THE EFFECTIVENESS OF TELEPHARMACY INTERVENTION ON HYPERTENSIVE PATIENTS

Genie Zaskia Makiling Aca-ac[1], Hudson Ken Abe Andawit[2], Nellyn Kyle Adrales Blando[3], Queenie Ursabia Calamba[4], Aura Thea Pagnamitan Fonte[5], Zaldhy Otagan Jualo[6], Maria Isabel Millan[7], Caryl Joyce Amista Pepugal[8], Elnie Jyne Nicor Tolog[9], Erwin Faller[10]

[1]San Pedro College, 12C Guzman Street Davao City Philippines, acaackia@gmail.com
[2]San Pedro College, 12C Guzman Street Davao City Philippines, hudsonken.andawit1223@gmail.com
[3]San Pedro College, 12C Guzman Street Davao City Philippines, blando.nellynkyle@gmail.com
[4]San Pedro College, 12C Guzman Street Davao City Philippines, queenie.calamba08@gmail.com
[5]San Pedro College, 12C Guzman Street Davao City Philippines, auratheafontee@gmail.com
[6]San Pedro College, 12C Guzman Street Davao City Philippines, zaldhyjualo@gmail.com
[7]San Pedro College, 12C Guzman Street Davao City Philippines, mariaisabel.millan4455@gmail.com
[8]San Pedro College, 12C Guzman Street Davao City Philippines, caryl.pepugal0805@gmail.com
[9]San Pedro College, 12C Guzman Street Davao City Philippines, elniejynent@gmail.com
[10]San Pedro College, 12C Guzman Street Davao City Philippines, erwin_faller@spcdavao.edu.ph

*Corresponding Author: Nellyn Kyle Blando [blando.nellynkyle@gmail.com]

ABSTRACT

Telepharmacy is a pharmaceutical care provision through a remote interaction between patients and pharmacists that provides patient counseling on medication management and adherence especially on chronic diseases such as hypertension. The study aims to evaluate the effectiveness of telepharmacy intervention on hypertensive patients during the COVID-19 pandemic. The research employed a quantitative, quasi-experimental design utilizing a purposive sampling technique to assess the effectiveness of telepharmacy intervention on their blood pressure and medication adherence. Thirty (30) participants were examined and subjected to the study using Wilcoxon signed-rank t-test and Student's t-test to compare and analyze the parameters before and after the interventions. The results showed that telepharmacy intervention manifested a significant difference in the level of effectiveness of the patient's systolic profile ($p=0.009$), diastolic profile ($p= 0.766$), and medication adherence ($p<.001$) in the intervention conducted. Moreover, there was a significant difference between the patients subjected to the intervention ($p=0.009$) between the patients who did not receive any intervention ($p=0.798$). Correlations between the parameters showed a moderately high negative relationship (-0.678) between the telepharmacy intervention and the blood pressure and medication adherence ($p<0.01$) which was highly significant. This means that as medication adherence increases, blood pressure decreases. Therefore, the effect size of the telepharmacy intervention was effective in decreasing its systolic, controlled diastolic, and medication adherence. Nevertheless, telepharmacy intervention is not yet fully maximized in the

Philippines which can be a potential use in delivering pharmaceutical care. Current findings clearly illustrate the desirability and efficacy of telepharmacy intervention that can be utilized in the accessibility of medications to hypertensive patients.

Keywords: adherence, blood pressure, covid-19, hypertension, telepharmacy

INTRODUCTION

The main cause of coronary and early death is hypertension around the world. The world average blood pressure (BP) was however stable or significantly reduced over the last four decades, due to the widespread use of antihypertensive drugs. In the Philippines, research has shown significant growth in the death rate from 11 percent in 1990 to 21 percent in 2017, although hypertension-related diseases have increased from 4 to 11 percent, and the prevalence of hypertension has increased significantly in the last three decades. The Hypertension Study Board 2007 Philippine Heart Association (PRESYON 2-TOD) observed that only 13 percent of hypertension in the Philippines were used for BP, and up to 75 percent of treated patients had monotherapy.

Pharmacists play a critical role in hypertension treatment. Their intervention has been shown to increase BP regulation and commitment to antihypertensive therapy, particularly counseling, drug tracking and examination, blood pressure (BP) assessment, and cardiovascular risk factors monitoring. The addition of telehealth (so-called telepharmacy) to such a model would improve the pharmacist's involvement and provide additional benefits for hypertensive patients and their overseeing physicians in pharmacy operations and medical care at a distance.

Telepharmacy is intended to provide remote pharmacy operations and patient services, as well as to improve healthcare access, patient safety, and stoic performance. To establish and deliver telepharmacy programs, a variety of tools, treatment models, and procedures are used, with the goal of reaching out to diverse communities suffering from a variety of pathological disorders, including cardiovascular disease.

With this, the researchers had evaluated the effectiveness of telepharmacy intervention on hypertensive patients, whether the said intervention is effective or not, through assessing hypertensive patients' medication adherence and blood pressure. The study may be utilized by pharmacy students, pharmacists, and other health professionals for future research about adopting telepharmacy in the Philippines.
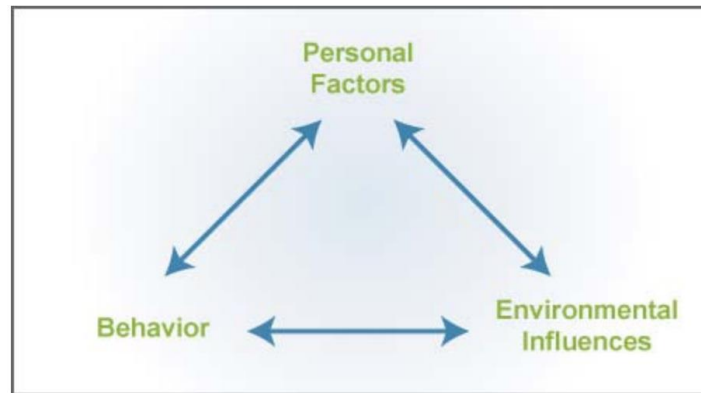
Figure 1. Bandura, A. (1986). Social Foundations of Thoughts and Action: A Social Cognitive Theory.

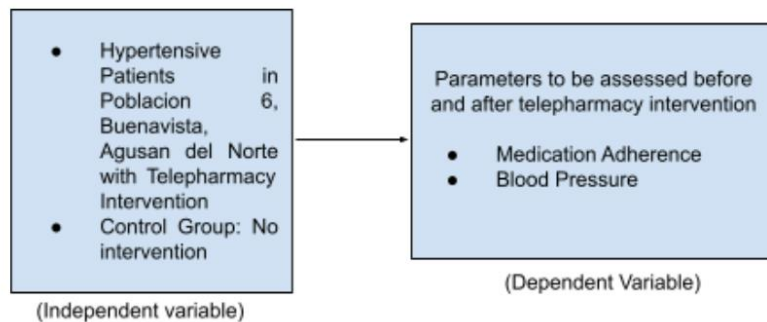"*This figure has been reproduced with kind permission from National Institutes of Health*"

Figure 2. Conceptual Framework

METHODS

Study Design

This study utilized a quantitative, quasi-experimental research design involving hypertensive patients from Poblacion 6, Buenavista, Agusan del Norte. A quasi-experimental research design was used to estimate a causal impact of an intervention on a target population without random assignment, which attempts to establish a cause and effect relationship. The researchers used purposive sampling techniques in choosing the participants by identifying them through inclusion and exclusion criteria. The purpose of this research was to evaluate the effectiveness of telepharmacy as an intervention among hypertensive patients by assessing the improvements in medication adherence and blood pressure.

Participants

The study was conducted through a series of phone calls with the participants from Barangay Poblacion 6, Buenavista, Agusan Del Norte. A total of 30 participants were selected for the quantitative, quasi-experimental research study.

Inclusion Criteria

Hypertensive patients age at least 30 years old and above, taking three or more medications including maintenance, supplements, over-the-counter drugs (polypharmacy), and a bonafide citizen of the Poblacion 6, Buenavista, Agusan del Norte. The participants had to have a cellular phone with them.

Exclusion Criteria

Hypertensive patients that are below 30 years old, temporarily staying at the said Barangay and enduring severe health problems, pregnant, and with cognitive impairment.

Intervention

The telepharmacy intervention was introduced to the participants. The 30 respondents were divided into two groups: 15 hypertensive participants for the first category without intervention and 15 hypertensive patients for the second category with the intervention.
Before the intervention, a survey was given to the 30 participants which was applied before and after the intervention by the pharmacist using the MyMAAT questionnaire. The results were measured using the Malaysian Medication Adherence Adherence Tool (MyMAAT) which enabled the researchers to compare the patient's adherence before and after the intervention.
The clinical pharmacist monitored the second category of participants that received an intervention, counseled their medication and verified patients' sufficient understanding, knowledge, and skill to follow their pharmacotherapeutic regimens, and also motivated patients to learn about their treatment and to be adherent to their medications through phone calls. Each and every piece of information that was done by the clinical pharmacist was recorded in audio throughout the study. The clinical pharmacist monitored the 15 participants every week for two months.

Research Locale

The study was conducted at Poblacion 6, Buenavista, Agusan del Norte, Philippines. As determined by the 2015 Census, its population was 1,783, which represents 2.89% of the total population of Buenavista, Agusan del Norte. The participants was surveyed at the said location. The researchers chose the place of implementation since the Barangay has one health center with lists of hypertensive patients and provides free medications for them. One of the researchers is also

residing at the said Barangay. Thus it was easier for the researchers to coordinate with the Barangay and their health center. Also, it was a low-risk area for COVID-19 to conduct the study. More significantly, the mentor monitored the implementation and progress of the survey through the Gantt chart, evaluation through progress report, and panel evaluation.
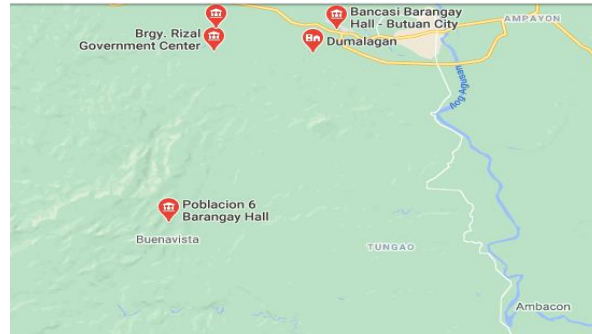

Figure 3. Map Showing the Location of the Area

Data Collection Procedures

The Barangay captain and the head Barangay health institution provided a list of hypertensive patients to assist the advocates to target their audience. The list used to verify responder identification is confidential. The involvement of hypertension patients followed data collection. These included the study's risks and benefits, as well as participants' rights to privacy. The permission form was sent to the barangay health center's head nurse. They contacted each respondent once they sign the consent form. The papers was returned in three days.

Thirty individuals were studied. The inclusion and exclusion criteria were used to choose participants. The first 15 people were located in the control group, while the remaining 15 were in the intervention group. The Malaysian Medication Adherence Scale (MyMAAT) survey form was provided to participants who agree to participate in the study. The patient communication questionnaire was translated into Bisaya. The MyMAAT questionnaire was delivered by a researcher to the Barangay head nurse. The survey took 10 minutes to complete. The Barangay head nurse then alerted the researchers to the MyMAAT findings. In order to enhance the participant's blood pressure an ambulatory nurse performed it during medication administration.

After the results were collected, 15 patients received telepharmacy, and 15 did not. The researchers used telepharmacy with a clinical pharmacist. The clinical pharmacist assisted the doctor in administering hypertension medication and advised patients to ensure they understood the intended drug use and administration. Participants were phoned in. This was done for two (2) months. The clinical pharmacist utilized phone calls to advise patients on medication and answer queries. A

record of every conversation was kept. The clinical pharmacist used telepharmacy to treat patients. They conducted another survey utilizing the MyMAAT questionnaire in two months to evaluate hypertension patients' adherence to the regimen. The patient's blood pressure was re-checked. The researchers analyzed and interpreted the responses to establish study validity.
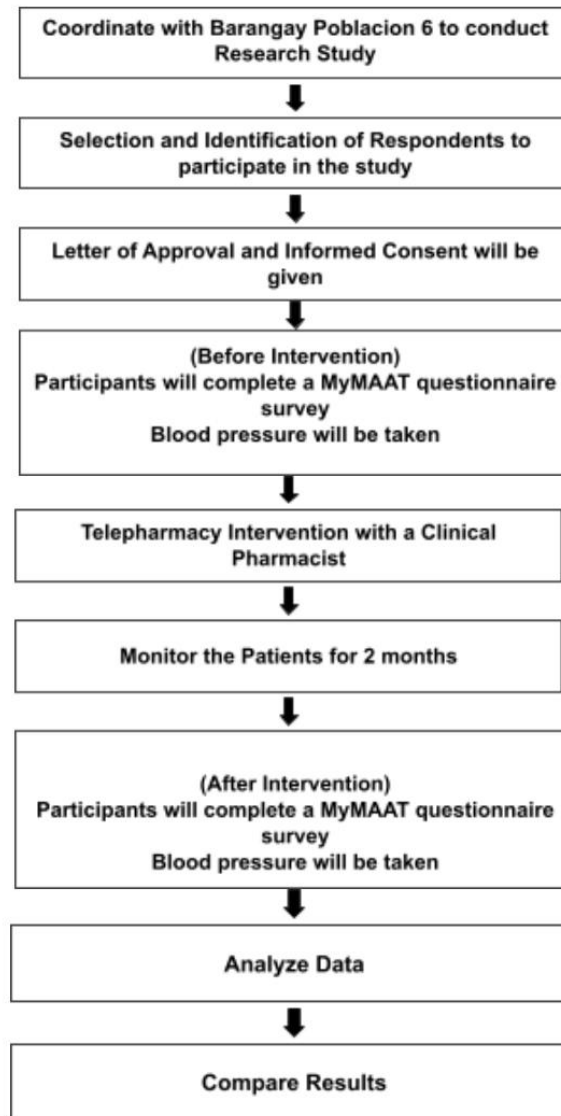

Figure 4. Flow Chart of the Data Collection Procedure

Data Analysis

The researchers utilized Mean and Standard deviation, Paired T-test (T-test for dependent sample), and Spearman's Correlation to analyze and interpret the data. In addition, the researchers employed

a quantitative, quasi-experimental design utilizing a purposive sampling technique to assess the effectiveness of telepharmacy intervention on their blood pressure and medication adherence.

Limitations of the Study

The study has potential limitations. This study is a quasi-experimental research design that focuses on assessing the effectiveness of telepharmacy on the hypertensive patients of Poblacion 6 through evaluating the improvements in their medication adherence and blood pressure. The selection procedure of the respondents was done through the purposive sampling technique. Thirty participants were selected based on inclusion criteria: Hypertensive patients, at least 30 years old and above, and a bonafide citizen of Poblacion 6, Buenavista Agusan del Norte. The study, therefore, is only applicable to hypertensive patients. The number of participants is also small which can undermine the internal and external validity of the study. Moreover, participants had the right to continue or withdraw from the survey, shrinking the sample size and decreasing the amount of data collected that can influence the result of the study. Lastly, the blood pressures of the participants were only measured before and after the intervention which can lead to inaccurate readings since the blood pressures can fluctuate every day.

Instrument

A questionnaire adapted from the Malaysia Medication Adherence Assessment Tool (MyMAAT), consisting of 12 questions, was utilized to survey the participants of the study.

Ethical Approval

An approval from the Research Ethics Committee of San Pedro College was obtained before the enactment of the study. All participants were given written consent upon joining the research. The support provided consisted of the following: the purpose of the study, the reason for the selection of participants, roles of the participant, potential risks and benefits of the study, and protection of the privacy of the research participants. The researchers did not use methods that inflict physical or psychological harm to the participants. The respondents were given autonomy to decide whether he/she will continue or withdraw from the study based on the agreement set by both parties. Only necessary information was utilized in the study with a disclosure from the participants. The data remained confidential and was handled appropriately by the pharmacist and the researchers.

RESULTS

Blood Pressure and Medication Adherence Profile of Respondents

Table 1 shows the profile of the respondents with and without intervention in terms of their blood pressure and medication adherence. For blood pressure, it is interpreted in terms of the systolic and diastolic profile and for medication adherence, it is interpreted based on the Malaysia Medication Adherence Assessment Tool (MyMAAT).

For the systolic profile of the group with intervention, before the telepharmacy, the respondents had a mean of 135.667 mm Hg (SD = 16.132). After the intervention, the patients with the intervention group had a decreased mean blood pressure of 119.333 mm Hg (SD = 27.830). The group without intervention, on the other hand, prior to the intervention, the group had a mean of 149.333 mm Hg (SD = 19.074) After the intervention, the group without intervention had persistent, elevated blood pressure, with a mean of 158.667 and a standard deviation of 8.338.

In the diastolic profile, both groups had a normal interpretation of their diastolic profile before and after the intervention. As for the patients with intervention, before the telepharmacy, 82.667 mmHg was the mean with a standard deviation of 4.577. After the intervention, a mean of 82.000 mmHg and a standard deviation of 4.140 was obtained. Furthermore, the group without the intervention had a mean score of 85.333 and a standard deviation of 4.140. After 2 months of no intervention, 85.333 mean and 6.339 standard deviations were obtained respectively, indicating a normal diastolic profile.

Whereas for the medication adherence of the respondents, both groups had a non-adherent score based on the MyMAAT Questionnaire. A mean score of 32.267 and a standard deviation of 12.909 was obtained for the group with intervention. Meanwhile, the group without intervention had a mean of 26.867 and a standard deviation of 13.479. After the intervention, the group who received the intervention had a mean score of 58.467 and a standard deviation of 1.060, which can be interpreted as adherent based on the MyMAAT scoring (Score $\geq$ 54). In contrast, the group without intervention remained non-adherent, with a mean of 24.267 and a standard deviation of 2.939.

There is a great improvement with the patients with intervention as compared to the group without intervention according to their blood pressure and medication adherence profile before and after the intervention. Patients with intervention had controlled blood pressure after 2 months of telepharmacy, and became adherent with their medication. In line with the study of Fensterheim et al., aimed at increasing treatment adherence by means of telepharmacy, of a patient with a pharmacist at the beginning of the intervention. In comparison to a control group, there were considerably greater chances of adhering to the medicine in individuals who had the telepharmacy consultation. Additionally, following Albasri et al. research, throughout the 6–12 months of

pharmacist telemonitoring, both blood pressure reductions and the proportion of patients meeting BP objectives were considerably improved as compared to standard treatment. This suggests that the evidence for using telepharmacy in hypertension care would be that the distant aspect of monitoring, along with the ability to notify doctors of the intervention possibilities sooner, makes telepharmacy BP services advantageous. This is likely to guarantee that the additional burden involved with analyzing data and acting on their results is distributed equitably throughout patient healthcare.

Table 1. Blood Pressure and Medication Adherence Profile of the Respondents

Parameter	Group	Before Intervention			After Intervention		
		Mean	**SD**	**Interpretation**	**Mean**	**SD**	**Interpretation**
Systolic (mm Hg)	With Intervention	135.667	16.132	High BP	119.333	27.830	Controlled
	Without Intervention	149.333	19.074	High BP	158.667	8.338	High BP
Diastolic (mm Hg)	With Intervention	82.667	4.577	Controlled	82.000	4.140	Controlled
	Without Intervention	84.667	5.164	Controlled	85.333	6.399	Controlled
Medication Adherence (MyMAAT)	With Intervention	32.267	12.909	Non-adherent	58.467	1.060	Adherent
	Without Intervention	26.867	13.479	Non-adherent	24.267	2.939	Non-adherent

Effectiveness of telepharmacy intervention based on the hypertensive patients' medication adherence and blood pressure after the intervention.

The effectiveness of telepharmacy intervention is determined using the effect size which establishes the relationship between the telepharmacy intervention and the parameters. The medication adherence and blood pressure of the patients were analyzed to measure their experimental effect on the study.

Table 2 shows the effect size of the tested parameters in the intervention. The systolic p-value (0.009) denotes that the intervention significantly works, and the systolic effect size (-0.945) indicates a large negative effect size. For this reason, the intervention that has been done revealed a high level of effectiveness in decreasing the systolic profile of the respondents.

Moreso, the diastolic p-value (0.766) tells us that the intervention is not significant yet within an acceptable range. Obtaining an effect size of –0.200 means acquiring a small negative effect size.

Hence, the intervention was neither effective to decrease the diastolic rate of the respondents due to its diastolic range (80-90 mm Hg). Nonetheless, the diastolic is still within the acceptable range.

As for the medication adherence, the MyMAAT p-value (<.001) that was accumulated means the intervention significantly works, providing an effect size of 1.989. The medication adherence denotes a large positive effect size which indicates that the intervention that has been put together has a high level of effectiveness in improving patients' adherence to medication.

Based upon the statistical outcome, the level of effectiveness of the telepharmacy intervention formulated on the hypertensive patients with their medication adherence and blood pressure after the intervention, positively laid out that the intervention is highly effective in decreasing the systolic, maintaining its diastolic within the acceptable range and its medication adherence. This clearly shows that the telepharmacy intervention really helped the hypertensive patients manage their condition. Apart from that, according to Omboni, telepharmacy intervention in terms of blood pressure, which includes educational support, medication trackers, and teleconsultation, may promote patient self-management as an additional tool to doctor intervention, and foster patient involvement in medical decision making. Thus, patients and their healthcare professionals may benefit from the use of health information technology in order to establish and sustain a long-term connection. Telepharmacy has the potential to empower hypertension patients and encourage self-management, as well as enhance the medical condition of patients. Digital interventions can assist to personalize the doctor-patient interaction, improving blood pressure and medication adherence.

Table 2. Effect Size of the Telepharmacy Intervention

Parameters	p	Effect Size	Interpretation
Systolic	0.009	-0.945	Large Negative
Diastolic	0.766	-0.200	Small Negative
MyMAAT	<.001	1.989	Large Positive

Difference Between the Before and After Telepharmacy Intervention Profiles of the With Intervention Group

The before and after intervention results of the patients with the intervention was compared to determine if significant differences exist in the blood pressure and medication adherence among the respondents.

As shown in Table 3, the results revealed that the group with intervention had a (p-0.009) in the systolic parameter which can be interpreted that there is a significant difference between the before and after telepharmacy of the participants' systolic blood pressures. The diastolic parameter had a (p-0.766) indicating that there is no significant difference in the before and after telepharmacy of the participants' diastolic blood pressures. Lastly, the medication adherence had a (p-<.001) which denotes that there is also a significant difference between the before and the after telepharmacy results of the participant's adherence to their medication.

With this, the researchers can infer that the respondents who have received an intervention have a significant difference in their systolic profile and medication adherence which means that there is an observed effect that is reflected on the blood pressure and medication adherence of the patients with intervention. In contrast, there is no significant difference in the patients' diastolic profile but it does not indicate that the intervention had no effect. Based on the book of Katzung and Trevor, "Basic and Clinical Pharmacology", End-organ damage is linked to both systolic and diastolic hypertension; the risk of end-organ damage is higher in African Americans and lower in premenopausal women than in males, regardless of blood pressure or age. It is important to emphasize that the diagnosis of hypertension is based on blood pressure measurements rather than symptoms described by the patient. By responding to the claim, until overt end-organ damage is impending or has already happened, hypertension is frequently asymptomatic.

Results in a patient are rather evident because many measures are utilized to quantify diastolic function, each with insufficient statistical significance. Consequently, it is mentioned in the book that even mild hypertension (blood pressure 140/90 mm Hg) raises the risk of end-organ damage in the long run. With each increase of 20/10 mm Hg throughout the blood pressure range, the risk of cardiovascular disease doubles, starting at 115/75 mm Hg. As per the large Hypertension Optimal Treatment research, 138/83 mm Hg is the ideal blood pressure endpoint. There is no advantage to lowering blood pressure below this level. In adults over the age of 60, systolic hypertension (blood pressure of 150 mm Hg in the context of normal diastolic blood pressure) is a serious cardiovascular risk factor that must be addressed.

Table 3. Significant Difference between Before and After Telepharmacy Intervention Parameters of Patients With Intervention

Group	Parameter	p-value	Interpretation
With Intervention	Systolic	0.009	Significant
	Diastolic	0.766	Not significant
	Medication Adherence	<.001	Significant

Difference Between the Before and After Telepharmacy Intervention Profiles of the Without Intervention Group

The before and after intervention results of the patients without intervention was compared to determine if significant differences exist in the blood pressure and medication adherence among the respondents.

Table 4 presents the data of the group without intervention with a (p-0.058) in the systolic parameter which shows that there is no significant difference in the before and after the intervention of their systolic blood pressures. The diastolic parameter had a (p-0.777) meaning that there is no significant difference in the before and after telepharmacy of the participants' diastolic blood pressures. In terms of their medication adherence, it had a (p-0.798) demonstrating that the difference of the participants' before and after intervention medication adherence findings were not significant. This implies that there was no significant difference in the before and after parameter values of the patients who did not receive the intervention. In harmony with Poudel and Nissen, when pharmacists aren't available in rural or distant places, the majority of pharmacy services are delegated to nurses, doctors, and other healthcare practitioners who may or may not be trained in proper pharmaceutical administration. This circumstance may have resulted in a less-than-ideal system that fails to meet government standards for the provision of high-quality pharmaceutical services to all individuals. Telepharmacy may be able to help with these concerns. As a result, telepharmacy helps to alleviate pharmacist shortages in rural locations while also increasing patient access to drugs and pharmaceutical services.

Table 4. Significant Difference between Before and After Telepharmacy Intervention Parameters of Patients Without Intervention

Group	Parameter	p-value	Interpretation
Without Intervention	Systolic	0.058	Not Significant
	Diastolic	0.777	Not Significant
	Medication Adherence	0.798	Not Significant

Correlation between the medication adherence and blood pressure of the patients

The blood pressure and medication adherence were correlated using the Spearman correlation. The spearman correlation determines the relationship between medication adherence and the blood pressure of the patients.

Table 5 shows that there is a correlation between the telepharmacy intervention and the respondent's medication adherence and blood pressure. The statistical analysis revealed that there is a moderately high negative relationship between the telepharmacy intervention and the following parameters, which means as the medication adherence increases, the blood pressure decreases. The p-value obtained was <.001 which means that it is highly significant. Similarly, a study conducted by Uludag, et al. investigated the relationship between patient medication adherence and blood pressure (BP) values. It was revealed in the result of the study that there is a negative correlation between systolic blood pressure and the medication adherence of the patients. This means that as one variable increases the other decreases. Additionally, Poulter, et al. found that poor adherence to antihypertensive medication is a key factor to poor blood pressure management in another study evaluation.

Table 5. Correlation between the Medication Adherence and Blood Pressure

Correlation Table		Spearman rho	p	Interpretation
MyMAAT	Systolic	-0.678	<.001	Significant
MyMAAT	Diastolic	-0.291	0.119	Not Significant

Consequently, as maintained by Schladetzky, pharmacists can use telepharmacy to build strong relationships with patients in underprivileged areas. The telepharmacy workflow enables pharmacists to deliver the tailored care required to develop a trusting connection, which is critical to enhancing medication adherence and monitoring of blood pressure. Patients' assessments of the telepharmacy indicated high levels of satisfaction with accessibility, service, and patient counseling, and similar outcomes were reported in the telepharmacy and retail chain environments.

DISCUSSION

According to their blood pressure and medication adherence profile before and after the intervention, the patients who received intervention fared far better than those without intervention. After two months of telepharmacy, intervention patients had stabilized blood pressure and become medication adherent. This implies that the evidence for utilizing telemedicine in hypertension management is that the remote element of monitoring, along with the capacity to alert doctors to intervene sooner, makes it beneficial.

Subsequently, the level of effectiveness of the telepharmacy intervention formulated on hypertensive patients with their medication adherence and blood pressure after the intervention, based on the statistical outcome, positively laid out that the intervention is highly effective in decreasing the systolic, maintaining its diastolic within the acceptable range, and medication adherence. As a result, telepharmacy has the ability to empower hypertension patients, encourage self-management, and improve their medical condition. Digital interventions can help to customize the doctor-patient relationship, resulting in better blood pressure control and medication adherence. The difference in the before and after Telepharmacy intervention profiles of the intervention group suggests that there is an observed impact that is reflected in the patients with intervention's blood pressure and medication adherence. In the long run, even moderate hypertension (blood pressure 140/90 mm Hg) increases the chance of end-organ damage. Blood pressure measures, rather than symptoms, are used to diagnose hypertension.

Most pharmacy services are delegated to nurses, physicians, and other healthcare professionals who may or may not be educated in the administration of pharmaceuticals. Telepharmacy might help relieve pharmacist shortages in remote areas while simultaneously improving patient access to medications and pharmaceutical services. Patients who did not get the intervention had no significant differences in their before and after measures. Finally, the findings revealed a link between the telepharmacy intervention and the respondents' medication adherence and blood pressure. In another study, Schladetzky, et al. discovered that poor adherence to antihypertensive medication is a major determinant in poor blood pressure management. The telepharmacy workflow enables pharmacists to provide the personalized care needed to build a trusting relationship with patients, which is essential for improving medication adherence and blood pressure monitoring. Patients expressed high levels of satisfaction with accessibility, service, and patient counseling, and comparable results were observed in telemedicine and retail chains.

CONCLUSION

With telepharmacy, you can operate a pharmacy from anywhere in the world. The study's goal is to see how well telepharmacy works for hypertension individuals. Patients' medication adherence and blood pressure were shown to be affected by telepharmacy intervention. The study's final results were already gathered after participant intervention monitoring. The effect size was used to calculate the effectiveness of telepharmacy on hypertensive patients. As a result of this positive effect, the intervention is highly effective in decreasing systolic, maintaining diastolic within acceptable ranges, and medication adherence. The telepharmacy intervention improves medication adherence and lowers blood pressure in patients who receive telepharmacy. This study also found that prior to and after the telepharmacy intervention, participants' medication adherence was significantly improved. The non-intervention group's final results, on the other hand, were minimal to non-existent. There is also a significant improvement in medication adherence and blood pressure between the groups who received and did not receive any intervention. Ultimately, medication adherence and blood pressure were found to be negatively correlated. Overall, the study found telepharmacy to be highly effective for hypertensive patients. The intervention has managed hypertensive patients effectively, as determined. Many illnesses go unnoticed in these times of global pandemic. Patients with hypertension are more susceptible to COVID-19 complications, even in these situations.

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CONFLICTS OF INTEREST
No conflicts of interest are declared.

REFERENCES

Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. Nature Reviews Nephrology. 2020;16(4):223–37.

Pipo MMQ, Lelis MA, Javelona JQ. [Internet]. An observational study on the antihypertensive management of high-risk patients in the Philippines . [cited 2020Dec28]. Available from: https://www.pcp.org.ph/files/PJIM%20Vol53%20No3/An_Observational_Study_on_the_Antihypertensive_Management_of_High-Risk_Patients_in_the_Philippines.pdf

Siang TC, Hassali MA, Fen NC. The role of pharmacist in MANAGING hypertension in the community: Findings from a community based study. Indian Journal of Pharmaceutical Education and Research. 2019;53(3):553–61.

Albasari A, Sheppard JP, McManus RJ, McDonagh STJ, Omboni S, Clark CE. Effective detection and management of hypertension through Community pharmacy in England. The Pharmaceutical Journal. 2020;

Gums TH, Uribe L, Vander Weg MW, James P, Coffey C, Carter BL. Pharmacist intervention for blood pressure control: Medication intensification and adherence. Journal of the American Society of Hypertension. 2015;9(7):569–78.

Poudel A, Nissen L. Telepharmacy: A PHARMACIST'S perspective on the clinical benefits and challenges. Integrated Pharmacy Research and Practice. 2016;Volume 5:75–82. (JOURNAL ARTICLE, 2 authors)

Krousel-Wood M, Thomas S, Muntner P, Morisky D. Medication adherence: A key factor in achieving blood pressure control and good clinical outcomes in hypertensive patients. Current Opinion in Cardiology. 2004;19(4):357–62.

Conn VS, Ruppar TM, Chase J-AD, Enriquez M, Cooper PS. Interventions to improve medication adherence in hypertensive patients: Systematic review and meta-analysis. Current Hypertension Reports. 2015;17(12).

Bhusal A, Jadhav P, Deshmukh Y. Assessment of medication adherence among hypertensive patients: A cross-sectional study. International Journal of Basic and Clinical Pharmacology. 2016;:1606–12.

Hamdidouche I, Jullien V, Boutouyrie P, Billaud E, Azizi M, Laurent S. Drug adherence in hypertension. Journal of Hypertension. 2017;35(6):1133–44.

Burnier M, Egan BM. Adherence in hypertension. Circulation Research. 2019;124(7):1124–40.

Vrijens B, Antoniou S, Burnier M, de la Sierra A, Volpe M. Current situation of medication adherence in hypertension. Frontiers in Pharmacology. 2017;8.

Beevers G. ABC of Hypertension: The pathophysiology of hypertension. BMJ. 2001;322(7291):912–6.

Beevers G. ABC of hypertension: Blood pressure measurement. BMJ. 2001;322(7292):981–5.

Omboni S. Connected health in HYPERTENSION MANAGEMENT. Frontiers in Cardiovascular Medicine. 2019;6.

Cottrell E, Cox T, O'Connell P, Chambers R. Implementation of simple telehealth to manage hypertension in general practice: A service evaluation. BMC Family Practice. 2015;16(1).

Perdew C, Erickson K, Litke J. Innovative models for providing clinical pharmacy services to remote locations using clinical video telehealth. American Journal of Health-System Pharmacy. 2017;74(14):1093–8.

Omboni S, Tenti M. Telepharmacy for the management of CARDIOVASCULAR patients in the community. Trends in Cardiovascular Medicine. 2019;29(2):109–17.

Fensterheim LE, Gunn JG, Pokuta KL, Straszewski A, Marks A. Initial impact OF TELEPHARMACY on specialty medication adherence. Value in Health. 2015;18(3).

Mohamed Ibrahim O, Ibrahim RM, Abdel-Qader DH, Al Meslamani AZ, Al Mazrouei N. Evaluation of Telepharmacy services in light of covid-19. Telemedicine and e-Health. 2021;27(6):649–56.

Baldoni S, Amenta F, Ricci G. Telepharmacy services: Present status and FUTURE Perspectives: A review. Medicina. 2019;55(7):327.

Omboni S, Tenti M, Coronetti C. Physician–pharmacist collaborative practice and telehealth may transform hypertension management. Journal of Human Hypertension. 2018;33(3):177–87.

Ibrahim OM, Ibrahim RM, Z Al Meslamani A, Al Mazrouei N. Role of telepharmacy IN PHARMACIST counselling to CORONAVIRUS disease 2019 patients and MEDICATION dispensing errors. Journal of Telemedicine and Telecare. 2020;

Tan CS, Hassali MA, Neoh CF, Ming LC. Beliefs about medicine and medication adherence among hypertensive patients in the community setting. Drugs & Therapy Perspectives. 2020;36(8):358–67.

Abrahamse W. Research designs for measuring the effectiveness of interventions. Research Methods for Environmental Psychology. 2016;:291–306.

Aziz F, Malek S, Mhd Ali A, Wong MS, Mosleh M, Milow P. Determining hypertensive patients' beliefs towards medication and associations with medication adherence using machine learning methods. PeerJ. 2020;8.

Singh S, Shankar R, Singh GP. Prevalence and associated risk factors of hypertension: A cross-sectional study in urban varanasi. International Journal of Hypertension. 2017;2017:1–10.

Mills KT, Bundy JD, Kelly TN, Reed JE, Kearney PM, Reynolds K, et al. Global disparities of hypertension prevalence and control. Circulation. 2016;134(6):441–50. (JOURNAL ARTICLE, more than 6 authors)

Kang CD, Tsang PPM, Li WTL, Wang HHX, Liu KQL, Griffiths SM, et al. Determinants of medication adherence and blood pressure control among hypertensive patients in Hong kong: A cross-sectional study. International Journal of Cardiology. 2015;182:250–7.

Vasan RS, Larson MG, Leip EP, Evans JC, O'Donnell CJ, Kannel WB, et al. Impact of high-normal blood pressure on the risk of cardiovascular disease. New England Journal of Medicine. 2001;345(18):1291–7.

Campbell N, Ordunez P, Jaffe MG, Orias M, DiPette DJ, Patel P, et al. Implementing standardized performance indicators to improve hypertension control at both the population and healthcare organization levels. The Journal of Clinical Hypertension. 2017;19(5):456–61.

Parati G, Stergiou GS, Asmar R, Bilo G, de Leeuw P, Imai Y, et al. European society of Hypertension practice guidelines for home blood pressure monitoring. Journal of Human Hypertension. 2010;24(12):779–85.

Hatah E, Rahim N, Makmor-Bakry M, Mohamed Shah N, Mohamad N, Ahmad M, et al. Development and validation of MALAYSIA medication adherence assessment Tool (MyMAAT) for diabetic patients. PLOS ONE. 2020;15(11).

Hypertension [Internet]. World Health Organization. World Health Organization; [cited 2020Dec28]. Available from: https://www.who.int/news-room/fact-sheets/detail/hypertension

Holland K. High blood pressure (hypertension): Causes, symptoms, and more [Internet]. Healthline. Healthline Media; 2020 [cited 2020Dec30]. Available from: https://www.healthline.com/health/high-blood-pressure-hypertension

Adam Chesler PD& JA. Telepharmacy essential to MITIGATING Covid-19 pandemic [Internet]. Learn about Telepharmacy. 2020 [cited 2020Dec30]. Available from: https://blog.telepharm.com/telepharmacy-essential-to-mitigating-covid-19-pandemic

Noriega R. UP college of Pharmacy free Consultation up [Internet]. Manila Bulletin. 2020 [cited 2020Dec28]. Available from: https://mb.com.ph/2020/07/19/up-college-of-pharmacy-free-consultation-up/

Schladetzky Z. How telepharmacy IMPROVES care in MEDICALLY underserved areas [Internet]. Learn about Telepharmacy. 2017 [cited 2020Dec30]. Available from: https://blog.telepharm.com/how-telepharmacy-improves-care-in-medically-underserved-areas

Sabanovic S, Veladzic A, Ramic I, Mamatnazarova N. Review of application of telepharmacy solutions in the practice. 2020 9th Mediterranean Conference on Embedded Computing (MECO). 2020;