The use of technology in the sexual health education especially among minority adolescent girls in the United States

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Abstract

Purpose of review—The purpose of this review is to examine current sexual health education technologies for adolescents and identify gaps in knowledge. Disparities in sexual health education are prominent and mainly affect young women of color. As a result, the use of technology to reach these marginalized populations could potentially invoke change. Thus, it is crucial to determine the viability of technology as a mechanism to bridge the knowledge gap regarding sexual health for adolescents that are most at risk of sexually transmitted infections and unwanted pregnancies.

Recent findings—With a lack of standardized, evidenced-based sexual health education programs in the United States, the future of comprehensive sexual health education is moving toward smartphone apps. Many sexual health technologies exist that target adolescents, most of which have been proven to demonstrate positive effects. Use of mobile apps, especially for vulnerable populations, can be more effective because of privacy and widespread dissemination.

Summary—Ultimately, more research needs to be conducted to determine the most effective content for these sexual health apps. Additionally, more research should be conducted on effective sexual health apps for marginalized populations to determine whether technology is a viable solution.

Keywords

adolescents; marginalized youth; mobile health; sex education

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INTRODUCTION

Adolescents in general are at increased risk for poor sexual health-related outcomes compared with any other age and sex group in the United States. In 2016, adolescents aged 13–24 accounted for approximately two-thirds of the newly diagnosed sexually transmitted infections (STIs) and 21% of the new HIV diagnoses among men and women under age 25 [1]. In the same year, 210000 babies were born to adolescent mothers (aged 15–19). Behaviors that increase susceptibility for adolescent women include limited maternal education achievement and having a mother who gave birth before the age of 20 [2■]. Social determinants of health have been fundamental in understanding additional risk factors for teen pregnancy, such as being from a single-parent home, living in a home with frequent family conflict, early sexual activity, level of participation in volunteer or community service work, and low self-esteem [2■,3,4■■]. These risky behaviors are most salient for African-American and Latina adolescent women (i.e., young women of color; YWOC) who experience worse sexual health-related outcomes compared with all other adolescent sub-groups in the United States [5].

Sexual and reproductive health disparities among YWOC are pronounced. YWOC represent a disproportionate percentage of HIV infections [6], and although average birth rates of teenage women in the United States are down to 2.03%, this percentage increases to 2.93 and 3.19% for African-American and Hispanic teenagers, respectively [7]. YWOC would greatly benefit from improved sexual health education. Unfortunately, they are less likely to have medical homes and receive such preventive services [8]. Thus, finding alternative, developmentally appropriate and culturally relevant methods to communicate sexual health information is necessary.

Sexual health education programs can provide information and support to improve knowledge, attitudes, and behaviors related to sexual and reproductive health. Research findings indicate adolescents prioritize confidentiality and accessibility over medical accuracy, two factors that are not likely to be present in a clinical environment that frequently demands parental involvement. There are studies that demonstrate how health technology tools are acceptable to teens and may be the preferred mode of sexual health education [9■■,10■■]. Mobile health (mHealth)-based sexual education has the potential to facilitate the delivery of comprehensive sexual education that is culturally relevant and easily accessible – both of which are key facets to improving sexual health-related outcomes among adolescent women in the United States. Our aim of this review is to synthesize recent literature regarding the potential of technology, and how to effectively harness it, in providing sexual health education to adolescents, especially minority girls within the United States.

SEXUAL EDUCATION IN THE UNITED STATES

According to the Centers for Disease Control and Prevention (CDC; 2014), the average time allocated for sexual health education is 7h in elementary school, 16 h in middle school, and approximately 20 h of formal instruction on sexual and reproductive health-related topics were received in high school. Notably, 80.4 and 74.7% of school districts allow elective

exclusion in middle school and high school, respectively [11]. Additionally, Lindberg *et al.* [12] found an overall decline in receipt of formal sex education between 2006 and 2013, further warning that growing gaps could leave teenagers without the necessary instruction in the avoidance of risky sexual behaviors. Furthermore, despite the fact that 3.4% of teens have had intercourse by 13 years of age, 36.2% by 10th grade, and 57.3% by 12th grade [13], limited time is allocated for sexual health education in the classroom. Yet, it is evident that by the time students receive extensive sexual health education, in high school, many have already become sexually active.

Structural factors are barriers to the widespread implementation of standardized, evidence-based sexual health education programs for adolescents in the United States [14■]. Federal funding for sexual education programs continues to support abstinence only until marriage curricula yet, studies have shown this model to be ineffective [5]. In addition, state-level funding for sexual health education varies by state, and only 13 states mandate medically accurate instruction, eight require inclusivity of sexual orientation, and eight ensure the elimination of racial or sex bias within the curriculum [14■]. The lack of time allocated to classroom-based sexual health education, and the structural factors that inhibit attainment of knowledge of sexual health in classroom settings warrant interventions that are informative, easily accessible, and readily accepted by adolescents. Thus, it is imperative that other strategies are developed to provide information and access to sexual health resources for adolescents outside of academic settings.

TECHNOLOGY AND SEXUAL HEALTH EDUCATION

Although the number of formal sex education programs has declined across the United States in recent years, there has also been a corresponding decline in adolescent birth rates and increased contraceptive use [14■,15]. It has been suggested that improvements in sexual health-related outcomes among adolescents may be attributed to the rise of technology and the increased access to information that comes with increasingly mobile knowledge platforms. Approximately 95% of teens in the United States own or have access to a smartphone, and 45% of teens say they are online constantly [16].

As the need to provide more comprehensive sexual education to adolescents grows, new platforms have arisen that have been shown to be efficient and accurate modes of information. One such avenue is the rise of technology-based interventions alternatively referred to as electronic health, mHealth, or digital media; these programs tend to center around technology such as computers, smartphones, or text messaging [17■■]. Unlike more traditional, formal sexual education approaches, incorporating more technology-based interventions could allow for larger impacts as a result of larger audiences at a relatively low cost, increased privacy for teens, and more flexibility in tailoring messages toward specific populations [17■■]. As technology becomes a dominant factor in adolescent lives, it is imperative to consider the use of new media in the realm of sexual health education.

There are various uses of technology for adolescents seeking sexual health information or tools to aid in their reproductive health. Two common implementations of technology that have emerged include the use of text messages and both mobile and computer applications.

Text messaging has become a common mode of health communication because it is immediate and convenient. Combined with the anonymity it provides to adolescents, incorporating text messages in interventions has become popular to communicate about sexual health topics. Text messages have been used to increase access to sexual health care within the adolescent population; a study called SEXINFO directed patients to local clinics via text, and approximately 11% of clinic patients had found the clinic via the text messaging program by the end of the study [18]. Another texting program called 'Text in the City' allowed teens to ask anonymous questions regarding sexual health to a reliable source. In a 6-month evaluation of the program, 500 questions were sent, with the majority of questions regarding the correct use of birth control [19].Yet another program centering around short message service text messages is Adolescent/Youth Reproductive Mobile Access and Delivery Initiative for Love and Life Outcomes study, which is a platform that is designed to provide essential facts and address misconceptions about sexual and reproductive health issues among youth such as puberty, sex and pregnancy, and contraception [20]. Clearly, numerous interventions involving text messaging have been created to educate adolescents on sexual health issues and have demonstrated positive results.

Online sites and mobile phone applications promote sexual health education to adolescents and provide tracking functions directed toward sexual and reproductive activities. These applications tend to only reinforce sex stereotypes and do not necessarily contribute to the promotion of healthy behaviors. On the other hand, some applications work to increase sexual health education and promote healthy behaviors. One such smartphone app is Girl Talk; this app directed toward adolescent girls aimed to improve knowledge on reproductive health issues [11]. Through a prospective study, researchers found that the reported usefulness of Girl Talk as a sexual health application increased significantly and knowledge improved most in topics such as anatomy and physiology and STI prevention [11]. Although most participants (76.5%) stated that they had been previously exposed to sexual health information, 94.1% of participants stated that Girl Talk provided new information than outlined in health class [11]. Another recent study by Mesheriakova and Tebb [21■■]showed that an iPad-based application was also effective at increasing fund of knowledge in girls 12–18 with increases of 10% on the average on baseline sexual health knowledge assessment. This suggests that applications that are directed toward a particular audience and provide comprehensive, accurate information can be successful in increasing awareness among adolescents.

Although much has been written on existing technologies that involve sexual and reproductive health education, few analyses exist on the efficacy of these programs. A study that compared the time to treat Chlamydia using normal communication methods (phone or clinic visit) versus text messaging found that individuals notified by text were diagnosed and treated faster [22]. One meta-analysis conducted found positive effects of computer-based programs on improving sexual health knowledge, safer sex, and safer sexual behavior among both adolescents and adults [23]. Another meta-analysis that focused on new media interventions for increasing condom use and STI testing found that these interventions produced the largest effect when targeting female adolescents [24]. A recent meta-analysis analyzing the effects of technology-based sexual health interventions among youth found

significant effects on condom use and abstinence, alongside greater effects in increasing sexual health knowledge and safer sex norms and attitudes when comparing control groups to intervention groups [17■■]. Ultimately, technology-based interventions have been demonstrated to have positive effects especially when targeted and tailored toward specific populations; however, challenges that have arisen with these programs involve the gradual decrease in effect over time alongside the lack of standardization in design features and identification of specific behavioral change techniques that prove effective [17■■].

USE OF MOBILE HEALTH TO ADDRESS HEALTH DISPARITIES

The use of mHealth technology is a promising method to address sexual and reproductive health disparities among YWOC. In total, 95% of adolescents report owning or having access to a smartphone [25■]. And unlike other technology media (e.g., computers), no differences in smartphone ownership across race/ethnicity or sex were found; suggesting that mHealth applications (mHealth apps) may be a superior technological method to disseminating sexual health information [25■,26]. Teens of color have suggested that social media apps similar to Facebook, Instagram, and Snapchat, should be used to provide information about reproductive and sexual health [27]. Further, girls compared with boys and teens of color compared with their white peers were more likely to report being online "constantly" [25■]. Compared with their white peers, YWOC are more likely to report going online via their smartphone compared with their white peers [26]. Girls are also more likely to report seeking sensitive health information, including information about sexual and reproductive health, online [26]. mHealth apps have been used to improve the sexual and reproductive health outcomes of teens of color, including YWOC. SEXINFO was a text messaging service which provided mobile access to information on STIs, HIV, birth control, and other sexual and reproductive health services [26]. There was a positive association between engagement in the mHealth app and reductions in sexual health risk [26]. Unfortunately, there is a paucity of mHealth initiatives to improve sexual health education for YWOC and teens of color. A systematic review of mHealth apps targeting reproductive health knowledge and pregnancy prevention revealed only two apps were specific to teens of color and only one app was specific to girls [28■■].

CONCLUSION

Digital health technologies are more easily disseminated and implemented, and have higher efficacy and greater engagement compared with traditional behavioral interventions [29]. Additionally, using technology offers the advantage of privacy, particularly for groups - including YWOC - who have been stigmatized around sexual health. Given prior research, there is great potential in leveraging digital health technologies, especially mHealth apps, to address sexual and reproductive health disparities in YWOC through education and behavioral intervention. However, there remains a gap in health technology utilization to improve sexual health education and more generally, sexual and reproductive health among YWOC. Thus, future research may consider focusing on the development of mHealth apps tailored to YWOC who are heavily burdened from poor reproductive outcomes.

Acknowledgments

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■ of special interest

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KEY POINTS

- Sexual health education within classrooms is still lacking, with many curricula still highly stigmatizing adolescents while promoting sex stereotypes. The need for more widespread and easily accessible sex education is prominent and can potentially be provided through technology.

- Various forms of technology exist in the realm of sexual health, primarily through mobile and computer applications. These applications have been found to have positive effects on certain aspects of adolescent sexual health; however, more research needs to be conducted on the most effective content presented through these applications.

- Technology can be a powerful tool to educating marginalized populations on sexual health issues, because it presents a more private and confidential learning experience, more research should be done investigating if there is a significant effect on developing applications specifically targeted to YWOC (those most affected by sexual health disparities).