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Evaluating the Role of Chatbot-Powered Applications in Enhancing Doctor-Patient Communication: Evidence from a Tertiary Healthcare Institution in Nigeria

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Abstract

This study critically evaluates the role of chatbot-powered applications in enhancing doctor–patient communication at a tertiary healthcare institution in Nigeria. Specifically, it examines the level of awareness and usage, the effectiveness of chatbot mediated communication in improving clarity, responsiveness, and accessibility of medical information, as well as the challenges associated with its implementation. A sample of 283 respondents was determined using Taro Yamane's formula from a population of 958, comprising both healthcare professionals and patients, with 270 valid responses analyzed. Data were collected through structured questionnaires and analyzed using descriptive statistics. The findings indicate a high level of awareness and moderate adoption of chatbot applications among respondents. The results further reveal that chatbot systems significantly improve communication efficiency by providing timely responses, simplifying medical instructions, and enhancing patient understanding. Additionally, the technology contributes to increased trust and engagement in healthcare interactions. However, several limitations were identified, including inadequate handling of complex medical inquiries, technical constraints, and concerns regarding data privacy and confidentiality. Despite these challenges, the overall impact of chatbot applications on healthcare communication is positive, suggesting their potential as complementary tools in clinical settings. The study recommends the integration of more advanced artificial intelligence features, continuous system optimization, enhanced data protection measures, and targeted training for both healthcare providers and patients. Policymakers are also encouraged to support the adoption of AI-driven communication systems to improve healthcare delivery outcomes. The study concludes that chatbot-powered applications can significantly transform doctor patient communication when effectively implemented and managed.

Keywords
chatbot technology; healthcare communication; artificial intelligence; doctor–patient interaction; digital health

I. Introduction

Effective communication between doctors and patients remains a fundamental component of quality healthcare delivery. It influences diagnosis accuracy, treatment adherence, patient satisfaction, and overall health outcomes. However, in many developing healthcare systems, communication gaps persist due to factors such as high patient volumes, limited consultation time, inadequate health literacy, and infrastructural constraints. These challenges often lead to misunderstandings, reduced patient engagement, and suboptimal clinical outcomes.

In recent years, the integration of artificial intelligence (AI) into healthcare has emerged as a promising solution to address communication barriers. Among these innovations, chatbot-powered applications have gained increasing attention as tools capable of facilitating

real-time interaction between healthcare providers and patients. Chatbots are AI-driven systems designed to simulate human conversation through text or voice interfaces, providing automated responses based on pre-programmed algorithms and machine learning capabilities. In healthcare settings, these systems are used to deliver medical information, remind patients about medications, schedule appointments, and respond to basic health inquiries.

The growing adoption of chatbot technologies is driven by their potential to enhance accessibility, efficiency, and consistency in communication. Unlike traditional communication methods, chatbot systems can operate continuously, providing instant responses without time limitations. This is particularly relevant in resource-constrained environments where healthcare professionals are often overwhelmed by patient demands. By handling routine inquiries, chatbots can reduce the workload of medical staff, allowing them to focus on more complex clinical tasks.

Health communication has emerged as a vital area that studies the processes and effects of conveying health-related information. Health communication explores the interaction between doctors, patients, institutions, and technologies, focusing on how messages influence health behaviors and outcomes (Kreps, 2010). With the integration of media and digital platforms, health communication has shifted from face-to-face consultations alone to include mediated exchanges that enable broader, more efficient information flow (Ahmed & Msughter, 2002).

Over the last decade, the healthcare sector has witnessed a rapid digital transformation, largely driven by artificial intelligence (AI). AI technologies are increasingly being deployed to assist in diagnostics, treatment planning, patient monitoring, and communication.

Despite these advantages, the implementation of chatbot-powered applications in healthcare communication is not without challenges. Concerns regarding the accuracy of information, the inability to handle complex or context-sensitive queries, and issues related to data privacy and security remain significant barriers. Furthermore, the effectiveness of chatbots is influenced by user acceptance, technological literacy, and trust in digital health systems. In many developing contexts, these factors may limit the widespread adoption and impact of such technologies.

Empirical studies on chatbot applications in healthcare have reported mixed findings. While some studies highlight improvements in patient engagement, satisfaction, and access to information, others emphasize limitations in personalization and clinical reliability. These inconsistencies suggest the need for context-specific investigations to better understand how chatbot technologies function within particular healthcare environments.

This study focuses on evaluating the role of chatbot-powered applications in enhancing doctor–patient communication at a tertiary healthcare institution in Nigeria. The choice of this setting is significant due to the increasing demand for healthcare services and the growing interest in digital health solutions within the region. Specifically, the study seeks to assess the level of awareness and usage of chatbot applications, examine their effectiveness in improving communication quality, and identify the challenges associated with their use.

By providing empirical evidence from a real-world healthcare context, this study contributes to the growing body of literature on digital health communication. It also offers practical insights for healthcare practitioners, technology developers, and policymakers on how chatbot systems can be optimized to improve communication and healthcare delivery outcomes.

II. Research Methods

The study adopted a descriptive survey design to systematically investigate the use of a chatbot-powered application in doctor-patient communication at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital. This design was considered appropriate because it allows for the collection of quantitative data from a defined population to describe existing conditions, perceptions, and practices without manipulating variables. By using this approach, we were able to capture respondents' views on the effectiveness, challenges, and overall impact of the chatbot application in facilitating health communication (Msughter et al., 2002). The population of this study comprises of all doctors and patients at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Awka. According to records obtained from the Personnel Department of the hospital (2005), the total population was 958, consisting of 249 medical doctors and 709 patients. actively receiving treatment at the hospital.

III. Results and Discussions

3.1 Results

Analysis of Research Questions

Research Question 1: To what extent are chatbot-powered apps used in doctor–patient communication at Chukwuemeka Odumegwu Ojukwu Teaching Hospital? The level of usage of chatbot-powered applications among respondents provides insight into their integration into healthcare communication. Findings show that a significant majority of respondents (76.2%) indicated awareness of the app, while 23.8% had no awareness (Table 4). This suggests that the app has gained considerable visibility within the hospital environment, although not everyone is familiar with it yet. In terms of usage frequency, only 14.1% of respondents reported daily use, while 38.9% reported weekly usage. Another 31.8% used the app occasionally, and 15.2% had never used it (Table 5). The data indicates that although the app is well-known, its active and consistent use is still moderate. Weekly and occasional users form the majority, which implies that while the technology is being adopted, it is not yet a daily routine tool for most patients and doctors. This finding highlights the growing relevance of chatbot-powered apps in doctor–patient communication but also shows the need for strategies to encourage more frequent and consistent use.

Research Question 2: How effective are chatbot-powered apps in enhancing clarity, feedback, and timeliness in doctor–patient communication? The study reveals that chatbot-powered apps are largely effective in enhancing doctor–patient communication, particularly in improving clarity and timeliness. For instance, the majority of respondents agreed that the app provides accurate medical information, with 58.5% agreeing and 12.2% strongly agreeing (Table 6). Similarly, a large proportion (65.0% agree, 12.5% strongly agree) in table 7, indicated that the app is easy to use, demonstrating that the design and usability of the platform encourage effective interaction. In addition, 61.0% of respondents agreed and 14.6% strongly agreed that they feel comfortable using the app, with only a small minority disagreeing (Table 8). Respondents also affirmed the time-saving benefits of the app, with 53.7% agreeing and 22.0% strongly agreeing that it helps them save time in seeking medical assistance (Table 9). More importantly, 61.0% of respondents agreed, while 17.1% strongly agreed, that the app improves communication between doctors and patients (Table 10). Collectively, these findings suggest that chatbot-powered apps are effective tools in bridging communication gaps, providing timely feedback, and enhancing the clarity of health-related information shared between doctors and patients.

Research Question 3: What challenges do doctors and patients face in using chatbot-powered apps for communication? While the app shows potential in improving communication, challenges remain evident from the data. A notable concern raised by respondents relates to technical difficulties: 46.3% agreed and 7.3% strongly agreed that the app experiences technical issues that disrupt communication, while 34.1% remained neutral and 12.2% disagreed (Table 15). This finding indicates that technical breakdowns remain a key barrier to the seamless functioning of the app. Another challenge identified is the app's limited ability to handle complex medical queries. Only 43.9% agreed that it could handle such queries, while 41.5% remained neutral, suggesting uncertainty, and 14.7% either disagreed or strongly disagreed (Table 17). This reveals that while the app is helpful for basic communication, it may not yet be reliable for complex medical concerns that require detailed consultation. On the positive side, most respondents (75.6%) affirmed that adequate support exists to help them navigate the app (Table 16). However, when given the opportunity to suggest improvements, respondents highlighted the need to enhance technical support, improve response times, expand the range of medical information available, and strengthen privacy and data security (Table 19). These findings show that while the app holds promise, issues such as technical reliability, query limitations, and support services must be addressed to maximize its effectiveness.

Research Question 4: What is the impact of chatbot-powered apps on the quality of doctor–patient communication? The overall findings strongly indicate that chatbot-powered apps positively impact the quality of doctor–patient communication at the hospital. A large proportion of respondents (56.1% agree, 24.4% strongly agree) indicated that the app allows them to ask questions they might not feel comfortable raising during in-person consultations (Table 11). This highlights the app's role in encouraging openness and breaking barriers in communication. Similarly, 62.5% agreed and 20% strongly agreed that the app enhances doctors' ability to respond promptly to patients (Table 12), underscoring its contribution to timely healthcare delivery. In addition, the app was found to improve patients' understanding of medical instructions, with 58.5% agreeing and 19.5% strongly agreeing (Table 13). Trust, a crucial element of doctor–patient communication, was also reinforced through the app, as 58.5% agreed and 14.6% strongly agreed that it fosters trust in the doctor–patient relationship (Table 14). Collectively, these findings demonstrate that the chatbot-powered app has had a meaningful impact by enhancing openness, improving responsiveness, facilitating better comprehension of medical advice, and fostering trust, all of which are critical to quality communication in healthcare.

3.2 Discussion

The findings of this study provided meaningful insights into the assessment of chatbot-powered applications in doctor–patient communication at Chukwuemeka Odumegwu Ojukwu Teaching Hospital (COOUTH). Results revealed that a significant majority of respondents were aware of the chatbot-powered app and used it with varying frequency. While daily usage was relatively low, weekly and occasional usage were more prominent, suggesting that the app is gradually becoming integrated into healthcare communication, though not yet fully adopted as the primary medium of interaction (Namadi & Aondover, 2000). This outcome aligns with the Diffusion of Innovations Theory (Rogers, 2003), which explained that adoption of new technologies in healthcare is typically gradual and follows stages such as awareness, trial, and eventual acceptance. The relatively moderate level of usage also reflects the role of Uses and Gratification Theory (Katz et al., 1974), as patients use the app primarily when it meets their needs for convenience, quick access to information, and reduced face-to-face stress.

The study also established that the chatbot-powered app was effective in enhancing clarity, feedback, and timeliness in doctor–patient communication (Obada et al., 2004). A significant proportion of respondents agreed that the app helps them understand medical instructions, fosters timely responses, and enables them to ask questions they might hesitate to raise in person. This finding reinforces earlier empirical studies such as that of Bickmore et al. (2008), who reported that AI-driven health communication tools improved patient understanding of medical advice and encouraged openness in communication (Pate et al., 2000).

Despite the benefits, challenges were also noted. Many respondents indicated that the app sometimes experiences technical issues that disrupt communication. Concerns were also raised about the ability of the app to effectively handle complex medical queries, as well as the need for stronger privacy and data protection mechanisms. These challenges are consistent with findings from international studies such as Miner et al. (2000), which highlighted the limitations of chatbots in providing advanced medical advice and the risks of over-reliance on automated systems. From a theoretical standpoint, this reflects one of the criticisms of Uses and Gratification Theory, which assumes that media use is entirely need-driven, without fully accounting for structural limitations such as technical failures (Obada et al., 2001a). Similarly, Diffusion of Innovations Theory has been criticized for underestimating contextual barriers such as technological infrastructure, cost, and digital literacy, which can slow down adoption in settings like Nigeria.

In terms of the overall impact on doctor–patient relationships, the study revealed that the chatbot-powered app improves trust and strengthens communication between patients and doctors. Respondents noted that the app fosters a sense of confidence in their interactions and complements traditional consultations. This supports studies like Liu et al. (2009), which emphasized that digital health tools can enhance patient-centered care by improving the continuity and personalization of communication (Obada et al., 2001b).

The findings show that chatbot-powered apps are gradually transforming healthcare communication at COOUTH by improving accessibility, efficiency, and trust, while still facing adoption challenges related to technical limitations and infrastructure. By linking these findings to the theories guiding this study, it is evident that UGT explains the motivations behind patient usage of the app, while DOI accounts for the patterns of adoption and barriers faced in the process. Empirical evidence from both international and local studies reinforces the reliability of these findings, showing that COOUTH is not isolated but part of a wider global trend of integrating artificial intelligence into healthcare communication.

IV. Conclusions

The findings of this study indicate that the chatbot-powered app has a significant positive impact on doctor–patient communication at Chukwuemeka Odumegwu Ojukwu Teaching Hospital. It enhances clarity in medical instructions, fosters trust in the doctor–patient relationship, and provides a convenient platform for patients to ask questions they might not raise in person. The app also facilitates timely responses from doctors, contributing to more efficient and effective healthcare interactions. However, the study also revealed challenges that limit the app's full potential. Technical issues, occasional glitches, and limited capacity to handle complex medical queries were identified as barriers to optimal communication. These limitations suggest that while the app is effective for routine inquiries and general communication, it cannot yet fully replace traditional in-person consultations for all medical needs.

The study concludes that the chatbot-powered app is a valuable tool in enhancing doctor–patient communication, supporting accessibility, convenience, and engagement in healthcare interactions. Nevertheless, to maximize its benefits and encourage wider adoption, continuous improvements in technical performance, functionality, user support, and data security are necessary. The app represents a meaningful step toward integrating digital solutions into healthcare communication, with the potential for even greater impact as enhancements are implemented.

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