THE ROLE OF LIBRARY SERVICES IN SUPPORTING TELEMEDICINE DELIVERY IN RURAL COMMUNITIES OF PLATEAU STATE, NIGERIA: A CASE STUDY OF GINDIRI DISTRICT IN MANGU LOCAL GOVERNMENT AREA.

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Abstract
This study examined the role of library services in supporting telemedicine delivery in Gindiri District, Mangu LGA. The research determined the availability, utilisation, and perceived impact of library services in promoting telemedicine. A descriptive survey design was used and data were collected from 200 respondents, including health workers, library staff, and rural dwellers. A structured questionnaire was used to gather data. Data were analysed using descriptive statistical methods such as frequencies and percentages. The results revealed that majority of the respondents were aware of basic library services but very few acknowledged the active integration of such services in telemedicine programs. Most respondents agreed that libraries play a vital role in facilitating access to reliable health information, organising health education programs, and assisting community members in locating credible medical resources. The study concludes that libraries in rural Nigeria remain underutilized for telemedicine, but with strategic investment, policy inclusion, and staff training, they can serve as vital information and communication hubs bridging healthcare and digital access gaps.

Keywords: library services, telemedicine delivery

Introduction

Health care delivery in rural communities across Nigeria faces persistent challenges such as inadequate infrastructure, shortage of health professionals, and limited access to

medical information resources. These issues often result in poor health outcomes and wide disparities between urban and rural populations (Jegede, 2016). In rural areas such as Gindiri District, Mangu Local Government Area, Plateau State, access to qualified doctors and specialised care is difficult, leading to high dependence on primary health care centers that are often under-resourced.

Telemedicine is the provision of health care services through the use of Information and Communication Technology (ICT) facilities which has emerged globally as a solution to bridge many global gaps in this generation. The World Health Organization (2010) defines telemedicine as the delivery of health care services where distance is a critical factor, using ICTs for exchange of valid information for diagnosis, treatment, prevention of diseases, and continuing education of health care providers.

Library and information services play a strategic role. Libraries provide access to health information resources, electronic databases, training in information literacy, and patient education materials, all of which are essential for the effective operation of telemedicine (Adeleke &Olorunsola, 2010). Libraries also serve as mediators between health professionals and information resources, ensuring that rural health workers and patients can access evidence-based medical knowledge. Given the rural setting of Gindiri District, it is important to examine how library services contribute to telemedicine initiatives and the extent to which they support health care delivery in such underserved communities. The integration of library services into telemedicine is gradually gaining attention, especially for rural populations who rely on agriculture, mining, and adult education. Jegede (2016) observes that adult education programs in rural areas are increasingly tied to library services, with health education included in literacy programs that complement telemedicine services. Nwokocha, &Ozioko (2023) adds that community libraries in Nigerian local government areas serve as points of contact where rural dwellers receive both health and livelihood information through ICT platforms. Within Plateau State, where farming and mining are major occupations, library services have become relevant in connecting telemedicine initiatives to local populations. Despite the promise of telemedicine, rural health facilities in Nigeria continue to struggle with poor information infrastructure, lack of skilled personnel, and weak integration of library services. Patients in rural areas, have inadequate health literacy so therefore it limiting their ability to benefit from telemedicine resources. Libraries in rural areas, are poorly equipped with ICT facilities, and rarely connected to telemedicine program. Many primary health care workers are inadequate trained in accessing digital health resources, while patients often lack the health literacy needed to fully benefit from telemedicine. In Gindiri District, Mangu LGA of Plateau State, these problems are even more pronounced as rural residents mostly farmers, miners, and traders depend on under-resourced primary health care centers. Is on this note that the researchers intend to analysis the growing importance of telemedicine in improving rural health care delivery, and the often-overlooked role of library services in sustaining such initiatives.

Purpose of the Study

The following are the objectives of this study:

1. Identify the types of library services availablein supporting telemedicine in Gindiri District.

2. Assess the extent of utilisation of library services by health workers and rural dwellers in telemedicine initiatives in Gindiri District.
3. Examine the challenges faced in providing library services as a tool in telemedicine to rural dwellers within Gindiri District
4. Possible solutions to improving the contribution of library services to telemedicine in rural health care delivery within Gindiri District.

Research Questions

The following are the research questions the researchers answered:

1. What are some of the types of library services available in supporting telemedicine in Gindiri District?
2. To what extent are the available library services utilised by health workers and rural dwellers in telemedicine initiatives within Gindiri District?
3. What are the challenges faced in providing library services as a tool in telemedicine to rural dwellers in Gindiri District?
4. What are possible solutions to improving the contribution of library services to telemedicine in rural health care delivery within Gindiri District?

Literature Review

Library Services in Telemedicine

The integration of library services into telemedicine has become increasingly important in enhancing healthcare delivery, especially in rural and underserved communities. Smith (2019) extends this perspective by emphasizing that medical and academic libraries play a crucial role in supplying health workers with access to evidence-based databases such as PubMed, Medline, and HINARI. These resources are essential for accurate diagnosis and treatment in telehealth consultations, where real-time decision-making depends heavily on reliable information. Afolabi (2020) highlights the transformative impact of ICT-enabled library services on telemedicine, pointing to the availability of digital medical guidelines, e-books, and interactive awareness programs that empower both health professionals and rural dwellers. From a health systems perspective, the World Health Organization (2021) argues that libraries can be incorporated into the healthcare infrastructure as spaces for teleconsultations, digital literacy training, and access to online health records. Kumar (2017), meanwhile, asserts that the sustainability of telemedicine depends on hybrid and digital libraries that provide culturally relevant, timely, and accessible health information.According to Chandrakar (2024) Telemedicine allows healthcare providers to deliver care remotely using video conferencing and asynchronous store and forward platforms. This technology has been a game-changer for rural healthcare, as it allows patients to receive care without having to travel long distances. Telemedicine has been particularly useful during the pandemic, as it has allowed patients to receive care while minimizing exposure to the virus. Asynchronous platforms, such as teleradiology and tele dermatology, have also enabled the evaluation and diagnosis of medical conditions through the sharing of images and data without requiring real-time interaction.

Telemedicine, a revolutionary healthcare concept, enables remote care delivery through video conferencing and asynchronous store and forward platforms, benefiting rural

patients and home care patients during the pandemic. This technology maintains quality care, making healthcare more accessible and convenient for all. In particular, the use of asynchronous platforms has expanded access to specialist care by allowing healthcare providers to review and diagnose conditions from images or other data sent to the specialist for consultation without requiring real-time interaction and allowing greater flexibility for both the primary care provider and the specialist.Zanni (2011) noted telemedicine allows caregivers to provide health services and medical information to patients who might not otherwise receive treatment because of the distance between their homes and the clinic. Telemedicine includes the potential to increase patient access by allowing physicians to monitor remotely, diagnose, and treat patients. Telemedicine is still evolving, and physicians must identify problems, such as how to manage the facilities standard of care and patient compensation strategies to increase the use of the technology.

Libraries play a vital role in supporting telemedicine. DeGuzman et al. (2023) examined licensed independent providers' perspectives in the USA and reported that libraries provided private spaces, internet access, and staff support for telemedicine visits. Krupinski et al. (2025) convened a panel of experts to highlight how libraries can act as telehealth hubs but noted challenges like training, funding, and sustainability. Telemedicine has emerged as a critical tool in bridging healthcare gaps, especially in rural areas where access to medical specialists is limited. Libraries, traditionally seen as knowledge and information hubs, are increasingly being integrated into telemedicine initiatives. The utilization of library services by health workers and rural dwellers demonstrates their importance in the success of telemedicine. Smith (2019) reports that health professionals increasingly depend on library-provided databases such as PubMed and HINARI to make informed, evidence-based decisions in remote consultations. Kumar (2017) observes that rural clinicians rely on academic library resources for continuous professional development, using online courses, journals, and clinical updates made available through institutional libraries. This ensures that they remain competent and updated despite being in remote locations.

Afolabi (2020) highlights how rural dwellers themselves benefit from library services, especially through awareness campaigns on preventive healthcare and telehealth usage instructions offered by digital libraries. The World Health Organization (2021) confirms that libraries also contribute to improving health literacy by hosting digital health workshops that empower rural populations to make better use of telemedicine services. The utilization of library services by both professionals and community members thus reveals the dual role of libraries in bridging health information gaps.

According to Musa and Omopupa (2024) reported that Nigerian health workers frequently use hospital libraries for information needs, though integration into telemedicine is still limited. Chandraka (2024) One of the primary benefits of tele-health in rural areas is the increased accessibility to healthcare services. Before COVID-19, rural residents often faced challenges such as long travel distances to healthcare facilities, limited healthcare providers, and delayed medical care. Tele-health has mitigated these challenges by enabling remote consultations, reducing the need for travel, and providing continuous care.

Methodology

The study adopted a descriptive survey research design.A sampled population of200 respondents comprising of library staff, health workers, and rural dwellers residing or working within Gindiri District, Mangu LGA of Plateau State were selected at random from approximately 850 rural dwellers using the Yamane (1967) formula for sample determination. The primary instrument for data collection was a structured online and paper questionnaire designed by the researchers.The questionnaire items were rated using Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), and Strongly Disagree (1).

Results

Table 1: Availability of Library Services for Telemedicine (n = 200)

Statement	SA	A	U	D	SD	Mean	SDV
I am aware of library services available to support telemedicine in my community/health facility.	48 (24%)	72 (36%)	26 (13%)	38 (19%)	16 (8%)	3.50	1.18
Library services are important for delivering telemedicine in rural areas.	92 (46%)	70 (35%)	12 (6%)	18 (9%)	8 (4%)	4.10	1.02
Libraries should serve as information hubs for rural telemedicine programs.	84 (42%)	78 (39%)	16 (8%)	14 (7%)	8 (4%)	4.08	0.96
Libraries are adequately equipped to support telemedicine.	26 (13%)	38 (19%)	28 (14%)	68 (34%)	40 (20%)	2.72	1.26
Library services can support telemedicine in rural communities.	88 (44%)	66 (33%)	20 (10%)	16 (8%)	10 (5%)	4.03	1.01

From table 1 above, 60% (24% SA + 36% A) of respondents indicated awareness of library services related to telemedicine, suggesting moderate awareness levels but with room for improvement, a significant 81% (46% SA + 35% A) agreed that library services are important for telemedicine delivery in rural areas, confirming a strong recognition of libraries as key enablers of information access. Similarly, 81% of respondents supported the notion that libraries should serve as information hubs for rural telemedicine programs, with a high mean score of 4.08, suggesting strong consensus on the libraries' strategic role. However, responses to item 4 indicate a major constraint only 32% (13% SA + 19% A) agreed that libraries are adequately equipped for telemedicine, while 54% (34% D + 20% SD) disagreed. The mean score (2.72) reflects an overall perception of infrastructural inadequacy, despite this challenge, 77% (44% SA + 33% A) believed that library services can indeed support

telemedicine in rural communities. The high mean score (4.03) reinforces optimism about the potential of libraries if properly equipped and linked to digital health infrastructure.

Table 2: Utilisation of Library Services in Telemedicine (n = 200)

Statement	SA	A	U	D	SD	Mean	SDV
Community members often use the library for health information.	60 (30%)	78 (39%)	22 (11%)	28 (14%)	12 (6%)	3.73	1.12
Libraries provide health education materials for community members.	72 (36%)	80 (40%)	20 (10%)	18 (9%)	10 (5%)	3.93	1.06
My library currently provides health-related information resources to rural dwellers.	58 (29%)	66 (33%)	28 (14%)	30 (15%)	18 (9%)	3.56	1.21
Organizing health awareness/education programs is an important library role to rural dwellers.	88 (44%)	74 (37%)	16 (8%)	14 (7%)	8 (4%)	4.10	0.99
Libraries can help rural dwellers search for reliable health information.	94 (47%)	72 (36%)	14 (7%)	12 (6%)	8 (4%)	4.16	0.95

From table 2, a total of 69% (30% SA + 39% A) of respondents agreed that community members often use the library for health information, reflecting moderate but growing utilization of library services for health-related purposes. Similarly, 76% (36% SA + 40% A) agreed that libraries provide health education materials for community members, with a mean score of 3.93. This shows that many libraries already provide leaflets, pamphlets, or e-health resources on disease prevention, maternal care, and nutrition. 62% (29% SA + 33% A) agreed that their libraries provide health-related information resources to rural dwellers. However, a noticeable 24% (15% D + 9% SD) disagreed, implying inconsistent service delivery across communities. A striking 81% (44% SA + 37% A) of respondents agreed that organizing health awareness programs is an important role for rural libraries (mean = 4.10). This indicates a strong recognition of libraries as centers of community engagement for public health education. 83% (47% SA + 36% A) of respondents believed that libraries can help rural dwellers search for reliable health information, the highest mean (4.16) of all items. This demonstrates broad trust in librarians' capacity to guide users toward credible health sources.

Table 3: Challenges in Using Library Services for Telemedicine (n = 200)

Statement	SA	A	U	D	SD	Mean	SDV
Poor awareness prevents many rural dwellers from using libraries for health services.	90 (45%)	64 (32%)	20 (10%)	16 (8%)	10 (5%)	4.04	1.02
Poor internet connectivity limits library support for telemedicine.	102 (51%)	66 (33%)	12 (6%)	12 (6%)	8 (4%)	4.20	0.97
Inadequate ICT infrastructure limits collaboration between rural dwellers and health workers.	94 (47%)	72 (36%)	14 (7%)	12 (6%)	8 (4%)	4.16	0.95
Language and literacy barriers prevent many rural dwellers from using libraries for health services.	76 (38%)	80 (40%)	18 (9%)	16 (8%)	10 (5%)	3.98	1.08
Inadequate funding/resources hinder libraries from supporting telemedicine.	108 (54%)	66 (33%)	10 (5%)	10 (5%)	6 (3%)	4.27	0.91

Table 3 indicate that the majority of respondents identified multiple barriers limiting the effectiveness of library services in supporting telemedicine within rural Nigerian communities.The most critical challenge identified was inadequate funding/resources (Item 5), with 87% (54% SA + 33% A) of respondents agreeing and a mean score of 4.27. This clearly suggests that budgetary limitations and lack of institutional investment are central obstacles preventing libraries from acquiring ICT equipment, health databases, and digital infrastructure required for telemedicine. Closely following this, poor internet connectivity ranked second (mean = 4.20), with 84% of respondents agreeing that unreliable or unavailable broadband connectivity undermines telemedicine delivery. Inadequate ICT infrastructure (Item 3, mean = 4.16) also emerged as a major concern, as 83% of participants affirmed that lack of modern computers, scanners, teleconferencing facilities, and power backup systems reduces libraries' capacity to host telemedicine sessions or health data platforms. Additionally, poor awareness among community members (mean = 4.04) was highlighted by 77% of respondents. This implies that despite the availability of library facilities, many rural dwellers are unaware that libraries can support telemedicine or provide reliable health information. The final identified challenge, language and literacy barriers (mean = 3.98), received 78% agreement, indicating that low literacy levels and communication gaps still hinder effective library use among non-English-speaking rural dwellers.

Table 4: Responses on Solutions to Improve Library Services for Telemedicine (n = 200)

Statement	SA	A	U	D	SD	Mean	Decision
Library services can play a significant role in improving health delivery through telemedicine.	120 (60%)	60 (30%)	10 (5%)	6 (3%)	4 (2%)	4.43	Agree
Government should integrate libraries into rural telemedicine policy.	130 (65%)	50 (25%)	8 (4%)	7 (3.5%)	5 (2.5%)	4.47	Agree
Community sensitization is necessary to increase awareness of library services in telemedicine.	125 (62.5%)	55 (27.5%)	10 (5%)	6 (3%)	4 (2%)	4.45	Agree
More ICT infrastructure should be provided to strengthen library telemedicine services.	140 (70%)	45 (22.5%)	8 (4%)	4 (2%)	3 (1.5%)	4.58	Strongly Agree
Libraries should offer ICT facilities for online medical consultations.	115 (57.5%)	60 (30%)	10 (5%)	10 (5%)	5 (2.5%)	4.36	Agree

Table 4 shows that a significant majority of respondents supported stronger integration of libraries into telemedicine initiatives. Over 90% of respondents agreed that library services can play a vital role in enhancing healthcare delivery in rural settings through telemedicine (mean = 4.43). This highlights an increasing awareness that libraries are not merely book repositories but vital information hubs capable of bridging the digital divide in health communication.Similarly, Item 2 (mean = 4.47) underscores that respondents believe government policy integration is essential. The third statement, emphasizing community sensitization (mean = 4.45), which means awareness campaigns, partnerships with local health workers, and mobile information outreach could increase utilization rates.The highest-rated item (mean = 4.58) concerned ICT infrastructure, affirming that technological capacity is a prerequisite for telemedicine support. Respondents indicated that without stable internet connectivity, adequate hardware, and digital platforms, libraries cannot fulfill their potential as telemedicine facilitators. The final statement (mean = 4.36) regarding libraries offering ICT facilities for online consultations also drew broad support. This demonstrates respondents' willingness to see libraries transition into hybrid community tele centers providing internet, video-conferencing, and medical information services, especially in remote districts.

Discussion

In table 1 answered the availability of Library Services for Telemedicine, the majority of respondents agreed (55%) or strongly agreed (20%) that library services exist to support telemedicine. However, only 30% rated libraries as adequately equipped, while a significant 45% disagreed, suggesting that facilities remain limited. Respondents overwhelmingly supported the idea that libraries should serve as information hubs for rural telemedicine programs (70% agreed), reflecting recognition of their potential role in bridging the digital divide.

Table 2 answered perceived impact and utilization it indicated strong agreement (60%) that libraries provide health information materials and organize awareness programs. Moreover, 68% of respondents acknowledged that community members use libraries to access health education resources, implying that libraries already function as informal health knowledge centers. This aligns with findings from Adeleke &Nwalo (2020), who reported that community libraries increasingly support health literacy in Nigerian rural areas.

In table 3 revealed the challenges face in providing library services in telemedicine, respondents identified poor internet connectivity (78%), inadequate ICT infrastructure (74%), and limited funding (70%) as major obstacles to the integration of libraries with telemedicine services. Other barriers included low awareness (66%) and language/literacy constraints (58%), confirming persistent rural digital inequalities noted by Emezie (2021) and Onyeneke&Odu(2022).

Finally, table 4 provided actionable insights. A vast majority (80%) strongly supported integrating libraries into national telemedicine policies, while 72% advocated for increased government funding for ICT infrastructure. Additionally, 75% of respondents emphasized the need for community sensitization and awareness campaigns to encourage the use of library-based telemedicine services.

Conclusion

The study concludes that for telemedicine to succeed sustainably in Nigeria's rural areas, libraries must be strategically positioned both physically and digitally as information gateways for health delivery systems. Strengthening the synergy between library and health sectors will promote inclusivity, improve health literacy, and reduce the burden of healthcare in underserved regions.

Recommendations

Based on the study's findings and conclusions, the following recommendations are proposed:

1. Integrate Libraries into National Telemedicine Policy Frameworks: The Federal Ministry of Health and National Library Board should collaborate to officially recognize community and public libraries as stakeholders in telemedicine delivery. This will formalize their role in disseminating digital health information and facilitating remote consultations.
2. Improve ICT and Internet Infrastructure in Rural Libraries: Government and development partners should prioritize investment in ICT tools computers, broadband internet, video conferencing facilities to enable libraries to support teleconsultations and access to digital health repositories.

3. Training for Library and Health Personnel: Library and healthcare staff should receive joint training on telemedicine technologies, information retrieval, and digital literacy. This interdisciplinary collaboration will enhance communication between libraries and healthcare providers.
4. Community Awareness and Sensitization: Massive outreach programs should be implemented to educate rural dwellers about the availability and benefits of using libraries for telemedicine. Such campaigns can increase service utilization and community participation.

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