while not always a reliable source of information, is a widely accessed platform that can be harnessed to disseminate accurate SRH information.(8)

The study, "An Artificial Intelligence Chatbot for Young People’s Sexual and Reproductive Health in India (SnehAI): Instrumental Case Study," explores the use of an AI-driven chatbot, SnehAI, as a tool for providing SRH information. The study indicates that chatbots can offer a confidential and accessible way for AYA to seek and receive SRH information, which is particularly important in a context where open discussions about SRH may be limited.(9)

## **User Perceptions and Experiences**

Rea et al. (2023) and Laar et al. (2023) explored adolescents' perceptions and experiences with technology-based SRH services. While many adolescents appreciated the increased access to information and services, concerns about privacy, confidentiality, and stigma were prevalent. (10) These findings underscore the need for carefully designed interventions that address these concerns to maximize their effectiveness. (11)

## **Barriers and Challenges in Adopting Digital Technology for SRH**

While the potential of digital technology to improve SRH outcomes is evident, several barriers and challenges have been identified in the literature. The study, "Using Digital Technology for Sexual and Reproductive Health: Are Programs Adequately Considering Risk?" emphasize the need for digital SRH interventions to consider the risks associated with technology use, such as privacy breaches and exposure to misinformation. The study underscores the importance of designing digital interventions with a strong focus on user safety and data protection. (12)

The systematic review, "Using mobile phones to improve young people sexual and reproductive health in low and middle-income countries: a systematic review to identify barriers, facilitators, and range of mHealth solutions," identify several barriers to the adoption of mHealth solutions for SRH, including limited access to technology, low digital literacy, and cultural barriers. The review suggests that addressing these barriers is essential for the successful implementation of mHealth interventions. (13)

## **6. DISCUSSION**

### **Use of Digital Technology for SRH**

Digital technologies have increasingly been leveraged to address sexual and reproductive health (SRH) challenges among adolescents, particularly in low- and middle-income countries. Various interventions, ranging from mobile phone programs to AI-driven chatbots, have been developed to improve access to information, support, and services. For instance, mobile phone programs in low-to-middle income countries have demonstrated their effectiveness in providing crucial SRH information and support, which are often unavailable through traditional channels (5). AI chatbots like Snehai have shown promising results by engaging users through accessibility, interactivity, and scalability, providing a safe space for discussing sensitive topics (9). Game-based interventions have also been successful, as evidenced by a study in New Delhi, India, where such an approach significantly improved adolescents' knowledge and attitudes towards SRH, promoting safer sexual behaviours (7).

### **Benefits of Digital Technology in SRH**

The benefits of digital technology in SRH are manifold. First, digital interventions ensure anonymity and safety, which are critical for adolescents seeking information on sensitive topics without fear of stigma or confidentiality breaches (6). Social media has also proven to be an effective tool in enhancing SRH knowledge among adolescents by providing frequent and reliable information (8). Furthermore, game-based interventions have not only improved SRH

knowledge but also created safe spaces for adolescents to discuss these topics (7) . Mobile health (mHealth) interventions, including text messaging and mobile apps, have shown efficacy in improving the uptake of SRH services, particularly in low- and middle-income countries where traditional health services may be less accessible (14) . The use of AI chatbots has facilitated continuous engagement and provided personalized advice, acting as a mentor and friend to young users (9) .

## **Challenges**

Despite the numerous benefits, several challenges remain in the deployment of digital technologies for SRH. One significant issue is the risk of confidentiality breaches and unintended disclosure, which can deter adolescents from using these services (12).

Additionally, there are socio-cultural barriers and gender norms that can limit the effectiveness of these interventions, particularly in conservative settings (15). Poor network connectivity and limited access to mobile devices and internet services are also major barriers, especially in rural and resource-constrained settings (11). Adolescents have expressed concerns about the cost of mobile data and messaging services, which can be prohibitive for sustained engagement with digital health platforms (10). Lastly, the lack of digital literacy among some adolescents and the challenge of creating culturally sensitive content that resonates with diverse populations further complicate the implementation of digital SRH interventions (13) .

## **7. CONCLUSION**

The use of digital technologies to enhance access to sexual and reproductive health (SRH) information among adolescents and young adults (AYAs) in India is a promising trend. Digital platforms have been shown to positively impact knowledge, attitudes, and behaviours related to SRH, highlighting their potential to contribute to better health outcomes. However, addressing concerns regarding privacy and confidentiality is crucial to fully realize this potential.

To mitigate risks associated with digital interventions, key strategies include prioritizing usercentred design, engaging young people in the development process, and implementing supportive policies. Future research directions should focus on evaluating the long-term impacts of digital health interventions, exploring innovative strategies to overcome existing barriers, and ensuring equitable access to SRH information and services for all adolescents.

Ultimately, the effective integration of digital technologies into SRH services can help bridge the gap in access to information and services, particularly for marginalized and structurally excluded populations. By addressing the concerns and challenges associated with digital interventions, we can harness their potential to improve the SRH outcomes of AYAs in India and beyond.

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