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Impact of reproductive health intervention on awareness of sexual and reproductive health service among adolescents in the Greater Accra and Eastern Regions of Ghana

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Abstract

Objective This study used the Knowledge and Access Power (KAP) mobile platform to assess the awareness and knowledge of sexual and reproductive health (SRH) among adolescents in the Greater Accra and Eastern Regions of Ghana.

Methods A mobile application, referred to as the KAP app was designed to assess SRH awareness and knowledge. To evaluate SRH awareness and knowledge among adolescents, an invitation to download and access the mobile application was sent via social media platforms, including Twitter, Facebook, and WhatsApp. A total of 386 adolescents downloaded the app and attempted the pre- and post-module quizzes.

Results From the quiz participation snapshot data, users attempted 1,040 quizzes. Descriptive statistics revealed that the overall average score received on SRH before completing the learning modules was 67.98 (SD = 26.597), while the overall average score gained on SRH after completing the learning modules was 73.66 (SD = 25.142). The pre- and post-module SRH scores were compared using a paired samples t-test, and the results showed a statistically significant difference between the two sets of scores [t(182) = -2.58, $p = 0.010$]. Based on these findings, using the KAP app can help increase SRH knowledge among teenagers.

Keywords Adolescent, Electronic healthcare, Mobile health intervention, Reproductive health, Sexual health

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Background

Adolescents in low- and middle-income countries face significant unmet sexual and reproductive health needs, including access to accurate information, contraception, sexually transmitted infections (STI) treatment, and menstrual hygiene support [1–3]. Physical, financial, and geographical barriers limit their ability to access sexual and reproductive health (SRH) services. Social stigma, misinformation, and inadequate provider capacity further discourage adolescents from seeking care. Additionally, limited parental support and disrespectful treatment at health facilities compound the challenges, leaving many young people underserved [4].

Adolescence is a period of both opportunities and risks that forms a vital stage of the transition between childhood and adulthood [1]. Aside from the opportunities, it is a risky period because this stage is characterized by physiological, psychological, and social changes that, when unguided, expose adolescents to risky SRH behaviours such as engaging in unprotected sex that exposes them to unwanted pregnancy, unsafe abortion, teenage pregnancy, early marriage, STI and HIV/AIDS [2, 3].

Sexual and Reproductive Health and Rights (SRHR) is primarily incorporated in the SDGs under Goal 3 (target 3.7) and Goal 5 (target 5.6). Target 3.7 states: "By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes". Across sub-Saharan African countries, adolescents experience structural, health facility, community, interpersonal, and individual-level barriers and facilitators to accessing and utilizing SRH services [14–15]. Furthermore, in sub-Saharan Africa (SSA), a high need for SRH services is documented among youth aged 10–24 years [2, 4]. The inability of SRH services in SSA to meet the needs of the youth is associated with high rates of STIs, HIV, unsafe abortion, and unintended pregnancies. For instance, Saul et al. [5] reported that more than half of the new HIV infections in SSA occur among young people aged 15–24 years.

Although the Government of Ghana, through the Ministry of Health and other stakeholders, has made considerable efforts in the provision and utilization of SRH, adolescents' knowledge and utilization of these services are limited [16]. This is evident with poor outcomes of SRH issues among adolescents, including unwanted pregnancy, unsafe abortion, and risks of STIs/HIV. According to the Ghana Health Service District Health Information Management Health System (DHIMS) between 2016 and 2020, Ghana recorded 542,131 pregnancies among adolescent girls aged 15–19 years and 13,444 pregnancies amongst young teenagers aged 10–14 years [6]. Not only are these figures high and cause for concern, but they also have lifetime ramifications for the life, health, wealth, and well-being of the adolescents, their children, families, communities, and the country at large. This problem can be linked to limited access to unmet needs of comprehensive contraception care and education among adolescents.

Mobile platforms are increasingly used to deliver SRH education and services to young people in low- and middle-income countries (LMICs). Most LMICs have attained rapid expansion of cell phone ownership and mobile phone penetration, characterized by high usage among younger populations [7, 8]. The existing solutions aimed at addressing this gap are more abstinence-focused, which do not ensure the anonymity of users and do not motivate the appropriate use of contraceptives among adolescents. This study utilized a mobile platform service to advance these priorities by providing adolescents with access to comprehensive contraception care and education. This innovation sought to address some of the priorities stated in Ghana's 2020 Adolescents Health Service Policy and Strategy (AHSPS). Our innovation piloted and advanced some of the AHSPS priorities by providing access to comprehensive contraception care and education among adolescents. Our project built a Knowledge and Access Power (KAP) mobile platform as part of a suite of programs to assess and promote the awareness of sexual and reproductive health services among adolescents in the Greater Accra and Eastern Regions of Ghana. To test the utility of the KAP platform, we incorporated both pre- and post-quizzes. For this study, our objective is to report the potential contribution of the KAP app in assessing and promoting SRH knowledge.

Methods

Study design

This study employed a quasi-experimental cohort design with pre- and post-intervention assessments, conducted in three phases. The first phase involved the co-creation and development of a stakeholder-driven SRH mobile platform, referred to as the KAP app. The second phase consisted of a baseline assessment of adolescents' SRH knowledge and service uptake. The third phase evaluated the KAP app's impact by comparing pre- and post-module quiz scores, assessing awareness, usage, and the delivery interface for reproductive health products.

Study participants

This study was conducted among male and female adolescents recruited on social media platforms. Participants were included in the study based on the following criteria: adolescents between the ages of 10 and 19 years, self-reported sexual activity in the past six months, willingness and ability to provide written informed consent

Table 1 A paired samples t-test analysis of the pre-and post-module quizzes

Variable	Obs.	Mean	Std. err.	Std. dev.	95% confidence interval	
					Lower	Upper
Before	183	67.97814	1.966145	26.59752	64.09877	71.85751
After	183	73.6612	1.858559	25.14212	69.99411	77.3283
diff	183	-5.68306	2.206055	29.84296	-10.0358	-1.33033
mean(diff) = mean (before - after) t = -2.5761						
H0: mean(diff) = 0 Degrees of freedom = 182						
Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha: mean(diff) > 0						
Pr(T < t) = 0.0054 Pr(|T| > |t|) = 0.0108 Pr(T > t) = 0.9946						

electronically via the secure mobile-based platform to participate in the KAP project, and access to an internet-enabled Android or iOS smartphone device.

Setting

Awareness of the mobile app was created using social media platforms (e.g., WhatsApp, Facebook, TikTok, Telegram, Twitter, Instagram), with eligibility criteria as adolescents aged 10–19 residing in the Greater Accra and Eastern Regions. The mobile app collected basic information on all adolescents who signed up for the first time. This information includes knowledge of SRH. All the mobile users participated in the impact evaluation exercise. The intervention lasted from August 2022 to January 2023. This entails asking adolescents questions on awareness, uptake, acceptability, and user satisfaction.

Measures

Outcome variable

The outcome variable in the study was SRH quizzes. During the survey, the pre-and post-module scores were stored in the KAP app. The study had no socio-demographic characteristics. The focus was on the pre- and post-module scores irrespective of socio-demographic variations.

Knowledge and access power (KAP) mobile application description

The KAP app was developed using Android and IOS software. The app was a gamified learning and engagement platform that enabled adolescents access to comprehensive contraception care and education. Additionally, the learning component of the app features gamified, easy-to-consume content, including write-ups and quizzes. The quizzes feature allowed users to invite others to a competitive contest. Winners earned redeemable badges (i.e., airtime, internet data) to incentivize users. The app had a QR location and notification feature that drives users to specific events where comprehensive contraception care and education are available and where contraceptives are sold to boost contraceptive use confidence. The app's features include the use of pseudonyms to protect users' data security and privacy rights. English was the sole language used for the SRH information on the app.

We added monitoring and measurement tools, such as quizzes and module participation snapshots to the app to enable tracking and evaluation of theimpact of the KAP project. As a result, we could monitor the total number of users logged into the platform and the percentage of users who subscribed to individual modules and participated in quizzes. The data collection system stored pre- and post-module quiz scores to determine whether there were significant changes in the awareness and knowledge of SRH. This allowed the app's effect to be measured in terms of adolescents' knowledge of SRH. A pilot study was conducted to identify flaws in the questions and modify them where necessary.

Data analysis

Data analyses were conducted using Stata software version 17.0 (StataCorp, College Station, Texas, USA). We used a histogram to visualize the distribution of scores before and after taking the intervention, offering insights into its spread, and shape. We conducted a paired samples t-test analysis to determine the magnitude of change resulting from the KAP app.

Results

Of the 386 people who downloaded the KAP app and attempted the pre- and post-module quizzes, only 183 completed the learning modules and had both pre- and post-test scores, meeting the data requirements for a paired samples t-test. Descriptive statistics revealed that the overall average score received on SRH knowledge before completing the learning modules was 67.98 (SD = 26.59), while the overall average score gained on SRH knowledge after completing the learning modules was 73.66 (SD = 25.14). The pre-module and post-module scores were compared using a paired samples t-test, and the results showed a statistically significant difference between the two sets of scores [t(182)=-2.58, $p = 0.0108$] (Table 1) .

Discussion

The findings of this study showed that the KAP app improved adolescents' awareness and knowledge of SRH. There was a significant difference in the pre-intervention and post-intervention scores, showing that using the KAP app among adolescents increases their knowledge of SRH. Our study finding is consistent with several other findings that used mobile phone interventions to improve young people's knowledge of contraceptive use. For example, a study conducted in Uganda revealed that mobile phone applications increased SRH knowledge scores, access to contraceptives, and voluntary testing and counselling for HIV and STI diagnosis and management among university students [11]. Another study conducted in Kenya using a data-based MHealth intervention app revealed a statistically significant difference in the total knowledge scores in the intervention group compared with the control group [10]. There was a significant improvement in the level of knowledge on abstinence and condom use from a mHealth application [10]. Our finding is also comparable to a study conducted in Nicaragua that used TeenSmart International's interactive intervention for rural and marginalized adolescents (14–17 years), which had encouraging effects [9]. The short-term e-learning program used quizzes, videos, and infographics to increase SRH knowledge, behaviours, abilities, and motivation. They further found that the intervention group scored 8.1% higher on SRH knowledge after the study compared to those in the control group, with increases found in knowledge of STIs, condom usage, pregnancy, abstinence, AIDS, and inappropriate relationships [9].

The current study findings could guide future strategies to improve SRH services' access to and utilization among adolescents in Ghana and SSA, thereby protecting them from unintended pregnancies and unsafe abortions. This is because studies have shown that improving the knowledge of SRH and the use of contraceptives lowers the number of unintended births among people [9–11]. In line with the findings of this study, it is critical to raise knowledge of the benefits of modern contraception and empower adolescents to make their own decisions about contraceptive services. Given that several studies, including ours, have found that mHealth is beneficial in increasing SRH service use [10, 12, 13], mHealth might be used in future SRH efforts to increase awareness, accessibility, and uptake of SRH services nationwide. It is advised to use mobile devices in SRH interventions for adolescents due to their ability to ensure privacy and reach underserved populations, incorporating mobile devices into SRH interventions among young people.

Limitations and strengths

The study's strength lies in its mobile platform, which breaks the barrier to accessing comprehensive contraception care and education among adolescents in Ghana. This study was limited to only two regions in Ghana, with a sample size of 183 adolescents. Therefore, the findings might not be generalizable to the entire population of adolescents in Ghana. Adolescents who were not active on any social media platform were excluded. Additionally, the study did not collect information on the socio-demographic characteristics, which does not allow us to know the variation of the module learning scores by socio-demographic characteristics. Furthermore, it is challenging to separate the scores obtained based on questions regarding awareness, acceptability, and user satisfaction. This is because the section of the questions does not disaggregate the scores answered.

Conclusion

Our findings reveal that using the KAP app among adolescents increases their knowledge of SRH. We recommend scaling up the KAP app across other parts of Ghana to improve SRH knowledge to prevent unwanted pregnancies and unsafe abortions.

Author contributions

RGAT, PA, TAT, WA, and JJO co-developed the study concept and design. All authors collected the data used in this analysis. AA and IY conducted the data analysis. RGAT secured funding for the study. All authors contributed to the writing, review, and editing of the manuscript. All authors read and approved the final manuscript.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles outlined in the Helsinki Declaration. Ethical approval was obtained from the Ghana Health Service Ethics Review Committee with approval Number GHS-ERC 012/01/22. Informed consent was obtained from all participants aged 16 years and above. For participants under the age of 16, informed consent was obtained from a parent or legal guardian, along with assent from the adolescents themselves.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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