Journal of the Nigerian Surgical Research Society

ORIGINAL ARTICLE

Telehealth Initiative Among Undergraduate Medical Students of Ambrose Alli University, Ekpoma

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Abstract

Introduction: Telehealth has emerged as a transformative force in healthcare delivery, particularly in academic settings. This study focuses on the undergraduate medical student population of Ambrose Alli University, Ekpoma, to assess their knowledge, attitudes, and challenges related to Telehealth adoption. Understanding these aspects was crucial for tailoring educational interventions and addressing barriers to successful integration.

Methods: This study aimed to explore Telehealth awareness, attitudes, and challenges among undergraduate medical students. It is a descriptive cross-sectional study performed amongst the clinical students at Ambrose Alli University College of Medicine, Ekpoma. Key goals include knowledge assessment, understanding perceptions, identifying barriers to Telehealth adoption, and effective Telehealth integration.

Results: A total of 161 respondents were included. 69.6% indicating awareness of Telehealth. Positive attitudes were prevalent, with 82.0% expressing interest in training, and 83.9% advocating for Telehealth inclusion in the curriculum. However, concerns about privacy (47.2%) and the perception of Telehealth as inferior (33.5%) are notable. Challenges include access to digital devices (13.7%), connectivity issues (16.1%), and institutional support barriers (64.6%).

Conclusion: While a positive inclination towards telehealth is evident among Ambrose Alli University's medical students, targeted interventions will be necessary. These will include curriculum enhancement, infrastructure investment, awareness campaigns, and cultural adaptation are recommended. By addressing these specific concerns and enhancing education, the university can pave the way for successful Telehealth integration, ensuring that future physicians are well-equipped for evolving healthcare landscapes.

Keywords: Telehealth, Telehealth barriers, Telehealth perception.

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Introduction

Telehealth, encompassing telemedicine and e-Health, refers to using electronic information and communication technologies to support remote healthcare, education, public health, and administration[1]. Telemedicine enables remote doctor-patient interactions, while e-Health uses information technologies broadly for healthcare purposes[2]. In Africa, telehealth was increasingly recognized for enhancing access to healthcare, especially in underserved areas.[3] Telemedicine is a crucial tool for expanding healthcare access, reducing costs, and addressing disparities and healthcare workforce shortages[4,5]. In developing countries, the growth of telehealth has been driven by advancements like high-speed Internet and smartphones, democratizing telehealth access[6].

The COVID-19 pandemic underscored telehealth's role in maintaining care continuity and reducing physical contact, highlighting its importance in crisis response. Developing countries' telehealth systems now include services like telemonitoring, telesurgery, and telepathology, extending beyond initial telephone-based care.

Integrating telehealth into medical education represents a transformative approach to enhance training and healthcare delivery. Globally, telehealth is increasingly adopted, and for Nigerian medical students, its potential to broaden clinical experiences, facilitate remote learning, and develop technological skills in patient care is clear. However, focused exploration is needed to understand the adoption, challenges, and potential of telehealth within Nigeria's unique medical education context.

Telehealth holds recognized potential for transforming medical education globally, yet specific challenges and opportunities tied to its implementation among Nigerian medical students remain underexplored. While technology enables enhanced clinical experiences, remote learning, and skill development, adopting telehealth in Nigerian medical education faces distinct obstacles that require systematic investigation. For instance, a U.S. study found that only 13.5% of undecided medical students had prior telemedicine exposure[7], and a study in the UAE showed 71.1% of students were interested in telemedicine instruction[8].

Nigerian medical education faces persistent issues with access, infrastructure, and regional resource disparities. Telehealth could address these challenges, but its impact on medical students remains unclear, and there is a shortage of studies on factors affecting telehealth acceptance in Nigeria. Key barriers include technology limitations, infrastructure gaps, resistance to change, and unequal access. Understanding these challenges is vital for developing targeted interventions and policies to support telehealth integration, ensuring equitable benefits for Nigerian students. This study explored these challenges and opportunities, adding to the discourse on healthcare, technology, and education in Nigeria.

Aims and Objectives

The objectives are to evaluate telehealth knowledge among Ambrose Alli University medical students, explore their attitudes and perceptions toward telehealth, and identify key barriers to its adoption within this academic setting. Additionally, our study assesses the perceptions of medical students regarding telemedicine, emphasizing the integration of telehealth into the medical school curriculum to improve knowledge, attitudes, and acceptance of telehealth.

We aim to contribute insights to the challenges surrounding telehealth adoption among Ambrose Alli University medical students, examining barriers in the Nigerian context, including technological, policy, and funding limitations. Insights gained aim to inform stakeholders on strategies to improve telehealth acceptance and utilization among Nigerian medical students.[9]

Methodology

This study was conducted among medical students at Ambrose Alli University, Ekpoma, Edo State, Nigeria, focusing on 400 and 500-level students. Edo State, located in southern Nigeria, has Ekpoma as a key town and the administrative center of Esan West Local Government Area, with a population of approximately 290,000. Ekpoma's residents include civil servants, educators, farmers, traders, and students. The local language is Esan, and major transportation is by road, with motorcycles and cars as the primary vehicles. Ekpoma hosts institutions like banks, eateries, schools, hospitals, and the state university, Ambrose Alli University.[10] The study adopted a descriptive survey design, targeting 400, 500 and 600 level medical students to gather their views on telehealth.

The sample size was calculated using Cochran's formula for cross-sectional surveys, with Z=1.96 for 95% confidence, P=82.5% (based on prior studies on telehealth awareness[19]), and d=0.05. The result was 146 respondents, with an additional 10% (14.6) for non-response, totaling 161 participants. This adjustment accommodates potential withdrawals per ethical guidelines. Inclusion criteria cover all 400, 500, and 600-level medical students at Ambrose Alli University, while the exclusion criteria omit students outside the 400,500 and 600-level categories. Simple random sampling by balloting was employed. Questionnaires were administered directly and retrieved immediately, with clarifications provided as needed. Data were stored in personal computer and analysis of the data was done using statistical package for social sciences (SPSS) version 22.

Results

The study involved 161 participants, achieving a 100% response rate. Sociodemographic characteristics were analyzed across various variables. In terms of age distribution, the majority (49.7%) of respondents fell within the 21-25 years range, followed by 39.8% in the 26-30 years range. A smaller proportion included those aged 31-35 years (7.5%) and those above 35 years (3.1%). Gender representation was fairly balanced, with 56.5% being male and 43.5% female. Education levels varied, with 37.3% at 500LA, 36.6% at 500LB, and 26.1% at 600L.

Religiously, 96.9% identified as Christians, while 2.5% and 0.6% identified as Muslims and adherents of African Traditional Religion, respectively. Ethnic composition revealed Esan as the predominant group at 45.3%, followed by Yoruba (9.9%), Igbo (10.6%), Benin (7.5%), Etsako (8.7%), and 18.0% from diverse ethnic backgrounds. This sociodemographic analysis provides a nuanced understanding of the respondent profile, encompassing age, gender, education level, religion, and ethnicity, contributing valuable insights to the broader study on Telehealth among Medical Students at Ambrose Alli University.

Table 1: Sociodemographic distribution of participants

Variable	Frequency (n=161)	Percentage(%)
Age range of the respondents (years) (Mean ± SD)		
21-25	80	49.7
26-30	64	39.8
31-35	12	7.5
>35	5	3.1
Gender of the respondents		
Male	91	56.5
Female	70	43.5
Level of education of the respondents		
400L	60	37.3
500L	59	36.6
600L	42	26.1
Religion of the respondents		
Christianity	156	96.9
Islam	4	2.5
African Traditional religion	1	.6
Ethnic group of the respondents		
Esan	73	45.3
Yoruba	16	9.9
Igbo	17	10.6
Benin	12	7.5
Etsako	14	8.7
Others	29	18.0

Table 2: Assessment of the level of knowledge of telehealth among medical students

Variable	Frequency (n=161)	Percentage (%)
Have you heard about telehealth?		
Yes	112	69.6
No	49	30.4
How did you hear of Telehealth?		
Home	4	2.5
School	25	15.5
Peer group	13	8.1
Television	5	3.1
Internet	107	66.5
Hospital	7	4.3
Have you had any personal experience with telehealth as a patent?		
Yes	29	18.0
No	132	82.0
Have you attended any lecture or teaching on telehealth?		
Yes	23	14.3
No	138	85.7

Have you ever consulted a doctor via telephone?		
Yes	88	54.7
No	73	45.3
Have you read any medical literature on telehealth?		
Yes	39	24.2
No	122	75.8
Do you know any internet applications providing health services in Nigeria?		
Yes	65	40.4
No	96	59.6
If yes, have you used the app?		
Yes	28	43.1
No	37	56.9
I understand the concept of telehealth and its applications in health care?		
Strongly disagree	23	14.3
Disagree	19	11.8
Neutral	49	30.4
Agree	48	29.8
Strongly agree	22	13.7
I am aware of the benefits of telehealth in improving access to healthcare services		
Strongly disagree	25	15.5
Disagree	16	9.9
Neutral	46	28.6
Agree	52	32.3
Strongly agree	22	13.7
I know the legal and ethical consideration associated with practicing telehealth		
Strongly disagree	26	16.1
Disagree	31	19.3
Neutral	51	31.7
Agree	39	24.2
Strongly agree	14	8.7
I feel confident in my ability to use telehealth technologies effectively for patient care		
Strongly disagree	19	11.8
Disagree	33	20.5
Neutral	64	39.8
Agree	34	21.1
Strongly agree	11	6.8
I understand the role of telehealth in providing remote consultations and follow up care		
Strongly disagree	21	13.0
Disagree	18	11.2
Neutral	48	29.8
Agree	52	32.3
Strongly agree	22	13.7

I am knowledgeable about the security and privacy measures involved in telehealth interactions		
Strongly disagree	27	16.8
Disagree	27	16.8
Neutral	62	38.5
Agree	32	19.9
Strongly agree	13	8.0

In evaluating telehealth knowledge among 161 medical students, 69.6% reported awareness of telehealth, with the internet (66.5%) and school (15.5%) as primary sources. Personal experience as telehealth patients was low (18.0%), and only 14.3% had attended telehealth-related lectures. More than half (54.7%) had consulted a doctor via telephone, and 24.2% had read related medical literature. Additionally, 40% were aware of health service apps in Nigeria, with 43.1% of those having used such apps. Regarding understanding, 60.1% agreed or strongly agreed that they comprehended telehealth's role in healthcare, though opinions varied on benefits, ethical considerations, confidence in technology use, and privacy issues. A t-test analysis found no significant difference in telehealth awareness by education level (p-values of 0.233 and 0.209). Overall, the findings suggest varying levels of telehealth awareness and understanding, highlighting the need for targeted education to improve knowledge among medical students.

Table 3: Assessment of attitude and perception of telehealth among medical students

Variable	Frequency (n=161)	Percentage (%)
Are you interested in receiving some form of training/teaching in the field of telehealth?		
Yes	132	82.0
No	29	18.0
Medical schools should include telehealth in their curriculum		
Yes	135	83.9
No	26	16.1
Telehealth is an opportunity to improve healthcare?		
Yes	147	91.3
No	14	8.7
The practice and use of telehealth should be encouraged?		
Yes	142	88.2
No	19	11.8
Compared to the current medical practice, Telehealth poses a great threat to the privacy and confidentiality of patient information		
Yes	76	47.2
No	85	52.8
Telehealth is threat to current medical practice?		
Yes	48	29.8
No	113	70.2

Telehealth would have an important role to play in the current and future clinical practice?		
Yes	140	87.0
No	21	13
Would you like to include telehealth in your practice as a future physician?		
Yes	134	83.2
No	27	16.8
In your opinion, what are the biggest challenges facing telehealth today?		
Patient privacy and data security technology access		
Yes	70	43.5
No	91	56.5
Literacy among patients		
Yes	93	57.8
No	68	42.2
Trust between healthcare providers and patients in a virtual environment		
Yes	62	38.5
No	99	61.5
How do you stay updated on the latest trends and advancements in telehealth technology?		
Industry-specific publications		
Yes	41	25.5
No	120	74.5
Webinars and conferences		
Yes	68	42.2
No	93	57.8
Relevant online forums and communities		
Yes	68	42.2
No	93	57.8
Professional networks and peers		
Yes	51	31.7
No	110	68.3
Do you think lack of exposure affects their interest and motivation to participate in telehealth initiatives?		
Yes	151	93.8
No	10	6.2

The assessment of the attitude and perception of Telehealth among 161 medical students provides valuable insights. An overwhelming 82.0% of participants expressed a keen interest in receiving training in Telehealth. Additionally, a substantial majority (83.9%) believed that Telehealth should be integrated into medical school curricula.

A significant 91.3% of respondents viewed Telehealth as an opportunity to enhance healthcare, while 88.2% supported the practice and use of Telehealth. Concerns about patient privacy and data security were notable, with 47.2% expressing apprehension. However, a minority (29.8%) perceived Telehealth as a significant threat to current medical practice. Despite these concerns, 87.0% acknowledged the important role that Telehealth could play in current and future clinical practice.

An encouraging 83.2% expressed a desire to include Telehealth in their future medical practice. Challenges identified included patient privacy and data security (43.5%), patient literacy (57.8%), and trust between healthcare

providers and patients in a virtual environment (38.5%). The majority (93.8%) believed that a lack of exposure affects interest and motivation to participate in Telehealth initiatives. Respondents stay informed through various channels, including webinars and conferences (42.2%), relevant online forums and communities (42.2%), and professional networks and peers (31.7%).

The t-test results suggest that there was no statistically significant difference in interest in training for Telehealth based on the level of education of the respondents (*p=0.562)*.

Eighty-three percent of respondent desire to include telehealth in their clinical practice as future physicians. The data showcases a positive attitude toward Telehealth among medical students, with a strong interest in training and future integration. Despite concerns about privacy and potential threats, there is a general acknowledgment of Telehealth's significance in improving healthcare. Identifying and addressing challenges, along with providing exposure, will be crucial in fostering greater enthusiasm and participation in Telehealth initiatives among future physicians.

Table 4: Factors hindering the successful adoption of telehealth initiatives among medical students of Nigeria, with focus on socioeconomic challenges

Variable	Frequency(n=161)	Percentage (%)
Do you have access to a computer device or similar digital device?		
Yes	139	86.3
No	22	13.7
Do you have an easy access to internet service?		
Yes	135	83.9
No	26	16.1
Do you have any formal computer training and education?		
Yes	115	71.4
No	46	28.6
How comfortable are you using a computer device?		
Yes	141	87.6
No	20	12.4
Do you agree that high tariffs on telecommunication and import duties on ICT equipment affect the adoption of telehealth initiatives among medical students?		
Yes	133	82.6
No	28	17.4
The cost of accessing telehealth services is a significant barrier for medical students in Nigeria		
Strongly disagree	23	14.3
Disagree	13	8.1
Neutral	36	22.4
Agree	41	25.5
strongly agree	48	29.8
The availability of a reliable internet connection is a challenge for medical students engaging in telehealth initiative		
Strongly disagree	15	9.3
Disagree	18	11.2

Neutral	28	17.4
Agree	52	32.3
Strongly agree	48	29.8
Limited access to smart phones, tablets or computers hinders medical students' participation in telehealth activities?		
Strongly disagree	16	9.9
Disagree	30	18.6
Neutral	31	19.3
Agree	47	29.2
Strongly agree	37	23.0
The perception of telehealth as inferior to in-person consultations affect its acceptance among medical students		
Strongly disagree	19	11.8
Disagree	13	8.1
Neutral	41	25.5
Agree	54	33.5
Strongly agree	34	21.1
The lack of support and infrastructure from educational institutions inhibits medical students' participation in telehealth initiatives		
Strongly disagree	15	9.3
Disagree	12	7.5
Neutral	30	18.6
Agree	58	36.0
Strongly agree	46	28.6
The complexity of telehealth platforms and applications deters medical student from using them effectively		
Strongly disagree	19	11.8
Disagree	21	13.0
Neutral	53	32.9
Agree	39	24.2
Strongly agree	29	18.0
Cultural beliefs and practices in Nigeria create barriers to the acceptance and use of telehealth services among medical students		
Strongly disagree	15	9.3
Disagree	17	10.6
Neutral	37	23.0
Agree	50	31.1
Strongly agree	42	26.1

The assessment of factors hindering telehealth adoption among 161 Nigerian medical students highlighted key socioeconomic challenges. Most respondents (86.3%) have access to computers, and 83.9% have internet access, with 71.4% having formal computer training and 87.6% feeling comfortable with computer use. High telecommunication tariffs and import duties were noted as barriers by 82.6%, while 55.3% cited the cost of telehealth services as a challenge.

Reliable internet was another concern, with 62.1% agreeing it is a challenge, and 52.2% noting limited access to digital devices as a hindrance. Perceptions of telehealth as inferior to in-person care affected acceptance for 54.6%, while 64.6% cited lack of institutional support. Platform complexity (53.9%) and cultural beliefs (57.2%) also posed barriers to telehealth adoption.

Discussion

Telehealth, encompassing telemedicine and e-Health, refers to using electronic information and communication technologies to support remote healthcare, education, public health, and administration.[1] Telemedicine enables remote doctor-patient interactions, while e-Health uses information technologies broadly for healthcare purposes. Telehealth= Telemedicine + e-Health.[1] In Africa, Telehealth was increasingly recognized for enhancing access to healthcare, especially in underserved areas.[2]

Telemedicine is a crucial tool for expanding healthcare access, reducing costs, and addressing disparities and healthcare workforce shortages. E-health is expanding rapidly to improve the health of the community, enhance scientific understanding of health issues, and facilitate communication between healthcare providers and patients in developing countries.[11]

In developing countries, the growth of Telehealth has been driven by advancements like high-speed internet and smartphones, and democratizing telehealth access.[3] Developed countries' telehealth systems now include services like telemonitoring, telesurgery, and telepathology, extending beyond initial telephone-based care.[3] Globally, Telehealth is increasingly adopted, and for Nigerian medical students, it has the potential to broaden clinical experiences, facilitate remote learning, and develop technological skills in patient care.[4] US study found that only 13.5% of medical students had prior telemedicine exposure[4] in contrast to 71.1% found in a study in the UAE.[5] Noel et al.[12] in a study conducted among 305 medical students in Jos, Nigeria, found out that 36.4% of the participants had good knowledge of telemedicine, while 37.1% had a good perception of the benefits of telemedicine, and 33.8% a good perception of the ease of its use. Integrating Telehealth into medical education represents a transformative approach to enhance training and healthcare delivery. However, focused exploration is needed to understand the adoption, challenges, and potential of telehealth within Nigeria's unique medical education context.[5]

The findings of the study underscore the multifaceted challenges hindering the successful adoption of Telehealth initiatives among medical students in Nigeria. Access to digital devices and the internet, economic factors, connectivity challenges, perceptions, institutional support, technological complexity, and cultural factors all contribute to the nuanced landscape of barriers. Addressing these challenges will be crucial in fostering a conducive environment for the integration of Telehealth into medical education and practice in Nigeria.

Recommendations

1. Curriculum Enhancement: Integrate Telehealth education into the medical curriculum to address the knowledge gap (69.6%) and ensure a comprehensive understanding.

2. Infrastructure Investment: Advocate for institutional support to improve internet connectivity (83.9%) and provide access to digital devices (86.3%).

3. Awareness Campaigns: Launch targeted campaigns to address concerns about privacy (47.2%) and alter the perception of Telehealth as inferior (33.5%).

4. Training Opportunities: Provide continuous training opportunities to enhance the

proficiency of the 82.0% of students interested in receiving training.

5. Collaboration: Encourage collaboration between educational institutions and stakeholders to create a supportive ecosystem, considering the 64.6% who identify institutional support as a barrier.

6. Cultural Adaptation: Tailor Telehealth initiatives to align with cultural beliefs and practices, recognizing the predominantly Christian population (96.9%).

Implementing these recommendations will not only address the specific percentages but also align with core values, ensuring that Ambrose Alli University becomes a pioneer in Telehealth integration, providing a model for other institutions.

Conclusion

In conclusion, the study underscores the need for a targeted approach to Telehealth integration. While there is a positive inclination, addressing concerns and enhancing formal education are crucial for successful adoption.

Conflict of interest: None

Funding: None

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