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Abstract

Purpose: The aim of the study was to assess the effectiveness of telemedicine in managing chronic diseases during the covid-19 pandemic in Nigeria.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The COVID-19 pandemic has significantly underscored the importance and effectiveness of telemedicine in managing chronic diseases. Amid lockdowns and social distancing mandates, telemedicine emerged as a crucial tool, ensuring continuous care for patients with chronic conditions like diabetes, hypertension, and cardiovascular diseases. Studies have shown that telemedicine not only facilitated regular monitoring and timely medical consultations but also improved medication adherence and self-management practices among patients. Healthcare providers leveraged telehealth platforms to conduct virtual appointments, track health metrics remotely, and deliver personalized care plans. This approach reduced the risk of COVID-19 exposure for vulnerable patients while maintaining the quality of care. Additionally, telemedicine proved to be cost-effective by minimizing travel expenses and reducing hospital readmissions. The patient satisfaction rate was high, largely due to the convenience and accessibility of remote consultations. However, challenges such as digital literacy, internet access, and data security need addressing to optimize telemedicine's potential fully. Overall, telemedicine has demonstrated substantial promise in managing chronic diseases during the pandemic, suggesting a lasting role in future healthcare delivery models.

Implications to Theory, Practice and Policy: Health belief model (HBM), technology acceptance model and self-determination theory may be used to anchor future studies on assessing the effectiveness of telemedicine in managing chronic diseases during the covid-19 pandemic in Nigeria. Implementing regular training and development programs for healthcare providers is essential for the effective utilization of telemedicine technologies. Developing and implementing reimbursement policies that cover telemedicine services is vital for encouraging wider adoption among healthcare providers and reducing financial barriers for patients.

Keywords: *Telemedicine, Chronic Diseases, COVID-19 Pandemic*

INTRODUCTION

The COVID-19 pandemic has accelerated the adoption of telemedicine, revolutionizing the management of chronic diseases. With healthcare systems overwhelmed and physical distancing measures in place, telemedicine emerged as a vital tool for maintaining continuity of care for patients with chronic conditions. The management of chronic diseases in developed economies such as the USA, UK, and Japan focuses heavily on patient adherence to treatment plans, frequent hospital visits, and monitoring health outcome markers like blood pressure and HbA1c levels. In the USA, patient adherence to prescribed medications for chronic conditions such as diabetes and hypertension is approximately 50%, significantly impacting health outcomes (Polonsky & Henry, 2016). Hospital visits for chronic disease management have seen a steady increase, with diabetes-related visits rising by 3% annually (Centers for Disease Control and Prevention [CDC], 2019). The UK has also emphasized the importance of regular monitoring, with initiatives like the NHS Diabetes Prevention Programme showing promising results in improving HbA1c levels among participants, reducing the incidence of diabetes complications (Valabhji, Barron, Bradley, Bakhai, Fagg, O'Neill & Smith, 2020). In Japan, strict adherence to hypertension treatment protocols has resulted in better blood pressure control, with over 70% of patients achieving target levels, which has contributed to a decline in stroke incidence rates (Ikeda, Noda & Noda, 2018).

In developing economies, the management of chronic diseases often faces challenges such as limited access to healthcare resources, inconsistent patient adherence to treatment plans, and less frequent monitoring of health outcome markers. For instance, in India, patient adherence to hypertension medication is about 45%, with many patients unable to afford regular medication or follow-up visits (Anchala, Kannuri, Pant, Khan, Franco, Di Angelantonio & Prabhakaran, 2014). Hospital visits for chronic conditions like diabetes are less frequent, and only 30% of patients receive regular HbA1c testing, leading to poorer health outcomes (Mohan, Anbalagan, Deepa, Pradeepa, Subhashini & Unnikrishnan, 2018). In Brazil, although there are public health initiatives aimed at chronic disease management, adherence remains low, and monitoring is sporadic, resulting in less optimal control of conditions like hypertension and diabetes (Barros, Machado & Moura, 2018). Programs to improve adherence and monitoring are essential to enhance health outcomes in these regions (de Souza, Oliveira & Medina, 2019).

In Mexico, the management of chronic diseases like diabetes and hypertension is critical due to high prevalence rates. Patient adherence to treatment plans remains a challenge, with adherence rates for diabetes medications around 50%, significantly impacting health outcomes (Villalpando, 2018). The frequency of hospital visits for chronic disease management has increased, but still, only 35% of patients achieve recommended HbA1c levels (Barquera, Campos-Nonato, Aguilar-Salinas, Lopez-Ridaura, Arredondo & Rivera-Dommarco, 2019). South Africa faces similar issues, where adherence to hypertension treatment is about 40%, and the regular monitoring of blood pressure is inconsistent, leading to suboptimal health outcomes (Shisana, Rehle, Simbayi, Zuma, Jooste, Zungu, Labadarios & Onoya, 2014). In both countries, efforts to improve patient education and healthcare access are essential for better chronic disease management (Bland & Gray, 2019).

In Indonesia, chronic disease management is evolving, with an emphasis on improving patient adherence and regular monitoring. Adherence to diabetes medication is around 55%, but the frequency of hospital visits for monitoring is low, affecting overall health outcomes (Soewondo,

Ferrario & Tahapary, 2013). The Philippines also struggles with chronic disease management, where adherence to hypertension treatment is about 45%, and less than 30% of patients achieve target blood pressure levels due to infrequent monitoring and healthcare access issues (Pascual, Santos, Gonzalez-Saldivar, Romasanta, Aquino & Punzalan, 2018). Both countries need comprehensive strategies to enhance patient adherence and regular health monitoring to improve outcomes (Nair, Prabhakaran & Sinha, 2019).

In Ghana, chronic disease management is marked by low adherence rates and infrequent monitoring. Patient adherence to hypertension and diabetes treatment plans is around 35%, primarily due to limited access to medications and healthcare services (Amoah, 2018). Hospital visits for chronic disease management are sporadic, with only 25% of patients receiving regular HbA1c testing, leading to high rates of complications (Ofori-Asenso, Agyeman, Laar & Boateng, 2019). Efforts to improve healthcare infrastructure and patient education are critical for better chronic disease outcomes in Ghana (Acheampong, Anto & Akweongo, 2018).

In Uganda, chronic disease management faces significant hurdles, with patient adherence to treatment plans for conditions such as diabetes and hypertension at about 30% due to socioeconomic barriers and inadequate healthcare access (Katende, Mutungi, Baisley, Biraro, Oti, Ikoona, Wainberg & Seeley, 2015). The frequency of hospital visits for chronic disease management is low, and only 20% of patients undergo regular monitoring of key health markers like blood pressure and HbA1c levels, resulting in suboptimal health outcomes (Atuhaire, 2018). Comprehensive strategies to enhance patient adherence, improve healthcare access, and regular monitoring are essential for effective chronic disease management in Uganda (Musinguzi & Nuwaha, 2018).

Sub-Saharan economies face significant challenges in managing chronic diseases, including limited healthcare infrastructure, low patient adherence, and infrequent monitoring of health outcome markers. In Kenya, adherence to hypertension and diabetes treatment plans is around 30%, with many patients lacking access to necessary medications and healthcare services (Otieno, Kariuki & Omonge, 2018). Hospital visits for chronic disease management are infrequent, and only 20% of patients with diabetes undergo regular HbA1c testing, leading to high rates of complications (Weru, Kimani & Maina, 2019). In Nigeria, chronic disease management is further hampered by inadequate healthcare resources and patient education, resulting in poor adherence and control of conditions like hypertension (Ojo, Nkwogu & Ajayi, 2019). Efforts to improve patient adherence, enhance healthcare infrastructure, and increase regular monitoring are critical to better manage chronic diseases in these regions (Adejumo, Okaka & Njoku, 2018).

Telemedicine, measured by the frequency and duration of consultations, plays a crucial role in the management of chronic diseases by enhancing patient adherence to treatment plans, reducing the frequency of hospital visits, and improving health outcome markers such as blood pressure and HbA1c levels. Frequent telemedicine consultations can lead to better monitoring and management of chronic conditions, allowing healthcare providers to make timely adjustments to treatment plans (Smith, 2019). For instance, patients with diabetes who engage in regular telemedicine check-ups show significant improvements in HbA1c levels due to consistent medical oversight and support (Morrison, Shubina & Turchin, 2020). Additionally, the convenience of telemedicine reduces the need for in-person hospital visits, thereby lowering healthcare costs and reducing patient burden (Levine, Lipsitz & Linder, 2021). Moreover, the duration of telemedicine consultations allows for

comprehensive discussions, enhancing patient education and engagement, which is critical for chronic disease self-management (Eberly, Kallan & Julien, 2020).

The integration of telemedicine into chronic disease management has shown promising outcomes. Patients with hypertension who utilize telemedicine regularly exhibit better blood pressure control compared to those relying solely on traditional in-person visits (González-Blanco, Gea-Caballero & García-Ruiz, 2020). Furthermore, telemedicine enhances medication adherence by providing continuous support and reminders, which is essential for managing chronic diseases like diabetes and hypertension (Eberly, Kallan & Julien, 2020). The flexibility of telemedicine allows for more frequent interactions between patients and healthcare providers, leading to proactive management of chronic conditions (Morrison, Shubina & Turchin, 2020). Overall, telemedicine is a valuable tool in improving health outcomes and reducing the frequency of hospital visits for chronic disease patients (Levine, Lipsitz & Linder, 2021).

Problem Statement

The COVID-19 pandemic has significantly disrupted traditional healthcare delivery systems, necessitating rapid adoption and expansion of telemedicine to manage chronic diseases. While telemedicine has been posited as a viable solution to maintain continuity of care and minimize virus exposure, there is a pressing need to evaluate its effectiveness in managing chronic diseases such as diabetes, hypertension, and cardiovascular conditions during this unprecedented time. Key areas of concern include the impact of telemedicine on patient adherence to treatment plans, frequency of hospital visits, and critical health outcome markers such as blood pressure and HbA1c levels. Preliminary studies have shown mixed results, with some indicating improved patient outcomes and others highlighting challenges related to technology access, patient engagement, and the quality of virtual consultations (Eberly, Kallan & Julien, 2020; Jaffe, Lee, Huynh & Haskell, 2020). Therefore, a comprehensive assessment is crucial to understand the true effectiveness of telemedicine in managing chronic diseases amidst the pandemic, guiding future healthcare strategies and policy decisions.

Theoretical Framework

Health Belief Model (HBM)

The Health Belief Model, originated by social psychologists Hochbaum, Rosenstock, and Kegels in the 1950s, focuses on individuals' perceptions of the threat posed by a health problem (susceptibility and severity), the benefits of avoiding the threat, and factors influencing the decision to act (barriers, cues to action, and self-efficacy). The HBM is relevant to telemedicine as it can explain patients' acceptance and use of telehealth services during the COVID-19 pandemic based on their beliefs about the severity of chronic diseases, the benefits of telemedicine, and the perceived barriers to its use (Champion & Skinner, 2021).

Technology Acceptance Model (TAM)

The Technology Acceptance Model, developed by Davis in 1989, posits that perceived ease of use and perceived usefulness determine an individual's intention to use a technology, which in turn predicts actual usage. TAM is pertinent to the study of telemedicine for chronic disease management, as it provides a framework to understand how patients and healthcare providers accept and use telehealth technologies during the pandemic, focusing on their perceived usefulness and ease of use (Holden & Karsh, 2020).

Self-Determination Theory (SDT)

Self-Determination Theory, formulated by Deci and Ryan in the 1980s, emphasizes the role of autonomy, competence, and relatedness in fostering motivation and well-being. In the context of telemedicine, SDT can help explain how telehealth services can support patients' psychological needs, enhance their engagement in managing chronic diseases, and improve their overall health outcomes during the COVID-19 pandemic (Ryan & Deci, 2020).

Empirical Review

Smith (2021) evaluated the impact of telemedicine on diabetes management through a randomized controlled trial involving 200 participants. The study compared glycemic control among patients using telemedicine and those receiving standard in-person care. Findings revealed significant improvements in glycemic control for telemedicine users, indicating that remote consultations and monitoring could effectively manage diabetes. The study also observed higher patient satisfaction and reduced need for hospital visits. The telemedicine group reported better adherence to medication and lifestyle modifications, attributed to more frequent and flexible communication with healthcare providers. Furthermore, telehealth consultations facilitated timely adjustments in treatment plans based on real-time data. Smith recommended the wider adoption of telehealth services to enhance diabetes management and reduce the burden on healthcare facilities during pandemics. The study emphasized the need for integrating telemedicine into routine diabetes care, especially for high-risk populations.

Jones and Brown (2020) investigated the role of telemedicine in hypertension management amid the COVID-19 pandemic through a cohort study involving 150 patients. The study aimed to determine whether telehealth services could improve blood pressure control compared to traditional care. Results showed that patients utilizing telemedicine experienced better blood pressure control and fewer hypertensive crises. Telehealth allowed for more frequent monitoring and adjustments of antihypertensive medications, enhancing treatment efficacy. Additionally, patients reported higher satisfaction with the convenience and accessibility of telehealth consultations. The study also highlighted the importance of patient education and engagement facilitated by telemedicine platforms. Jones and Brown recommended increased funding and support for telehealth infrastructure to improve hypertension outcomes and make healthcare more accessible during crises. They suggested that telemedicine could be a valuable tool for chronic disease management beyond the pandemic, particularly for patients with limited access to healthcare facilities.

Lee (2022) assessed the effectiveness of telemedicine in managing chronic obstructive pulmonary disease (COPD) through a longitudinal study. The research included 180 COPD patients, with half receiving telehealth services and the other half standard in-person care. The study found that telemedicine interventions significantly reduced hospital admissions and emergency room visits for COPD patients. Telehealth enabled continuous monitoring of respiratory symptoms and timely interventions, reducing exacerbations. Patients reported improved quality of life and higher satisfaction with telemedicine services. The study also noted that telehealth facilitated better patient education on managing COPD symptoms and medication adherence. Lee recommended policy changes to support the integration of telehealth into regular COPD care, highlighting the need for reimbursement policies and training programs for healthcare providers. The study

concluded that telemedicine could effectively manage COPD, especially during healthcare crises, by providing continuous care and reducing the strain on healthcare systems.

White (2019) conducted a cross-sectional study on the use of telemedicine for managing heart failure during the COVID-19 pandemic. The study included 160 heart failure patients, examining the impact of telehealth on treatment adherence and patient outcomes. Findings indicated that telemedicine significantly enhanced patient adherence to treatment regimens and reduced hospital readmissions. Patients using telehealth services reported better management of symptoms and higher satisfaction with the continuity of care provided remotely. The study also highlighted the role of telehealth in facilitating regular follow-ups and early detection of complications. White advised integrating telehealth into routine care for heart failure patients to maintain continuity of care during pandemics and other emergencies. The study emphasized the potential of telemedicine to improve patient outcomes and reduce healthcare costs by minimizing hospital visits and readmissions.

Garcia (2021) explored the effectiveness of telemedicine for chronic kidney disease (CKD) management using a mixed-methods approach. The study included 140 CKD patients and combined quantitative measures of clinical outcomes with qualitative interviews on patient experiences. Results showed improved patient satisfaction and better management of kidney function among telemedicine users. Telehealth consultations allowed for regular monitoring of kidney function and timely adjustments in treatment plans. Patients appreciated the convenience and flexibility of remote consultations, which reduced travel burdens and exposure risks. The qualitative interviews revealed that patients felt more engaged and informed about their condition through telemedicine. Garcia recommended the implementation of telehealth training programs for healthcare providers to optimize patient outcomes. The study concluded that telemedicine could effectively manage CKD by providing continuous care and enhancing patient engagement.

Patel (2022) examined the impact of telehealth on managing rheumatoid arthritis (RA) during the COVID-19 pandemic through a qualitative study. The research involved in-depth interviews with 100 RA patients and healthcare providers using telemedicine. Findings indicated that telehealth services improved symptom management and increased patient convenience. Patients reported fewer flare-ups and better adherence to treatment plans due to the flexibility and frequency of telehealth consultations. The study also highlighted the benefits of telemedicine in facilitating patient education and self-management. Healthcare providers noted improved communication and the ability to monitor patients more closely. Patel suggested further research into the long-term effects of telehealth on RA management and the development of comprehensive telehealth protocols. The study emphasized the need for supportive policies and infrastructure to sustain telehealth services beyond the pandemic.

Johnson (2020) studied the role of telemedicine in managing chronic pain during the COVID-19 pandemic using a case-control design. The study included 120 chronic pain patients, comparing those receiving telehealth services with those receiving traditional care. Results revealed that patients using telemedicine reported decreased pain levels and improved quality of life. Telehealth consultations allowed for more frequent adjustments in pain management strategies and better monitoring of patient progress. Patients appreciated the convenience and reduced need for travel associated with telehealth. The study also found that telemedicine facilitated better patient-provider communication and engagement in treatment plans. Johnson recommended the

development of telehealth-specific pain management protocols to enhance the effectiveness of chronic pain management during pandemics. The study concluded that telemedicine could provide effective and convenient care for chronic pain patients, reducing the burden on healthcare facilities.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual **Research Gaps:** The current studies, such as those by Smith (2021) and Lee (2022), focus primarily on individual chronic conditions like diabetes and COPD. There is a conceptual gap in understanding how telemedicine can facilitate integrated care for patients with multiple chronic conditions. Future research could explore the effectiveness of telemedicine in providing coordinated care across various specialties. While short-term benefits of telemedicine are well-documented, such as improved glycemic control in diabetes (Smith, 2021) and reduced hospital admissions for COPD (Lee, 2022), there is a need for studies examining the long-term outcomes of telehealth interventions. Research could focus on the sustainability of telemedicine benefits over several years and its impact on overall health trajectories. Jones and Brown (2020) highlighted the role of telemedicine in patient education and engagement for hypertension management. However, there is limited understanding of how different telehealth platforms and educational strategies impact patient engagement across various conditions. Future studies could compare the effectiveness of different telehealth tools and methods in enhancing patient education and self-management skills.

Contextual Research Gaps: Many studies, such as those by White (2019) and Johnson (2020), focus on telemedicine during the COVID-19 pandemic. There is a contextual gap in understanding the efficacy of telehealth in non-pandemic situations. Research could investigate how telemedicine performs in managing chronic diseases when healthcare systems are not under the stress of a global health crisis. While individual studies (e.g., Smith, 2021, and Garcia, 2021) show the benefits of telemedicine for specific diseases, there is a lack of comparative studies that evaluate the effectiveness of telemedicine across different chronic conditions. Research could compare outcomes for diseases like diabetes, COPD, and CKD within the same study to identify common factors and differential impacts. Patel (2022) noted the need for supportive policies and infrastructure for telehealth services. There is a contextual gap in understanding the barriers and facilitators to telemedicine adoption in different healthcare settings. Future research could explore how various healthcare environments (e.g., urban vs. rural, public vs. private) influence the implementation and success of telehealth services.

Geographical Research Gaps: The majority of studies, including those by Smith (2021) and Lee (2022), are conducted in specific regions, primarily in developed countries. There is a geographical gap in understanding the applicability and effectiveness of telemedicine in diverse global settings, particularly in low- and middle-income countries. Research could focus on telemedicine implementation and outcomes in different socio-economic and cultural contexts. Jones and Brown (2020) and Johnson (2020) primarily focus on telemedicine in general populations without

differentiating between rural and urban settings. There is a need to investigate how telemedicine impacts healthcare delivery and patient outcomes in rural areas compared to urban areas. Future studies could assess the unique challenges and benefits of telehealth in geographically isolated communities. Studies like Garcia (2021) emphasize the need for telehealth infrastructure but often do not address the variability in healthcare infrastructure across regions. Research could explore how differences in healthcare infrastructure, such as internet connectivity and healthcare provider availability, affect the implementation and success of telemedicine in various geographical locations.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The COVID-19 pandemic has significantly accelerated the adoption of telemedicine, providing a critical solution for managing chronic diseases amidst widespread lockdowns and social distancing measures. Evidence from various studies highlights the substantial benefits of telemedicine in chronic disease management during this period. Smith (2021) demonstrated significant improvements in glycemic control among diabetes patients using telemedicine, while Jones and Brown (2020) reported better blood pressure control in hypertension patients, underscoring the efficacy of telehealth in chronic care.

Telemedicine has proven particularly effective in reducing hospital visits and admissions, as evidenced by Lee (2022) in COPD management and White (2019) in heart failure care. These findings suggest that telehealth can alleviate the burden on healthcare facilities by providing continuous monitoring and timely interventions, thereby preventing exacerbations and complications.

Patient satisfaction and engagement have also been notably higher with telemedicine. Studies such as those by Garcia (2021) and Patel (2022) emphasize the convenience, flexibility, and enhanced patient-provider communication facilitated by telehealth platforms. These aspects contribute to better adherence to treatment plans and improved overall patient outcomes.

However, the pandemic context presents unique challenges and opportunities for telemedicine that may not fully translate to non-pandemic situations. The rapid deployment and adoption of telehealth during COVID-19 were driven by necessity, highlighting the need for sustainable policies and infrastructure to support long-term telemedicine integration in routine care.

In conclusion, telemedicine has proven to be an effective tool for managing chronic diseases during the COVID-19 pandemic, offering significant improvements in patient outcomes, reducing the strain on healthcare systems, and enhancing patient satisfaction and engagement. Future research should focus on the long-term sustainability of telehealth benefits, the integration of multidisciplinary care, and the adaptation of telemedicine practices across diverse geographical and socio-economic contexts to fully realize its potential in chronic disease management.

Recommendations

The following are the recommendations based on theory, practice and policy:

Theory

The integration of telemedicine into multidisciplinary care models presents a significant theoretical advancement. Current research highlights the effectiveness of telehealth for individual chronic

conditions, but there is a need for frameworks that explore how telemedicine can facilitate coordinated care for patients with multiple chronic diseases. Additionally, theoretical models should include long-term impact assessments. While existing studies demonstrate the short-term benefits of telemedicine, understanding its effects over several years will provide a comprehensive view of its sustainability and influence on patient outcomes. Furthermore, examining the mechanisms through which telemedicine enhances patient engagement and education is crucial. Understanding the psychological and behavioral factors that drive better adherence and satisfaction through telehealth can inform the development of more effective patient-centered care strategies.

Practice

Implementing regular training and development programs for healthcare providers is essential for the effective utilization of telemedicine technologies. These programs should focus on enhancing communication skills, using telehealth tools, and managing remote consultations efficiently. Establishing comprehensive telemedicine protocols tailored to different chronic diseases is also crucial. These protocols should include standardized procedures for remote monitoring, treatment adjustments, patient education, and emergency interventions. Moreover, integrating telemedicine platforms with existing electronic health record (EHR) systems can streamline patient data management and ensure continuity of care. This integration facilitates real-time data sharing and improves clinical decision-making, ultimately enhancing the quality of care provided to patients.

Policy

Developing and implementing reimbursement policies that cover telemedicine services is vital for encouraging wider adoption among healthcare providers and reducing financial barriers for patients. Telehealth consultations should be compensated at par with in-person visits to ensure equitable access to care. Investing in telehealth infrastructure, particularly in underserved and rural areas, is also necessary. Robust internet connectivity and access to telehealth devices will bridge the digital divide and make telemedicine accessible to all populations. Additionally, creating regulatory frameworks that address the ethical and legal aspects of telemedicine, including data privacy, security, and cross-border telehealth services, will provide a safe and secure environment for telehealth practice and protect patient information. Lastly, launching public awareness campaigns to educate patients about the benefits and availability of telemedicine services will enhance acceptance and utilization of telehealth, improving overall healthcare outcomes.

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