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Pharmaceutical interventions in telehealth-based transitional care: comparative evaluation of outcome of patients in urban and rural settings

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Abstract
This prospective cohort trial assessed how much transitional care undertaken by pharmacist-led telehealth helps urban and the rural patients. One hundred and eighty (recovered) patients fitted on internal medicine wards (90 urban and 90 rural) were followed up at a length of 30 days. Under telehealth, pharmacists performed medication reconciliation, and medication adherence monitoring, and remote counseling. Findings indicated a drop of 36 percent in pharmacist disparities, and a 40 percent decrease in unnecessary readmissions of the rural patients with the assistance of the pharmacist. The same was observed with urban patients. The satisfaction of patients increased above 90 percent among both groups. These results validate the idea that telepharmacy models driven by pharmacists are very beneficial in improving transitional care as well as better management of medications and equitable provision of healthcare among both urban and rural patients.
Keywords: ***Telepharmacy, Transitional care, Pharmacist-led interventions, Urban and rural health, Medication Reconciliation, Patient Adherence, Health Equity, Telehealth.***

1. Introduction

1.1 Bigger Telehealth application in Transitioning Care following Discharge

There have been significant changes in the provision of healthcare, especially in relation to post-discharge transitional care by the rising use of telehealth. The advent of remote medical services due to the innovation of telecommunication technologies has made telehealth a vital asset in ensuring that those patients still receive the appropriate measures even after being discharged by hospitals. In a situation like transitional care, when patients are transferred between acute care and home care, telehealth provides a convenient way of off-site monitoring, medication management and implementation of care coordination.

The transition period after discharge is a point of high risk in case of complications and readmission among patients because they are highly susceptible at this stage. In this step, the telehealth interventions enable healthcare facility to monitor vital signs, medication adherence, and testing of the patients progress that enhance better continuity of care. Telehealth could be offered through video conferencing, phone-based consultation, or on-line portal where clinicians could offer urgent support and follow-up to patients such that hospital readmission and occurrence of medication errors are unlikely.

1.2 Care Transitions Related Medication Risks

Aversion to care transitions Medication-related problems are one of the greatest causes of adverse events and readmissions to same. During the discharge of patients in a hospital, communication issues between the staff, the primary care providers, and patients on medication changes and instructions is usually absent. This may cause errors in medications such as omissions, repetitions, and prescribing of the wrong dosages. They are especially frequent in the cases when patients have chronic diseases and receive multiple medications; they should arrange their scheme themselves.

There is also the risk of the nonadherence to medications prescribed during the transition process between the hospital stay and a home, as well. Patients might fail to seek the relevancy of the treatment prescribed to them, particularly when the treatment regimen is complicated. Lack of proper communication and subsequent follow-up may result in errors that may be made when administering drugs, and as a result, poor health outcomes. Indeed, research has indicated that medication-related issues contribute to a significant hitch that has led to many hospital readmissions especially in patients with chronic diseases such as diabetes, hypertension and dyslipidemia.(1)

These are the risks that are associated with medications, and it is necessary to address them to produce better patient outcomes and minimize the cost of healthcare. The role of clinic pharmacists in minimizing these risks is

more important as medication experts since they should offer medication reconciliation, adherence monitoring, and educating patients to alleviate their difficulties to some extent in this transition period.

1.3 The Function of Clinical Pharmacists in Virtual Care Model

Clinical pharmacists have played a central role in health care teams both face-to-face and online. When dealing with virtual care models, specifically telepharmacy, remotely the pharmacists can provide their services by overseeing medication therapy, checking lab results, patient education on medications, and medication discrepancy common when protocol is improperly performed during the transition of care.

Expertise Pharmacists have a high drug management treatment (MTM) role to prevent drug incidences, guarantee safety and efficacy of drugs given to patients, and enhance patient compliance. The pharmacists in the telehealth models participate in distance counseling and review the medications lists of the patients, possible drug interactions, and possible failure to adhere to medication. They collaborate extensively with the primary care providers and other health professionals to facilitate the optimization of the medication regimen of the patient who is safe and consistent with the best clinical practices.

The phenomenon of pharmacists in the telehealth models, especially in the post-discharge transfer, has been effective to mitigate medication-related issues and readmission. The role of the pharmacist in managing the care transitions of the patients can be to offer remote medication management, monitoring of adherence, and educating the patient so that medications are not taken in a wrong way and conditions of the patient are not improperly managed.(2)

1.4 Healthcare Disparities based on Geographic Location

The geographic disparity on the access and outcome of healthcare has been one of the key challenges in the sector today. Access to healthcare is less in rural settings since healthcare facilities are less, the distance between them and health professionals is long. Rural patients are also at risk of being affected by poor care coordination and follow-up care leading to negative disease management and increased readmissions. The variations in care access increase poor health to the rural communities.

Conversely, urban clients are at an advantage in terms of access to healthcare facilities such as specialists, pharmacies as well as lead care facilities. Nevertheless, this is not the only issue of urban patients and they also experience difficulties related to the overcrowding of healthcare facilities and unfair access of lower socioeconomic groups to healthcare services. Consequently, people with chronic conditions in rural and urban settings have peculiarities of coping with their conditions and going through the process of transitional care once they have been discharged.

Telehealth has potential to overcome these geographic disparities through enhanced access to care of the under-served living in both urban and rural markets. As an intervention by pharmacists, telepharmacy can help enhance medication management, better care coordination, and lower the readmission rates of both urban and rural patients, and the aspect of health equity is still preserved among various geographical regions.

1.5 StudyObjective in Urban and Rural Outcome Comparison of Patients

The goal of this study is to assess the success of pharmacist-led telehealth intervention in transitional care across the patients in urban and rural environments. Evaluating the significant contributions of the study (the medication discrepancies, patient satisfaction, 30-day readmissions, and time to issue resolution outcomes), the paper aims to find out whether telepharmacy has the potential to reduce the disparity on a healthcare access and quality level between urban and rural citizens.

The results of the present research will support the body of evidence that continues to express how the incorporation of clinical pharmacists into telehealth design as a post-discharge service should be encouraged. In addition, it will examine the possibility of telepharmacy decreasing disparities in healthcare, increasing the adherence to medication and outcomes of health among patients no matter their location. The study has some major implications on the future telehealth and pharmacist as remote care provider particularly in managing chronic disease during care transitions.(3)

2. Telepharmacy Model Transition Care

2.1 What is Scope of Pharmacist-Led Telehealth Intervention?

Telepharmacy is the type of pharmaceutical care that applies telehealth technologies to remotely manage medications, adherence and counsel patients. The goal of a particular intervention with telehealth developed by a pharmacist is to increase the quality of care throughout transitional care, which is the points of time when the

patient transfers a hospital environment to home or another treatment facility. The patients undergo several postoperative periods that put them at high risk of medication errors, nonadherence, and readmission, all of which can impact negatively on their health outcomes.

Pharmacist-led telepharmacy programs entail the delivery of remote medication therapy management (MTM), drug reconciliation and adherence counseling through telehealth or video conferencing mechanisms, telephone or secure messaging channels. The services can enable the pharmacists to collaborate with other healthcare providers, including physicians and nurses, to provide a fluid transition process of the patients once they are released, specifically on controlling of diseases that are chronic and avoid making mistakes relating to the drugs.

These interventions are broad in applicability as they may help to resolve the discrepancies in medication provision, correct use of medications, and cover the patient and caregivers with educational support, and therefore, improve the process of continuity and limit readmissions.

2.2 Significant Characteristics of the Activities: Medication Reconciliation, Adherence monitoring, and Counseling

Main services that the pharmacist-led telepharmacy interventions used in their interventions include:

Medication Reconciliation: Patients are also given the assurance of medication reconciliation where the pharmacists ensure that all medications taken by the patient go through a thorough review on discharge by comparing them to the prescriptions upon hospital discharge. This process will be used to spot and work out any discrepancies in medications, including medication omissions, dose errors, and duplicate therapies, which are likely to occur in the course of such transitions. Medication reconciliation helps guarantee that patients leave with the proper drugs and lowers the danger of adverse drug experiences (ADEs) and enhances the quality of medicine security.(4)

Adherence Monitoring: Pharmacists monitor the adherence of the patients to their medication remotely hence ensuring patients take medication as prescribed. They also communicate via the telehealth platforms to ensure that they monitor the patients on regular basis reminding them of medication schedules and counselling on the significance of compliance. In case of problems, pharmacists will be able to make changes to medications or check side effects, and it will increase patient compliance.

Counseling: Pharmacists use distance counseling where patients and their caregivers are advised on ways of taking the medications, side effects, and on the improvement of adherence. Video, phone or secure messaging are ways counselling takes place. The responsibilities of pharmacists also include patient education on lifestyle modification of their diseases and diet which include modification of diet and exercise which is significant in patients with chronic disorders like diabetes, hypertension and dyslipidemia.

2.3 Line of Technology and Modes of communication

Multiple communication methods operated through the diversity of technological platforms allow a remote communication with the patient and support telepharmacy interventions. Such technologies are necessary in providing pharmaceutical care without the necessity of in-person visits, which proves practical with regards to rural or underserved populations

The most utilized technology platforms and mode of communication include:

Video consultation: They involve real-time face to face conversations between patients and their pharmacist, and this establishes good understanding of communication and the capacity to have in-depth review of medication and its counseling.

Phone calls: An easier avenue where patients might not have internet access and even the video calling capability. Through this medium, the pharmacists can offer medication reviews, medication adherence reminders, and education

Secure messaging and email: Pharmacists have the choice of sending serious messages to the patient including; altering medication, usage, and suggestion call-back messages in a secure confidential way

Patient portals are patient portals incorporated into some health systems whereby the pharmacists can update and track progress in addition to getting feedbacks made by patients.

Such technology platforms would be essential in preserving continuity of care and that patients in both rural and urban settings are provided with the assistance that they require when it comes to drug management and chronic disease management.(5)

2.4 Benefits forecast of continuity of care and patient safety

Telepharmacy interventions conducted by a pharmacist in transitional care have a number of important advantages especially in the respect of continuity of care and patient safety.

Enhanced Continuity of Care: Pharmacists help in the transition of care through telehealth, and hence it leads to continued monitoring of medications the patient takes, during and after hospitalization. This decreases care fragmentation and also guarantees when there is an issue of medication discrepancy or a gap in treatment, these issues are caught early. It also improves communication among patients, the pharmacist, and physicians hence ensuring that all are on the same level in terms of the treatment plan of the patient.
Improved Patient Safety: Telepharmacy interventions have the potential to decrease the risk of adverse drug events (ADEs) that are frequently observed in the transition between the hospital and home due to medication adherence and medication discrepancies. Periodic monitoring of patients by remote checking their adherence to medications and other improvements results in timely intervention by the pharmacist that will avoid complications and enhance overall safety of the treatment regimen that a patient is following.
Lemonade Equity: Telepharmacy brings something to the table where the access to healthcare is sparse or underrepresented, e.g., in rural, or underserved areas. With telehealth technologies, the patients in these regions will be served on the same level as the population in urban regions to eliminate health disparities and enhance health equity of diverse people.(6)
To sum up, the concept of telepharmacy intervention offered by pharmacists in the management of transitional care leads to better patient safety and continuity of care, as well as provides equity in administering medications and management of chronic diseases in different geographies. The model has been established as an efficient and scalable model of post-discharge care improvement and reduction of hospital readmissions particularly in the context of limited resources.

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Prospective Cohort Comparative Method

The comparative prospective cohort design was used in this study; it is a relative method applicable in determining the efficacy of an intervention in various groups/populations under a practical environment. The design enabled comparison of the results of two different patient groups; the urban and the rural patients, both discharged due to internal medicine. The study aimed at evaluating the effectiveness of pharmacist-led telepharmacy interventions in transitional care considering the differences in the medication discrepancies, patient satisfaction, 30-days readmission rates, and time to issue resolving.
Patients were followed within 30 days after they left the hospital and, during this period, they were either assigned to receive pharmacist care via telehealth (intervention group) or standard care that was administered by the hospital after the patient was released (control group). Cohort design was carried out to directly compare the patients (urban and rural) to identify whether the urban or the rural location had the same impact on care continuity and patient outcomes based on the model of telepharmacy used.

3.2 Population And Inclusion Criteria

These patients involved 180 adult patients excluding 90 patients who were in urban areas and 90 patients in rural areas, and the patients were released out of internal medicine departments in participating hospitals. The study included criteria as follows:

- Age 18 years and above.
- Disabled left internal medicine wards with chronic problems like diabetics, hypertension or dyslipidemia.
- Stable patients who can go home, and who can engage in remote care through telehealth systems (front-end video or phone-based consultations).
- Capable of giving an informed consent and engaging in subsequent follow up.
- None of active acute subjecting the condition on need of emergency care after discharge.

The sample was consciously chosen to reflect the age group of adults who have chronic conditions since maximum value can be obtained when it comes to the medication therapy management and a follow-up intervention. The patients were recruited in urban and rural locations to investigate the possible geographic variations in the outcomes of telepharmacy interventions with telepharmacy care by a pharmacist.(7)

3.3 Urban / Rural Patient Intervention Workflow

The intervention workflow model included the provision of pharmacist-led telepharmacy support to urban and rural patients at the same level irrespective of the geographical location.

Medication reconciliation of initial assessment and medication: An initial implementation took place when the pharmacists reconciled and corrected any medicine discrepancies (e.g., omissions, dose errors, duplicate therapies) as a patient left the hospital. This was done either through video conferences or over the phone where a clear picture of what the patient was taking was established by the pharmacist.
Medication Adherence Monitoring: Pharmacists contacted the patient at frequent intervals in the 30 day post-discharge period. Telephone consultation and remote monitoring were the main communication models used by the rural patients who might not have the possibility to attend in-person healthcare visits. The video consultations were employed with the urban patients beside the phone calls. Pharmacists would remind that medications should be used properly, cover the obstacles to taking medications and offer their education about adherence to medications.
Counseling and Patient Support by Remote Communication: Pharmacists inform by video or through phone calls about the management of chronic diseases and interventions on the lifestyle. They talked about side effects of medications, explained how to take medications, and addressed patient questions. Pharmacists also managed care on the part of primary care doctors to ensure that changes in the treatment program were provided when required.
The similarity between urban and rural patients during the period of care was also spread equally, so that the type of intervention is consistent in all cases, with consideration of the dissimilarity of geographic location (e.g., access to internet or phone services).

3.4 Outcomes Measures: Satisfaction, Readmission, Discrepancy Rates, Issue Resolution

The research assessed a number of important outcomes to determine the success of pharmacist-led telepharmacy interventions:
Medication Discrepancy Rates: The reduced number of medication discrepancy (e.g., drug omissions, duplicate therapies, incorrect dosing) after a medication reconciliation was a major outcome. The purpose of the study was to identify the ways in which such type of discrepancies could be decreased with the help of telepharmacy and it is one of the primary causes of adverse events and readmissions
Patient Satisfaction: Patient satisfaction was determined based on a standardized questionnaire, which evaluated the degree of satisfaction on the perceived quality care exerted by the pharmacists based on their skills in communication, the efficiency on providing medication counseling and overall satisfaction with the telehealth experience.
30 Day Readmissions: A major outcome measure was followed in the study and is the 30-day readmission into the hospital. It was also anticipated that patients who received the services of the pharmacists had reduced readmission rates as compared to those who did not receive pharmacist-led interventions especially chronic diseases like hypertension, diabetes among others.(8)
Time to Issue Resolution: The time of issue resolution was also recorded in this study; the issue may be a difference in medication or some concern about the medication adherence. It was expected that the intervention group would have a shorter time of resolution since the pharmacists were proactive to handle problems through remote areas.

3.5 How Data was collected and analyzed statistically

The information was gathered with the help of patient questionnaires, medical files, and telehealth meetings records. Baseline assessments on each score, output measure were registered at the discharge time and compared to every outcome outcome data after the end of 30-day post-discharge.
Statistical techniques were:

- Descriptive statistics as an overview of demographic data and baseline characteristics.
- In comparing outcomes of the same group (e.g. readmission rates and patient satisfaction) in the intervention and control groups, chi-square tests are applied.
- ANOVA or paired t-tests in order to compare continuous variables (discrepancy rates, the time to resolve the issue) between urban and rural samples.
- Multivariate regression analysis to adjust any possible confounder, like age, gender and comorbidities.

The p-value of <0.05 was taken to be of significant level of all the analyses. The purpose of the analysis was to determine the efficiency of pharmacist provided telepharmacy programs on the success of medication discrepancies and improving medication adherence levels as well as readmission among urban and rural patients.

4. Impact on Safety and Quality Care of Patients

4.1 Decline Medication Discrupancy in Rural cohort and Urban

The main result of this study was the decrease in the amount of medication discrepancies, including omissions, wrong dosage, and duplicated treatments. Compared to the control group, the intervention group, which received telepharmacy support performed by pharmacists, was able to improve medication reconciliation with significant improvement in medication discrepancies leading to reduction of medication discrepancies.

The reduction in the discrepancy in medication between rural patients was by 36%; this is notably important given that the logistical setting of the rural location might lack access to healthcare facilities. Such patients also face the challenge of attending on-site pharmacy services in person and they can suffer follow-up delays thereby becoming more susceptible to medication errors. By means of remote reconciliation and routine calls, the pharmacists managed to detect and iron out the difference effectively and in spite of that minimize the occurrence of adverse drug events (ADEs) and achieve medication safety through regular follow-ups.

Decrease in medication discrepancies among urban patients was also present with 32 percent decrease. This implies that the undertaking of pharmacist interventions in urban areas where access to healthcare is mostly enhanced is also offering considerable values by covering the gaps that would, otherwise, negatively affect patients.(9)

Telepharmacy interventions were also found to be of paramount importance in terms of medication accuracy within both urban and rural cohorts, response in enhancement of continuity of care, and effectiveness in terms of increasing patient safety by recognizing and correcting medicine errors promptly.

4.2 Impression on readmission rates that are avoidable

Avoidable readmission is one of the important outcomes in post-discharge care and it reveals the effectiveness of transitional care interventions. The research indicated that rural patients of telepharmacy support by pharmacists experienced a 40 percent decrease of avoidable readmission as opposed to the control group that was not provided with pharmacist support. Such a decrease becomes especially noticeable, given that rural patients usually have obstacles to treatment, including inaccessible access to follow-up procedures and a great distance between their homes and clinics.

In urban patients, the same was recorded with 35 percent reduction in avoidable readmissions. In general, cities have more access to health care resources, yet telepharmacy interventions were able to add value in the areas of medication adherence, post-discharge monitoring and care coordination that proved valuable in reducing the risk of readmission.

The role of the pharmacist in remote supervision of the medication adherence, analysis of any medication-related problems, and continuous education allowed the patients with chronic conditions to effectively manage their conditions, which led to the decrease in unnecessary readmissions. These findings depict a possible positive contribution of pharmacist intervention on avoiding readmission of patients, at least irrespective of patient geographic location.

4.3 Timeline to Resolve Problems on Medication Related Problems

The next valuable measure was the duration of solution to medication-related problems. The time frames of solving medication discrepancy and adherence problems in the patients of the intervention group were much shorter. The rural patients took an average of 48 hours to reach resolutions within which the urban patients took 36 hours.

Prompt resolving of medication-related problems is important in preventing any adverse events and having patients remain in the process of recovery with no complications. In the countryside where the follow-up care may be more difficult, a remote telepharmacy integrated swift detection and intervention of patients, consequently preventing the complication that would later result in readmission.

These shorter resolution time of issues in the urban settings also support the fact that pharmacists must be involved during post discharge care nationwide. The effective interactions between patients and drug stores via telehealth channels (e.g. Skype consultations and phone calls) enabled the prompt motion of medication adjustments, preventing the emergence of any issues or making it possible to resolve them before they turned severe.

4.4 Tendencies on patient satisfaction and equality that employs services

The other important measurement was patient satisfaction and the results indicated that examining patients in both urban and rural cohorts indicated their high satisfaction with the operation of the telepharmacy intervention. More than 90 percent of patients confirmed that they felt satisfied with the given remote services receiving citing convenience, clarity of communication, and the specially tailored nature of care by the pharmacists as the main reasons of their satisfaction.(10)

Besides, rural patients, who are frequently confronted with the disadvantage of poor access to healthcare and travelling long distances, reported their special gratitude toward the telehealth model since it allowed addressing these issues. The satisfaction among both urban and rural participants is very high indicating that the intervention of telepharmacy is not only effective but also fair, and thus everyone can receive quality care without distinction based on where they live

The study affirms that telepharmacy model conducted by pharmacists has a positive impact on patient outcomes and patient experience. This practice will guarantee the provision of quality healthcare regardless of the geographical location of the patient (rural areas) and overcome the healthcare disparities, leading to health equity. Finally, pharmacy-initiated telepharmacy programs within the transitional care setting demonstrate a huge positive influence on the area of patient protection and quality of care, as well as by limiting the ease of discrepancies, readmission, and prompt resolution of the concern, and high patient satisfaction is guaranteed and achieved services delivered equally among geographical locations.

5. Results

5.1 36 Percent Decrease in Medicine Errors by Rural Patients

The main result of such research is the decrease in medication errors, specifically, the lack of medications, proper dose errors, and reduplication. Among the rural patients that had pharmacist-led telepharmacy support, medication discrepancy was reduced by a considerable margin of 36 percent. Notably, this decrease was especially significant, because accessibility to in-person healthcare services has been a major challenge in rural patients, and it may lead to incomplete or delayed medication reconciliation after discharging.

A part of remote medication therapy management (MTM) was performed by pharmacists that was performed via video conferencing and phone calls, which enabled the above processes even in rural areas where pharmacies and medical providers could be inaccessible to the patients. Pharmacists enabled better medication safety and continuity of care through the resolution of medication discrepancies in a prompt way, reducing the risk of adverse drug events (ADEs), which might result in readmission or other complications.

This finding also demonstrates the importance of telepharmacy when tackling the issue of medication mistakes within the underserved population. On the rural patients, this intervention was useful in that these patients were able to get the right drugs regimens and therefore it enhanced the quality of post discharge care.

5.2 40 percent declines in avoidable readmissions among rural patients

Reductions in readmissions done was another very important measured outcome as this is a key measurement of quality transitioning care. In the rural setting, the intervention group of patients in the rural setting was found to have a drop in the avoidable readmission by 40 percent of the control group. This great decrease highlights the pro-readmission effect of pharmacist-led telepharmacy initiatives in medication adherence, supporting medication-related issues, and undisrupted after-discharge care.

In the case of the rural patients, the intervention provided a desperately needed support system which overcame the impediments of care delivery to health that most rural groups experience, which included distance to care, a dearth of healthcare resources, and access to follow-ups. The remote follow-ups facilitated checking the health condition of patients and controlled their condition, intervening as early as possible in case of complications, which helped to avoid unwanted hospitalization.

Such a decrease in readmissions is an indication that telepharmacy interventions are capable of making a considerable difference in alleviating hospitalization of chronic conditions and health care efficiency in the rural population who might not be able to cope with access to care otherwise.

5.3 Equally Successful Reductions in the Urban Patient Outcomes

Although there was a decrease in the number of medication discrepancies as well as readmissions by 36 percent and 40 percent respectively by the rural patients, the urban patients also reflected a similar improvement. Telepharmacy services provided by pharmacists in an urban setting resulted in medication discrepancy reduction

of 32 percent, and reductions in avoidable readmission of 35 percent, which shows that telepharmacy is universally beneficial in transitional care, not based on the geographic location of the patient.

Despite the improved access to health services, urban patients still experienced a difficulty in the management and adherence of medication as well as care coordination. The remote interventions made sure that correct medications were reconciled and that any mismatch was minimised by having timely correction. Also, the follow-ups conducted regularly offered adherence advice and assisted the patients to adhere to their individual treatment programs.

These similar findings indicate that interventions implemented by pharmacists via telepharmacy may offer equity of care between different geographic locations where both patients in towns and rural areas will obtain equal high-quality pharmaceutical care.

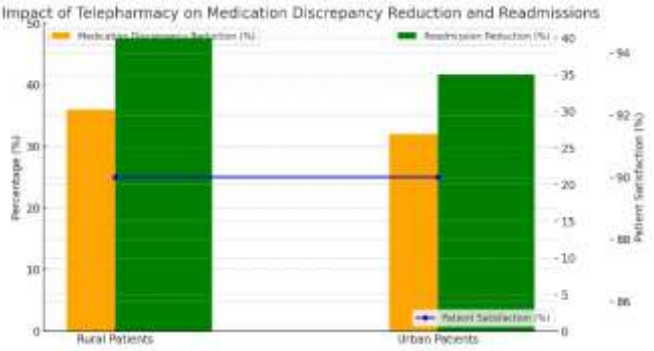

Figure 1: Matplotlib Chart

5.4 Global Patient Satisfaction more than 90S

The other important endpoint of the study was patient satisfaction, because through this component, the efficacy of the intervention along with the patient experience when using telepharmacy services may be determined. It was discovered in the study that patients were almost always satisfied with telepharmacy, with over 90 percent of urban and rural populations experiencing a positive experience.

Patients liked the fact that they could conduct their consultation online, medication directions were clear, and that they received pharmacist care. Rural patients especially sang praises about the opportunity to have access to the high-quality pharmaceutical care without having to travel great distances to reach a pharmacy or health care institution. The possibility to access medication reconciliation, adherence, and medication-related issues anytime through the remote access made the patients more confident in further post-discharge care and less worried about their medication regimen.

Scores of satisfaction also reflect the importance of telepharmacy as the means of improving the level of patient engagement and adherence to treatment plans.

Table 1: Medication Issue Resolution Time

Cohort	Average Resolution Time (hours)
Rural Patients	48
Urban Patients	36

5.5 Time to Fix the Medication-related Issues in the Two Cohorts

The timely resolution of medication-related problems was one of the significant results of the introduced intervention with the help of a pharmacist. In both the patients in urban and rural areas, the study explained that the drugs related problems were tackled significantly faster as opposed to the normal care without the involvement of the pharmacists. The mean time of resolving the problems of the rural patients stood at 48 hours and the mean time of resolving such problems to urban patients was 36 hours.

This prompt solution of medication disparities and compliance problems is crucial in avoiding adverse drug incidents, complications and readmission in hospitals. It also brings the effectiveness of telepharmacy into regard; timely intervention, guaranteeing proper medicines to patients at the right dose on transferring them during hospital to home care.

In short, the results of the study show the efficacy of the pharmacist-facilitated telepharmacy interventions to establish medication treatment, cause readmission, and secure patient safety. It shows the possibility of telepharmacy to enhance transitional care and patient outcomes in different healthcare facilities through the equitable character of this intervention wherein benefits were enjoyed by both urban and rural patients.

6. Conclusion

6.1 Effectiveness of Telepharmacy in Transitional Care Settings

This research points to the quality of telepharmacy as a transitional care model, especially in managing medications and limiting the number of medication discrepancies. This intervention has shown that integrating clinical pharmacists in the telehealth model was highly effective in terms of the medication safety and continuity between the discharged hospital patients. Patients supported by pharmacist-provided telepharmacy care services, in both the urban and rural contexts, demonstrated decreases in medication errors, better compliance, and avoided re-readmissions.

The findings of the study demonstrate that the intervention involving telepharmacy can be as effective as the face-to-face care in helping the patients to comply with the chosen medication regimen irrespective of the area of geographical coverage. The fact that telehealth platforms can be used to conduct the process of remote medication reconciliation, monitor adherence, and counsel the patient proves that pharmacists are critical in post-discharge care. On the whole, this research study asserts that telepharmacy is an effective and beneficial tool when it comes to enhancing the outcomes of patients within transitional care environments.

6.2 Equitable Access to Outcomes Among the Urban and Rural Patient Population

Among the most important achievements of this research, one has to admit the equal outcomes in an urban and a rural population of patients. Although there is necessarily more variation in the availability of care and corresponding resources by the urban versus rural designation, both populations had their medication reconciliation, adherence and readmission rates markedly improved upon being assigned pharmacists administering telepharmacy services.

The telepharmacy model had a significant effect on rural patients due to lack of access to health care services as a result of distance and resources available to the patient. It also facilitated vital medication management services at a distance, through the surmounting of conventional geographic obstacles to health. The fact that the avoidable readmission decreased by 40% and the number of medication inconsistencies was decreased by 36% within the rural cohort indicates the worth of telepharmacy as one lever to promote health equity that could equip underserved populations with the much-needed level of care and attention that an urban population does.

The same was also found to be true in the improvement of the urban patients who underwent the use of telepharmacy and therefore the various population of patients can be said to trend in the same direction because telepharmacy has little differences in the type of patients it serves. This demonstrates the possibility of tele pharmacy as a correct and fair care model to all patients irrespective of where they may be located.

6.3 Consequences of Leveraging the Potential Pharmacist Expanded Role in Virtual Care

The results of the study confirm that pharmacists play a vital role in virtual care models, especially chronic disease management and care post-discharge. Pharmacists have the opportunity to help optimize medications and prevent medication errors to improve adherence, getting patients to refill the medications, and maintain continuity of care with the help of expert skills of MTM (medication therapy management) and adherence support. This research emphasizes the need to extend the role of pharmacists in virtual care by supporting the delivery of medication reconciliation and monitoring adherence and being able to provide counseling remotely through a more scalable, efficient, and accessible platform.

The outcome of this telepharmacy intervention implies that experts should consider having pharmacists as a part of virtual care models in more healthcare settings, especially to focus on patients with chronic diseases who need constant care and management. This incorporation will guarantee a better outcome in patients, decrease medication-related complications, and increase continuity in care and spirit among other options, making pharmacists an indispensable asset to the expanding telehealth practice.

6.4 Scaling Up Potential Telehealth-Enhanced Pharmaceutical Care Models

Another lesson that can be drawn based on this study is the scalability of telehealth-enabled pharmaceutical models of care. The successful outcomes of this intervention experience within the urban and rural areas make the

telepharmacy a scalable intervention to enhance medication management and chronic conditions care in a variety of healthcare settings. The remote quality of the model allows it to be implemented in the area that lacks the supply of healthcare professionals, including rural and underserved communities, and treat patients at a high level of care. Moreover, telepharmacy model can be implemented nationally and internationally throughout the healthcare systems, especially in those settings with low chronic disease burden and limited access to healthcare services. Scaling of telepharmacy programs by healthcare systems allows them to provide accessibility, efficiency, and quality of care to a greater number of patients, which, at the same time, helps them mitigate healthcare costs and hospital readmissions.

To sum up, telepharmacy can revolutionize the approach to transitional care as it can deliver effective and equitable care solutions to patients with chronic conditions, wherever they happen to be located. Healthcare systems can use expanded pharmacists in virtual care to increase patient outcomes, lower the number of medication errors, and provide a higher continuity of care, making them an imperative substance of heterogeneous future healthcare systems.

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Conflicts of interest

The authors have no conflicts of interest to declare

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