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Research Article

Adoption and Utilization of *Ada Health* AI Chatbot in Seeking Health Information on Sexually Transmitted Diseases among Undergraduates in Anambra State

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About Article

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ABSTRACT

This study examined the adoption and utilization of the Ada Health AI chatbot for health information seeking on sexually transmitted diseases (STDs) among undergraduates at selected universities in Anambra State, Nigeria. The growing integration of artificial intelligence (AI) into healthcare communication has created new opportunities for students to access confidential, instant health information. However, the extent to which undergraduates adopt and utilise AI-powered health chat bots for STD information remains unclear. The study was guided by five research objectives focusing on knowledge, adoption and utilization patterns, perception of usefulness, and the relationship between adoption and utilization of the Ada Health AI chatbot. The study was anchored on the Technology Acceptance Model (TAM) and the Uses and Gratifications Theory (UGT). A survey research design was adopted. The population of 62,703 comprised undergraduates from Nnamdi Azikiwe University, Awka; Chukwuemeka Odumegwu Ojukwu University, Igbariam; and Paul University, Awka. From this population, a sample of 384 respondents was selected using a multistage sampling design that combined stratified and simple random sampling to ensure adequate representation across institutions and study levels. A structured questionnaire served as the data collection instrument. Data were analysed using frequency tables, simple percentages, and appropriate statistical tools to examine the relationship between adoption and utilization. Findings revealed that undergraduates' knowledge of the Ada Health AI Chabot was moderate, with social media and peer networks as major sources of information. While some respondents had adopted the Chabot for general health information seeking, utilization specifically for STD-related information was relatively lower. The study also found a significant relationship between awareness (adoption) and utilization, indicating that students who were aware of the chatbot were more likely to use it for STD information seeking. Furthermore, respondents generally perceived the chatbot as useful for accessing confidential and convenient health information. The study concludes that AI-powered health chatbots such as Ada have strong potential to enhance private, accessible STD information-seeking among undergraduates. It recommends increased awareness campaigns, institutional support, and integration of AI-based digital health tools into university health education programmes to improve adoption and sustained utilization.

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Introduction

The rapid expansion of digital technology and the emergency of artificial intelligence (AI) have transformed numerous industries across the world, with health communication experiencing the most significant changes. In health education, AI tools are increasingly acknowledged for their ability to increase access to timely, precise, and easy to use health services. One of such developments is the introduction of AI-driven health chatbots, such as *Ada Health.* These AI-driven assistant utilize machine learning and natural language processing to create human dialogue and deliver personalized medical advice(Nnaji & Adigwe,2022).. These platforms are changing how individuals seek and engage with health information, especially in regions and contexts where stigma, cultural norms, or logistical barriers may restrict the effectiveness of traditional health systems.

Globally, sexually transmitted diseases (STDs) continue to cause major public health threats. According to the World Health Organisation (WHO, 2022), over one million sexually transmitted infections (STIs) are contracted every day, with a large percentage affecting young people. Across Nigerian communities, the rate at which STDs arecontracted among university students is alarming due to risky sexual practices, low health awareness, and limited access to youth-focused sexual health services (Iloh et al., 2022). These factors highlight the urgent need for alternative health communication channels, such as *Ada Health*, that are both youth-centred and technologically driven. Within Nigeria, and particularly in Anambra State, undergraduate students predominantly, constitute the largest demography of youth population that are increasingly relying on digital technologies to meet their health information needs. This trend reflects not only the broad availability of smart phones and internet connectivity, and the sensitive nature of many health challenges affecting young people, specifically those related to sexual and reproductive health. STDs remain a major public health issue globally and excessively affect young adults aged 18–24 years. According to the WHO (2022), over a million STIs are contracted daily globally, with young people being at risky of sexual behaviours, limited access to sexual health education, and social taboos restricting discussions of sexual health.

The *Ada Health* chatbot shows the combination of machine learning and natural language processing (NLP) to enhance access to health information. The Chabot gives users opportunity to enter symptoms, ask questions, and receive personalized health advice confidentially and effectively. For undergraduates, who belong to a sexually active age andare highly vulnerable to contracting STDs, *Ada Health* offers users stress-free and less critical platform to obtain very important health-related information. One of the features of the Chabot is its ability to maintain confidentiality, protect users' privacy and reduction in social stigma associated with STDs and related health conditions. These advantages particularly resonate with the cultural context of Anambra State, where conversation about sexual and reproductive health remains a sensitive issue (Okafor & Ekwueme, 2022). The use of *Ada Health*is in line withwidely

adopted trends in mobile health (mHealth) or tele-healt has smart phones and other digital devices are widely used by Nigerian youths. In digital spaces, access to reliable sexual health information seems to be restricted or flawed by misinformation and disinformation, thereby reechoing the need for*Ada Health*to fills this criticalgap. By offering evidence-based insights into symptoms STD, its preventive measures, and treatment options, individuals are equipped to make informed decisions about their sexual and reproductive health (Garg et al., 2023). This investigation increases the levels of awareness, use, perceived usefulness, and limitations to useof AI-based health agent among students in accessing health information.

Statement of the Problem

The spread of sexually transmitted diseases (STD is now public health concern and continues to pose serious threat to the health and well-being of young adults, particularly undergraduates in tertiary institutions in Nigeria they remain a,. In Nigeria, conversation about sexual health education is done not openly, sometimes, it is constrained by socio-cultural, andreligious beliefs. These barriers have made many young people to lack access to accurate, timely, and confidential information about STDs. This has resulted in gap in health communication and has contributed to high prevalence of STD, poor health-seeking behaviour, and prevalence of misinformation among university students. In Anambra State, these health challenges are further complicated by societal taboos and sacredness surrounding discussions of sex and sexuality. Additionally, the stigma and shame associated with STDs and the fear of what parents, friends, and peers will say coupled with the attitude of some healthcare professionals towards young people discourage many undergraduates from seeking help through conventional health channels.

As a result of this, many students have turned to the internet sources for anonymous and accessible health information. Even though the internet sources are easily accessible, but often times unregulated online content leads to misinformation that worsens health outcomes. However, with the introduction of Artificial Intelligence (AI) chatbots, such as Ada Health, it is assumed that some of challenges confronting conventional and online approaches of obtaining credible information about STDs will be addressed. Ada Health is an AI-assisted symptom assessment tool that offers medically evaluated information through conversational format. It offers users a confidential, relatable and user-friendly platform to ask questions about symptoms diseases, including those related to STDs. For the undergraduates who are also part of the digital natives and always connected to mobile technology tools like Ada Health could fill important information gaps and allow them to take charge of their sexual health. Beyond these Ada Health offerings, there is limited or lackof empirical evidence concerning the actual functioning and usefulness of Ada Health in context STDs. Therefore, this study examines the adoption and utilization of the Ada Health AI chatbot to seek health information on sexually transmitted diseases among undergraduates in Anambra State.

Objectives of the Study

The primary objective of this study is to examine the adoption and utilization of *Ada Health* AI chatbot in seeking health information on sexually transmitted diseases (STDs) among undergraduates in Anambra State. The specific objectives were:

1. To find out what the respondents know aboutthe *Ada Health* AI chatbot in Anambra State.
2. To ascertain the adoption patterns of the *Ada Health* AI chatbot for health information seeking on sexually transmitted diseases among the respondents in Anambra State
3. To determine the utilization pattern of the *Ada Health* AI chatbot for health information seeking on sexually transmitted diseases among the respondents in Anambra State
4. To evaluate the perceived usefulness of the *Ada Health* AI chatbot in providing information on STDs among undergraduate users.
5. To determine the relationship between the adoption of the *Ada Health* AI chatbot and utilisation patterns in health information seeking on sexually transmitted diseases among the respondents in Anambra State

Theoretical Framework

The researcher adopted two theories for this study: the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Uses and Gratifications Theory (UGT). While UTAUT provided insights into how social factors (e.g., peer recommendations) and the availability of resources (e.g., access to AI tools) affect undergraduates' use of AI tools, UGT was used to analyse why undergraduates choose AI tools (e.g., privacy, convenience, or credibility) for health information on STDs.

Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh, Morris, Davis, and Davis (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT, an influential model for understanding user acceptance and use of technology, in various sphere of human activities or endeaveaors. It adapts its constructs from eight major existing theoretical models that, provide a unified framework for analysing technology adoption behaviours across different domains, including organisational, educational, and societal settings. . Initially, UTAUT model was designed by its developers as an integrative framework, combining elements of the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT).into a single model. The main purpose of UTAUT model is to explain users' intentions to adopt and use technology by highlighting theinterface between core motivators and moderating variables or factors (Venkatesh et al., 2003).

The four primary constructs of the theory that directly influence behavioural intention and use include performance expectancy (PE), which refers to the extent to which users believe that technology will improve their job performance; effort expectancy (EE), which refers to the perceived ease of use of

technology; social influence (SI), which mean the extent to which users perceive how important others believe they should adopt technology. The remaining construct of the theory is facilitating conditions (FC), which refers to the availability of organizational and technical infrastructure to support technology use.

Empirical Review

Kanitza et al (2024) conducted a study that utilized a randomized, crossover, head-to-head, double-blinded trial to compare the diagnostic accuracy, safety, usability, and acceptance of two symptom-checker (SC) applications (Ada and Symptoma).The participants of the study included consecutive adult patients presenting at the emergency department (ED) of University Hospital Erlangen, Germany. The researchers were motivated to carry the study following their observation in the use of symptom-checkers to largely ease tension and overcrowding in the ED by offering on-demand diagnostic suggestions. Beside this observation, empirical evidence obtained from direct patient use, as compared to vignette-based testing, remained rare. Given situation therefore, the purpose of the study was to ascertain whether Ada, the major platform at the core of the researchers' thesis, and Symptoma could consistently approximate physician-confirmed discharge diagnoses and safely triage patients.

The study adopted a crossover design that controls between-subject variance, enrolling 450 patients between April and November 2021. The researchers had the applications completed by every participant and used six blinded expert raters to classify the concordance of each SC's suggestions with the actual discharge diagnosis as identical, plausible, or diagnostically different. A five-point Likert scale was used to measure usability and acceptance with the Net Promoter Score (NPS). Both clinical and user-experience outcome were measured.

The findings revealed that Ada performed better than Symptoma on diagnostic accuracy. An identical diagnosis was ranked within the top five suggestions for 27% of patients on Ada compared with 13% on Symptoma. Also an identical or plausible diagnosis was recorded within the top five for 75% and 64% of patients, respectively. Ada Health was also rated easier to use (88% vs 78%) and had a less negative Net Promoter Scale. However, both applications failed to show any life-threatening diagnoses in a non-trivial minority of cases (13% for Ada, 14% for Symptoma), and Ada under-triaged 13% of patients. The study concluded that, in spite of Ada's relative superiority, the overall trustworthiness of symptom-checker recommendations is doubtful. The study recommended that regulatory authorisation of such tools should come first before the rigorous clinical evaluation to avert wrong diagnosis, unprotected triage advice, and wrong allocation of scarce medical resources.

The randomized crossover design, large sample, and blinded multi-rater adjudication process, which are a rigorous methodological process, to a large extent reduce the risk of bias that impacts many chatbot-acceptance surveys. Its principal limitation for the present the study is context-based rather than methodologically

based: the study was carried out in a particular German tertiary hospital using an adult emergency department patients assessed for undistinguished severe complaints (chest pain being the most common presenting symptom), which is a distinctly different context from health information-seeking behaviour among undergraduate students concerning sexually transmitted diseases in Nigerian higher institution , particularly the university setting.

This study also measures investigative correctness and clinical safety instead of adoption intention or behavioural influencers. Ada Health supports technical performance and trustworthiness instead of psychosocial and technology-acceptance constructs such as perceived usefulness, stigma avoidance, and trust that are at the core of adoption research. On sense of balance, however, Kanitza et al's study offers crucial, premium evidence on Ada's diagnostic performance and risk-benefit profile/data from the same commercially available product under examination in the present study, and its cautious conclusion concerning reliability usefully moderates any assumption that high adoption inherently implies safe or accurate health information delivery.

A study by Mokmin and Ibrahim (2021) assessed the value, effectiveness, and technology adoption of a purpose-built chatbot designed to educate undergraduates and strengthen their health literacy. The gap the study sought to close was the limited to empirical data on chatbot-mediated health education specifically among undergraduate students, a category of people who rely much on mobile-based conversational tools for informal learning. The study employed a mixed design approach that integrates a semi-structured interview with quantitative analytics from a Google Analytics dashboard. It adopted the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) framework to explain technology acceptance. A total of seventy-five undergraduates engaged with the chatbot over a period of two months, using mobile devices, engaging it with terms and words infused into the chatbot's pre-programmed goals. Findings indicated that over 73. % of respondents found the chatbot useful to them, particularly in understanding health issues and judged the conversational experience to be satisfactory. Performance analytics disclosed a less than 3% exit rate, which is suggestive of sustained engagement.

Methodology

Research Design

This study used survey research design to examine the adoption and utilization of Artificial Intelligence (AI) tools, particularly the Ada Health AI chatbot, for seeking information on sexually transmitted diseases (STDs) among undergraduates in Anambra State, Nigeria.

Population of the Study

The population for this study comprises undergraduate students from Nnamdi Azikiwe University (NAU), Awka; Chukwuemeka Odumegwu Ojukwu University (COOU), Igbariam; and Paul University, Awka, for the 2023/2024 academic session. Data obtained from the

Students' Affairs Departments of these universities as at September 22, 2024, showed that the total student population is 62,703. This total is distributed as follows: NAU has 38,981 students, COOU has 22,320, and Paul University has 1,402 students.

Method of Data Analysis and Presentation

Both descriptive and inferential statistical methods were employed in the analysis of data. Descriptive statistics were used including frequencies, percentages, means, and standard deviations, while inferential statistical techniques (chi-square) were used to test the study's hypotheses.

Data Analysis

Answer to Research Questions

Research Question One

What do respondents in Anambra State know about the *Ada Health* AI chatbot?

Table 3: Knowledge about the Ada Health AI Chatbot (N =378)

Knowledge	**Frequency**	**Percentage**
It is an AI-powered health chatbot	95	25.1
It provides symptom-checking services	91	24.1
It gives information on transmitted disease {STDs}	83	22.0
It suggests possible health conditions based on th symptoms entered	86	22.8
I do not know anything about it	23	6.1
Total	**378**	**100**

Source: Field survey

Table 3 captures respondents' knowledge about Ada Health AI chatbot. 95 respondents or 25.1% acknowledged Ada Health as AI-powered health chatbot, 91 (24.1%) identify it as a tool that provides symptom-checking services, while 83 (22.0%) respondents acknowledge that it as a tool that gives information on sexually transmitted diseases (STDs). 86 (22.8%) recognized it as tool that suggests possible health conditions based on the systems entered, while 23 or 6.1% respondents have less knowledge about the Ada Health AI chatbot. This result indicates that over two-third of the respondents (272 or 72.0%), reported using the tool for general health information and symptom checking.

Research Question Two

What are the adoption patterns of the Ada Health AI chatbot for health information seeking on sexually transmitted diseases among respondents in Anambra State?

Table 4 : Adoption Patterns of the Ada Health AI Chatbot for STD Health Information Seeking (N = 378)

S/N	Adoption Indicator	Frequency {f}	Percentage
1	Use of the Ada Health AI chatbot for STD information	83	22.0
2	Use of Ada Health AI chatbot for symptom checking general or Health purposes	272	72.0
3	Do not use it /have no knowledge of it	23	6.1
	Total Respondents	**378**	**100**

Source: Field Data

Table 4 captures respondents' adoption pattern of Ada Health AI chatbot. More than two-third of the respondents (272 or 72%) use the chatbot mainly for general health information and symptom checking purposes. 83 (22.0%) said they use the Ada Health AI chatbot mainly for obtaining health-related information on sexually transmitted diseases. The remainder of 23 (6.1%) claimed they do not have knowledge or specifically use it for any health-related activity.

Research Question Three

What are the patterns (frequency) of utilization Ada Health AI chatbot for health information seeking on sexually transmitted diseases among respondents in Anambra State?

Table 5 : Frequency Table: Utilisation Patterns of Ada Health AI Chatbot (N = 378)

S/N	Pattern	Frequency	Percentage
1	Frequency used for STD information	45	11.9
2	Occasionally used for STD information	38	10.1
3	Rarely used for STD information	28	7.4
4	Do not used for STD information	267	70.6
	Total	**378**	**100**

Source: Field survey

Table 5 capture the frequency ofutilization or usage of the Ada Health AI chatbot by respondents for seeking STD health information, Data revealed that 45 (11.9%) respondents frequently used it for STD information, 38 (10.1%) occasionally used it for seeking and obtaining STD information, 28(7.4%) rarely used it for STD information. However, over three quarters (267or 70.6%) of the respondents do not use it for STD information, suggesting that a huge distinction between awareness and definite utilization of Ada Health AI chatbot among undergraduate students in the study area. This also can be interpreted that awareness of something is different from its adoption or usage.

Research Question Four

How do undergraduate users perceive the usefulness of the Ada Health AI chatbot in providing information on sexually transmitted diseases?

Table 6: Perceived Usefulness of Ada Health AI Chatbfor STD Information (N =378)

S/N	Perception Statement	Frequency (f)	Perception (%)
1	Very useful	72	19.0
2	Useful	104	27.5
3	Moderately useful	93	24.6
4	Slightly useful	67	17.7
5	Not useful	42	11.1
	Total	**378**	**100**

Source: Field survey

Table 6 captures the perceived usefulness of Ada Health AI chatbot for STD information by respondents. Data in the table indicate that less than a quarter of the respondests (104 or 27.5%) found Ada Health AI chatbots useful for STD information, 93 (24.6%) found it moderately useful, while 72(19.0%) perceived it as very useful. 67 (17.7%) perceived it as slightly useful, while 42(11.1% perceived it as not useful. Overall, despite levels of perception, it can be deduced that majority of respondents perceived Ada Health AI chatbot useful for providing STD information. Impliedly, the respondents that perceived Ada Health AI chatbot not useful can be described as being skeptical about authenticity of information provided from such platform.

Research Question Five

What relationship exists between the adoption of the Ada Health AI chatbot and its utilization pattern in health information seeking on sexually transmitted disease among respondents in Anambra State?

Table 7: Adoption vs Utilisation Patterns (N = 378)

Adoption of Chatbot	Frequency use	Occasional Use	Rare use	No use	Total
Adoption (Aware)	40	35	25	120	220
Not Adopted(Unaware	5	3	3	147	158
Total	**45**	**38**	**28**	**267**	**378**

Source: Field survey

Table 7 shows the relationship between the adoption of Ada Health AI chatbot and its usage or utilization by undergraduates for obtaining information on STDs. Data indicate that respondents' awareness of Ada Health AI chatbot reflects their level of adoption of the app; that is those (100 or 45%) who frequently, occasionally, or rarely use it can be described as adopters. Non awareness of the chatbot indicates low or non utilization of Ada Health AI chatbot. A shown in the table, 147(93%) respondents is non-adopters.

Research Hypothesis

Hypothesis

There is no significant relationship between the adoption of the Ada Haealth AI chatbot and its utilization patterns in health information seeking on sexually transmitted diseases among respondents in Anambra State

Table 8: Chi-Square Table

Adoption/Utilisation	Observed Frequency (O)	Expected Frequency (E)	$(O–E)^2/E$
[illegible]	40	26.19	7.79
Adopted(Aware)-Occasional	35	22.12	6.37
Adopted(Aware)-Rare	25	16.30	4.60
Adopted(Aware)-No Use	120	155.40	8.69
Not Adopted(Unaware)- Frequent	5	18.81	9.45
Not Adopted(Unaware)-Occasionally	3	15.88	9.03
Not Adopted (Unaware) – Rare	3	11.70	7.88
Not Adopted (Unaware) – No Use	147	111.60	10.70

Source: Field survey

Chi-square statistic (X2) = 65.79
Degree of freedom (df) = 3
P-value ≈ 0.000

Decision Rule

Reject the null hypothesis if p-value < 0.05.
Since the calculated chi-square (X^2) value of 67.79 at df = 3, and at p-value 0.000 is less than critical p-valueof 0.05, we reject the null hypothesis and accept the alternative which states that "there significant relationship between the adoption of the Ada Haealth AI chatbot and its utilization patterns in health information seeking on sexually

transmitted diseases among respondents in Anambra State.

Conclusion

This study examined how undergraduate students in Anambra State adopted and utilized the Ada Health AI chatbot for seeking information on sexually transmitted diseases (STDs). From the findings of the study, it can be deduced that awareness of the Ada chatbot alone does not translate to large scale adoption and utilization of the tool. This further demonstrates moderate adoption specifically for STD-related health information, which also resulted in relatively in low utilization of the chatbot. The use of Ada Health AI chatbot by a significant number of respondents for seeking general health information and symptom-checking purposes validates multi-functionality of the chatbot. However, in spite of the awareness of this functional uses of the tool, a small number of respondents consistently relied on it for sexual health information.

These findings statistically showed a significant relation between adoption and utilization of AI-driven health chatbot, particularly Ada Health chatbot. In comparison, undergraduates who are aware of the chatbot and adopt it are more likely to utilise it for STD information than those students who may be unaware of it. This further implies that adoption may not necessrily translate to meaningful utilisation, while perceived usefulness, trust, digital literacy, and privacy issues may influence the extent of engagement with AI tool. The study concludes that AI-powered health chatbots like Ada Health are very important in this digital era, and will help to promote confidentiality and privacy of users and also improve undergraduates' access to timely sexual health information. It also concludes that practically, awareness does not usually give rise the sustained adoption and utilisation of technology. This aligns with the theoretical lens of the Unified Theory of Acceptance and Use of Technology (UTAUT) concerning acceptance and use of new technologies (Venkatesh et al., 2003).

Recommendations

Based on the syntheses of the findings of the study, the following is recommended:

1. Since awareness does not usually give raise the sustained adoption and utilization of technology, tailored but structured sexual and reproductive health campaigns should be implemented by universities to expose their students on the needs to adopt and frequently use AI-powered health chatbot to access confidential information on sexual transmitted diseases. This can be incorporated into the institutions' orientation and health week programmes, and published via campus media platforms and implemented using seminars and talk shows.
2. The medical centers of the three selected universities used in the study, should acquire and adopt AI-driven platforms, like Ada Health AI chatbot tool to strengthen their health communication strategies and response to patients' feedback. This increases privacy and confidentiality of students seeking confidential and preliminary health information.
3. Advocacy groups and youth organizations should organise

seminars and workshops to educate their young people on the dangers of STDs and the need for adopting and frequently use AI-driven Health chatbot tools, like Ada Health to access online confidential health information on STDs and other sexuality issues.

4. Student leaders and student organizations should use their social networks, peer-led advocacy to significantly increase adoption and consistent utilization of Ada Health AI chatbot. .

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