Int. j. adv. multidisc. res. stud. 2025; 5(1):792-802

Received: 16-12-2024
Accepted: 26-01-2025

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Patterns of Knowledge and Utilization of AI-Powered Smart Gadgets for Stroke Prevention and Management among University Employees in Southeast Nigeria

[1] Aghaebe Sandra Ekene, [2] Igboeli Chinedu Chukwueloka

[1, 2] Department of Mass Communication, Faculty of Social Sciences, Chukwuemeka Odumegwu Ojukwu University, Igbariam Campus, Nigeria

Corresponding Author: **Aghaebe Sandra Ekene**

Abstract

The rising prevalence of strokes in Southeast Nigeria underscores the urgent need for effective prevention and management strategies. AI-powered smart gadgets, such as smartwatches and ECG monitors, offer innovative solutions for health monitoring. However, their utilization among university employees in this region remains understudied. This research aims to assess the patterns of knowledge and utilization of these AI-powered devices for stroke prevention and management among university employees in Southeast Nigeria. The study will evaluate the level of awareness, patterns of engagement, barriers to adoption, and perceptions of these smart gadgets. Anchored on the Uses and Gratifications theory, the study adopted the survey research method in assessing the opinions of respondents with a sample size of 384 drawn from a population of 63,080 teaching and non-teaching staff of selected university employees in Southeast Nigeria. The findings reveal that while there is a moderate level of awareness about AI-powered smart gadgets like smartwatches and ECG monitors, their utilization for stroke prevention and management remains relatively low. Key barriers identified include limited knowledge of device functionalities, concerns about cost, and perceived reliability of the technology. Despite these challenges, participants expressed a positive attitude towards the potential benefits of these devices in enhancing health monitoring and stroke prevention. The study highlights the need for targeted educational initiatives and improved accessibility to these smart gadgets to increase their adoption and utilization.

Keywords: Knowledge, Utilization, AI-Powered Smart Gadgets, Stroke Prevention and Management, University Employees

Introduction

Stroke is a significant cause of mortality and disability globally, particularly among older adults. In Nigeria, stroke accounts for a substantial portion of non-communicable diseases, with an increasing prevalence among the ageing population (WHO, 2020). Stroke is especially prevalent among older adults (aged 50 years and above) who tend to have comorbid conditions such as high blood pressure, diabetes, and high cholesterol levels. Addressing stroke prevention and effective management strategies is crucial to mitigate its impact on public health. Thus, timely access to medical attention can significantly improve a patient's prognosis, with modern digital health communication playing a significant role, particularly among older adults (Johns Hopkins Medicine, 2023) [12].

While there have been significant advances in stroke prevention and treatment over the past several decades, there is still a need for innovative approaches to reduce the incidence and burden of stroke, particularly among older adults working in universities. AI-powered smart gadgets such as smartwatches and electrocardiograms (ECG) have the potential to play a significant role in this effort by providing individuals with tools and resources to better manage their health and reduce their risk of stroke. These AI-powered smart gadgets have been introduced as convenient and accessible tools for promoting healthy behaviours and tracking health indicators among older university employees. These technologies can be used to provide personalized health information, reminders for medication adherence, and tracking physical activity levels (Nwafor, Nwokoro and Omoeva, 2022 [21]; Aghaebe & Igboeli, 2025).

Smartwatches are multifunctional wearable devices that offer features such as heart rate monitoring, blood pressure tracking, and electrocardiogram (ECG) functionality. Through their integration with mobile applications, these devices enable real-time health monitoring and instant communication with healthcare providers. Studies have shown that smartwatches equipped with AI algorithms can predict atrial fibrillation, a significant precursor to stroke, with remarkable accuracy (Chen, Zhao, & Wang, 2022) [5]. On the other hand, ECG monitors are specialized devices designed to detect irregular heart rhythms and provide diagnostic insights. Their portability and ease of use make them particularly valuable for continuous monitoring. Advanced models use AI to interpret ECG readings, alerting users and healthcare providers to potential health risks in real time (Jones, Smith, & Thompson, 2023; Nwafor, Muoboghare, & Osafile, 2022) [13, 22]. These features are critical for managing the chronic conditions often associated with stroke risk.

According to Küfeoğlu (2022) [15], the integration of AI-powered smart gadgets into healthcare paradigms, particularly for stroke prevention and management, underscores a transformative shift in the approach to elder care. Knowledge of these innovations is crucial, as they offer functionalities that can enhance monitoring, early detection, and real-time intervention capabilities among older adults. Such devices can actively track vital signs, analyze data trends, and prompt healthcare interventions, aligning with the findings that highlight challenges posed by climate change and socio-economic factors in developing regions, such as Africa, where such health disparities are prevalent. Moreover, emerging technologies like AI not only aid in individual health management but also reinforce community health initiatives, thereby contributing to sustainable development goals (Küfeoğlu, 2022) [15]. This comprehensive understanding is imperative for older university employees in Southeast Nigeria, who may benefit significantly from adopting these technologies to mitigate stroke risk and improve management outcomes.

Knowledge about AI-powered gadgets for health management is a critical determinant of their adoption. Therefore, the adoption of smartwatches and ECG gadgets depends heavily on health literacy levels. Studies suggest that older university employees, despite being educated, may lack the digital skills necessary to use these technologies effectively (Eze, Nnaji, & Obi, 2023) [8]. Thus, promoting digital health literacy is essential for maximizing the benefits of these devices. Older university employees may have varying levels of awareness regarding the functionalities and benefits of smartwatches and ECG gadgets. Research highlights the need for targeted educational programs to bridge knowledge gaps (Umeh, Chukwu, & Nwankwo, 2022; Nwammuo, Obi & Nwafor, 2015 [25]). More so, the utilization of AI-powered gadgets is influenced by several factors, including accessibility, perceived usefulness, and affordability. A study by Chukwu, Okafor, & Uzor (2023) [6] found that while many older adults in Nigeria are aware of wearable health technologies, actual usage rates remain low due to economic and infrastructural challenges.

Older adults, particularly those over 40 years of age, are at a higher risk of developing stroke due to age-related health vulnerabilities. University employees in this demographic often face occupational stress and sedentary lifestyles, compounding their risk factors. AI-powered devices, especially smartwatches and ECG monitors, offer a non-invasive and convenient approach to monitoring cardiovascular health, thus providing a personalized pathway for stroke prevention (Ahmed, Hassan, & Malik, 2023) [1]. AI-powered smart gadgets and wearable devices such as smartwatches which function as fitness trackers and heart rate monitors are increasingly used to monitor patients at risk of stroke. They can measure vital signs and identify changes in heart rhythms, helping to detect subclinical atrial fibrillation, which can increase the risk of stroke. Also, m-health devices such as mobile ECG monitors and blood pressure cuffs are used to monitor patients outside the hospital setting. They send data wirelessly to healthcare providers, who can then monitor patients and make early interventions if necessary (Nwammuo & Nwafor, 2017) [24].

The intersection of AI-powered gadgets and the workforce of older university employees raises pertinent questions about their awareness and understanding of these evolving tools. Within higher education institutions, there remains a significant generational gap regarding the adoption of innovative technologies, particularly those used for health management and preventive care. For this demographic, clinical advancements like AI-powered smart gadgets can play a pivotal role in stroke prevention and management, yet many older employees may feel intimidated or disconnected from these technologies. To effectively leverage AI tools, it is essential to enhance their knowledge and understanding through targeted training and resources. This is particularly important as highlighted by the recognition that only those familiar with advanced technology can utilize them effectively; technologies must be made approachable and relevant (Küfeoğlu, 2023) [16]. A comprehensive framework of support can empower older employees, fostering their engagement and improving health outcomes in stroke prevention initiatives.

Also, this demographic group's engagement with such technological interventions remains relatively understudied, hindering the optimization of stroke care. Thus, conducting a comprehensive study to investigate the knowledge and utilization of these AI-powered smart gadgets for stroke prevention and management among older adults in the universities in Southeast Nigeria provides valuable insights. This research, therefore, aimed to bridge the gap between technological advancements and their practical implementation in stroke care among this demographic.

Statement of the Problem

Strokes are a leading cause of morbidity and mortality worldwide, with a significant impact on individuals and healthcare systems. In Southeast Nigeria, stroke prevalence continues to rise, posing a major public health challenge. Despite advancements in medical technology, the integration and utilization of AI-powered smart gadgets, such as smartwatches and ECG monitors, for stroke prevention and management remain limited among university employees in this region. Several factors contribute to the underutilization of these innovative tools. Knowledge and awareness about the capabilities and benefits of AI-powered smart gadgets are often insufficient. Additionally, there may be technological, economic, and cultural barriers that hinder their adoption and consistent use. University employees, who are typically educated and exposed to technological advancements, present a unique

demographic to study the patterns of knowledge and utilization of these devices. Understanding the level of awareness, attitudes, and practical engagement with AI-powered smart gadgets for stroke prevention and management among this group is crucial. This research aims to identify gaps in knowledge and utilization, explore the barriers to adoption, and provide insights into how these smart devices can be better integrated into everyday healthcare practices. Addressing these issues will ultimately contribute to reducing the burden of strokes and improving health outcomes in Southeast Nigeria.

Objectives of the Study

The general objective of this study was to assess the knowledge and utilization of AI-powered smart gadgets like smartwatches and ECG monitors for stroke prevention and management among older university employees in Southeast Nigeria. The specific objectives were to:

1. To determine the respondents' level of knowledge of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management.
2. To assess the extent of utilization of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management among the respondents.
3. Determine the utilization patterns of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management among the respondents.
4. Analyze the relationship between the level of knowledge and utilization patterns of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management among the respondents.
5. Assess the relationship between the utilization of AI-powered smartwatches and ECG smart gadgets and the effectiveness of stroke management among the respondents.
6. Examine the factors influencing respondents' utilization of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management.

Theoretical Framework

The Uses and Gratifications Theory (UGT) serves as a foundational framework for understanding media consumption behaviours, particularly in the context of AI-powered smart gadgets for stroke prevention and management among older adults. UGT posits that individuals actively seek out media to satisfy specific needs and desires, such as entertainment, information, and social connection (Nwafor & Nnaemeka, 2023). Originating in the 1940s and '50s, UGT emerged as a response to traditional media effects theories, focusing instead on audience motivations and the functional needs that media fulfils. Pioneering work by Katz, Blumler, and Gurevitch in 1974 highlighted that individuals often engage with media for gratification rather than mere information consumption, emphasizing the active role of the audience in media interactions (Nwafor, Muoboghare & Osafile, 2022) [22].

Recent studies have applied UGT to explore how older adults utilize AI-powered smart gadgets for stroke prevention and management. For instance, Powers *et al.* (2020) [30] examined a tele-rehabilitation system for stroke patients, revealing that convenience and flexibility were key motivators for engagement. They underscored the relevance of self-determination theory alongside UGT in understanding patient motivations. Similarly, Ojo *et al.* (2019) [26] found that the needs and preferences of older adults significantly influenced the success of mobile health (mHealth) applications, advocating for user-centred design principles informed by UGT. Oksanen *et al.* (2020) [27] further supported this notion by investigating wearable devices, noting that users appreciated the novelty of the technology, reinforcing the importance of aligning product design with user expectations.

In a Korean context, Kim *et al.* (2021) [14] identified factors influencing the adoption of mHealth applications for stroke prevention among older adults. Their findings indicated that perceived usefulness, ease of use, and social influence were critical predictors of adoption, emphasizing UGT's role in understanding older adults' motivations. Lee *et al.* (2021) [17] explored the use of smartwatches for stroke rehabilitation, highlighting that older users valued convenience and ease of use, further illustrating UGT's applicability in this domain. A systematic review by Ojo *et al.* (2021) reiterated the importance of UGT in comprehending user motivations and expectations regarding AI-powered smart gadgets for stroke management.

The implications of utilizing AI-powered smart gadgets extend to promoting healthy ageing among older university employees. By leveraging smart technologies, this demographic can enhance their health outcomes through effective stroke prevention and management (Nwafor, Aghaebe, Bartholomew, & Umuze, 2024) [23]. UGT can guide the development of these technologies by ensuring they align with the specific needs and preferences of older adults. Understanding the motivations behind technology adoption can lead to better-designed products that facilitate user engagement. UGT is particularly relevant in this context as it provides insights into the diverse motivations older adults may have for using AI-powered gadgets. These motivations can range from seeking health information and social interaction to finding entertainment and asserting personal identity. Factors such as age, gender, education, socioeconomic status, and cultural values significantly influence attitudes and behaviors toward these technologies.

Key determinants affecting the adoption and utilization of AI-powered smart gadgets among older adults in Nigeria include usability, accessibility, trust, privacy, healthcare provider support, and social networks. By identifying these gratifications, healthcare providers and technology developers can tailor their offerings to meet the specific needs of older adults, potentially leading to increased adoption and utilization rates. The application of UGT in studying AI-powered smart gadgets for stroke prevention and management among older adults provides valuable insights into user motivations and preferences. By understanding these factors, researchers and developers can create technologies that resonate with older users, ultimately promoting healthier ageing and improved health outcomes. The integration of UGT into the design and evaluation processes of these technologies is essential for fostering engagement and ensuring that the needs of older adults are met effectively.

Literature Review

Patterns of Knowledge and Utilizations of AI-powered Smart Gadgets for Stroke Prevention and Management

The integration of AI-powered smart gadgets into healthcare presents a promising avenue for enhancing stroke prevention and management, particularly among older adults. Stroke is

a prevalent and debilitating condition that disproportionately affects this demographic, with risk factors such as hypertension, diabetes, and atrial fibrillation becoming more common with age. The potential of AI technologies to improve health outcomes is significant, yet the knowledge and awareness of these tools among older adults remain limited. This gap in understanding can hinder the effective utilization of these technologies, ultimately impacting stroke management and prevention efforts.

AI-powered smart gadgets encompass a range of technologies, including health monitoring devices, telehealth services, mobile health applications, virtual reality, neuromodulation devices, and data analytics. These tools can facilitate health monitoring, provide remote healthcare services, and assist in self-management, thereby improving the quality of care for stroke patients. However, studies indicate that older adults often lack familiarity with these technologies. For instance, a UK study revealed that only 26% of older adults were aware of health monitoring devices, with a mere 12% having used them (Nguyen *et al*., 2021) [18]. Similarly, a study in Singapore found that only 20.6% of stroke survivors utilized health monitoring devices (Bey *et al*., 2019) [4]. Telehealth services, which can offer remote consultations and follow-ups, also face low awareness and utilization rates among older adults. A survey in the US indicated that only 21% of older adults were aware of telehealth services, and only 4% had utilized them (Pew Research Center, 2019) [29]. In Canada, while interest in telehealth was noted among stroke patients, actual usage remained low (Balhara *et al*., 2019) [3]. Mobile health applications designed to provide education and self-management tools for stroke patients similarly suffer from low awareness, with only 19.7% of older adults in Taiwan being aware of such apps (Kuo *et al*., 2019).

Virtual reality and neuromodulation devices, which can enhance rehabilitation efforts, also show limited awareness and usage among older adults. A Canadian study found that only 48% of older adults were aware of virtual reality technology, with only 2% having used it (McKay *et al*., 2020; Ezeaka, 2024 [9]). Neuromodulation devices had even lower awareness, with only 16% of older adults in the UK being familiar with them (Das *et al*., 2021) [7]. The role of artificial intelligence in predicting stroke risk and aiding in diagnosis is similarly underrecognized, with only 18% of older adults aware of AI technologies (Pew Research Center, 2019) [29]. The Internet of Things (IoT) can facilitate remote monitoring for stroke patients, yet awareness remains low, with only 38% of older adults in Australia being familiar with IoT technologies (Hordacre *et al*., 2021) [11]. Electronic health records and personal health records, which can enhance patient engagement and self-management, also face low awareness and usage rates among older adults (Guérard *et al*., 2021; Pew Research Center, 2019 [29]). Data analytics and clinical decision support systems, which can improve treatment effectiveness and decision-making, are similarly underutilized, with only 21% of older adults aware of data analytics (Hordacre *et al*., 2021) [11]. In Nigeria, the situation is particularly pressing, as stroke is a leading cause of death and disability, accounting for approximately 15% of all deaths (World Health Organization). The increasing population of older adults in Nigeria necessitates innovative approaches to manage chronic conditions like stroke. However, the level of knowledge regarding AI-powered smart gadgets among older adults remains uncertain. A study by Balhara *et al*. (2019) [3] highlighted a lack of awareness and utilization of telestroke technology among older adults in rural areas, attributing this to insufficient infrastructure and resources.

The limited knowledge and awareness of AI-powered smart gadgets among older adults can be attributed to several barriers, including cognitive decline, lack of exposure to technology, and limited access to health-related information. Additionally, affordability, mobility issues, and privacy concerns further complicate the adoption of these technologies. Addressing these gaps requires multifaceted approaches, including public education campaigns, targeted training programs, and collaborations among healthcare providers, technology developers, and policymakers. Research also indicates that the utilization of AI-powered smart gadgets for stroke prevention and management among older adults is low across various countries. For instance, a study in China found that only 13.2% of older adults used AI-powered smart gadgets for stroke management (Isah *et al*., 2021). Similarly, studies in Jordan, Japan, and South Korea reported low utilization rates of mobile applications and telemedicine technologies for stroke management (Al-Dmour *et al*., 2020 [2]; Nishimura *et al*., 2019; Kwon *et al*., 2020).

In Nigeria, the challenges are compounded by low digital literacy and limited access to technology. A study by Soriyan and Adeyanju (2019) [31] found that only 2% of patients reported prior use of telemedicine technologies. Other studies have highlighted the low utilization of mobile health applications and wearable devices among older adults, despite the potential benefits these technologies offer (Olowookere *et al*., 2020; Osamor *et al*., 2019). To enhance the utilization of AI-powered smart gadgets for stroke prevention and management, targeted education and awareness campaigns are essential. These initiatives should focus on increasing digital literacy, improving access to affordable technologies, and fostering a supportive environment for older adults to engage with these tools. Furthermore, collaboration among stakeholders, including healthcare providers, technology developers, and policymakers, is crucial to creating an ecosystem that promotes the adoption of AI-powered smart gadgets. While AI-powered smart gadgets hold significant promise for improving stroke prevention and management among older adults, the current level of knowledge and utilization remains low. Addressing the barriers to awareness and access is essential for maximizing the potential of these technologies (Ezeaka, Ochuba & Bartholomew, 2025) [10]. With concerted efforts in education, training, and collaboration, older adults can be empowered to utilize AI-powered smart gadgets effectively, leading to better health outcomes and improved quality of life.

Methodology

This study employed the survey method. The survey design facilitates the collection of quantitative data from a large sample, enabling the analysis of trends and patterns. The survey component involved the development of standardized questions to capture various dimensions of knowledge, adoption, and utilization of AI-powered smart

gadgets, particularly for stroke management. The study's population comprises all teaching and non-teaching staff from nine selected universities across three states in Southeast Nigeria: Anambra, Enugu, and Abia. The universities include Nnamdi Azikiwe University, Chukwuemeka Odumegwu Ojukwu University, and Tansian University in Anambra; University of Nigeria Nsukka, Enugu State University of Science and Technology, and Godfrey Okoye University in Enugu; and Michael Okpara University of Agriculture, Abia State University, and Gregory University in Abia. The total population is 63,080, as sourced from each institution's Personnel Unit. A sample size of 384 was determined using Dusick's (2014) sample size calculator, with a 5% confidence interval and a 95% confidence level, ensuring a representative sample. A multi-stage research approach was implemented. In Stage 1, purposive sampling selected the nine universities due to their staff's vulnerability to stroke. Stage 2 involved cluster sampling to categorize respondents by state and university, creating Anambra, Abia, and Enugu clusters. Stage 3 utilized purposive sampling to focus on individuals aged 40 and above, aligning with research specifications. Stage 4 employed accidental sampling to distribute questionnaires to respondents encountered during the process, optimizing time and cost. Finally, Stage 5 applied proportional sampling to determine the number of respondents in each cluster, as described by Salkind (2010), who noted that this method divides a population into subpopulations and applies random sampling techniques to each (p. 1120).

Data Presentation

The sample consists of slightly more males (54.97%) than females (45.03%). This indicates a fairly balanced gender distribution among the respondents, though there is a small male majority. The age distribution shows that the majority of respondents are in the 50-59 years age group (41.88%), followed by the 40-49 years age group (31.41%), and 60 years and above (26.70%). This indicates that most respondents are in their middle to late career stages. The majority of respondents are married (65.45%), with single individuals making up 21.47% of the sample and divorced/widowed individuals comprising 13.09%. This suggests a predominance of stable family units among the respondents. The highest level of education among respondents indicates that most have a Bachelor's degree (39.27%), followed by those with a Master's degree (23.56%) and a Diploma (20.94%). A smaller proportion holds a Doctorate (8.38%) or a Secondary education (7.85%). This suggests that the majority of respondents are well-educated, with a significant portion having advanced degrees. There is a slight majority of academic staff (54.97%) compared to non-academic staff (45.03%) among the respondents. This indicates a relatively balanced distribution between academic and non-academic roles, though academic staff are slightly more represented.

Answers to Research Questions

Research Question One

What is the respondents' level of knowledge of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management?

a. Have you heard about AI-powered smart gadgets like smartwatches and ECG monitors used for stroke prevention and management?

Table 1: Respondents' Level of Knowledge of AI-Powered Smart Gadgets

Response	Frequency	Percentage (%)
Yes	300	78.53
No	82	21.47
Total	**382**	**100**

A significant majority of respondents (78.53%) have heard about AI-powered smart gadgets like smartwatches and ECG monitors used for stroke prevention and management. This indicates a relatively high level of initial awareness among the sample population. However, 21.47% of respondents are still unaware of these technologies, highlighting a need for further education and outreach to ensure comprehensive awareness.

b. Please indicate your familiarity with these AI-powered smart gadgets:

Table 2: Respondents' Level of Familiarity with AI-Powered Smart Gadgets

Response	Frequency	Percentage (%)
Very familiar	150	39.26
Somewhat familiar	202	52.87
Not familiar with it at all	30	7.85
Total	**382**	**100**

Among those who have heard about AI-powered smart gadgets, the majority of the respondents (52.87%) are somewhat familiar with these technologies, while 39.26% are very familiar. However, 7.85% of respondents are unfamiliar despite having heard about them. This suggests that while initial awareness is high, there is a varying degree of familiarity, with a significant portion of the population needing more detailed information and understanding.

c. How do you rate your understanding of how these AI-powered smart gadgets can help prevent and manage stroke?

Table 3: Respondents' Level of Understanding of the AI-Powered Smart Gadgets

Response	Frequency	Percentage (%)
Very good	99	25.91
Good	180	47.12
Fair	73	19.10
Poor	30	7.85
Total	**382**	**100**

Regarding their understanding of the role of AI-powered smart gadgets in stroke prevention and management, 40.00% of respondents rated their understanding as good, and 30.00% rated it as very good. However, 20.00% of respondents considered their understanding to be fair, and 10.00% rated it as poor. This indicates that while a majority have a positive perception of their understanding, there is still a substantial portion that may benefit from further education to enhance their knowledge.

Research Question Two

What is the extent of utilization of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management **among the respondents? Answering research question two as indicated in the questionnaire.**

a. Have you ever used or are you currently using any AI-powered smart gadgets, such as smartwatches and ECG monitors, for stroke prevention and management?

Table 4: Respondents' Extent of Use of AI-Powered Smart Gadgets

Response	Frequency	Percentage (%)
Yes	120	31.41
No	262	68.59
Total	**382**	**100**

Only 31.41% of respondents have ever used or currently use AI-powered smart gadgets for stroke prevention and management, while a significant majority of 68.59% do not use these technologies. This indicates that despite relatively high awareness, the actual utilization of these gadgets remains low, suggesting potential barriers to adoption that need to be addressed.

b. How long have you been using these AI-powered smart gadgets like smartwatches and ECG monitors?

Table 5: Respondents' Length of Use of AI-Powered Smart Gadgets

Response	Frequency	Percentage (%)
Less than 6 months	50	13.00
6 months to 1 year	30	8.00
1-2 years	20	5.00
More than 2 years	20	5.00
Never Used	262	68.00
Total	**362**	**100**

Among those who use AI-powered smart gadgets, 13% have been using them for less than 6 months, indicating a recent adoption trend. The remaining respondents are fairly evenly split among the longer usage durations, with 13% using them for 6 months to 1 year, and 5% each for 1-2 years and more than 2 years. While the majority of the respondents never used any of the gadgets for stroke prevention and management. This suggests that while adoption is growing, many users are relatively new to these technologies while the majority are yet to adopt the gadgets for stroke prevention and management.

Research Question Three

What are the utilization patterns of AI-powered smart gadgets **for stroke prevention and management among the respondents?**

a. How frequently do you use AI-powered smart gadgets for stroke prevention and management?

Table 6: Respondents' Utilization Patterns of AI-Powered Smart Gadgets

Response	Frequency	Percentage (%)
Daily	40	10.47
Several times a week	50	13.90
Once a week	20	5.68
Rarely	10	2.61
Never Used	262	68.58
Total	382	100.00

Among the users of AI-powered smart gadgets, 10.47% use them daily, and 14.90% use them several times a week, indicating a relatively high frequency of use. However, 5.68% use them once a week, 2.61% use them rarely and 68.58 never use any of the gadgets. This suggests that while a significant portion of users integrate these technologies regularly into their routines, there are also users with less frequent engagement and the majority have neither adopted nor used the gadgets for stroke prevention and management.

b. What specific features of AI-powered smart gadgets do you find most useful for stroke prevention and management?

Table 7: Respondents' Views on the most useful features of AI-Powered Smart Gadgets

Feature	Frequency	Percentage (%)
Monitoring vital signs	100	26.17
Providing medication reminders	60	15.70
Offering exercise or rehabilitation programs	45	11.78
Facilitating communication with healthcare providers	30	7.85
Providing educational resources about stroke prevention	25	6.54
All of the above	262	68.58
Total	382	100.00

The most useful features of AI-powered smart gadgets identified by users include monitoring vital signs (26.17%) and providing medication reminders (15.70%). Other significant features include offering exercise or rehabilitation programs (11.78%) and facilitating communication with healthcare providers (7.85%). Providing educational resources about stroke prevention (6.54%) and all of the above features (68.58%) were the highest. This means that the majority of the respondents find monitoring vital signs, providing medical reminders, offering exercise or rehabilitation programmes, facilitating communication with healthcare providers and providing educational resources about stroke prevention as the most useful for stroke prevention and management. This highlights the importance of health monitoring and reminders in the utility of these gadgets.

Research Question Four

What is the relationship between the level of knowledge and utilization patterns of AI-powered smartwatches and ECG smart gadgets **for stroke prevention and management among the respondents?**

a. Do you believe that having more knowledge about AI-powered smart gadgets increases the likelihood of using them for stroke prevention and management?

Table 8: Relationship between Knowledge Level and Utilization Rates

Response	Frequency	Percentage (%)
Strongly agree	150	39.27
Agree	130	34.03
Disagree	60	15.71
Strongly disagree	42	10.99
Total	**382**	**100**

A majority of respondents (39.27%) strongly agree, and 34.03% agree that having more knowledge about AI-powered smart gadgets increases the likelihood of using them for stroke prevention and management. However, 15.71% disagree, and 10.99% strongly disagree. This

suggests that while most respondents believe in the importance of knowledge for adoption, there is a notable minority that does not see this connection as strongly.

Research Question Five

What is the relationship between the utilization of AI-powered smartwatches and ECG smart gadgets **and effective stroke management among the respondents?**

a. In your opinion, how effective are AI-powered smart gadgets in helping manage stroke-related conditions?

Table 9: Relationship between Utilization and Effectiveness of Stroke Management

Response	Frequency	Percentage (%)
Very effective	120	31.41
Effective	140	36.65
Somewhat effective	80	20.94
Not effective	42	10.99
Total	**382**	**100**

Most respondents view AI-powered smart gadgets as either very effective (31.41%) or effective (36.65%) in managing stroke-related conditions. However, 20.94% find them somewhat effective, and 10.99% do not find them effective. This indicates a generally positive perception of the effectiveness of these technologies but also highlights the need for continuous improvement and education to enhance their perceived effectiveness.

Research Question Six

What are the factors influencing your adoption and utilization of AI-powered smart gadgets for stroke prevention and management?

a. What factors influenced your decision to adopt AI-powered smart gadgets for stroke prevention and management?

Table 10: Factors that Influence Decision to Adopt AI-Powered Smart Gadgets

Factor	Frequency	Percentage (%)
Ease of use	100	26.18
Cost	80	20.94
Recommendations from healthcare providers	70	18.32
Influence of family or friends	50	13.09
Perceived effectiveness	60	15.71
Availability of technical support	22	5.76
Total	**382**	**100**

The most significant factor influencing the adoption of AI powered smart gadgets for stroke prevention and management is ease of use (26.18%), followed by cost (20.94%) and recommendations from healthcare providers (18.32%). Other factors include perceived effectiveness (15.71%) and influence of family or friends (13.09%). Availability of technical support (5.76%) is the least influential factor. These insights suggest that while usability and affordability are crucial for adoption, endorsements from trusted healthcare professionals also play a vital role.

b. What barriers, if any, have you encountered in using AI powered smart gadgets for stroke prevention and management?

Table 11: Barriers have you encountered in using Adopt AI Powered Smart Gadgets

Barrier	Frequency	Percentage (%)
Lack of technical knowledge	120	31.41
Cost of devices or services	100	26.18
Lack of access to reliable internet or mobile networks	70	18.32
Concerns about privacy and data security	50	13.09
Difficulty incorporating technology into daily routine	42	10.99
Total	**382**	**100**

The most common barrier to using AI-powered smart gadgets for stroke prevention and management is a lack of technical knowledge (31.41%). Other significant barriers include the cost of devices or services (26.18%), lack of access to reliable internet or mobile networks (18.32%), and concerns about privacy and data security (13.09%). Difficulty incorporating technology into daily routines (10.99%) is also a notable barrier. This indicates that educational initiatives and support services could be crucial in mitigating these barriers and enhancing technology adoption.

Test of Hypotheses

Hypothesis One

$H0_1$ There is no significant relationship between the level of knowledge and utilization patterns of AI-powered smartwatches and ECG smart gadgets **for stroke prevention and management among the respondents.**

Analysis for H_{01}: Relationship between Knowledge and Utilization Patterns

Category	Observed (O)	Expected (E)	(O -	(O - E)²	(O - E)² / E
High - Regular	80	42.44	37.56	1411.20	33.26
High - Occasional	60	42.44	17.56	308.22	7.26
High - None	20	42.44	-22.44	503.41	11.86
Moderate - Regular	60	42.44	17.56	308.22	7.26
Moderate - Occasional	40	42.44	-2.44	5.95	0.14
Moderate - None	40	42.44	-2.44	5.95	0.14
Low - Regular	30	42.44	-12.44	154.76	3.65
Low - Occasional	30	42.44	-12.44	154.76	3.65
Low - None	22	42.44	-20.44	417.74	9.85
Total	382	382			77.07

$\chi 2=77.07\backslash chi\hat{}2 = 77.07$

Chi-Square Test Results for H_{01}

Test Statistic	Value	df	p-value
Chi-Square	77.07	8	0.0001

The p-value is less than 0.05, indicating that we reject the null hypothesis (H_{01}). This means that there is a significant relationship between the respondents' level of knowledge and utilization patterns of AI-powered smartwatches and ECG smart gadgets for stroke prevention and management. **Decision: Reject H_{01}.**

Hypothesis Two

$H0_2$ There is no significant relationship between the utilization of AI-powered smartwatches and ECG smart gadgets **and effective stroke management among the respondents**

Analysis for H_{02}: Relationship between Knowledge and Utilization Patterns

Category	Observed (O)	Expected (E)	(O - E)	$(O - E)^2$	$(O - E)^2 / E$
High - Effective	100	42.44	57.56	3312.02	78.06
High - Somewhat Eff.	30	42.44	-12.44	154.76	3.65
High - Not Eff.	10	42.44	-32.44	1052.22	24.80
Mod. - Effective	80	42.44	37.56	1411.20	33.26
Mod. - Somewhat Eff.	40	42.44	-2.44	5.95	0.14
Mod. - Not Eff.	30	42.44	-12.44	154.76	3.65
Low - Effective	30	42.44	-12.44	154.76	3.65
Low - Somewhat Eff.	50	42.44	7.56	57.14	1.35
Low - Not Eff.	12	42.44	-30.44	926.57	21.84
Total	382	382			170.40

$\chi 2=170.40\backslash chi\hat{}2 = 170.40$

Chi-Square Test Results for H_{02}

Test Statistic	Value	df	p-value
Chi-Square	170.40	8	0.00001

The p-value is less than 0.05, indicating that we reject the null hypothesis (H_{02}). There is a significant relationship between the respondents' utilization of AI-powered smartwatches and ECG smart gadgets and effective stroke management. **Decision: Reject H_{02}.** These results indicate significant relationships for both hypotheses, confirming that increased knowledge positively influences utilization patterns, and the utilization of these devices is significantly related to effective stroke management.

Discussion of Findings

The findings from the study indicate that a significant majority of respondents (78.53%) have heard about AI-powered smartwatches and ECG monitors used for stroke prevention and management. This relatively high level of awareness suggests that these technologies are becoming more prominent, likely due to increasing global and local discussions about health technology. Recent studies align with this finding, noting that awareness of wearable health technologies has grown in developing regions due to campaigns and advertisements targeting middle-aged and elderly populations susceptible to cardiovascular diseases (Mishra *et al*., 2023). However, the 21.47% of respondents who remain unaware highlight an information gap. This lack of awareness could stem from limited access to health technology information, particularly among populations with lower health literacy levels or those living in rural areas.

The data also revealed varying levels of familiarity among respondents who had heard about these gadgets. The majority (52.87%) reported being "somewhat familiar," while 39.26% were "very familiar." Only 7.85% indicated that they were "not familiar at all." This suggests that while general awareness is high, detailed knowledge and understanding of how these technologies function and can be applied in stroke prevention are unevenly distributed. Similar observations have been made in studies such as Li *et al*. (2022), which found that while many people are aware of wearable health devices, their actual understanding of features and benefits remains limited. When respondents were asked to rate their understanding of the role of these gadgets in stroke management, a majority (47.12%) considered their understanding to be "good," while 25.91% rated it as "very good." However, 19.10% rated their understanding as "fair," and 7.85% as "poor." This diversity in self-assessed understanding underscores the need for targeted educational initiatives. Campaigns and workshops focused on the functionalities and benefits of these devices could bridge the knowledge gap, as highlighted in a report by Nguyen *et al*. (2023), which emphasized the importance of user education in increasing adoption rates of health technologies.

The findings from research question two indicated that despite the relatively high level of awareness, the extent of utilization of these technologies remains low. Only 31.41% of respondents indicated that they had ever used or were currently using these gadgets for stroke prevention and management, while a significant 68.59% had never used them. This discrepancy between awareness and usage aligns with findings by Zhang *et al*. (2022), which noted that awareness does not always translate to utilization, particularly in regions where cost, accessibility, and technical literacy pose barriers. The length of use among those who adopted these devices further highlights the recent nature of their adoption. A majority of users (13%) reported using these gadgets for less than six months, suggesting that many are relatively new to these technologies. Longer durations of usage were less common, with only 8% using them for 6 months to 1 year and 5% each for 1-2 years and more than 2 years. This pattern may reflect the increasing availability of these gadgets in the market and growing public interest in their potential for stroke prevention. However, the substantial proportion of respondents who have never used these devices (68%) points to significant barriers, such as cost, limited technical knowledge, and lack of access, which need to be addressed to encourage broader adoption. These findings are consistent with the conclusions of Abubakar *et al*. (2023), who highlighted financial and infrastructural barriers as key inhibitors to the widespread adoption of health technology in Sub-Saharan Africa.

The findings from research question three showed that the utilization patterns of AI-powered smart gadgets reveal significant variation in frequency of use among respondents. Among those who use these technologies, 10.47% reported daily usage, and 13.90% used them several times a week, indicating a subset of users who have integrated these

devices into their daily health routines. However, less frequent usage was also evident, with 5.68% using them once a week and 2.61% rarely. The majority (68.58%) reported never using these gadgets, further emphasizing the gap between awareness and adoption. These findings suggest that while a small group of users is leveraging these technologies effectively, broader adoption remains limited. Studies like that of Johnson *et al*. (2023) suggest that regular usage correlates with higher perceived benefits, which underscores the importance of encouraging consistent use. Respondents also identified specific features they found most useful in these gadgets. Monitoring vital signs emerged as the most commonly appreciated feature (26.17%), followed by providing medication reminders (15.70%) and offering exercise or rehabilitation programs (11.78%). Other features, such as facilitating communication with healthcare providers (7.85%) and providing educational resources about stroke prevention (6.54%), were also noted. Interestingly, 68.58% of respondents recognized the combined utility of all these features, indicating the multifaceted value these technologies offer in stroke prevention and management. This aligns with findings from Patel *et al*. (2023) [28], which showed that multifunctionality is a significant factor in the perceived utility of wearable health technologies.

The findings from research question four suggests a strong relationship between knowledge levels and utilization patterns. A majority of respondents (39.27%) strongly agreed, and 34.03% agreed, that having more knowledge about these technologies increases the likelihood of using them for stroke prevention and management, a finding statistically supported by the rejection of H_{01} ($\chi^2 = 77.07$, $p < 0.05$). This underscores the role of knowledge as a critical enabler of technology adoption. However, a notable minority (15.71%) disagreed, and 10.99% strongly disagreed, indicating that knowledge alone may not suffice for adoption in all cases. Factors such as affordability, accessibility, and personal health priorities may mediate this relationship. These findings are supported by Okonkwo *et al*. (2023), who identified knowledge as a significant but not exclusive determinant of health technology adoption.

Findings from research question five indicated that the majority of respondents rated these technologies as either very effective (31.41%) or effective (36.65%) in managing stroke-related conditions. This positive perception aligns with the growing body of evidence that highlights the potential of wearable health technologies in improving health outcomes through continuous monitoring and timely interventions (Kim *et al*., 2023). However, 20.94% found these gadgets only somewhat effective, and 10.99% considered them not effective, suggesting variability in user experiences and expectations. Factors such as device reliability, user expertise, and integration with healthcare systems could influence these perceptions, as noted by Singh *et al*. (2023). The rejection of H_{02} ($\chi^2 = 170.40$, $p < 0.05$) further substantiates this relationship, confirming that utilization correlates with improved outcomes. However, 10.99% perceive no effectiveness**,** likely due to technical challenges or unmet expectations.

Finding from research question six indicated that ease of use (26.18%) was the most significant factor influencing adoption, followed by cost (20.94%) and recommendations from healthcare providers (18.32%). Other factors included perceived effectiveness (15.71%) and influence from family or friends (13.09%). Availability of technical support (5.76%) was the least influential factor. These findings highlight the multifaceted nature of technology adoption, where usability, affordability, and professional endorsements play crucial roles. Studies like those of Adeyemi *et al*. (2023) emphasize similar factors, particularly the role of healthcare professionals in influencing patient decisions. Barriers to adoption were also identified, with lack of technical knowledge (31.41%) and cost (26.18%) emerging as the most significant challenges. Other barriers included lack of access to reliable internet or mobile networks (18.32%), privacy and data security concerns (13.09%), and difficulty incorporating technology into daily routines (10.99%). These barriers point to the need for comprehensive strategies to address both systemic and individual-level challenges, as echoed by Brown *et al*. (2023).

The findings from this study provide a nuanced understanding of the awareness, utilization, and perceived effectiveness of AI-powered AI powered smart gadgets for stroke prevention and management. While awareness is relatively high, actual utilization remains limited, underscoring the need for targeted interventions to address barriers and enhance adoption rates. The relationship between knowledge and utilization highlights the importance of educational initiatives, while user experiences with these technologies emphasize their potential for effective stroke management.

Conclusion

The investigation into the patterns of knowledge and utilization of AI-powered smart gadgets for stroke prevention and management among university employees in Southeast Nigeria has shed light on several critical aspects. The study underscores a promising awareness and growing acceptance of these advanced technologies within the academic community. However, it also highlights significant gaps in accessibility, training, and trust that hinder widespread adoption. The findings suggest that while university employees recognize the potential benefits of AI-driven smart gadgets in mitigating stroke risks and enhancing post-stroke care, there is a need for targeted educational initiatives and infrastructural support to bridge the existing knowledge and utilization gaps. Implementing comprehensive training programs and improving access to these technologies could foster a more informed and health-conscious workforce. Ultimately, the research advocates for a collaborative approach involving stakeholders in education, healthcare, and technology sectors to ensure that AI-powered innovations reach their full potential in promoting better health outcomes. Addressing the identified barriers will be pivotal in maximizing the utility of smart gadgets for stroke prevention and management, thereby contributing to the overall well-being and productivity of university employees in the region.

Recommendations

Based on the research findings the study recommends the following:

1. Develop and implement targeted educational programs to increase awareness and knowledge about AI-powered smart gadgets for stroke prevention and management among university employees.

2. Collaborate with technology providers to make AI-powered smart gadgets more accessible and affordable for university employees.
3. Establish training programs to ensure university employees are equipped with the necessary skills to effectively use AI-powered smart gadgets.
4. Advocate for policies that promote the integration of AI technologies in healthcare and workplace wellness programs.
5. Engage the university community in discussions about the benefits and potential concerns related to AI-powered health technologies.

References

1. Ahmed S, Hassan T, Malik K. Exploring the effectiveness of wearable health devices for cardiovascular risk management in developing nations. Journal of Health Innovations. 2023; 12(4):345-359.
2. Al-Dmour H, Obeidat Z, Al-Dmour R. The adoption of mobile health applications for stroke management in Jordan. Middle Eastern Journal of Digital Health. 2020; 5(2):102-116.
3. Balhara YS, Verma R, Gupta R. Challenges in adopting telestroke technology in rural healthcare settings in Canada. Canadian Journal of Telemedicine. 2019; 8(3):321-337.
4. Bey C, Tan H, Lim K. Awareness and utilization of health monitoring devices among stroke survivors in Singapore. Asian Health Journal. 2019; 6(2):117-129.
5. Chen L, Zhao X, Wang Y. Predicting atrial fibrillation with AI-powered smartwatches: A systematic review. Journal of Cardiovascular Computing. 2022; 8(3):217-230.
6. Chukwu M, Okafor C, Uzor P. Barriers to the adoption of wearable health technologies in Sub-Saharan Africa. African Journal of Public Health. 2023; 15(6):425-440.
7. Das R, Kumar A, Singh P. Neuromodulation devices for stroke rehabilitation: Awareness and applications among the elderly in the UK. Journal of Geriatric Medicine. 2021; 9(1):45-57.
8. Eze U, Nnaji E, Obi A. Digital health literacy and adoption of wearable health gadgets among older adults in Nigeria. Nigerian Journal of Health Education. 2023; 10(3):198-210.
9. Ezeaka NB. Artificial Intelligence (AI) and Health Communication Policy in Nigeria: Challenges and Prospects. Journal of Advanced Research and Multidisciplinary Studies. 2024; 4(4):141-149. Doi: 10.52589/JARMS-ARD2E2R4
10. Ezeaka NB, Ochuba CC, Bartholomew CE. Addressing Healthcare Inequalities in Nigeria: A Communication Perspective on Advocacy and Policy Implications. Journal of Advanced Research and Multidisciplinary Studies. 2025; 4(4):1-11. Doi: 10.52589/JARMS-AAQQDLCJ
11. Hordacre B, Boddy J, Reynolds E. Internet of Things (IoT) in stroke management: A global perspective. Journal of Digital Health. 2021; 7(2):99-115.
12. Johns Hopkins Medicine. Stroke prevention strategies and the role of digital health interventions. Stroke Prevention Insights. 2023; 15(1):8-14.
13. Jones D, Smith R, Thompson L. The impact of AI-integrated ECG monitors on cardiovascular health management. American Journal of Cardiology. 2023; 21(7):765-781.
14. Kim J, Park S, Lee D. Factors influencing the adoption of mHealth applications for stroke prevention among Korean older adults. Korean Journal of Medical Informatics. 2021; 12(4):231-245.
15. Küfeoğlu S. The transformative role of AI-powered gadgets in healthcare paradigms for elder care. Global Journal of Health Technology. 2022; 18(3):345-360.
16. Küfeoğlu S. Bridging the generational gap in adopting health technology: Lessons from wearable AI gadgets. International Journal of Health Systems. 2023; 19(1):89-102.
17. Lee K, Choi Y, Lim J. Adoption and use of smartwatches in stroke rehabilitation: Insights from older adults. Asian Rehabilitation Journal. 2021; 5(2):142-156.
18. Nguyen P, Tran T, Vu H. Awareness and barriers to using health monitoring devices among older adults in the UK. Journal of Global Health Technology. 2021; 9(3):112-125.
19. Nwafor GU, Nnaemeka FO. Uses and gratifications of TikTok platform among university undergraduates. African Journal of Social Sciences and Humanities Research. 2023; 6(6):139-153. Doi: 10.52589/AJSSHR66FABNCR.
20. Nwafor GU, Nnaemeka FO. Influence of TikTok as an Edutainment Platform on Female Students' Awareness and Use of Contraceptives. Journal of Advanced Research and Multidisciplinary Studies. 2023; 3(3):65-77. Doi: 10.52589/JARMS-VJD3AKNW
21. Nwafor GU, Nwokoro CI, Omoevah BA. Access to coronavirus vaccination information and market women's attitude towards uptake in Onitsha, Anambra state. Advance Journal of Linguistics and Mass Communication. 2022; 6(5):5-19 https://aspjournals.org/journals/index.php/ajlmc/article/view/183
22. Nwafor GU, Muoboghare N, Osafile CO. Communicating Health Information through Artificial Intelligence: A Survey of COOU Female Undergraduates' Usage of Flo Period & Ovulation Tracker. International Journal of Applied Research in Social Sciences. 2022; 4(11):15-27.
23. Nwafor GU, Aghaebe SE, Bartholomew CE, Umuze AN. Investigating the Effectiveness of TikTok in Promoting Public Awareness and Engagement on Climate Change Adaptation and Mitigation Measures in Nigeria. Asian Journal of Education and Social Studies. 2024; 50(12):67-82.
24. Nwammuo AN, Nwafor GU. Convergence of traditional and new media of communication. In E.M. Mojaye (ed.) Traditional and new media of mass communication, p. 56-66. Asaba: Delta State University Press, 2017.
25. Nwammuo AN, Obi P, Nwafor GU. What has Information got to do with Safe-Motherhood Practice? Analysis of Influence of Safe-Motherhood Programme on Women. American Academic & Scholarly Research Journal. 2015; 7(5):44-56.
26. Ojo A, Adewale B, Adebayo T. Understanding user needs in mobile health applications for stroke care. West African Medical Journal. 2019; 14(2):105-115.

27. Oksanen T, Virtanen M, Nyberg A. User acceptance of wearable health devices for stroke rehabilitation. Scandinavian Journal of Digital Medicine. 2020; 8(4):235-245.
28. Patel S, Sharma V, Gupta R. Multifunctionality in wearable health technologies: Implications for adoption in stroke prevention. International Journal of Health Tech. 2023; 14(1):89-101.
29. Pew Research Center. Digital health trends among older adults: A comprehensive survey. Pew Reports on Digital Health. 2019; 3(12):56-78.
30. Powers S, Khan L, Rogers P. Examining tele-rehabilitation systems for stroke patients: A motivational framework. Health Informatics Journal. 2020; 16(3):128-145.
31. Soriyan H, Adeyanju J. Exploring barriers to telemedicine in rural Nigeria. Journal of African Medical Technologies. 2019; 11(6):456-471.