

## Effectiveness of reproductive health education through social media on adolescent knowledge

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### ABSTRACT

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This study investigates the effectiveness of reproductive health education delivered through social media platforms in enhancing adolescent knowledge. With increasing digital engagement among youth, social media presents a promising avenue for disseminating critical health information. A quasi-experimental design was employed, involving 300 adolescents aged 13–18 from urban and semi-urban areas. Participants were divided into intervention and control groups. The intervention group received structured reproductive health content via Instagram and TikTok over eight weeks, while the control group received no additional educational material. Pre- and post-intervention surveys assessed knowledge levels across key reproductive health topics, including puberty, contraception, sexually transmitted infections (STIs), and consent. Statistical analysis revealed a significant improvement in knowledge scores among the intervention group compared to the control group ( $p < 0.01$ ). Qualitative feedback indicated that adolescents found the content engaging, accessible, and relevant to their daily lives. The findings suggest that social media can serve as an effective and scalable tool for reproductive health education, particularly in reaching adolescents who may lack access to traditional sources of information. This study underscores the need for evidence-based, youth-centered digital health strategies in public health programming and policy development. Further research is recommended to evaluate long-term impacts and behavioral outcomes.

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### 1. INTRODUCTION

Adolescence is a pivotal and dynamic stage of human development, characterized not only by rapid physical and psychological maturation but also by the formation of lifelong attitudes, behaviors, and knowledge. Within this period, reproductive health emerges as an especially critical domain: young people face evolving challenges as they enter puberty, confront peer and societal pressures, and begin to form intimate relationships. Globally, statistics continue to underscore persistent gaps in adolescents' reproductive health knowledge and access to information. According to the World Health Organization, adolescents and youth aged 10–24 account for a substantial proportion of the global population, yet many lack accurate and timely reproductive health educationa deficit linked to elevated rates of unintended pregnancies, sexually transmitted infections (STIs), and broader psychosocial vulnerabilities. Effectively closing these gaps remains a pressing public health priority.

Traditionally, reproductive health education has been delivered through school-based sex education curricula, community-based programs, clinical settings, or informal family and peer channels. While these modalities have had varying degrees of success, they are frequently constrained by factors such as inconsistent implementation, cultural stigma, limited resources, and gaps in coverage especially

in low- and middle-income contexts. Moreover, formal programs often struggle to engage adolescents dynamically or sensitively address topics like consent, contraception, and STIs in a way that resonates with their lived experiences. In parallel, many young people find themselves turning to informal, ad hoc sources friends, the internet, social media, and popular culture for guidance on reproductive matters. This underscores both the inadequacy of conventional education and the potential of alternative platforms that better align with adolescents' realities and preferences.

Over the past two decades, social media platforms such as Facebook, Instagram, TikTok, YouTube, Twitter, and Snapchat have become central arenas of adolescent socialization, self-expression, and information-seeking. These platforms offer unprecedented reach, interactivity, conformity to youth-friendly formats, peer validation, and adaptability. Adolescents access them not only for entertainment but also for learning, sharing, and community-building around topics ranging from mental health to identity to reproductive knowledge. Indeed, social media's ubiquity and resonance make it an intuitive channel through which reproductive health content could be delivered more effectively than through traditional means. The dynamic combination of attractive visuals, engaging narratives, peer influence, and interactive components could if well designed aid comprehension, retention, motivation, and even behavioral intention regarding healthy reproductive choices.

Despite this intuitive promise, empirical understanding of how effective reproductive health education delivered through social media actually is particularly in increasing adolescent knowledge remains emergent. Several small-scale pilot initiatives have explored approaches such as short informational videos, peer-led Instagram campaigns, influencer-collaborated messages, interactive quizzes, and moderated discussion forums. Some studies have reported encouraging improvements in awareness of key topics, self-efficacy to seek services, and intention to adopt safer behaviors. Others have encountered pitfalls including misinformation, low engagement, cultural mismatches, or potential reinforcement of harmful norms. To translate social media's potential into tangible educational gains at scale, a more robust and nuanced understanding is required one that attends to message content and framing, platform-specific dynamics, cultural and contextual sensitivities, measurement of knowledge domains, and equity in access and outcomes.

The present research thus focuses on "The Effectiveness of Reproductive Health Education through Social Media on Adolescent Knowledge." Framed within the intersection of digital communication, educational intervention, and public health, this investigation seeks to explore not only whether social media education can enhance adolescent reproductive health knowledge, but also under what conditions, for which subgroups, and in what ways the impacts manifest. Recognizing that "knowledge" itself is a multi-dimensional construct encompassing factual understanding (e.g., of anatomy, contraception types, mechanisms of STIs), procedural awareness (e.g., how to access resources or services), attitudes and values (e.g., consent, autonomy), and self-efficacy this study adopts a comprehensive lens to measurement. Moreover, "social media" is understood broadly, but analyzed attentively, acknowledging the varied affordances of different platforms (e.g., TikTok's short-form video, Instagram Stories' ephemeral visuals, YouTube's longer-form content, and Snapchat's peer-to-peer dynamics).

This study aligns with several theoretical frameworks. First, Social Cognitive Theory suggests that learning occurs in social contexts with dynamic and reciprocal interactions among personal, behavioral, and environmental factors. Adolescents observing modeled behaviors or receiving peer-reinforced messages around reproductive topics may experience enhanced knowledge and motivation. Second, Uses and Gratifications Theory emphasizes that media users actively select content that fulfills cognitive, emotional, or social needs. Adolescents may gravitate toward reproductive health content that is engaging, peer-relevant, or visually compelling. Third, Diffusion of Innovations Theory can help interpret how new ideas and practices such as modern contraceptive methods or consent-informed dialogues spread through peer networks via social media, potentially amplifying educational effects.

Answering these questions involves deploying a mixed-methods research design: quantitatively measuring knowledge gains via pre- and post-intervention assessments, and qualitatively exploring participant experiences through focus groups or open-ended survey responses. Content analysis of educational materials and engagement metrics provides further insight into content effectiveness and design principles. Sampling across diverse adolescent populationsurban and rural, varying

socioeconomic statuses, and different cultural backgrounds ensures findings are informative across contexts and equity-oriented.

The significance of this research is manifold. From a public health perspective, enhancing adolescent reproductive health knowledge is foundational to reducing unintended pregnancies, preventing STIs, and supporting overall well-being. From an educational innovation lens, social media represents a scalable, cost-effective, and youth-aligned delivery channel particularly crucial in settings where traditional sex education is limited or stigmatized. From a policy and programming standpoint, evidence of effectiveness may encourage health ministries, NGOs, and educators to invest strategically in digital reproductive health interventions. And from a theoretical vantage, this study contributes to understanding how digital media function as learning ecosystems for sensitive, socially complex content like reproductive health.

In addition to direct knowledge outcomes, this research may illuminate secondary benefits and potential unintended consequences. For instance, effective social media education may help normalize conversations about puberty, consent, and contraception, reducing stigma and enhancing adolescents' willingness to seek support. Conversely, risks such as exposure to misinformation, privacy breaches, or reinforcement of stereotypes must also be monitored and mitigated. Understanding how to design trustworthy, accurate, and youth-responsive content is essential for safeguarding both educational quality and ethical integrity.

In summary, the introduction lays out the context and urgency of improving adolescent reproductive health knowledge; the promise and challenges of social media as an educational platform; the conceptual framing drawing on relevant theories; the core research questions guiding the study; the methodological approach envisioned; and the significance across health, education, policy, and theory. By rigorously examining whether and how social media-based reproductive health education enhances adolescent knowledge, this research aims to provide actionable insights for designing interventions that are both effective and resonant with young people's lived experiences in a digital age where information access and peer influence are increasingly mediated by social media channels.

## 2. RESEARCH METHOD

This study employed a quasi-experimental pre-test-post-test control group design to assess the effectiveness of reproductive health education delivered through social media on adolescent knowledge. The target population included adolescents aged 13 to 18 years from both urban and semi-urban secondary schools. A total of 300 participants were purposively selected and randomly assigned into two groups: an intervention group ( $n=150$ ) and a control group ( $n=150$ ). The intervention group received structured reproductive health education through curated content on Instagram and TikTok over an 8-week period. The content included short videos, infographics, polls, and interactive Q&A sessions, developed in consultation with reproductive health professionals to ensure accuracy and age-appropriateness. Topics covered included puberty, contraception, STIs, menstrual health, and consent. The control group received no additional educational material beyond their standard curriculum. Pre-intervention and post-intervention assessments were conducted using a validated questionnaire measuring reproductive health knowledge across five domains. The instrument included multiple-choice and true/false questions, with a maximum score of 100. Data were analyzed using SPSS software. Descriptive statistics summarized participant demographics and baseline knowledge, while paired and independent t-tests compared pre- and post-test scores within and between groups. A p-value of  $<0.05$  was considered statistically significant. Qualitative data were also collected through focus group discussions with a subset of intervention participants to explore their engagement with the content, perceived relevance, and barriers to understanding. Thematic analysis was used to interpret qualitative responses. Ethical approval was obtained from the relevant institutional review board, and informed consent was secured from both participants and their guardians. All data were anonymized to ensure confidentiality. This mixed-methods approach allowed for a comprehensive evaluation of both knowledge outcomes and user experiences.

### 3. RESULTS AND DISCUSSIONS

#### 3.1. Participant Demographics and Baseline Equivalence

A total of 300 adolescents aged 13–18 completed the study, with 150 in the intervention group and 150 in the control group. Participant demographics including age, gender distribution (52% female, 48% male), socioeconomic status, urban versus semi-urban residence were statistically similar across groups ( $p > 0.05$ ), confirming baseline equivalence and mitigating allocation bias. Baseline Knowledge Scores. The average pre-test knowledge scores out of 100 were 45.2 ( $SD = 12.8$ ) for the intervention group and 44.7 ( $SD = 13.1$ ) for the control group, a non-significant difference ( $t(298)=0.39$ ,  $p = 0.70$ ). This parity underscores that observed post-intervention differences stem from the intervention itself rather than initial disparities.

#### 3.2. Quantitative Outcomes: Knowledge Gains

Overall Knowledge Improvement. Post-intervention, the intervention group's average knowledge score increased to 71.6 ( $SD = 14.5$ ), a mean gain of 26.4 points ( $p < 0.001$ ). In contrast, the control group showed a marginal increase to 48.2 ( $SD = 13.7$ ), a gain of 3.5 points ( $p = 0.04$ ). Between-group comparison of mean change was highly significant ( $t(298)=18.2$ ,  $p < 0.001$ ), evidencing strong effect of the social-media-delivered education. Domain-Specific Gains. Knowledge gains varied across domains (mean gain in intervention vs. control): Puberty and Anatomy: +27.8 vs. +4.0, Contraception: +30.2 vs. +2.5, STIs: +25.6 vs. +3.8, Menstrual Health: +24.1 vs. +4.1, Consent & Communication: +22.9 vs. +2.3, All domain-specific improvements in the intervention group were statistically significant ( $p < 0.001$ ), whereas control group changes were minimal and only occasionally significant.

These clear quantitative improvements demonstrate that structured, social-media-based reproductive health content produces substantial knowledge gains across multiple domains. Contraception knowledge showed the steepest rise, suggesting that adolescents particularly benefit from visual and concise explanations often used in social media formats. The smaller gain in consent and communication though still robust might reflect the more nuanced, contextual nature of these topics, which may require deeper narrative or interactive engagement to fully internalize.

#### 3.3. Platform and Content Format Effectiveness

We tracked engagement metrics and correlated them with individual knowledge gains. Participants accessed material across two platforms Instagram and TikTok and through diverse formats: short videos, static infographics, polls/quizzes, and interactive Q&A sessions. Videos (short-form clips) garnered highest engagement (average views per participant = 8.4 out of 10), and those who watched  $\geq 80\%$  of videos scored on average 30 points higher than those with lower viewership. Infographics saw moderate engagement (average views = 6.7), but correlated strongly with factual recall questions in pre-post tests. Polls/Quizzes had the highest relative interaction rates per exposure time and were associated with sustained retention in subsequent weeks. Q&A sessions (live or story-based) attracted fewer participants (only  $\sim 40\%$ ), but those who engaged demonstrated significantly higher gains in the Consent domain (mean +28 vs. +20 among non-engagers).

Short videos seem highly effective likely due to their alignment with adolescent consumption habits and ability to succinctly deliver complex information. Infographics support visual processing and memory, while interactive polls/quizzes boost active recall and retention. Q&A's strong impact on nuanced topics (like consent) underscores the value of two-way, personalized educational formats that allow clarification and reflection. These insights suggest interventions should mix media formats to capitalize on each medium's strengths: videos for core information, infographics for reinforcement, quizzes for recall, and interactive formats for sensitive or complex topics.

#### 3.4. Moderating Effects: Participants' Characteristics

Analyses explored whether age, gender, baseline digital literacy, or socioeconomic context moderated knowledge gains. Age: Younger adolescents (13–15) showed slightly greater absolute gains in puberty/anatomy (+29) than older teens (16–18, +24), though both groups experienced significant improvements. Conversely, older adolescents gained more in contraception and STI knowledge. Gender: Female participants had marginally higher gains in menstrual health (+26 vs. +22), but other domains showed negligible gender differences. Digital Literacy: Participants self-rated as digitally literate (e.g. "very comfortable online") had greater engagement and higher total gains (+29) compared to those less comfortable (+22), highlighting the importance of access and familiarity. Socioeconomic Context: Urban adolescents exhibited slightly higher engagement rates but similar knowledge gains compared to

semi-urban peers suggesting the intervention's adaptability across settings, given equitable access to devices and connectivity.

These moderating findings emphasize the need for nuanced adaptation: tailoring content to younger audiences' developmental stage (e.g. puberty topics simplified for younger ages), proactively supporting digitally less confident adolescents (e.g. guided tutorials), and ensuring equitable access to resources. The consistency across urban and semi-urban groups is encouraging, but points to the importance of infrastructure support.

### **3.5. Qualitative Insights: Engagement, Relevance, and Barriers**

Focus group discussions and open-ended survey responses ( $n = 30$  participants) revealed rich insights. Engagement Motivators. Adolescents reported that content that mirrored their language, culture, or aesthetics (e.g., local influencers, regional dialect, relatable scenarios) made information feel "real," "not awkward," and "actually helpful." One participant shared: "When I saw girls talking about getting their period exactly like my group of friends, I paid attention it felt like they were talking to us." Credibility and Trust. Participants were more trusting of content that cited credible sources (health professionals, WHO, etc.) or visibly showed expert voices. A participant noted: "I liked when they said 'this is from a doctor at the clinic I go to,' then I felt okay to believe it." Barriers and Concerns. Several adolescents expressed concerns over privacy particularly when liking or commenting on reproductive health posts. Some avoided public interactions, preferring direct messages or anonymous submissions. In one case: "I wanted to ask about... but didn't want my friends to see it." Others flagged the stigma of being seen engaging with such content in conservative communities, suggesting private modes of access (e.g., disappearing stories, whisper chat features) may alleviate discomfort. Requested Improvements. Participants suggested adding storytelling or dramatizations to illustrate scenarios; expanding language options or subtitles; and offering offline downloadable summaries for contexts where connectivity is sporadic.

These qualitative findings enhance our understanding of what drives adolescent engagement: relatability, trustworthiness, and perceived anonymity are critical. They also highlight risks social visibility may deter interaction. Educators must ensure privacy-friendly ways to engage, incorporate localized and culturally resonant creatives, and consider low-data or offline alternatives to promote inclusivity.

### **3.6. Integration of Quantitative and Qualitative Findings**

Synthesizing the data, several integrated themes emerge: Multi-format intervention boosts knowledge most effectively: Videos, infographics, quizzes, and live formats complement each other across topics and learning styles. Engagement is key to learning: Adolescents who interacted more deeply (watched videos, did quizzes, asked questions) demonstrated larger gains showing that reach alone is insufficient. Localization and trust drive effectiveness: Content rooted in familiar social contexts and endorsed by credible sources enhances commitment to learning. Privacy-sensitive design is essential: Fear of exposure limits participation; interventions must accommodate anonymity and private engagement. Equity considerations matter: Digital literacy and access influence engagement; supportive scaffolding is needed for digitally under-resourced adolescents. Topic intricacy matters: Straightforward, factual topics are well-suited to quick formats, while complex relational topics like consent benefit from interactive dialogue.

While the study primarily targeted knowledge gains, several unintended consequences emerged: Peer sharing: Some adolescents repurposed content to educate siblings or peers, indicating potential for peer-led diffusion and wider social impact. Curiosity about services: A subset (12%) reported seeking out clinics or parental conversations after consuming content suggesting behavioral intention beyond knowledge. Misinformation confusion: Some participants reported encountering contradictory or misleading sexual health content online; comparative discussion in the Q&A sessions helped clarify and reinforce correct information. The study design's ethics approach proved effective: ensuring anonymity,

explicitly consenting guardians and adolescents, and providing access to further resources and professional support increased participant comfort and safety.

While results are robust, several limitations require acknowledgment: Short-term measurement: Knowledge was measured immediately post-intervention. Future research should assess retention over time and behavioral outcomes (e.g., health service uptake, safe sex behaviors). Self-reported engagement metrics: These may overestimate actual interaction. Incorporating backend analytics (e.g., platform data) would add precision. Cultural context specificity: Findings are grounded in the cultural and linguistic milieu of the study population; generalizing to other contexts should be done cautiously and with adaptation. Lack of active control: The control group received no intervention beyond standard education. Future studies could compare social media-based education to traditional or in-person health programs.

In summary, our study demonstrates that reproductive health education delivered through social media can profoundly enhance adolescent knowledge across key domains, across demographic groups, and with potential ripple effects beyond direct participants. The greatest effectiveness arises from multi-format, localized, and interactive content that balances accessibility with privacy. While promising, ensuring retention, translating knowledge into behavior, and scaling ethically remain vital next steps. This research provides strong empirical and practical foundations for integrating social media into adolescent public health education strategies.

#### 4. CONCLUSION

This study set out to evaluate the effectiveness of reproductive health education delivered through social media platforms in enhancing adolescent knowledge across key domains such as puberty, contraception, sexually transmitted infections (STIs), menstrual health, and consent. In an era where digital media increasingly shapes the way young people access and engage with information, this research confirms that social media can serve as a powerful and accessible tool for reproductive health education when content is well-designed, youth-centered, and culturally responsive. The findings clearly demonstrate that adolescents who received structured educational content via platforms like Instagram and TikTok exhibited significantly higher gains in reproductive health knowledge compared to those who did not receive the intervention. Not only were the overall post-test scores higher in the intervention group, but the improvements were also consistent across all knowledge domains.

Particularly notable were the knowledge gains in contraception and STI prevention areas where misinformation and stigma often prevail. This suggests that social media, when used strategically, can break down barriers to accurate knowledge and increase adolescents' confidence in managing their reproductive health. Furthermore, the study highlights the importance of content format and engagement strategies. Short-form videos, infographics, quizzes, and interactive sessions each contributed to different aspects of learning, with the most engaged participants achieving the greatest knowledge improvements. Importantly, the study revealed that trust, relatability, and privacy are central to adolescent engagement. Content that incorporated local language, culturally familiar scenarios, and input from credible sources was more likely to be trusted and shared. Likewise, adolescents valued privacy in navigating sensitive topics, suggesting the need for anonymous and stigma-free interaction features.

Qualitative insights further enriched our understanding by underscoring the role of peer influence, digital literacy, and the potential for social media to serve not only as a source of information but as a catalyst for conversation, behavior change, and community engagement. However, challenges such as varying levels of digital access, potential misinformation, and privacy concerns must be addressed in future implementations. In conclusion, reproductive health education via social media has strong potential to fill critical knowledge gaps among adolescents, especially in settings where formal education is limited or stigmatized. This approach is not a replacement for school-based or clinical education, but rather a complementary strategy that meets adolescents where they are: online. To maximize impact, future programs should invest in content development that is interactive, inclusive, and evidence-based, while also ensuring digital equity and safeguarding privacy. With thoughtful design and implementation, social media can become a transformative tool in advancing adolescent reproductive health literacy and promoting long-term health and well-being.

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