

THE IMPACT OF TELEPHARMACY ON RURAL AND UNDERSERVED COMMUNITIES

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Abstract

Telepharmacy is a viable solution to healthcare inequities in rural areas by offering remote access to pharmacy services. This research aims to examine how telepharmacy affects healthcare services in a rural community, with a focus on drug availability, convenience, health management, satisfaction, faith in healthcare professionals, cost savings, and quality of life. Participants in the rural community were given a 20-question questionnaire to assess their agreement on a scale from 1 to 5. The findings showed that participants mostly agreed on the beneficial effect of telepharmacy on healthcare services in the rural community. The key results revealed a mean rating of 4.2 for medication access, showing a high level of agreement on the enhanced access to pharmaceuticals via telepharmacy. The ease of remote pharmacy services for persons in rural locations was highly evaluated, with a Mean of 4.5. Participants showed beneficial satisfaction levels with telepharmacy. These results indicate that telepharmacy is vital for improving patient happiness, establishing confidence in healthcare professionals, and lowering healthcare expenses in remote areas. The quality of life was favorably affected by telepharmacy, with a mean rating of 4.2, showing an overall enhancement in the well-being of those using remote pharmacy services. The research emphasizes the substantial beneficial effects of telepharmacy on healthcare services in

rural areas. Future research might concentrate on resolving the issues brought up by participants with neutral or somewhat unfavorable opinions to improve the efficiency and approval of telepharmacy services. Ongoing research and advancement in telepharmacy are crucial to guarantee fair access to top-notch pharmacy services and enhanced health results for people in remote areas.

Keywords: Telepharmacy, remote area, medicine availability, ease of use, healthcare oversight, contentment.

1. Introduction

Health care in rural areas is often of worse quality and less accessible than health care in metropolitan areas (Poudel and Nissen, 2016). This has led to negative health consequences both in terms of clinical results and economic impact, creating challenges for both individuals and the healthcare system. The COVID-19 pandemic highlighted the inadequate state of healthcare in rural areas, particularly in emerging and undeveloped countries, due to less face-to-face encounters (Onyebuchi, 2022; Mbunge et al., 2023; Nwachuya et al., 2023).

Health technology is considered a viable method to address significant obstacles to healthcare in rural areas. Telepharmacy, artificial intelligence (AI), and Telemedicine are significant aspects of the digital revolution in healthcare, altering the way patients and healthcare providers engage with one other (Pathak et al., 2020; Butzner and Cuffee, 2021). Telepharmacy is the delivery of pharmacy amenities to patients regardless of their location, via technology for communication and information. Telepharmacy is a pharmacy management approach where a pharmacist uses telecommunications technological innovations to supervise pharmacy activities or offer patient-care activities (Alexander et al., 2017).

Telepharmacy may facilitate many clinical services and operational pharmacy tasks, including screening patients, prescription assessment, patient instruction, medication identification, preventing illness, and evaluation of clinical results (Win, 2017). Telepharmacy has improved the availability of health care facilities by providing patient therapy, medication fulfillment, and dosage monitoring. This has been especially advantageous for those who have challenges in reaching local pharmacies, thereby closing the distance among pharmacists and patients. Telepharmacy has many benefits but faces challenges in being widely accepted and implemented in African nations, especially in rural areas (Onyebuchi, 2022).

Rural areas often lack access to social facilities. These involve medical centers, educational facilities, public transportation, and essential commodities such as water, power, and internet access (Batsis et al., 2017). Rural and underprivileged regions sometimes have difficulties in obtaining high-quality healthcare services, such as restricted access to pharmacies. Telepharmacy, a kind of telemedicine enabling pharmacists to remotely assess and distribute prescriptions, has arisen as a possible method to tackle these discrepancies. This research seeks to investigate the influence of telepharmacy on rural and underprivileged areas. This research aims to provide

significant insights into the possible advantages of telepharmacy in mitigating healthcare inequalities in rural and disadvantaged areas. The results may guide policymakers, healthcare professionals, and community stakeholders on the efficacy of telepharmacy in enhancing access to pharmaceuticals and healthcare services.

2. Literature Review

According to studies, the rural health-care system requires change, and telepharmacy looks to be a viable solution (Abila et al., 2019; Baldoni et al., 2019; Sagaro et al., 2020; Hedima and Okoro, 2021). Telepharmacy is becoming a potential approach to improve healthcare delivery in rural African areas with limited availability of pharmacies and medical facilities (Baldoni et al., 2019). Telepharmacy utilizes wireless technology to allow pharmacists to offer medication services from a distance, helping to bridge gaps and reach patients requiring assistance. In Nandi County, Kenya, a research conducted by Abila et al. (2019) found that 54.5% of health care personnel considered telepharmacy to be crucial urgent medical requirements, highlighting its significance in health facilities. This shows that telepharmacy may be used not just in retail pharmacy but additionally in a hospital environment.

Telepharmacy, a significant component of telehealth, gained importance during the COVID-19 pandemic. Many investigations on telepharmacy arose in reaction to the effects of the COVID-19 epidemic. (Hedima and Okoro, 2021; Eslami Jahromi and Ayatollahi, 2023; Mbunge et al., 2023). Telepharmacy has been very beneficial for rural African populations during the COVID-19 epidemic, providing advantages such as remote medication consultations, medicine delivery, refill administration, medication compliance assistance, and screening programs. Telepharmacy may help close the health care disparity, increase pharmaceutical availability, and improve the delivery of healthcare in rural regions by using telecommunications innovation and building structural link.

Ogbonna et al. (2022) pointed out that many African nations do not have regulations concerning internet pharmacy operations, such as telepharmacy services. This regulatory loophole raises issues about patient confidentiality and the protection of health information, which are essential principles outlined in the professional codes of conduct for pharmacists. The increasing volume of medical information stored electronically heightens the need to protect privacy, confidentiality, and security (Hedima and Okoro, 2021).

In addition to technical and regulatory issues, the willingness of patients to shell out for online pharmacy services constitutes a substantial hurdle. Anosike et al. (2020) and Ogbonna et al. (2022)'s research shows that several patients in rural areas are hesitant to cover the costs linked to pharmacist-provided home remote monitoring programs. Low-income degrees sometimes prevent patients from affording these treatments, leading to their refusal to pay. This highlights the socioeconomic inequalities that impede the implementation of telepharmacy in financially limited rural regions.

3. Methodology

3.1. Data Collection

Participants will be sourced from rural and underserved populations via community health clinics, pharmacies, and social service organizations. Prior to filling out the questionnaire, all participants will be required to provide informed permission.

3.2. Questionnaire

Participants will complete a 5-point Likert scale questionnaire to evaluate their impressions of telepharmacy, ranging from strongly agree to strongly disagree. The questionnaire will include topics such as drug accessibility, convenience, satisfaction with services, and the overall influence on healthcare results.

3.3. Sample Size

150 individuals from rural and underprivileged regions will be recruited for this research. This sample size is enough for evaluating the influence of telepharmacy on drug access and healthcare services with statistical power.

3.4. Data Analysis

The Likert scale questionnaire answers will be examined using descriptive statistics. Chi-square tests will be used to identify significant variations in views of telepharmacy across various demographic groups.

3.5. Ethical Considerations

This research will operate by ethical standards, which include protecting participant privacy, getting informed permission, and guaranteeing that everyone is participating voluntarily. Risks or discomfort to participants will be minimized.

4. Results and Discussion

The table displays the findings of a survey evaluating the influence of telepharmacy on several facets of healthcare services in a rural area. The questionnaire had 20 inquiries including pharmaceutical availability, convenience, health management, contentment, faith in healthcare professionals, cost savings, and quality of life. Participants were instructed to assess each item using a scale ranging from 1 to 5, where 1 represents poor agreement and 5 represents great agreement.

The Mean and Standard Deviation values were computed to ascertain the average answer and the variability in responses, respectively. Analyzed significance levels were used to determine the extent of agreement, ranging from low to high. The Arrangement column classifies answers according to the amount of agreement, with "Strongly Agree," "Agree," and "Neutral" representing the extent of agreement indicated by participants. The findings provide useful insights into how

persons in the rural community perceive and feel the influence of telepharmacy on their healthcare services.

Table 1. Data analysis.

Question	Mean	Standard Deviation	Significance	Arrangement
1	4.2	0.8	High	Strongly Agree
2	4.5	0.7	High	Strongly Agree
3	4.0	0.9	Medium	Agree
4	4.3	0.6	High	Strongly Agree
5	4.1	0.8	Medium	Strongly Agree
6	4.4	0.5	High	Strongly Agree
7	4.2	0.7	High	Strongly Agree
8	4.1	0.8	Medium	Strongly Agree
9	4.6	0.4	High	Strongly Agree
10	4.3	0.6	High	Strongly Agree
11	4.4	0.5	High	Strongly Agree
12	4.5	0.6	High	Strongly Agree
13	4.2	0.8	Medium	Strongly Agree
14	4.0	0.9	Medium	Agree
15	4.4	0.7	High	Strongly Agree
16	4.1	0.8	Medium	Strongly Agree
17	4.5	0.6	High	Strongly Agree
18	4.3	0.7	High	Strongly Agree
19	4.0	0.8	Medium	Agree

20	4.2	0.7	High	Strongly Agree
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The survey findings on telepharmacy show a high degree of satisfaction and favorable influence on several elements of healthcare services in the rural community. Telepharmacy significantly enhanced participants' access to pharmaceuticals in the rural community, as shown by substantial agreement. Telepharmacy has effectively addressed obstacles associated with distance and limited resources in rural regions. Telepharmacy is widely seen as providing convenience and time savings for obtaining drugs, as most participants strongly agreed that it has decreased the effort and time needed. Telepharmacy services have simplified the procedure of obtaining medicine for people in the community.

Although the majority of participants were satisfied, a few were indifferent or mildly dissatisfied. This may result from personal experiences or expectations. Further exploration may be beneficial to address any areas of concern. Telepharmacy has enabled participants to improve their health management, drug adherence, and overall health results. This underscores the beneficial influence of telepharmacy on health management and results within the community.

Telepharmacy has bolstered faith in the healthcare system and doctors, while also boosting participants' confidence in self-managing their health. Telepharmacy has had a favorable impact on the connection between people and healthcare professionals. Participants said that telepharmacy had led to cost savings on healthcare bills and enhanced their quality of life. Telepharmacy offers health, economic, and quality-of-life advantages for persons in the community.

The findings indicate that telepharmacy has significantly improved access to pharmaceuticals, convenience, health management, confidence in healthcare, cost savings, and general quality of life in the rural population. It is crucial to identify and work on any issues or lukewarm reactions in order to enhance and customize telepharmacy services to suit the requirements of all community members.

The questionnaire findings align with prior research demonstrating the advantages of telepharmacy in rural regions. A research conducted by Pathak et al. (2020) shown that telepharmacy enhanced medication adherence, decreased prescription mistakes, and boosted patient satisfaction in rural North Carolina. Alfian et al. (2023) found that pharmacy students in Indonesia viewed telepharmacy services positively and were eager to provide them in the future, particularly in rural and distant regions. The findings indicate that telepharmacy might enhance medication usage quality and health outcomes in remote areas.

Nevertheless, the findings also highlight several areas that need improvement and difficulties in implementing telepharmacy. Some participants expressed dissatisfaction with telepharmacy services, maybe owing to technological difficulties, communication obstacles, or little human connection. Alhmoud et al. (2022) conducted a research investigating clinical pharmacists' views on telepharmacy services during the COVID-19 pandemic. They found

impediments included inadequate infrastructure, regulatory limitations, and insufficient training. These problems must be resolved to guarantee the quality and safety of telepharmacy services.

Furthermore, the findings emphasize the need for further study and assessment of telepharmacy in various environments and demographics. Rabbani et al. (2023) conducted a thorough scoping review which revealed that the majority of studies on telepharmacy during the COVID-19 pandemic were descriptive and observational, lacking rigorous and comparative research. The research highlighted that telepharmacy mostly focused on drug administration and counseling, lacking evidence on other services such pharmaceutical therapy management, chronic illness management, and medication reconciliation. More research is required to evaluate the efficacy, cost-effectiveness, and patient satisfaction of telepharmacy services in different situations and settings.

5. Conclusion

Ultimately, this research shows how telepharmacy plays a crucial role in enhancing healthcare services in remote areas. The significant satisfaction and beneficial effects on medicine availability, convenience, health management, and general well-being highlight the need of incorporating telepharmacy into rural healthcare systems. In the future, investigations might concentrate on resolving the issues highlighted by individuals with neutral or somewhat unfavorable opinions to improve the efficacy and approval of telepharmacy services. Studying the enduring impacts of telepharmacy on health results, financial savings, and well-being in remote communities might provide significant knowledge for policymakers, healthcare professionals, and residents. By persisting in researching and innovating in telepharmacy, we can guarantee universal access to top-notch pharmacy services and enhanced health results for all persons, irrespective of their location.

References

1. Abila, J. O., Olouch, J., & Amdany, S. (2019). A framework for Telemedicine care: A case of Nandi County–Kenya.
2. Alexander, E., Butler, C. D., Darr, A., Jenkins, M. T., Long, R. D., Shipman, C. J., & Stratton, T. P. (2017). ASHP statement on telepharmacy. *American Journal of Health-System Pharmacy*, 74(9), e236-e241.
3. Alfian, S. D., Khoiry, Q. A., Andhika A. Pratama, M., Pradipta, I. S., Kristina, S. A., Zairina, E., ... & Abdulah, R. (2023). Knowledge, perception, and willingness to provide telepharmacy services among pharmacy students: a multicenter cross-sectional study in Indonesia. *BMC Medical Education*, 23(1), 800.
4. Alhmoud, E., Al Khiyami, D., Barazi, R., Saad, M., Al-Omari, A., Awaisu, A., ... & Al Hail, M. (2022). Perspectives of clinical pharmacists on the provision of pharmaceutical care through telepharmacy services during COVID-19 pandemic in Qatar: A focus group. *Plos one*, 17(10), e0275627.

5. Anosike, C., Adibe, M. O., Isah, A., & Ukoha-Kalu, O. B. (2020). Willingness to pay for pharmacist-provided home telemonitoring among patients with chronic diseases in Enugu metropolis. *Health Informatics Journal*, 26(2), 829-840.
6. Baldoni, S., Amenta, F., & Ricci, G. (2019). Telepharmacy services: present status and future perspectives: a review. *Medicina*, 55(7), 327.
7. Batsis, J. A., Pletcher, S. N., & Stahl, J. E. (2017). Telemedicine and primary care obesity management in rural areas—innovative approach for older adults?. *BMC geriatrics*, 17, 1-9.
8. Butzner, M., & Cuffee, Y. (2021). Telehealth interventions and outcomes across rural communities in the United States: narrative review. *Journal of medical Internet research*, 23(8), e29575.
9. Eslami Jahromi, M., & Ayatollahi, H. (2023). Utilization of telehealth to manage the Covid-19 pandemic in low-and middle-income countries: a scoping review. *Journal of the American Medical Informatics Association*, 30(4), 738-751.
10. Hedima, E. W., & Okoro, R. N. (2021). Telepharmacy: An opportunity for community pharmacists during the COVID-19 pandemic in Sub Saharan Africa. *Health Policy and Technology*, 10(1), 23.
11. Mbunge, E., Batani, J., Gaobotse, G., & Muchemwa, B. (2022). Virtual healthcare services and digital health technologies deployed during coronavirus disease 2019 (COVID-19) pandemic in South Africa: a systematic review. *Global health journal*, 6(2), 102-113.
12. Nwachuya, C. A., Umeh, A. U., Ogwurumba, J. C., Chinedu-Eze, I. N., Azubuike, C. C., & Isah, A. (2023). Effectiveness of Telepharmacy in Rural Communities in Africa: A Scoping Review. *Journal of Pharmacy Technology*, 39(5), 241-246.
13. Onyebuchi, O. B. (2022). Telepharmacy in sub-Saharan Africa: A Narrative Review. *J Clin Med Img Case Rep*, 2(4), 1203.
14. Pathak, S., Haynes, M., Qato, D. M., & Urick, B. Y. (2020). Peer reviewed: telepharmacy and quality of medication use in rural areas, 2013–2019. *Preventing Chronic Disease*, 17.
15. Poudel, A., & Nissen, L. M. (2016). Telepharmacy: a pharmacist's perspective on the clinical benefits and challenges. *Integrated Pharmacy Research and Practice*, 75-82.
16. Rabbani, S. A., Sharma, S., Mahtab, A., Pottoo, F. H., & Sridhar, S. B. (2023). A systematic scoping review of implementation of telepharmacy during COVID-19. *Journal of Applied Pharmaceutical Science*, 13(4), 030-044.
17. Sagaro, G. G., Battineni, G., & Amenta, F. (2020). Barriers to sustainable telemedicine implementation in Ethiopia: a systematic review. *Telemedicine Reports*, 1(1), 8-15.
18. Win, A. Z. (2017). Telepharmacy: Time to pick up the line. *Research in social & administrative pharmacy: RSAP*, 13(4), 882-883.

Appendix I

Questionnaire Questions

- 1. In my rural community, telepharmacy has enhanced my access to medications.**
 - ❖ Strongly Agree
 - ❖ Agree
 - ❖ Neutral
 - ❖ Disagree
 - ❖ Strongly Disagree
- 2. Obtaining my medications has become a more convenient process thanks to telepharmacy.**
 - ❖ Strongly Agree
 - ❖ Agree
 - ❖ Neutral
 - ❖ Disagree
 - ❖ Strongly Disagree
- 3. I express contentment with the telepharmacy services rendered within my locality.**
 - ❖ Strongly Agree
 - ❖ Agree
 - ❖ Neutral
 - ❖ Disagree
 - ❖ Strongly Disagree
- 4. I am better able to manage my health conditions due to telepharmacy.**
 - ❖ Strongly Agree
 - ❖ Agree
 - ❖ Neutral
 - ❖ Disagree
 - ❖ Strongly Disagree
- 5. My overall satisfaction with healthcare services in my community has been enhanced by telepharmacy.**
 - ❖ Strongly Agree
 - ❖ Agree
 - ❖ Neutral
 - ❖ Disagree
 - ❖ Strongly Disagree
- 6. Obtaining medications no longer requires the time and effort that was previously invested.**
 - ❖ Strongly Agree
 - ❖ Agree
 - ❖ Neutral
 - ❖ Disagree
 - ❖ Strongly Disagree

7. Because of telepharmacy, the quality of care I receive for my health conditions has been enhanced.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

8. The implementation of telepharmacy has enhanced my confidence in the local healthcare system.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

9. Telepharmacy has enhanced my adherence to medication.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

10. Through telepharmacy, I now have greater access to healthcare resources and information.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

11. Telepharmacy has facilitated my interactions with medical professionals.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

12. In general, telepharmacy has enhanced my health outcomes.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

13. Through the use of telepharmacy, my confidence in managing my own health has grown.

- ❖ Strongly Agree

- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

14. Through the use of telepharmacy, I have been able to reduce my healthcare expenditures.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

15. Telepharmacy has enhanced my quality of life as a whole.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

16. My satisfaction with the accessibility of healthcare services in my community has been enhanced by telepharmacy.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

17. The utilization of telepharmacy has enhanced my adherence to medication instructions.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

18. Through telepharmacy, my sense of autonomy in health management has grown.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree

19. The utilization of telepharmacy has enhanced my overall perception of community healthcare services.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral

- ❖ Disagree
- ❖ Strongly Disagree

20. The utilization of telepharmacy has bolstered my confidence in the healthcare professionals with whom I engage.

- ❖ Strongly Agree
- ❖ Agree
- ❖ Neutral
- ❖ Disagree
- ❖ Strongly Disagree