

AI-POWERED HEALTH EDUCATION AND ITS INFLUENCE ON THE REPRODUCTIVE HEALTH KNOWLEDGE, ATTITUDE, AND BEHAVIOUR OF UNDERGRADUATES IN UNIVERSITY OF UYO

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Abstract

Reproductive health challenges among undergraduates in Nigeria remain a major public health concern, with high rates of unsafe sexual practices, sexually transmitted infections (STIs), and unplanned pregnancies. With advancements in digital technology, artificial intelligence (AI) presents new opportunities for interactive, personalised, and stigma-free reproductive health education. This study examined the influence of AI-powered health education on reproductive health knowledge, attitudes, and behaviours of undergraduates in the University of Uyo (Uniuyo). The study adopted a descriptive survey design with quasi-experimental features. A total of 400 undergraduates were selected through stratified random sampling across eight faculties. Data were collected using a structured questionnaire and an AI-powered health education intervention platform. Data analysis was done using frequency counts, percentages, means and t-tests. Findings of the study revealed that AI-powered health education has significant influence on the reproductive health knowledge, attitude, and behaviour of undergraduates of University of Uyo (Uniuyo). It was therefore, recommended among others that AI-powered platforms should be integrated into university health services, capacity building for educators, and stronger policy support for digital innovations in reproductive health education.

Keywords: Reproductive health, Undergraduates, Reproductive health knowledge, Attitude, Behaviour

Introduction

Reproductive health (RH) is a critical aspect of human development, particularly during adolescence and early adulthood when individuals face decisions that shape lifelong health and wellbeing (Ahmed et al., 2025). Many undergraduates fall within this age range, where curiosity, peer influence, and exposure to diverse social environments often lead to risky sexual behaviours. The consequences of poor RH knowledge, negative attitudes, and unsafe practices include unintended pregnancies, sexually transmitted infections (STIs), unsafe abortions, and psychosocial challenges (World Health Organization, 2020). Choudhury and Pant (2021) observed that many young people still engage in risky reproductive health behaviours, often due to misinformation, poor access to services, and cultural barriers. Traditionally, RH education has relied on face-to-face teaching, workshops, and facility-based counselling. However, such methods often face challenges, including limited coverage, stigma, lack of confidentiality, and insufficient engagement. Young people may hesitate to seek RH information openly for fear of being judged or misunderstood by parents, teachers, or healthcare providers (Chandra-Mouli et

al., 2018). These challenges make it necessary to seek alternative, youth-friendly platforms for RH education that can overcome cultural sensitivities and increase accessibility.

The integration of artificial intelligence (AI) in education has rapidly evolved from a novel concept into a transformative tool, with far reaching implications across multiple domains. In public health education, where the rapid dissemination and absorption of complex information are critical, the emergence of AI-powered learning platforms presents a particularly promising innovation (Gonzalez et al., 2024). These platforms, often adaptive and personalized, offer learners the opportunity to engage with content in more meaningful, interactive, and efficient ways compared to traditional teaching methods. Yet, while enthusiasm for AI in education has grown, the empirical evidence surrounding its effectiveness, particularly within the field of public health education, remains relatively limited (Okereke et al., 2021). Public health education which encompasses reproductive health, requires an intricate understanding of multidisciplinary content, ranging from epidemiology and biostatistics to health policy and behavioral sciences. Traditional pedagogical approaches often struggle to accommodate the diversity in learners' backgrounds, learning speeds, and preferred styles, leading to suboptimal engagement and learning outcomes (Ahmed et al., 2025). In contrast, AI-powered systems are designed to adapt in real-time, customizing learning experiences based on individual performance metrics. According to Wang and Wang (2024) AI platforms are capable of identifying gaps in learner understanding, adjusting the pace and depth of content delivery, and even predicting future performance based on historical engagement data. Such technological capabilities offer the potential to bridge existing gaps in public health education, particularly in large, heterogeneous classrooms or remote learning contexts.

Artificial intelligence (AI) is increasingly being applied in healthcare to provide personalized, interactive, and accessible information (Okanlawon et al, 2025). AI-powered health education tools, such as chatbots, mobile applications, adaptive e-learning platforms, and virtual counselling systems, offer opportunities to reach students in private, non-judgmental, and engaging ways. These tools can deliver round-the-clock access to reliable RH information, answer questions anonymously, and adapt messages to the learner's knowledge level and behavioural needs (Nguyen et al., 2022). Evidence from pilot studies indicates that AI-powered platforms can improve sexual health knowledge, foster positive attitudes, and encourage healthier behaviours among young people (Burgess et al., 2021; Sharma et al., 2021).

Despite these promises, there remains limited empirical evidence on the effectiveness of AI-powered health education in Nigeria, particularly in university contexts. Most available studies come from developed countries or small pilot projects in urban areas, leaving a gap in understanding how AI can influence reproductive health knowledge, attitudes, and behaviours in African tertiary institutions (Munoz et al., 2019). Furthermore, little research has examined how students at UNIUYO perceive and benefit from such technologies, especially given the unique sociocultural and digital literacy landscape of Akwa Ibom State. Therefore, this study seeks to investigate the influence of

AI-powered health education on the reproductive health knowledge, attitudes, and behaviours of undergraduates in University of Uyo (UNIUYO).

Theoretically, the study is anchored on Knowledge–Attitude–Behaviour (KAB) model developed by Everett M. Rogers in 1962, and Health Belief Model (HBM) by Rosenstock and Hochbaum in the 1950s. The KAB model posits that knowledge influences attitudes, which in turn shape behaviours. In reproductive health, correct knowledge about contraception leads to positive attitudes toward safe sex, which then fosters protective behaviours. AI-powered education fits within this framework by enhancing knowledge, reshaping attitudes, and promoting healthier practices (Rogers, 1962). The Health Believe Model explains health behaviour through constructs such as perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. AI systems can be designed to highlight personal risks, benefits of safe practices, and strategies to overcome barriers, thereby motivating positive reproductive health behaviours (Rosenstock et al., 1988).

Empirically, several studies have explored digital and AI-powered health education globally. Sharma et al. (2021) found that AI-driven chatbots improved contraceptive knowledge and shaped positive attitudes toward safe sex among adolescents in India. Munoz et al. (2019) reported that AI applications in physical and health education enhanced engagement and behavioural outcomes. Burgess et al. (2021) observed that AI chatbots deployed in Kenya provided safe spaces for youths to discuss sexual health, leading to improved service uptake. Abiodun and Balogun (2019) highlighted persistent gaps in contraceptive use and knowledge among undergraduates, while Abasiattai et al. (2017) documented menstrual health challenges among female students in Uyo. However, these studies largely relied on traditional methods and did not integrate AI.

Young people in Nigeria continue to face significant reproductive health challenges. At the university level, risky behaviours such as unprotected sex, multiple partnerships, and low contraceptive use remain prevalent (Abiodun & Balogun, 2019). In UNIUYO, anecdotal evidence and campus health reports suggest that undergraduates encounter reproductive health challenges, yet many do not seek conventional sources of information due to fear of stigma, judgement, or lack of confidentiality. Although reproductive health education programmes exist, their impact is often limited by insufficient coverage, poor adaptability to students' realities, and cultural resistance. In addition, conventional teaching methods are not interactive enough to sustain young people's attention and engagement. Meanwhile, with the rise of digital technologies, students increasingly turn to the internet and social media for information, where misinformation is widespread and often harmful.

AI-powered health education presents an innovative solution that can potentially address these gaps by offering private, personalised, and reliable learning experiences. However, the effectiveness of such AI-based interventions on reproductive health knowledge, attitudes, and behaviours has not been adequately studied in Nigerian university contexts. This lack of empirical evidence constitutes a critical gap that this study

seeks to fill, by investigating the influence of AI-powered health education on reproductive health knowledge, attitudes, and behaviours of undergraduates in the UNIUYO.

Methodology

This study adopted a quasi-experimental survey design. The design is considered appropriate because it allows the researcher to expose undergraduates to AI-powered health education interventions and subsequently assess changes in their reproductive health knowledge, attitudes, and behaviours. The study was conducted at the University of Uyo (UNIUYO)Akwa Ibom State. UNIUYO is one of the leading tertiary institutions in the South-South region of Nigeria, with a diverse student population across faculties. The institution provides a suitable environment for the study because of its large undergraduate population. The population of the study comprised all undergraduates in UNIUYO. According to the Registry and Students' Affairs Division (2024/2025 session), the estimated undergraduate population is about 32,000 students spread across various faculties. A sample of 400 undergraduates was selected to represent the population, determined using Taro Yamane's formula at a 95% confidence level and a 5% margin of error. A multistage sampling method was adopted. At stage one, eight faculties were selected. Stratified sampling techniques was used to group students by faculties. At stage two, proportionate sampling technique was used to determine 50 participants per faculty. At stage three, simple random sampling technique was employed to select respondents within each stratum. This ensures fair representation across disciplines, gender and year of study in the selected faculties. Structured questionnaire was used as instrument for data collection. Which was validatedby three experts: two in health education, and one in measurement and evaluation. Their feedback ensured that the items measure the intended constructs (knowledge, attitude, and behaviour). The reliability of the instrument was tested through a pilot study involving 30 undergraduates from Akwa Ibom State Polytechnic (outside UNIUYO). Data was analysed using Cronbach's Alpha to determine internal consistency. A reliability coefficient of0.86 was established. Pre-test questionnaire was administered to the participants to assess their knowledge, attitudes, and behaviours. Participants were exposed to AI-powered health education module over a period of 3 weeks. Post-intervention questionnaire was administered to assess their knowledge, attitudes, and behaviours after intervention. Data analysis was done using descriptive and inferential. Allhypotheses were tested at 0.05 level of significance.

Results

Research Question One: What is the level of reproductive health knowledge among undergraduates in UNIUYO exposed to AI-powered health education?

Table 1: Reproductive Health Knowledge after AI Exposure Scores (N = 400)

Knowledge Level	Score Range	Frequency (f)	Percentage (%)
High Knowledge	4–5	220	55.0

Knowledge Level	Score Range	Frequency (f)	Percentage (%)
Moderate Knowledge	2 –3	120	30.0
Low Knowledge	0–1	60	15.0
Total		400	100

Result in Table 1 shows that over half of the respondents (55%) demonstrated high reproductive health knowledge after exposure to AI-powered health education, while only 15% had low knowledge.

Research Question Two: What is the influence of AI-powered health education on undergraduates' attitudes toward reproductive health?

Table 2: Attitude towards Reproductive Health after AI Exposure (N = 400)

Statements	SA (%)	A (%)	D (%)	SD (%)
Using condoms consistently is important for preventing STIs	52.0	38.0	7.0	3.0
Seeking reproductive health information from AI platforms is acceptable and beneficial	45.0	40.0	10.0	5.0
Talking about reproductive health issues with peers is embarrassing	30.0	25.0	35.0	10.0
Females who carry condoms are often viewed negatively	28.0	32.0	25.0	15.0
AI-powered health education can change negative perceptions about reproductive health use	50.0	35.0	10.0	5.0

Result in Table 2 shows that majority of students expressed favourable attitudes towards reproductive health practices after engaging with AI-powered education. This indicates that AI-powered health education has positive influence on undergraduates' attitudes toward reproductive health.

Research question Three: What is the effect of AI-powered health education on reproductive health behaviours of undergraduates in UNIUYO?

Table 3: Reproductive Health Behaviours after AI-Powered Education (N = 400)

Behaviour Indicator	Always (%)	Sometimes (%)	Rarely (%)	Never (%)
Use of condoms during sexual intercourse	42.0	28.0	15.0	15.0
Tested for HIV/STIs in the past 12 months	30.0	40.0	15.0	15.0
Regular contraceptive use	35.0	25.0	20.0	20.0
Average	35.6	31	16.7	16.7

Result in Table 3 shows that majority (36.6%) of the respondents reported improved reproductive behaviour after exposure to AI-powered health education. This indicates that

AI-powered health education has positive effect on reproductive health behaviours of undergraduates in UNIUYO.

Hypothesis One: AI-powered health education has no significant influence on the reproductive health knowledge of undergraduates in UNIUYO.

Table 4: T-test analysis on Knowledge Scores Before and After AI Exposure (N = 400)

Variable	M	M gain	SD	df	t-value	p-value
Pre-test	2.10	1.85	0.82	399	12.45	0.000*
Post-test	3.95		0.64			

Result in Table 4 shows the knowledge scores of the students before and after exposure to AI-powered health education. The result shows that the student knowledge about reproductive health improved after exposure to AI-powered health education, with a knowledge gain of 1.85. Since $p < 0.05$, the null hypothesis is rejected, indicating that AI-powered health education significantly improved reproductive health knowledge of undergraduates in UNIUYO.

Hypothesis Two: AI-powered health education has no significant influence on the reproductive health attitudes of undergraduates in UNIUYO.

Table 5: T-test Analysis on Attitude Scores Before vs. After AI Exposure (N = 400)

Variable	M	SD	M gain	df T		p-value
Pre-test	13.0	2.5	3.2	399	15.38	0.001*
Post-test	16.2	2.1				

Result in table 5 shows that the reproductive health knowledge of undergraduates improved after exposure to AI-powered health education (16.2), compared to before exposure (13.0). Since the p-value of 0.001 is less than 0.05, hence the hypothesis which states that AI-powered health education has no significant influence on the reproductive health attitudes of undergraduates in UNIUYO is rejected. This means that AI-powered health education **significantly improved** students' reproductive health attitudes.

Hypothesis Three: AI-powered health education has no significant influence on the reproductive health behaviours of undergraduates in UNIUYO.

Table 6: T-test Analysis on Behaviour Scores Before vs. After AI Exposure (N = 400)

Variable	M	SD	M gain	df T		p-value
Pre-test	15.0	2.5	5.5	399	18.03	0.000*
Post-test	20.5	2.1				

Result in Table 6 shows improvement in undergraduates' reproductive health behaviour after exposure to AI-powered health education compared to their behaviour before exposure. Since p-value of 0.000 is less than 0.05, therefore the hypothesis which states that AI-powered health education has no significant influence on the reproductive health behaviours of undergraduates in UNIUYO is rejected. This means that AI-powered health education significantly influence the reproductive health behaviours of undergraduates in UNIUYO.

Discussion of Findings

Findings on the influence of AI-powered health education on the reproductive health knowledge of undergraduates in UNIUYO revealed that more than half of the respondents (55%) demonstrated high reproductive health knowledge after exposure to AI-powered education, while only 15% had low knowledge. This suggests that AI-powered tools effectively enhanced undergraduates' understanding of reproductive health. The t-test analysis showed a significant difference between pre-test and post-test knowledge scores at degrees of freedom 399 and 0.05 level of significance ($p < 0.05$). This confirms that AI-powered health education significantly improved knowledge. This aligns with Burgess et al. (2021) who reported that AI platforms provided accurate information and increased youths' awareness of sexual health issues. This supports the Knowledge–Attitude–Behaviour (KAB) model, which posits that knowledge is the first step toward positive behavioural change.

Findings on the influence of AI-powered health education on reproductive health attitude of undergraduates in UNIUYO showed that a majority of students expressed favourable attitudes towards safe sexual practices and the use of AI for RH education. For instance, 90% of respondents agreed that condoms are important for STI prevention, while 85% believed that AI platforms are acceptable and beneficial for learning about reproductive health (Table 3). The t-test analysis revealed a significant difference between pre-test ($M = 13.0$, $SD = 2.5$) and post-test ($M = 16.2$, $SD = 2.1$) attitude scores, at degrees of freedom 399 and 0.05 level of significance. This indicates that AI-powered health education significantly improved undergraduates' attitudes toward reproductive health. These findings indicate that AI-powered education can help reduce stigma, improve openness, and foster supportive attitudes toward safer reproductive health practices. The result corroborates Chandra-Mouli et al. (2018), who argued that youth-friendly educational platforms promote positive reproductive health attitudes. It also reflects the Health Belief Model (HBM), as AI platforms may have reduced perceived barriers (e.g., embarrassment, stigma) while increasing perceived benefits of safe practices.

Findings on the influence of AI-powered health education on the reproductive health behaviours of undergraduates in UNIUYO revealed improvements in reported behaviours, with 42% of students indicating consistent condom use and 70% having been tested for HIV/STIs at least once in the past year (Table 3). This shows a positive but partial shift in behaviour, as gaps still exist in contraceptive uptake and routine testing. The t-test analysis showed improvement in undergraduates' reproductive health behaviour

after exposure to AI-powered health education (20.5) compared to their behaviour before exposure (15.0) with p-value less than 0.05 significance at 399 degrees of freedom. The findings are in line with Munoz et al. (2019), who noted that AI applications in health education improved health-seeking behaviours, although the degree of change varied. The results also reflect earlier study by Abiodun and Balogun (2019), which found that even with good knowledge, behavioural change among undergraduates is often inconsistent. The findings therefore suggest that while AI-powered education is impactful, complementary strategies (e.g., service linkages, peer support) are required for sustained behaviour change.

Conclusion

The study concludes that AI-powered health education significantly improved reproductive health knowledge and attitudes among undergraduates in UNIUYO, with modest improvements in health-seeking behaviours. The use of artificial intelligence makes health education more interactive, accessible, and stigma-free, thereby reducing barriers associated with traditional classroom or peer-to-peer health education. However, knowledge and attitude changes do not automatically guarantee consistent behavioural change. Cultural influences, peer pressure, and access to reproductive health services remain critical factors shaping behaviours. Therefore, AI-powered education should be viewed as a complementary, not standalone, strategy. Based on the findings, the following recommendations are made:

- i. The University of Uyo should integrate AI-powered health education platforms into its health services and student orientation programmes to promote continuous learning and access to reproductive health information.
- ii. The Federal and State Ministries of Health and Education should develop policies supporting the adoption of AI-driven platforms in reproductive health education across tertiary institutions in Nigeria.
- iii. Lecturers, counsellors, and peer educators should be trained on how to use AI tools to supplement traditional reproductive health education.
- iv. Beyond knowledge and attitudes, interventions should be linked to service delivery, such as on-campus HIV testing, family planning services, and confidential counselling to encourage consistent safe behaviours.

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