The Impact of Technology on Adolescent Sexual and Reproductive Needs

Judith Bacchus Cornelius 1,* and Jaleesa Marshay Smoot 2

1 School of Nursing, University of North Carolina at Charlotte, Charlotte, NC 28223, USA
2 Program in Public Health: Epidemiology and Health Informatics and Analytics, University of North Carolina at Charlotte, Charlotte, NC 28223, USA; jsmoot3@uncc.edu
* Correspondence: jbcornel@uncc.edu

1. Introduction

The call for articles for the International Journal of Environmental Research and Public Health Special Issue “Using mobile technology to promote adolescent sexual and reproductive health (SRH)” was proposed to identify efforts to provide adolescent SRH services during the COVID-19 pandemic. During the pandemic, adolescents experienced limited access to SRH information, an increase in intimate partner violence, disruption in maternity care, and increased involvement in risky or exploitative work [1]. mHealth interventions were developed to provide adolescent SRH across a wide range of services. In our review, we found that the widest range of mHealth interventions for adolescent SRH during COVID-19 occurred in the United States, followed by Africa, Asia, Europe, and South America. Other articles in this issue will discuss additional adolescent SRH mHealth interventions developed to reduce challenges that adolescents faced during the pandemic.

1.1. In the United States

In the United States, SRH telehealth interventions were found to increase self-efficacy with condom use [2] and were found feasible for screening for sexually transmitted infections [3]. With a focus on subgroups of adolescents, mHealth interventions targeted homeless adolescents [4], trans youth [5–7], and justice-involved youth [8]. This underscored the importance of mHealth interventions because numerous homeless and LGBTQ+ youth own a mobile phone, and many reported mental health issues, substance abuse, eating disorders, homelessness, risky sexual behaviors, and victimization during the pandemic. One mobile app, +Proud equipped families of LGBTQ+ youth to identify adaptive strategies to reduce the negative effects of stigma that many of their youth experienced [6]. When addressing pregnancy prevention for cisgender lesbian, gay, bisexual, and other sexual minority (LGB+) teens, Girl2Girl was a mHealth intervention found to be associated with higher rates of condom use and intentions to use birth control during the pandemic [7]. Justice-involved youth were especially vulnerable to risky sexual behaviors and mental health issues during the pandemic. Snow-hill et al [8] tested and adapted the PHAT-Life intervention with juvenile justice staff and found that this intervention could be sustained within the justice system setting.

With social media platforms, Snap Chat was found to be a promising way to distribute SRH educational materials during COVID. Of the 236 hospitalized teens who received a Snap Chat access code to SRH information, almost half accessed the site after being discharged from the hospital [9]. Friendship networks were also examined during the pandemic. The Grindr mobile phone app was found to be promising in getting adolescents diagnosed with syphilis and gonorrhea to identify others in their friendship networks who could be infected when compared to individual sexual contacts [10]. SIHLEplus was an intervention delivered via telemedicine to African American girls who lacked access to drug and sexual risk-taking prevention programs in urban areas. The intervention...
demonstrated usability and acceptability with drug prevention and in reducing sexual risk-taking behaviors during the pandemic [11]. Wilkinson et al. [12] found that telephone and video platforms were well suited to providing SRH care during the pandemic. They recommended that health care providers use an algorithm to address all possible SRH concerns during a pandemic.

1.2. In Africa

During the pandemic, the Inthistogether mHealth pregnancy prevention program was found to be feasible and acceptable with the delivery of 5–11 text messages per day for 8 weeks to Ugandan youth [13]. WhatsApp was used to deliver the mHealth peer supported intervention, Interactive transition support for 15 to 19 year-old adolescents living with perinatally acquired HIV (InTSHA) in South Africa [14]. The 4 Youth by Youth mHealth photo verification app for self-texting was found to be feasible by Nigerian youth [15]. Text messaging was recommended to provide family planning information to adolescent and young adult women in Sierra Leone [16]. In Zambia, the Insake mobile phone app provided support to pregnant women living with HIV [17]. An average of 169 text messages were sent per user.

1.3. In Asia

In India, the artificial intelligence app, SnehAl Chatbot, was found to be innovative in engaging hard-to-reach populations with sexual health topics [18]. During this time, the HIV Info Corner app was developed for Indonesian youth [19]. After further evaluation, the HIV Info Corner app was found to have major and minor problems that were addressed.

1.4. In Europe and South America

In Italy, the need for abortion services increased during the pandemic. Brandell et al. [20] found that telemedicine was an alternative way to provide women access to abortion services. In Brazil, telemedicine services increased with the launch of the PrEP 1519 demonstration program [21]. Participants were recruited on social media sites, hook-up apps, word of mouth, and using the Amanda Selfie AI chatbot. Social and mental health services were added to allow for more comprehensive health care [21].

2. Conclusions

In many countries, there was a proliferation of mHealth technology to ensure that adolescents received SRH, mental health, and drug prevention information during the pandemic. The authors in our special issue will highlight innovative strategies that they used to meet adolescents’ SRH needs during COVID-19. We believe that these articles will challenge traditional paradigms about health promotion during a pandemic.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. World Health Organization. WHO Director-General’s Opening Remarks at the Media Briefing on COVID-19—11 March 2020. Available online: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020 (accessed on 18 June 2022).

2. Saragi, D.; Tonapa, S.; Porta, C.; Lee, B. The effects of telehealth interventions for adolescent sexual health: A systematic review and meta-analysis of randomized controlled studies. J. Telemed. Telecare 2021, 21, 2006. [CrossRef] [PubMed]

3. Gogineni, V.; Waselewski, M.; Jamison, C.; Bell, J.; Hadler, N.; Chaudhry, K.; Chang, T.; Mmeje, O. The future of STI screening and treatment for youth: A national survey of youth perspectives and intentions. BMC Public Health 2021, 21, 2006. [CrossRef] [PubMed]

4. Lal, S.; Halicki-Asahawa, A.; Fauvelle, A. A scoping review on access and use of technology in youth experiencing homelessness: Implications for healthcare. Front. Digit. Health 2021, 3, 782145. [CrossRef] [PubMed]
5. Silva, C.; Fung, A.; Irvine, M.; Ziabakhsh, S.; Hursh, B. Usability of virtual visits for the routine clinical care of trans youth during the COVID-19 pandemic: Youth and caregiver perspectives. *Int. J. Environ. Res. Public Health* 2021, 18, 11321. [CrossRef] [PubMed]

6. Bourdon, O.; Rossi, M.; Larocque, O.; Jacmin-Park, S.; Sansfacon, A.; Ouellet-Morin, I.; Juster, R. Proud: A mobile application to empower LGBTQ+ youth and their family. *Sante Ment. Que.* 2021, 46, 229–249 PMID: 34597496. [CrossRef] [PubMed]

7. Ybarra, M.; Price-Feeney, M.; Prescott, T.; Goodenow, C.; Saewyc, E.; Rosario, M. Girl2Girl: How to develop a salient pregnancy prevention program for cisgender sexual minority adolescent girls. *J. Adolesc.* 2020, 85, 41–58. [CrossRef] [PubMed]

8. Snow-hill, N.; Donenberg, G.; Feil, E.; Smith, D.; Floyd, B.; Leve, C. A technology-based training tool for a health promotion and sex education program for justice-involved youth: Development and usability study. *JMIR Form. Res.* 2021, 5, e31185. [CrossRef] [PubMed]

9. Mehta, S.; Porada, K.; McFadden, V. Did you get my snap? Snapchat as a health education tool for hospitalized adolescents. *J. Adolesc. Health* 2020, 68, 411–413. [CrossRef] [PubMed]

10. Rosenbaum, J.; Jennings, J.; Jonathan, E.; Borkovic, L.; Scott, J.; Wylie, C.; Rompalo, A. Contact tracing through friendship groups identifies additional syphilis and gonorrhea cases. *BMC Public Health* 2020, 20, 1526.

11. Lopez, C.; Gilmore, A.; Moreland, A.; Danielson, C.; Acierno, R. Meeting kids where they are at—a substance use and sexual risk prevention program via telemedicine for African American girls: Usability and acceptability study. *J. Med. Internet Res.* 2020, 22, e16725. [CrossRef] [PubMed]

12. Wilkinson, T.; Kottke, M.; Berlan, E. Providing contraception for young people during a pandemic is essential health care. *JAMA Pediatr.* 2020, 174, 823–824. [CrossRef] [PubMed]

13. Ybarra, M.; Agaba, E.; Chen, E.; Nyemara, N. Iterative development of In This together, the first mHealth HIV prevention program for older adolescents in Uganda. *AIDS Behav.* 2020, 24, 2355–2368. [CrossRef] [PubMed]

14. Zanoni, B.; Archary, M.; Sibaya, T.; Goldstein, M.; Bergman, S.; Denton, D.; Cordero, V.; Peng, S.; Psaros, C.; Marconi, V.; et al. Mobile phone-based intervention among adolescents living with perinatally acquired HIV transitioning for pediatric to adult care: Protocol for the interactive transition support for adolescents living with HIV using social media (InTSHA) study. *JMIR Res. Protoc.* 2022, 11, e5455. [CrossRef] [PubMed]

15. Oladele, D.; Iwelunmor, J.; Gbajabiamila, T.; Obiezuz-Umehe, C.; Okwuzu, J.; Nwaozuru, U.; Musa, A.; Idigbe, I.M.; Tahlil, K.; Tang, W.; et al. The 4 youth by youth mHealth photo verification app for HIV self-testing in Nigeria: Qualitative analysis of user experiences. *JMIR Form. Res.* 2021, 5, e25824. [CrossRef] [PubMed]

16. Chukwu, E.; Gilroy, S.; Addaquay, K.; Jones, N.; Karimu, V.; Garg, L.; Dickson, K. Formative study of mobile phone use for family planning among young people in Sierra Leone: Global systematic survey. *JMIR Form. Res.* 2021, 5, e23871. [CrossRef] [PubMed]

17. Simpson, N.; Kydd, A.; Phiri, M.; Mbewe, M.; Sigande, L.; Gachie, T.; Ngobeni, M.; Monese, T.; Figeroza, Z.; Schlesinger, H.; et al. Insaka: Mobile phone support groups for adolescent pregnant women living with HIV. *BMC Pregnancy Childbirth* 2021, 21, 663. [CrossRef] [PubMed]

18. Wang, H.; Gupta, S.; Singhal, A.; Muttreja, P.; Singh, S.; Sharma, P.; Piterova, A. An artificial intelligence chatbot for young people’s sexual and reproductive health in India (SnehAL) Instrumental case study. *J. Med. Internet Res.* 2022, 24, e29969. [CrossRef] [PubMed]

19. Lindayan, L.; Bhakti, P.; Darmawati, I.; Tarjudy, T. Usability and usefulness of a mobile health app for HIV prevention among adolescents in Indonesia. *Creative Nurs.* 2021, 27, 201–208. [CrossRef]

20. Brandell, K.; Vanbenschoten, H.; Parachini, M.; Gomperts, R.; Gemzell-Danielsson, K. Telemedicine as an alternative way to access abortion in Italy and characteristics of requests during the COVID-19 pandemic. *BMJ Sex. Reprod. Health* 2021, 1–7. [CrossRef] [PubMed]

21. Dourado, I.; Magno, L.; Soares, F.; Massa, P.; Nunn, A.; Dalal, S.; Grangeiro, A.; The Brazilian PrEP 1519 Study Group. Adapting to the COVID-19 Pandemic: Continuing HIV prevention services for adolescents through telemonitoring. *Brazil. AIDS Behav.* 2020, 24, 1994–1999. [CrossRef] [PubMed]