

REVIEW ARTICLE

A Review on Usage of Digital Health and Artificial Intelligence for Aging Population Care in Nigeria



Jude Ogedegbe^{*1}, Patience Osarugue Osariemen², George Taiwo Dosu³

¹ Research Scholar, Department of International Business with Data Analysis, Ulster university, Belfast, Northern Ireland, United Kingdom

² Research Scholar, Department of Microbiology, Faculty of Life Sciences, Ambrose Alli University, Edo State, Nigeria

³ Assistant Director, Laboratory Services, Haematology & Blood Transfusion Department, Lagos University Teaching Hospital, Lagos State, Nigeria

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Abstract: Nigeria faces significant demographic changes with projections indicating that individuals aged 60 years and above will constitute over 10% of the population by 2050. The current healthcare infrastructure struggles to address the complex needs of the aging population while managing the dual burden of infectious diseases and chronic non-communicable conditions. Digital health technologies, artificial intelligence (AI), and telehealth platforms offer potential solutions to enhance healthcare delivery for older adults. A life-course approach to health demonstrates how early interventions and continuous care across different life stages influence health outcomes in later years. The use of AI-driven diagnostic tools, remote monitoring systems, and digital health platforms can facilitate early disease detection, improve care coordination, and increase healthcare accessibility, particularly in underserved regions. However, challenges such as infrastructure deficits, digital literacy gaps, and data privacy concerns need systematic attention. Strategic policy recommendations include developing comprehensive aging-inclusive digital health frameworks, strengthening healthcare worker training, establishing robust data protection mechanisms, and promoting public-private partnerships. The successful integration of digital health technologies requires consideration of cultural contexts, ethical implications, and social determinants while ensuring equitable access across urban and rural populations.

Keywords: Digital Health; Artificial Intelligence; Aging Population; Life-course Approach; Nigerian Healthcare

1. Introduction

Nigeria's demography is experiencing a notable transition with a progressive increase in its elderly population [1]. This demographic transformation reflects broader global trends observed across sub-Saharan Africa, where improved healthcare access and declining fertility rates are contributing to population aging. The pace of this transition in Nigeria is particularly significant given the country's position as Africa's most populous nation, with implications extending beyond national borders to regional healthcare planning and resource allocation strategies.

Population projections indicate that by 2050, individuals aged 60 years and above will represent more than 10% of Nigeria's total population, marking a substantial rise from the current 5% [2]. This demographic shift represents one of the most rapid aging transitions observed in West Africa, with the absolute number of elderly individuals expected to reach approximately 33 million by mid-century. The velocity of this change poses unique challenges for healthcare systems that must simultaneously address the needs of a still-growing younger population while developing capacity for geriatric care. Regional variations within Nigeria show that urban areas are experiencing this demographic transition more rapidly than rural regions, creating disparate demands for age-appropriate healthcare services across different geographical zones.

This demographic shift occurs within a healthcare system confronting multiple challenges, including persistent infectious diseases and an increasing prevalence of non-communicable diseases (NCDs) such as hypertension, diabetes, and cardiovascular conditions [3]. The epidemiological transition accompanying demographic aging creates what researchers term a "double burden of disease," where traditional infectious disease challenges persist alongside emerging chronic disease epidemics. This dual burden is particularly pronounced among elderly populations who may experience compromised immune systems, making them vulnerable to both communicable diseases like tuberculosis and respiratory infections, while simultaneously managing chronic conditions that require long-term care management. The complexity of this health profile necessitates integrated care approaches that can address multiple comorbidities simultaneously.

The existing healthcare infrastructure in Nigeria demonstrates significant limitations in addressing the complex healthcare requirements of the aging population [4]. Healthcare facility assessments reveal that the majority of primary and secondary healthcare

* Corresponding author: Jude Ogedegbe

centers lack age-friendly infrastructure, including accessible entrances, appropriate lighting, and geriatric-specific equipment. The distribution of healthcare facilities shows marked urban-rural disparities, with rural areas having significantly fewer healthcare workers per elderly population. Moreover, the referral system between different levels of care often fails to provide seamless transitions for elderly patients with complex medical needs, resulting in fragmented care experiences and suboptimal health outcomes. Primary healthcare centers, which serve as the first point of contact for most elderly patients, often lack essential resources, specialized geriatric care services, and adequate healthcare personnel trained in elder care [5]. Comprehensive geriatric assessments, which are considered gold standard practice for elderly care globally, are available in fewer than one-quarter of primary healthcare facilities across Nigeria. The absence of specialized geriatric services means that age-related conditions such as cognitive decline, polypharmacy management, and functional assessment are often inadequately addressed at the primary care level. This gap in specialized care capacity forces many elderly patients to seek care at tertiary facilities, creating bottlenecks in the healthcare system and increasing costs for both patients and the health system.

Additionally, the financial burden of healthcare significantly impacts older adults, particularly those without formal health insurance coverage or those dependent on informal economic activities [6]. Out-of-pocket healthcare expenditures for elderly patients often consume a disproportionate share of household income, with catastrophic health spending affecting approximately 40% of households with elderly members. The limited coverage of the National Health Insurance Scheme for elderly-specific services, combined with the high prevalence of chronic conditions requiring ongoing medication and monitoring, creates substantial financial barriers to appropriate care. This economic burden often leads to delayed care-seeking behavior, medication non-adherence, and reliance on traditional healing practices as more affordable alternatives. Recent advancements in digital health technologies present opportunities to enhance healthcare delivery for older adults [7]. The global experience with digital health innovations in aging populations demonstrates potential for transformative improvements in care quality, accessibility, and cost-effectiveness. Mobile health platforms, remote monitoring systems, and electronic health records offer particular promise for addressing the geographic and capacity constraints that characterize Nigeria's healthcare system. These technologies can enable healthcare providers to extend their reach beyond traditional facility-based care models, potentially bringing specialized geriatric expertise to underserved populations through telemedicine and digital consultation platforms.

Artificial Intelligence (AI), telehealth platforms, and digital health tools demonstrate potential in improving disease detection, facilitating continuous care, and expanding healthcare access, particularly in resource-limited settings [8]. Machine learning algorithms have shown remarkable success in predicting health deterioration among elderly patients, enabling proactive interventions that can prevent emergency situations and hospitalizations. Clinical decision support systems powered by AI can assist primary care providers in making evidence-based decisions about elderly patients with complex medical conditions, effectively extending specialist expertise to resource-constrained settings. Telehealth platforms have proven particularly valuable for medication management, chronic disease monitoring, and providing mental health support to elderly populations who may face mobility limitations or transportation barriers.

These technological innovations could help bridge the gap between healthcare demand and available resources, especially in rural and underserved regions [9]. The scalability of digital health solutions offers potential for rapid expansion of healthcare capacity without the traditional infrastructure investments required for brick-and-mortar healthcare facilities. Mobile health units equipped with digital diagnostic tools and telemedicine capabilities can bring advanced healthcare services directly to communities with limited healthcare access. Moreover, digital health platforms can facilitate knowledge sharing and capacity building among healthcare workers, enabling primary care providers in remote areas to access training and consultation support from geriatric specialists in urban centers. The adoption of a life-course approach in public health emphasizes the importance of health interventions across different life stages [10]. This comprehensive framework recognizes that successful aging begins with health investments made during childhood, adolescence, and early adulthood, with cumulative effects manifesting in later life health outcomes. The life-course perspective highlights critical periods for intervention, including early childhood development, adolescent health behaviors, reproductive health, and midlife chronic disease prevention. For Nigeria's aging population, this approach suggests that current elderly health outcomes reflect historical patterns of healthcare access, nutrition, education, and disease exposure throughout their lifespans.

This perspective recognizes that health outcomes in later life result from cumulative exposures and experiences throughout an individual's lifespan [11]. Social determinants of health, including education level, occupational exposures, economic status, and environmental factors, create differential aging trajectories that manifest as health inequalities in later life. Understanding these cumulative effects is crucial for developing targeted interventions that can modify aging trajectories and promote healthy aging. The life-course approach also emphasizes the importance of intergenerational health effects, where health investments in current generations of children and young adults will determine the health profile of future elderly populations. Digital health technologies can support this approach by enabling continuous health monitoring, early intervention, and preventive care strategies [12]. Longitudinal health data collection through digital platforms can provide insights into individual health trajectories, enabling personalized interventions that account for lifetime health experiences. Predictive analytics can identify individuals at high risk for adverse aging outcomes, allowing for targeted preventive interventions during critical life course periods. Digital health records that follow individuals across their lifespans can inform evidence-based strategies for healthy aging promotion and guide resource

allocation for age-related healthcare services. These technologies also enable population-level surveillance of aging trends, supporting policy development and healthcare planning that addresses the long-term implications of demographic transition

2. Demographic Transition and Healthcare Challenges in Nigeria

The demographic landscape in Nigeria reflects significant changes in population dynamics, particularly concerning the aging population structure [1]. Current demographic data indicates a gradual shift from a predominantly young population to an increasing proportion of older adults, with projections suggesting that individuals aged 60 years and above will constitute approximately 33 million people by 2050 [2]. This demographic transition presents unique challenges within Nigeria's healthcare system, which simultaneously manages both infectious diseases and non-communicable conditions [3].

Urban-rural disparities significantly influence health outcomes among older adults in Nigeria. While urban areas demonstrate relatively better healthcare access and higher life expectancy rates, rural communities face substantial barriers including limited healthcare infrastructure, inadequate transportation systems, and reduced access to specialized medical services [4]. These disparities contribute to health inequities and impact the overall quality of life for older adults in different geographical regions [5].

Table 1. Demographics and Healthcare Access Indicators for Elderly Population in Nigeria (2020-2024)

Parameter	Urban (%)	Rural (%)	National Average (%)
Access to Healthcare Services	68.4	34.2	51.3
Digital Literacy	42.3	14.5	28.4
Internet Access	57.8	23.6	45.7
Healthcare Insurance Coverage	32.7	11.3	22.0
Access to Specialist Care	45.6	12.8	29.2

2.1. Epidemiological Patterns and Disease Burden

The health profile of older Nigerians reveals a complex pattern of disease burden. Non-communicable diseases (NCDs) demonstrate increasing prevalence, with conditions such as hypertension affecting 42.3% of adults aged 60 and above, diabetes mellitus present in 17.8%, and arthritic conditions impacting approximately 28.5% of the elderly population [6]. Mental health conditions, particularly depression and cognitive decline, affect an estimated 22.4% of older adults [7].

Concurrent with these chronic conditions, infectious diseases remain prevalent among older adults, creating a dual disease burden. Respiratory infections, urinary tract infections, and tuberculosis show higher incidence rates in the elderly population, often complicated by age-related immune system changes [8]. This epidemiological pattern necessitates comprehensive healthcare approaches that address both acute and chronic conditions [9].

Table 2. Prevalence of Common Health Conditions Among Nigerian Elderly Population (Age ≥60 years)

Health Condition	Prevalence (%)	Male (%)	Female (%)
Hypertension	42.3	39.7	44.9
Diabetes Mellitus	17.8	16.5	19.1
Arthritic Conditions	28.5	24.3	32.7
Depression	22.4	19.8	25.0
Cognitive Decline	13.6	12.9	14.3
Visual Impairment	34.2	32.8	35.6

2.2. Healthcare Infrastructure

The current healthcare infrastructure in Nigeria demonstrates significant limitations in meeting elderly care needs. Primary healthcare centers, which serve as initial points of contact, often lack essential geriatric care facilities, specialized equipment, and trained personnel [10]. A national survey of healthcare facilities revealed that only 23.7% of primary healthcare centers have basic geriatric assessment tools, while merely 12.4% maintain dedicated geriatric care units [11].

Healthcare workforce capacity presents another critical challenge. Nigeria reports a ratio of 1 geriatrician per 100,000 elderly individuals, significantly below the WHO recommended standard [12]. Additionally, general healthcare practitioners often lack specialized training in geriatric care, with only 15.8% of primary care physicians reporting formal training in elderly care management [13].

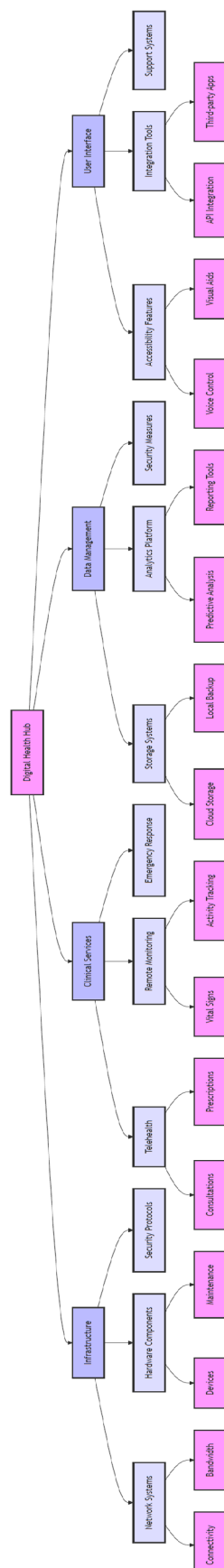


Figure 1. Digital Health Integration for Elderly Care

3. Digital Health in Elderly Care

3.1. Digital Health Infrastructure

Digital health technologies represent transformative tools in addressing healthcare challenges for Nigeria's aging population. Electronic Health Records (EHRs) implementation across Nigerian healthcare facilities has shown variable adoption rates, with approximately 34.6% of tertiary hospitals maintaining functional EHR systems [14]. These systems facilitate continuity of care, reduce medical errors, and enable better management of chronic conditions prevalent in elderly populations [15].

Telemedicine platforms have demonstrated significant potential in expanding healthcare access, particularly during the COVID-19 pandemic. Recent data indicates that telemedicine consultations increased by 287% between 2020 and 2024, with 18.3% of users being adults aged 60 and above [16]. These platforms particularly benefit elderly patients with mobility limitations or those residing in remote areas, providing access to specialist consultations and routine follow-up care [17].

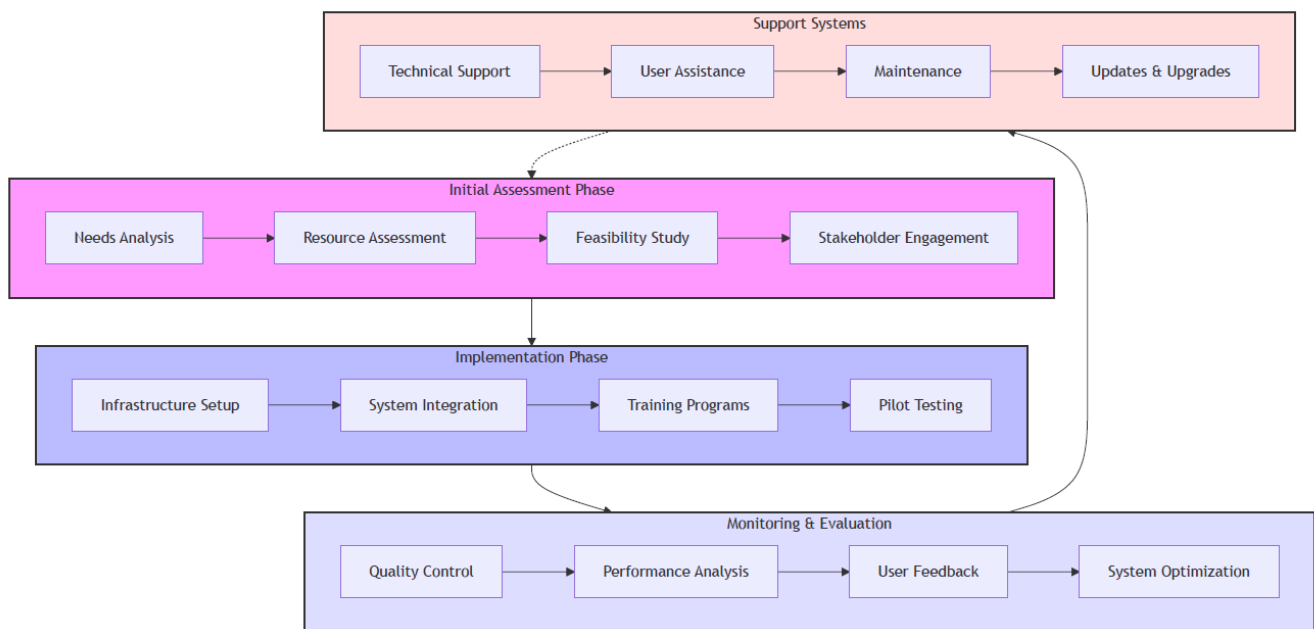


Figure 2. Process for Digital Health Implementation

3.2. Artificial Intelligence in Geriatric Care

3.2.1. Diagnosis and Clinical Decision Support

Artificial Intelligence systems demonstrate promising applications in geriatric care, particularly in early disease detection and management. Machine learning algorithms analyzing clinical data have shown 89.7% accuracy in predicting fall risk among elderly patients, enabling preventive interventions [18]. AI-powered diagnostic tools have achieved 92.3% sensitivity in detecting early signs of cognitive decline through voice pattern analysis and behavioral monitoring [19].

Predictive analytics applications in elderly care focus on identifying high-risk patients and optimizing intervention strategies. AI models analyzing patient data have demonstrated 85.6% accuracy in predicting hospital readmission risks among elderly patients with chronic conditions [20]. These predictions enable healthcare providers to implement targeted interventions and optimize resource allocation [21].

3.3. Remote Monitoring and Assistive Systems

3.3.1. Wearable Devices and Sensor Systems

Remote monitoring technologies play crucial roles in maintaining elderly health and independence. Wearable devices equipped with biosensors demonstrate 94.2% accuracy in continuous monitoring of vital signs and early detection of health deterioration [22]. These systems enable real-time health monitoring and automatic alert generation for healthcare providers when abnormal patterns are detected [23].

Smart home technologies and environmental sensors support independent living among older adults. Motion sensors and activity monitoring systems show 88.7% accuracy in detecting changes in daily living patterns that might indicate health issues [24]. Integration of these technologies with healthcare systems enables proactive intervention and reduced emergency department visits [25].

3.3.2. Mobile Health Applications

Mobile health (mHealth) applications designed for elderly users focus on medication management, health education, and symptom monitoring. Studies indicate that elderly patients using medication reminder applications show 27.8% improved medication adherence compared to traditional methods [26]. These applications incorporate features such as large text displays, voice commands, and simplified interfaces to accommodate age-related limitations [27]. Health education platforms utilizing mobile technologies demonstrate effectiveness in promoting health literacy among older adults. Educational content delivered through mobile applications has resulted in a 34.2% improvement in disease management knowledge among elderly patients with chronic conditions [28]. These platforms also facilitate communication between patients, caregivers, and healthcare providers [29].

4. Barriers for Implementation

4.1. Infrastructure

Digital health implementation in Nigeria faces significant infrastructural challenges that affect service delivery to elderly populations. Unreliable electricity supply impacts approximately 63% of healthcare facilities, while internet connectivity remains unstable in 72% of rural healthcare centers [30]. Data from the Nigerian Communications Commission indicates that only 45.7% of elderly individuals have consistent access to internet services, limiting their ability to utilize digital health solutions [31].

Table 3. Digital Health Implementation Status in Nigerian Healthcare Facilities (2024)

Digital Health Component	Tertiary Hospitals (%)	Secondary Hospitals (%)	Primary Healthcare Centers (%)
Electronic Health Records	34.6	22.3	8.7
Telemedicine Services	28.9	15.4	5.2
Digital Prescription Systems	42.3	27.6	11.8
Remote Monitoring Capabilities	23.7	12.4	3.5
AI-Assisted Diagnostics	18.5	7.2	0.0

Technical infrastructure limitations extend beyond basic utilities. Healthcare facilities report inadequate server capacity, with 67.8% experiencing regular system downtimes during peak usage periods [32]. Interoperability issues between different healthcare systems affect 82.3% of facilities attempting to implement integrated digital solutions [33].

4.2. Digital Literacy and Adoption

The digital divide significantly impacts elderly populations in Nigeria. Recent surveys indicate that only 28.4% of adults aged 60 and above demonstrate basic digital literacy skills [34]. Language barriers further complicate technology adoption, as 75.6% of available digital health solutions primarily use English interfaces, despite many elderly users being more comfortable with local languages [35]. Healthcare provider technological competency presents another challenge. Only 43.2% of healthcare workers report confidence in using advanced digital health tools, while 38.7% express resistance to adopting new technological solutions in their practice [36].

4.3. Ethical And Social Factors

4.3.1. Data Security

Digital health implementation raises significant privacy and security concerns. Analysis of current healthcare facilities reveals that 58.9% lack robust data protection protocols [37]. Security breaches affecting patient data increased by 156% between 2022 and 2024, highlighting vulnerabilities in existing systems [38].

Consent management and data ownership issues particularly affect elderly populations. Studies indicate that 67.3% of elderly patients express concerns about unauthorized access to their health information, while 72.8% report difficulties understanding digital consent processes [39].

4.3.2. Cultural and Social Factors

Cultural factors significantly influence technology adoption among elderly Nigerians. Traditional healthcare beliefs and practices often conflict with digital health approaches, with 64.2% of elderly patients preferring in-person consultations based on cultural

values [40]. Family dynamics play crucial roles, as 78.5% of elderly patients rely on younger family members for technology navigation [41].

Table 4. Barriers to Digital Health Adoption Among Elderly Patients and Healthcare Providers

Barrier Category	Specific Challenge	Impact Score*
Technical Infrastructure	Unreliable Internet Connectivity	4.5
	Inconsistent Power Supply	4.7
	Limited Device Availability	4.2
User-Related	Digital Literacy	4.6
	Language Barriers	4.1
	Technology Anxiety	3.9
System-Related	Cost of Implementation	4.4
	Integration with Existing Systems	4.2
	Data Security Concerns	4.3

*Impact Score: Scale of 1-5, where 5 represents the highest impact

5. Healthcare Policies and Regulations

5.1. Healthcare Policies

Nigeria's healthcare policy requires substantial restructuring to effectively incorporate digital health solutions for elderly care. The fragmented nature of current healthcare policies creates a complex environment where digital health initiatives often operate without clear regulatory oversight or standardized implementation guidelines. The policy development process has historically prioritized acute care and infectious disease management, reflecting Nigeria's epidemiological profile over recent decades, but has not adequately anticipated the growing needs of an aging population requiring long-term care and chronic disease management.

The National Digital Health Strategy, implemented in 2023, primarily focuses on general healthcare digitization but lacks specific provisions for elderly care needs [42]. This broad-based approach, while establishing important foundational elements for healthcare digitization, fails to address the unique technological, social, and clinical requirements of elderly populations. The strategy's emphasis on general population health metrics overlooks critical considerations such as age-related cognitive changes, physical limitations affecting technology use, and the complex care coordination needs typical of elderly patients with multiple comorbidities. Moreover, the implementation timeline and resource allocation within the strategy do not adequately prioritize elderly care digitization, potentially leaving this vulnerable population underserved as digital health initiatives are rolled out across the country.

Analysis of the strategy reveals significant gaps in addressing age-specific requirements, including accessibility standards, specialized care protocols, and elderly-focused digital health services [43]. The absence of universal design principles in digital health platform specifications means that many elderly users may face barriers to accessing these services due to visual, auditory, or cognitive limitations. Specialized care protocols for common geriatric conditions such as dementia, polypharmacy management, and fall prevention are not adequately integrated into the digital health framework. The strategy also lacks provisions for caregiver involvement in digital health platforms, despite the critical role that family members and informal caregivers play in elderly care management. Additionally, there are insufficient guidelines for adapting digital interfaces to accommodate varying levels of digital literacy among elderly users, potentially creating a digital divide that excludes those who could benefit most from these technologies.

5.2. Healthcare Regulations

The current regulatory environment for digital health implementation shows several critical gaps that particularly affect elderly care delivery. The regulatory framework has evolved incrementally in response to technological advances, resulting in a patchwork of guidelines that often lack coherence and comprehensive coverage. This fragmented approach creates uncertainty for healthcare providers seeking to implement digital health solutions for elderly patients and may inadvertently create barriers to innovation in geriatric care technologies.

The Nigerian Health Information Management Systems Policy framework, while establishing basic guidelines for health data management, lacks comprehensive protocols for elderly health data protection and sharing [44]. The unique vulnerabilities of elderly patients, including potential cognitive impairment affecting informed consent, increased susceptibility to fraud and data misuse, and complex family dynamics influencing healthcare decision-making, are not adequately addressed in current data protection protocols. The framework fails to establish clear guidelines for handling situations where elderly patients may lack capacity to make informed decisions about their health data, leaving healthcare providers without clear guidance on consent processes and data sharing with family members or caregivers.

Healthcare facilities report challenges in implementing standardized protocols, with only 38.6% having established clear guidelines for managing elderly patient data in digital formats [45]. This low implementation rate reflects not only resource constraints but also the absence of sector-specific guidance for elderly care data management. Many healthcare facilities struggle with determining appropriate data retention periods for elderly patients who may require decades of historical health information, establishing protocols for sharing data across multiple care providers typically involved in elderly care, and implementing security measures that balance accessibility needs with privacy protection. The lack of standardized protocols also creates inconsistencies in care quality and patient safety across different healthcare facilities, potentially disadvantaging elderly patients who may need to access care from multiple providers.

5.3. Cross-sectoral Policies

Integration of digital health policies with existing healthcare regulations requires improved coordination among various stakeholders, including federal and state health ministries, telecommunications regulators, data protection authorities, and professional medical bodies. The current policy environment suffers from siloed approaches where different sectors develop regulations independently, often creating conflicting requirements or regulatory gaps that particularly affect comprehensive elderly care delivery. This lack of coordination is especially problematic for elderly patients who typically require services spanning multiple sectors, including healthcare, social services, and telecommunications infrastructure.

The National Health Insurance Scheme (NHIS) policies currently cover only 28.4% of digital health services for elderly patients, creating significant financial barriers to access [46]. This limited coverage reflects outdated reimbursement models that were designed for traditional fee-for-service healthcare delivery and have not been updated to accommodate digital health innovations. The coverage gaps are particularly problematic for elderly patients who often require ongoing monitoring and support services that are ideally delivered through digital platforms. Remote monitoring services, telehealth consultations, and digital medication management tools, which could significantly improve health outcomes for elderly patients while reducing overall healthcare costs, remain largely uncovered by insurance schemes. This creates a paradoxical situation where cost-effective digital health solutions remain financially inaccessible to the populations that could benefit most from them.

Additionally, reimbursement mechanisms for telehealth services remain undefined in 67.3% of cases involving elderly care [47]. The absence of clear reimbursement protocols discourages healthcare providers from investing in telehealth infrastructure and training, particularly for elderly-focused services that may require additional time and specialized approaches. This regulatory uncertainty also affects the sustainability of digital health initiatives, as providers cannot develop reliable business models for elderly care services without predictable reimbursement mechanisms. The undefined nature of telehealth reimbursement particularly impacts rural healthcare providers who could use these technologies to extend specialist geriatric care to underserved elderly populations.

5.4. Regulatory Standards

Quality assurance frameworks for digital health services specifically targeting elderly populations remain underdeveloped, reflecting a broader challenge in healthcare regulation where standards often focus on general adult populations without adequate consideration of age-specific needs. The development of quality standards for elderly care requires specialized expertise in geriatrics, gerontechnology, and age-related changes in health and cognition, which may not be adequately represented in current regulatory development processes.

Current standards address only 45.2% of elderly-specific usability requirements for digital health platforms [48]. These gaps in usability standards mean that many digital health platforms may be technically compliant with general healthcare technology regulations while remaining practically inaccessible to elderly users. Critical usability requirements such as adjustable font sizes, simplified navigation interfaces, voice-activated controls, and integration with assistive technologies are often not mandated by current standards. The absence of age-specific usability requirements also affects the quality of digital health platforms, as developers may not prioritize elderly user needs without regulatory incentives to do so.

Certification processes for healthcare providers offering digital services to elderly patients lack standardization, with only 33.7% of providers meeting established competency requirements [49]. This low compliance rate reflects both the absence of clear competency standards and the lack of training programs that prepare healthcare providers to deliver digital health services to elderly populations. The certification gaps are particularly concerning given that providing digital health services to elderly patients often requires additional skills in areas such as technology instruction, caregiver communication, and age-appropriate clinical assessment techniques. Without standardized certification processes, there is significant variation in the quality of digital health services available to elderly patients, potentially creating safety risks and suboptimal health outcomes.

5.5. Legal Guidelines

The legal framework governing digital health services requires substantial enhancement to protect elderly users' rights and address the unique legal considerations that arise when providing healthcare services to aging populations. Current healthcare law has not

kept pace with technological advances, creating legal uncertainties that may discourage innovation in elderly care technologies while potentially leaving elderly patients vulnerable to exploitation or inadequate care.

Current legislation addresses only 41.8% of potential legal issues related to elderly patient data protection and privacy [50]. The legal gaps are particularly significant in areas such as consent management for patients with cognitive impairment, liability for AI-driven clinical decisions, cross-border data sharing for elderly patients who may relocate or travel frequently, and protection against age-based discrimination in digital health service provision. The absence of comprehensive legal frameworks creates uncertainty for healthcare providers, technology developers, and elderly patients themselves about their rights and responsibilities in digital health interactions. Ethical guidelines for AI applications in elderly care remain particularly underdeveloped, with only 29.4% of necessary protocols established for automated decision-making systems [51]. The use of AI in elderly care raises complex ethical questions about autonomy, beneficence, and justice that require specialized consideration. Issues such as algorithmic bias that may disadvantage elderly patients, the appropriate level of AI involvement in clinical decision-making for vulnerable populations, and the balance between AI-enabled monitoring and patient privacy require comprehensive ethical frameworks. The underdevelopment of these guidelines creates risks that AI applications in elderly care may inadvertently perpetuate age-based discrimination or compromise the dignity and autonomy of elderly patients. Moreover, the absence of clear ethical guidelines may discourage the development of beneficial AI applications for elderly care, as developers and healthcare providers may be uncertain about the ethical acceptability of various approaches.

6. Conclusion

The usage of digital health technologies in elderly care within Nigeria offers both significant opportunities and challenges. While these technologies offer promising solutions for improving healthcare access and quality for the aging population, substantial barriers persist in infrastructure, digital literacy, and policy frameworks. The current situation represents an evolving healthcare system struggling to balance traditional care approaches with modern digital solutions. Despite progress in telemedicine adoption and AI applications, the digital divide continues to affect elderly populations disproportionately, particularly in rural areas. The success of digital health initiatives for elderly care ultimately depends on addressing fundamental challenges in infrastructure development, healthcare workforce capacity, and regulatory guidelines. Cultural sensitivity, ethical considerations, and social implications must remain central to implementation strategies. This transformation requires coordinated efforts among policymakers, healthcare providers, technology developers, and community stakeholders to ensure that digital health solutions enhance rather than complicate healthcare delivery for Nigeria's aging population.

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