

IMPACT OF DIGITAL HEALTH TOOLS ON THE KNOWLEDGE OF REPRODUCTIVE HEALTH AMONG FEMALE ADOLESCENTS IN IKERE LOCAL GOVERNMENT AREA, NIGERIA

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Abstract

Reproductive health literacy is essential for improving adolescent well-being, reducing risky behaviours and enhancing informed decision-making. In many developing countries, adolescents face persistent challenges in accessing accurate reproductive health information due to cultural restrictions, stigma and inadequate school-based sexuality education. This study therefore examined the impact of digital health tools on knowledge of reproductive health among female adolescents in Ikere Local Government Area of Ekiti State, Nigeria. A descriptive survey research design was employed and a sample of 500 female adolescents was selected through purposive and non-proportionate stratified sampling techniques. Data was collected using a validated questionnaire and analysed using regression analysis and ANOVA at 0.05 level of significance. Reliability of the instrument was ensured through the use of split half method and reliability co-efficient(r) of 0.82 was obtained. Findings revealed that digital health tools have significant impact on reproductive health knowledge among female adolescents. Findings also showed that demographic factors significantly affected the use of mobile applications for reproductive health learning; older adolescents and those with higher educational attainment reported greater usage and engagement. The study concluded that digital health tools play vital role in improving reproductive health literacy among female adolescents and that demographic characteristics shape their usage patterns. Therefore, integrating digital health education into school systems and enhancing adolescent-friendly online reproductive health platforms are recommended.

Keywords: Reproductive Health, Digital Health Tools, Mobile Applications, Female Adolescents, Reproductive Health Literacy.

Introduction

Adolescence is a critical period of human development, characterised by profound physical, psychological, and social changes that significantly influence health behaviour and decision-making patterns. Reproductive health is a central component of adolescent well-being, encompassing not only

the absence of reproductive illness but also the capacity to have a safe and satisfying sexual life, access accurate information, make informed decisions about sexual activity, contraception, and prevention of sexually transmitted infections, and exercise autonomy in reproductive choices (Ugwu, et al 2022). Female adolescents are

particularly vulnerable to reproductive health challenges in developing countries, including Nigeria, due to biological susceptibility, socio-cultural restrictions, and limited access to education and health services. Reports indicate that adolescent females in Nigeria experience high rates of early sexual initiation, unintended pregnancies, unsafe abortions, and sexually transmitted infections, often resulting from inadequate reproductive health knowledge (Nmadu& Usman, 2020). Adolescents, especially females, require accurate knowledge of reproductive health to navigate the physical and social transitions of puberty. Limited access to reproductive health information can lead to risky sexual behaviours, early pregnancies, unsafe abortions and increased vulnerability to sexually transmitted infections (Nmadu& Usman, 2020).

Traditional avenues for reproductive health information, including parents, teachers, and health providers, are often insufficient due to cultural taboos, embarrassment, and inadequate training in adolescent sexual health communication. Consequently, many adolescents rely on peers, mass media, or unverified online sources, increasing the risk of misinformation and unsafe practices (Ugwu, et al 2021). This highlights the urgent need for accessible, reliable, and adolescent-friendly channels for reproductive health education. Digital health tools have emerged as promising solutions to bridge gaps in adolescent reproductive health knowledge. These tools include mobile applications, interactive websites, social media platforms, and online

counselling services, which deliver confidential, accessible, and engaging health information to adolescents (Otu et al 2021). The advantages of digital health platforms include anonymity, 24-hour access, multimedia content delivery, interactivity and the ability to personalize health education to the needs of individual users.

The researcher is of the opinion that despite the potential of digital health interventions, adoption and effective utilization are affected by demographic factors such as age and educational level. Understanding these demographic determinants is essential for designing targeted digital health interventions that are inclusive and responsive to the needs of diverse adolescent groups.

This study therefore addresses two primary objectives. First, it investigates whether digital health tools significantly enhance reproductive health knowledge among female adolescents in Ikere Local Government Area of Ekiti State, Nigeria. Second, it examines whether demographic factors, specifically age and educational level, significantly affect adolescents' use of mobile applications for reproductive health literacy. The study is expected to provide evidence-based insights that can inform policymakers, educators and health practitioners in developing effective digital strategies to improve reproductive health outcomes and empower female adolescents with the knowledge necessary to make informed and safe reproductive health decisions.

Reproductive health refers to a state of complete physical, mental, and social well-being in all matters relating to the reproductive system.

It is not merely the absence of disease but involves the ability to make informed decisions regarding sexual activity, reproduction, and the prevention of sexually transmitted infections (Ugwu, et al 2022). In Nigeria, cultural taboos and societal norms often restrict open discussions about sexuality, leading to inadequate sexual and reproductive health education both at home and in schools. Studies indicate that adolescent girls frequently rely on peers or unverified online sources, which may expose them to misinformation or unsafe practices (Ugwu, et al 2021). Ensuring that female adolescents have access to accurate, age-appropriate reproductive health information is therefore essential for promoting safe sexual behaviours and positive health outcomes.

Digital health tools have emerged as innovative solutions for addressing gaps in adolescent reproductive health knowledge. These tools include mobile applications, interactive websites, social media platforms, and online counselling services, all designed to provide accessible, confidential, and interactive health information (Otu et al 2021). Mobile health (mHealth) interventions have become increasingly relevant in Nigeria due to the widespread penetration of smartphones and internet access among young people.

The advantages of digital health platforms include 24/7 availability, anonymity, interactive content such as videos and quizzes and personalized guidance. Empirical evidence indicates that adolescents who engage with digital health tools demonstrate increased knowledge and positive attitudes toward contraceptive use, menstrual

hygiene and prevention of sexually transmitted infections (Akande et al 2024). Digital platforms also provide opportunities for remote consultation with health professionals, overcoming barriers related to stigma, inconvenient clinic hours or parental disapproval (Ihesie & Chukwuogo, 2017).

Despite these advantages, access and utilization of digital health tools are not uniform across all adolescents. Factors such as affordability of smartphones, internet connectivity and digital literacy influence the extent to which adolescents benefit from these platforms (Otu et al 2021). Understanding these constraints is essential for developing interventions that maximize the effectiveness and reach of digital reproductive health education.

Age and educational level are critical determinants of digital health tool adoption among adolescents. Older adolescents typically possess higher digital literacy, greater autonomy and enhanced cognitive ability to navigate and evaluate online health content, making them more likely to engage effectively with digital platforms (Ugwu et al 2021). Conversely, younger adolescents may experience challenges related to comprehension, limited access to smartphones, or restricted autonomy.

Educational attainment also plays a significant role in predicting usage patterns. Adolescents with higher levels of education are better able to critically evaluate the reliability of online health information, interpret complex health messages, and apply knowledge in real-life situations (Odo et al 2021). Older adolescents

tend to exhibit higher digital literacy, greater autonomy and increased confidence in using online platforms for reproductive health information compared to younger peers. Likewise, adolescents with higher educational attainment are more capable of critically evaluating online content, navigating mobile applications effectively and applying knowledge in practical contexts (Ugwu et al 2021).

Research also emphasizes the importance of demographic considerations. Agu et al (2024) reported that age and educational level significantly predict adolescents' awareness and utilization of sexual and reproductive health services in Nigeria. Younger and less-educated adolescents were less likely to use digital tools effectively, underscoring the need for age- and education-sensitive interventions. These findings highlight the potential of digital platforms for improving reproductive health knowledge while emphasizing the necessity of targeted strategies to ensure equity and inclusiveness. Studies in Nigeria and other low- and middle-income countries consistently show that age and education significantly influence adolescents' engagement with digital health tools, suggesting that interventions should be tailored to accommodate these demographic differences.

Research Objectives

The objectives of this study were to:

1. Investigate whether digital health tools significantly impact reproductive health knowledge among female adolescents in Ikere Local

Government Area of Ekiti State, Nigeria.

2. Examine whether demographic factors, specifically age and educational level, significantly affect adolescents' use of mobile applications for reproductive health literacy in Ikere Local Government Area of Ekiti State, Nigeria.

Research Hypotheses

The following hypotheses were tested at 0.05 level of significance.

1. There is no significant impact of digital health tools on the reproductive health knowledge of female adolescents in Ikere Local Government Area
2. There is no significant effect of age on the use of digital health tools for reproductive health literacy among female adolescents in Ikere Local Government Area.
3. There is no significant effect of education level on the use of digital health tools for reproductive health literacy among female adolescents in Ikere Local Government Area.

Methodology

This study adopted the descriptive survey research design to investigate the impact of digital health tools on knowledge of reproductive health among female adolescents in Ikere Local Government Area, Nigeria. The population for this study comprised all female adolescents attending public secondary schools within Ikere Local Government Area. According to the Area Education Office (2025) there are 3,517 female students enrolled in public secondary schools within the area. A

total of 500 female adolescents were selected as the sample size for this study using purposive and non-proportionate stratified sampling techniques.

Data were collected using a structured questionnaire titled *Reproductive Health and Digital Tool Usage Questionnaire (RHDTUQ)*. The questionnaire consisted of three sections. Section A was used to collect demographic information. Section B was used to collect information on reproductive health knowledge. Section C was used to collect information on the use of digital health tools, such as mobile applications, websites, and social media platforms for reproductive health information.

Face and content validity were ensured through the help of experts. A pilot study involving 20 female adolescents from a school aside the ones selected for study was conducted to assess the reliability of the instrument. The split half method of reliability was employed,

Cronbach's Alpha and Spearman Brown's formulae were used to analyse the data. A reliability coefficient of 0.82 was obtained, which means the research instrument was reliable.

Approval was obtained from the authorities of participating schools prior to data collection. Respondents were assured of confidentiality and the instrument was administered with the aid of one trained research assistant. Data collected were coded and analysed using IBM SPSS Statistics version 26. Inferential statistics of regression analysis and ANOVA were applied to test the study's hypotheses. All hypotheses were tested at 0.05 level of significance.

Results

Hypotheses Testing

Hypothesis 1: There is no significant impact of digital health tools on the reproductive health knowledge of female adolescents in Ikere Local Government Area

Table 1: Summary of Regression Analysis on the Impact of Digital Health Tools on the Reproductive Health Knowledge of Female Adolescents

Model			Unstandardized Coefficients		Standardized Coefficients	T	Sig.
			B	Std. Error	Beta		
(Constant ^a)			4.538	.081		55.740	.000
Social Media Platforms (SMP)			.922	.024	.868	38.937	.000

R=.868^a, R²=.753, Adjusted R²=.752, SEE= .44020 P-value= 0.000, a. Dependent Variable: Health Literacy (HL)

Table 1 revealed that multiple R was 0.868 which indicated high predictability. Also, the regression coefficients (0.922) for social media platform also revealed high impact. There is 86.8% contribution by social media platform to adolescent health literacy in Ikere Local

government area. This contribution is also high. The t-test calculated was found high and P-values (0.000) was less than 0.05 level of significance. Therefore, the null hypothesis was rejected. This implies that criterion variables analysed (social media platform) contribute significantly to

adolescent health literacy in Ikere Local Government Area. The regression equation derivable is given as $HL = 4.538 + 0.922 (SMP)$.

Hypothesis 2: There is no significant effect of age on the use of digital health tools for reproductive health literacy among female adolescents in Ikere Local Government Area.

Table 2: Analysis of Variance (ANOVA) on the Effect of Age on Adolescents' Use of Mobile Applications for Reproductive Health Literacy

	Sum Squares	o:df	Mean Square	F	Sig.
Between Groups	3590.302	1	3590.302	31.073	.031
Within Groups	268.810	2	134.405		
Total	3859.112	3			

$P < 0.05$ (Significant)

Table 2 revealed the effect of age on the use of mobile applications for reproductive health literacy. It was found that age was statistically significant as $df = (1, 497)$ and $P < 0.05$ at 0.05 level of significance. This led to the rejection of null hypothesis. Hence, there is a significant effect of age on the use of

mobile applications for reproductive health literacy in Ikere Local Government Area.

To determine the age group that make use of mobile application for reproductive health literacy, estimated marginal mean was computed and revealed in Table 3

Table 3: Estimated Marginal Means on the Use of Mobile Apps by Age groups

Age in years	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
13-15 yrs	3.335	.025	3.285	3.384
16-18 yrs	4.000	.029	3.942	4.058
19-21 yrs	1.747	.045	1.658	1.836

Table 3 shows that students between the ages of 16-18 years make the highest use of mobile application for reproductive health literacy in secondary schools. This was closely followed by students between the ages of 13-15 years and the least was

students between the ages of 19-21 years.

Hypothesis 3: There is no significant effect of education level on the use of digital health tools for reproductive health literacy among female adolescents in Ikere Local Government Area.

Table 4: Analysis Of Variance (ANOVA) on the Effect of Educational Level on the Use of Mobile Applications for Reproductive Health Literacy

	Sum Squares	o:df	Mean Square	F	Sig.
Between Groups	5090.782	1	3590.302	51.207	.019

Within Groups	205.888	2	102.944
Total	5296.670	3	

$P < 0.05$ (Significant)

Table 4 revealed the effect of educational level on the use of mobile applications for reproductive health literacy. It was found that educational level was statistically significant as $df = (1, 497)$ and $P < 0.05$ at 0.05 level of significance. This led to the rejection of null hypothesis. Hence, there is a significant effect of educational level on the use of mobile applications for reproductive health literacy in Ikere Local Government Area.

To determine the educational level that usually make use of mobile application for reproductive health literacy, estimated marginal mean was computed and revealed in table 5

Table 5: Estimated Marginal Means on the Use of Mobile Apps by Educational level

Educational level	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
SS 1	3.348	.049	3.251	3.445
SS 2	4.000	.037	3.928	4.072
SS 3	2.531	.040	2.453	2.610

Table 5 revealed that students in SS 2 make the highest use of mobile application for reproductive health literacy in secondary schools. This was closely followed by students in SS 1 and the least was students in SS 3.

Discussion

This study examined the impact of digital health tools on reproductive health knowledge and the effect of demographic factors on mobile application usage among female adolescents in Ikere Local Government Area, Ekiti State, Nigeria. The finding revealed that digital health tools significantly enhanced reproductive health knowledge among female adolescents in Ikere Local Government. This corroborates the assertion of Otu et al (2021) that digital tools are all designed to provide accessible, confidential and interactive health information. This finding also confirms empirical evidence by Akande et al (2024) that adolescent who engage with digital health tools demonstrate increased knowledge and positive attitudes toward contraceptive use, menstrual hygiene and prevention of sexually transmitted infections. The finding also falls in line with the view of Ihesie and Chukwuogo, (2017) that digital platforms provide opportunities for remote consultation with health professionals, overcoming barriers related to stigma, inconvenient clinic hours or parental disapproval.

The study also found that age and educational level of the adolescents, significantly affected the use of mobile applications for reproductive health literacy. Older adolescents and those with higher educational attainment were more likely to engage effectively with digital platforms. This finding aligns with the Technology Acceptance Model, which suggests that perceived ease of use and perceived usefulness of technology are influenced by users' prior experience, cognitive skills, and educational background (Ugwu et al 2021). The result also corroborates prior research indicating that adolescents with greater digital literacy and cognitive maturity are better equipped to navigate online health resources (Odo et al 2021). This finding also agrees with the assertion of Agu, et al (2024) that age and educational level significantly predict adolescents' awareness and utilisation of sexual and reproductive health services in Nigeria.

These findings have important practical implications. First, they suggest that incorporating digital health tools into adolescent reproductive health programmes can enhance knowledge, promote safe sexual behaviours and reduce the incidence of risky practices. Second, the significant role of demographic factors indicate that digital interventions should be tailored to accommodate the diverse needs of adolescents at different ages and educational levels. Policy makers and educators should ensure equitable access

to smartphones, internet connectivity and age-appropriate content to maximize the effectiveness of digital health initiatives.

Conclusion

In conclusion, this study demonstrates that digital health tools had a significant impact on reproductive health knowledge among female adolescents in Ikere Local Government Area. Age and educational level also significantly affected engagement with digital tools, emphasizing the need for tailored interventions that consider demographic differences. These findings underscore the importance of integrating digital health strategies into adolescent reproductive health programmes to improve knowledge, encourage informed decision-making and promote safe reproductive behaviours. Future interventions should prioritize accessibility, digital literacy training and content relevance to ensure that all adolescents, regardless of age or educational attainment, can benefit from technology-based reproductive health education. The study provides a foundation for policy makers, health practitioners and educators to leverage digital platforms in enhancing reproductive health outcomes among female adolescents in Nigeria.

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