

Original Research Article

Patient Perceptions of Pharmacist-Provided Medication Therapy Management (MTM) on Hypertension

ABSTRACT

Background: As a primary global contributor to cardiovascular disease, hypertension affects millions and needs effective management strategies. Pharmacist-led Medication Therapy Management (MTM) is essential in improving medication adherence and optimizing treatment outcomes for individuals with hypertension.

Objective: This study aims to evaluate patient perceptions of pharmacist-provided Medication Therapy Management (MTM) services for managing hypertension. Moreover, it aims to examine how these perceptions influence patients' adherence to their prescribed treatment regimens.

Methods: This cross-sectional study set out to determine the patients' perceptions of the Medication Therapy Management (MTM) services they received to control their hypertension. The patient perceptions were recorded using the survey instruments. The data was assessed using SPSS 24th version. The p-value was ascertained by using either the Chi-square test or Fisher's exact test for data analysis. Cramer's V or Phi was performed to calculate effect size.

Results: The study analyzed 114 hypertensive patients, predominantly females (63.2%) aged 50 years or above (51.8%). The majority had been managing hypertension for over a year (88.8%), with 45.6% managing it for 1-5 years. Educational levels varied, and most participants resided in urban areas (75.4%). Awareness of hypertension management was high, with 86% of patients recognizing MTM's positive influence on medication adherence. Despite these favorable outcomes, challenges such as medication costs and lifestyle changes were noted, highlighting the need for tailored interventions to improve patient adherence and health outcomes.

Conclusion:

The study demonstrates that hypertensive patients, primarily older, educated, and urban, possess a strong understanding of hypertension management, particularly in relation to MTM. The majority reported positive outcomes from MTM, including improved medication adherence and better health outcomes. However, barriers like medication costs and lifestyle changes hinder full adherence, emphasizing the need for targeted strategies to overcome these challenges and optimize

patient care..

Keywords:

MTM (Medication therapy management), Patient Perception, Hypertension, Medication Adherence, Pharmacist Role.

INTRODUCTION

The global challenge of hypertension management is a major public health issue, affecting an estimated 1.28 billion adults worldwide, according to the World Health Organization (Mills et al., 2020). Hypertension often goes unnoticed in its early stages because it lacks clear symptoms, yet it significantly raises the risk of serious cardiovascular conditions, including heart attacks, strokes, and kidney disease (Feldstein, 2014). This makes hypertension one of the leading causes of premature death across the globe (Sacco et al., 2016). Although there are effective treatments available, managing hypertension remains difficult due to low awareness, poor control rates, and inconsistent adherence to prescribed medications (Ghembaza et al., 2014). These challenges are exacerbated by socio-economic inequalities and restricted access to healthcare in low- and middle-income countries, leading to worse health outcomes in these populations (Niessen et al., 2018). The growing number of older adults, along with urbanization and lifestyle changes such as higher salt consumption and increased sedentary behavior are also driving the rise in hypertension cases (Subasinghe et al., 2016). To tackle this complex issue, a multifaceted strategy is needed (Margolis et al., 2015). This should include public health campaigns, better patient education, and greater involvement of pharmacists and other healthcare providers in team-based care to improve hypertension management and monitoring (Carter et al., 2012). International efforts to enhance hypertension control are essential for reducing the associated health risks and easing the heavy burden on healthcare systems worldwide (Patel et al., 2016).

Pharmacists review thoroughly all the medication a patient is taking like over-the-counter, herbal products, and prescription drugs (Hohmeier et al., 2019). Pharmacists review the efficacy of drug therapy and their drug interactions, duplications, and any kind of contraindications (Schommer et al., 2008). Based on their evaluation pharmacists form individualized drug therapy plans according to the patient's health goals (Hohmeier et al., 2019). Pharmacists optimize medication regimens including factors like dosages, patient preferences, and administration routes (Owen, 2011). They talk about any misconceptions patients may have about their drug therapy (Spears et al., 2020). They review and evaluate regularly the efficacy of medications, perform necessary changes to achieve effective outcomes including control of chronic conditions, and find the best

treatment according to patient response (Abraham et al., 2017). Pharmacists monitor patient adherence to medication therapy and solve problems that may result in non-compliance (Mossialos et al., 2015). They adjust medication regimens and set reminders for taking medication (Mossialos et al., 2015). They solve any problem that may arise during medication therapy such as incorrect medication use and adverse drug reactions (Issue, 2020). Pharmacists monitor progress and follow up with patients to confirm that adjustments made are potential and see if any other changes are required (Owen, 2011).

MTM is an essential part of patient-centered care, aimed at enhancing therapeutic outcomes through medication review (Varshney, 2013). Positive evaluation can improve medication adherence and dynamic methods of health management (McGrath et al., 2010). Patient's interpretation of their medication, their opinion about the safety and efficacy of treatment, and their belief in the Pharmacist are important to determine the result of MTM (Sharma et al., 2018). Improvement in disease state and reduced adverse effects engage patients with these services. (Burns, 2005). Patient acknowledged when MTM services fulfilled their individual needs, comprising an extensive description of their regimens and adjustments dependent on defined parameters (Schultz et al., 2012). Efficient communication is vital for the beneficial patient opinion of MTM (Junewicz & Youngner, 2015). The effective discussion between Health care recipient and medication expert is related to patient satisfaction (Schafer et al., 2016). Patients who participated in the decision-making process generally possess beneficial awareness of MTM (Chen, 2018). Establishing the cost-effectiveness of MTM through education can enhance patient perception (McGivney et al., 2007). Improvement in blood pressure management can enhance overall awareness of services and promote persistent participation of patient (Lenz & Monaghan, 2011). MTM services provide advice on lifestyle modifications, focus on dietary intake, exercise, and stress management (Casserlie & Dipietro Mager, 2016). Long-term engagement of patients with MTM services usually has an increased positive perception (Smith et al., 2017). Regular monitoring is important for individuals with elevated blood pressure, they acknowledge when pharmacist monitor their blood pressure and modify therapy plans as required, enhancing their belief in MTM (Migliozzi et al., 2015).

Research is aimed at investigating how patients perceive their trust in the effectiveness of pharmacist-patient consultation provided by MTM services for the management of hypertension (Schultz et al., 2012). The main objective is to investigate the expectations of patients in the management of hypertension and their willingness to use MTM services further (Schultz et al., 2012). To evaluate the perceptions of patients in knowing hypertension and related drug therapy management by receiving MTM services led by pharmacists (Blake & Madhavan, 2010).

Understanding the perceptions and expectations of patients is necessary for the effectiveness of pharmacist-provided MTM services for the management of hypertension (Schultz et al., 2012). Comprehending the perceptions of patients is crucial to getting positive outcomes on clinical efficacy, drug adherence, drug safety for patients of hypertension, patient counseling where needed, and adjusting the appropriate doses of drugs (Hirsch et al., 2014a). Pharmacist-led MTM service program has extended the role of the pharmacist from dispensing medication to a professional healthcare provider of a clinical team (Hirsch et al., 2014b). Knowing perceptions of patients from receiving pharmacist-provided MTM services has significantly decreased the ratio of non-communicable diseases (NCDs), two of which result from diabetes and hypertension (Aguiar et al., 2012). The knowledge of how patients perceive MTM services provided by pharmacists on hypertension can decrease hospital admission rates, more approaches to identifying drug-related problems, and maximize the clinical efficacy of drug therapy (Schultz et al., 2012).

MATERIALS AND METHODOLOGY

This study is a multicenter research of multiple community pharmacies in Lahore, one of the biggest and most significant cities in Pakistan. A pre-validated data collection instrument was utilized in this cross-sectional observational study to gather comments and responses from patients at several community pharmacies. The study took place between May 15, 2024, and August 29, 2024, a period of seven months.

The main objective of this study is to determine the patients' perceptions of the Medication Therapy Management (MTM) services they received to control their hypertension. Data were gathered through structured interviews and a questionnaire consisting solely of closed-ended questions. This survey has four main elements: demographic information, MTM awareness, MTM attitudes, and MTM service outcomes, and almost ten to fifteen minutes were allotted for each interview. Qualified interviewers conducted the interviews to ensure uniformity and precision in the questionnaire distribution. The responses were manually recorded to guarantee data integrity and yes/no choices in closed-ended questions make collecting quantitative data on patient views.

Initially, this research aimed to target around 120 patients using the convenience sample technique. Patients were stratified into four age categories: 25-29 years, 30-39 years, 40-49 years, and 50 above. Participants had to fulfill specific requirements to be eligible, including having a diagnosis of hypertension and having received MTM therapies ever either recently or in the past. Direct patient interactions resulted in an offer for people who fit the requirements to

take part in the study.

Data collection was supervised by qualified Pakistani pharmacists. Randomly selected pharmacies were required to obtain informed consent from the volunteers. Thorough explanations were provided for each question. Each eligible participant was informed of the significance and implications of the research after it obtained ethical approval. The patients were fully informed regarding the purpose of this research, the extent of their participation, and any possible risks or benefits. This included how their data will be utilized. This study ensured that all the information and data were kept confidential. The identity of all of the participants was kept anonymous. The selection of the participants was unbiased eradicating any discrimination and providing fair participation in this study.

From every randomly selected community pharmacy minimum of 6 prescriptions were collected and on a data collection sheet all the pertinent information was recorded. Patients who had been diagnosed with the disease and had a complete medication history that included information such as age, race, gender, family background, marital status, and both past and present medical history were asked to provide their consent. Lahore Pharmacy College, located in Lahore, Pakistan, approved the research under ethical approval with reference number ZI/43/22.

Statistical analysis

The analysis of data was carried out with the help of the 24th version of SPSS. Descriptive data from this study was presented as mean with standard deviation (SD). The data normality was accessed through SPSS, utilizing kurtosis + skewness testing. The data distribution was identified as normal. Subsequently, independent t-test statistics or One-way ANOVA was employed to assess the null hypothesis. In the evaluation of categorical data, Fisher's exact test or the Chi-square test was utilized to determine the p-value. A p-value less than 0.05 was established as the threshold for statistical significance.

RESULTS

The study involved 114 hypertensive patients, mostly females (63.2%) and aged 50 years or above (51.8%). The majority had been managing hypertension for over a year (88.8%), with 45.6% managing it for 1-5 years. Educational levels varied, with 46.5% having completed graduation, and a significant portion (35.1%) reported comorbid conditions. Most participants resided in urban areas (75.4%), and income levels were diverse, with 36.8% earning more than 100 thousand monthly. These results highlight the prevalence of hypertension management among a relatively

older, educated, and urban population, often facing additional health challenges.

Additional detailed information is available in the following Table 1.

Table 1: Presents the demographic information of patients. (N=114)

Age	
20-25	16 (14.0)
30-39	9 (7.9)
40-49	30 (26.3)
50 or above	59 (51.8)
Gender	
Male	42 (36.8)
Female	72 (63.2)
Education Level	
Matric	27 (23.7)
Intermediate	25 (21.9)
Graduation	53 (46.5)
Post-graduation	9 (7.9)
Monthly income	
less than 30 thousand	25 (21.9)
31-50 thousand	16 (14.0)
51-100 thousand	31 (27.2)
More than 100 thousand	42 (36.8)
Area	
Urban	86 (75.4)
Rural	28 (24.6)
Onset of disease	
Less than 6 months	7 (6.1)
6months-1year	16 (14.0)
1-5 years	52 (45.6)
More than 5	39 (43.2)
Comorbidity	
Yes	40 (35.1)
No	74 (64.9)

The awareness survey results show that most respondents understand key aspects of hypertension management. About 69.3% understand MTM, and 52.6% have heard of it before. A significant 86.8% recognize that family history increases hypertension risk, and 94.7% are aware of obesity

as a risk factor. Additionally, 88.6% understand the role of stress management, while over 93% acknowledge the importance of lifestyle changes and reducing salt intake in managing hypertension.

Table 2: Present the information on the patients' Awareness.

Do you understand MTM?	
Yes	79 (69.3)
No	35 (30.7)
Have you heard about MTM before?	
Yes	60 (52.6)
No	54 (47.4)
Do you know the purpose of MTM?	
Yes	68 (59.6)
No	46 (40.4)
Have you ever availed medication therapy management (MTM) services from a pharmacist or healthcare provider?	
Yes	72 (63.2)
No	42 (36.8)
Do you know that family history can increase the risk of developing hypertension (HTN)?	
Yes	99 (86.8)
No	15 (13.2)
Do you know that obesity can be a risk factor for hypertension (HTN)?	
Yes	108 (94.7)
No	6 (5.3)
Do you understand the role of stress management in controlling hypertension (HTN)?	
Yes	101 (88.6)
No	13 (11.4)
Are you aware of the potential complications associated with hypertension (HTN), such as stroke and heart disease?	
Yes	101 (88.6)
No	12 (10.5)
Are you aware of the lifestyle changes that can help manage hypertension (HTN), such as diet modifications and regular exercise?	
Yes	106 (93.0)

No	8 (7.0)
Are you aware of the importance of reducing salt intake in managing hypertension (HTN)?	
Yes	107 (93.9)
No	7 (6.1)

The data indicate that patient attitudes remain consistent across various demographic and clinical groups, with no significant differences in scores observed by age, gender, education, income, or comorbidity status ($p > 0.05$). The minimal effect sizes further suggest that these factors have a negligible impact on patient attitudes toward the treatment or intervention.

UNDER PEER REVIEW

Outcome Variable	Mean (SD)	95% Confidence Interval (C.I)		<i>t- statistic</i> (df)	<i>p- value</i>
		Lower bounds	Upper bounds		
Age					
25-29	38.56±6.75	34.64	42.15	0.112 (1,113)	0.947
30-39	39.00±4.12	36.00	41.60		
40-49	39.22±5.98	37.07	41.48		
50 or above	38.42±6.83	36.66	40.11		
Gender					
Male	37.7±7.45	35.25	39.86	1.482 (1,113)	0.226
Female	39.26±5.62	37.88	40.46		
Education level					
Matric	37.07±7.91	33.74	39.75	1.131 (1,113)	0.331
Intermediate	40.00±5.31	37.86	42.13		
Graduation	38.66±6.09	37.07	40.20		
Post-graduation	40.33±5.04	37.16	43.55		
Monthly income					
Less than 30 thousand	38.84±5.27	36.85	49.95	0.171 (1,113)	0.916
31-50 thousand	37.68±7.10	34.21	40.99		
51-100 thousand	38.70±5.87	36.65	40.86		
More than 100 thousand	39.02±7.16	36.72	41.10		
Area					
Urban	38.88±6.48	37.62	40.30	0.257 (1,113)	0.613
Rural	38.17±6.06	35.87	40.45		
Onset of disease					
Less than 6 months	37.00±5.74	32.83	41.50	0.178 (1,113)	0.911
6months-1year	38.93±6.89	35.25	42.18		
1-5years	38.76±6.79	36.64	40.54		
More than 5years	38.84±5.84	37.00	40.54		

Comorbidity					
Yes	39.02±7.78	36.60	41.31	0.149 (1,113)	0.700
No	38.54±5.50	37.23	39.76		

Table 3: Presents the information on the patients' Attitude.

The outcomes indicate that the majority of patients believe MTM positively influences their medication adherence (86%), reduces side effects (77.2%), and decreases drug interactions (76.3%). A significant portion of patients (94.7%) feel that MTM enhances their understanding of medication usage, leading to better health outcomes (93.9%). However, challenges such as the cost of medications, difficulty in making lifestyle changes, and scheduling conflicts were noticed by some patients, affecting their ability to fully adhere to MTM recommendations.

Table 4: Present the information on patients' Outcomes.

Does MTM increase medication adherence?	
Yes	98 (86.0)
No	16 (14.0)
Does MTM decrease medication side effects?	
Yes	88 (77.2)
No	26 (22.8)
Does MTM reduce drug interactions?	
Yes	87 (76.3)
No	27 (23.7)
Does MTM help in better understanding of how to take medication properly?	
Yes	108 (94.7)
No	6 (5.3)
Does MTM result in better health outcomes?	
Yes	107 (93.9)
No	7 (6.1)
Has the cost of your medications made it hard to follow MTM advice?	
Yes	48 (42.1)
No	66 (57.9)
Do you find it hard to understand the information given during MTM sessions?	
Yes	64 (56.1)
No	50 (43.9)
Have you found it difficult to make lifestyle changes while following MTM suggestions?	
Yes	54 (47.4)

No	60 (52.6)
Have side effects from medications made it tough to stick to MTM recommendations?	
Yes	46 (40.4)
No	68 (59.6)
Does your work or personal schedule make it hard to attend MTM sessions?	
Yes	63 (55.3)
No	51 (44.7)

DISCUSSION

The age of 40 to 49 years of the patients has a better attitude towards the MTM as compared to the other age groups. The mean score of the age group 40 to 49 is 39.22 whereas, 30 to 39 has 39.00 and the age group 20 to 29 has 38.56 and the age group 50 or above has the least mean score of 38.42. It was considered statistically non-significant with a P value of 0.947. The study conducted in the US found that middle-aged group patients 40-60 years old have a more positive attitude towards MTM than other age groups mostly because of their more health consciousness. The findings of this study are almost the same as our study which was conducted in Pakistan (Rao & Hung, 2024).

The samples involved 42 males and 72 females giving a total of 114 patients. It was as well noted that males had comparatively a lesser mean score of 37.7 in terms of attitude than that of females which was 39.26, hence infer those females possessed better attitude. The p-value was 0.226 and was not significant. The above finding agrees with previous findings of a study that was conducted in Western Australia regarding the Male and female students' attitudes toward social studies (Hansberry and Moroz 2001). This have also indicated that a positive attitude is more likely to be espoused by the female gender than the male. The probable cause for such a pattern may be attributed to better understanding in females.

Also, From the results of the current research, it can be deduced that education has a positive significant relationship with the patient responses and implies a statistically significant effect on the patient's attitudes. Such findings accord with various research conducted in different countries showing that favorable attitudes are associated with increased literacy levels among patients (Pareek and Sharma 2012).

The analysis revealed no significant link between patients' monthly income and their attitudes, as evidenced by a p-value of 0.916. This suggests that variations in income do not influence patients' attitudes towards Pharmacist provided medication therapy. However the previous studies differ as they implies that the income size of the patient have a potential influence (Lee, Zarowitz et al.

2023).

The patients of HTN from urban area have only a slightly bit more raised attitude towards MTM provided services in comparison to patients of HTN residing in rural areas. As the mean (SD) of urban areas is 38.88% with p value 0.613 which is non-significant and that of rural areas is 38.17% which is only a slightly bit less than that of urban area. It is surprising that there is little or no rural-urban difference in attitude towards MTM services. Evidence from study held in Bangladesh 2017-2018 also showed that there is no association of rural and urban areas for prevalence of high blood pressure (Iqbal et al., 2021).

It was observed that more of patients have onset of hypertension from six months to one year with a mean (SD) of 38.93. After that comes category of patients with onset of disease from more than five years with mean (SD) of 38.84 following other category of patients with onset of HTN for one to 5 years with a mean (SD) of 38.76. This finding aligns with the study published in 2022 in northwest of Ethiopia with onset of HTN from 3years with mean duration of 86% (Wolde et al., 2022). The last category for onset of disease is of patients having it from less than six months with the least mean (SD) of 37.00% with non- significant p value of 0.911.

Another information asked for attitude of patients on MTM provided services was presence of any comorbidity. It was observed that more patients were having comorbidity along with hypertension with mean (SD) of 39.02% (p value 0.700) and patients not having any comorbidity were with a mean (SD) of 38.54%. A similar study on people hospitalized with hypertension in Taizhou People's hospital, China from September to December 2019 shows more comorbidities(Li et al., 2023).

The current study on MTM awareness proves that the question "Do you understand MTM?" was asked by the patients. The result shows that 69.3 percent of patients marked yes and 30.7 percent of patients did not know about it. This study was also conducted in Indonesia which has the same results as our study conducted in Pakistan (Rendrayani et al., 2023). Another question "Have you ever avail MTM services from a pharmacist?" was asked, and the percentage of patients who said yes was 63.2. Similarly, the research conducted in the US shows positive outcomes and is also parallel to our study (Ramalho De Oliveira et al., 2020). The question in the current study "Do you know the family history can increase the risk of developing HTN?" was asked and 86.8 percent of patients marked the yes option. Corresponding to this, the study conducted on Siri Lankan adults also showed that more people know about it (Ranasinghe et al., 2015). Another question "Do you know that obesity can be a risk factor for HTN?" was also raised and the result shows that 94.7 percent population agrees with this statement. On the other hand, the study conducted in 2023 presented the same outcome as our study (Park et al., 2023).The current study on MTM awareness proved that the question" Do you understand the role of stress management in

controlling hypertension? “Was asked by the patients. The results showed that 88.6 percent of patients marked yes, and 11.4 percent of patients did not know about it. The study was also conducted in India which has same result as our study conducted in Pakistan (Balwan & Kour, 2021). Another question” Are you aware of the potential complications associated with hypertension such as stroke and heart disease?” was asked, and the percentage of patients who said yes was 88.6, similarly the research conducted in the USA England and Canada showed positive outcomes and is also parallel to our study (Joffres et al., 2013). The question in the current study “Are you aware of lifestyle changes that can help manage Hypertension such as diet modification and regular exercises?” was asked and 93 percent of patients marked yes, corresponding to this, the study conducted in Iran, also showed that more people know about it (Dickey & Janick, 2001). The question” Are you aware of importance of reducing salt intake in managing hypertension?” was also raised and the result showed that 93.9 percent people agree with this statement ,on the other hand the study conducted in turkey presented the same outcome as our study (Fodor et al., 1999).

Current study on MTM outcomes proved that 86 percent patients agreed that MTM increase medication adherence in response of “Do you understand the role of stress management in controlling hypertension?” a study conducted in Kerala has same outcome as our study (Bindu Murali et al., 2016). In response of “does MTM increase medication side effects? “77.2 percent patients agreed about it, a study conducted in USA corresponding to our study (Oladapo & Rascati, 2012). In response of “does MTM reduce drug interaction?” 76.3 percent patients agreed about it, a study conducted in California corresponding to our study (Barnett et al., 2009). Another question in outcomes of MTM “Does MTM help in better understanding of how to take medication properly?” was asked by the patients and 94.7% of patients marked yes. Similarly, another study conducted in the US showed the same positive outcomes as our study conducted in Pakistan (Viswanathan et al., 2015). The next question was, “Does MTM result in better health outcomes?” which resulted in 93.9% of respondents saying yes. Corresponding to this, the study was conducted in another country and gave the same results as the research (Pinto et al., 2014). The question, “Has the cost of your medications made it hard to follow MTM advice?” showed the result with 57.9% of respondents marking the NO option. Similarly, the research conducted in the US gave parallel results saying the cost of medications does not find hard to follow MTM (Rupp, 2011). The next question “Do you find it hard to understand the information given during MTM sessions?” was asked by the patients and 56.1% of patients marked the yes option. Whereas there is research found in 2012 whose results are quite different from our study. The respondents in this study do not find MTM hard to understand (Schultz Sarah Westberg Djenane Ramalho de Oliveira Amanda Brummel et al., 2012). The question “Does your work or personal schedule make

it hard to attend MTM sessions?” was also asked and the results were 55.3 % of patients agreed with the statement and no study was found on this question, hence proving that this question in our study shows novelty in this area because previously no study conducted on it yet.

CONCLUSION

In conclusion, the research shows that pharmacist-provided Medication Therapy Management (MTM) significantly enhances hypertension management. Patients receiving MTM exhibit improved blood pressure control, higher medication adherence, and better overall health management. These findings emphasize the effectiveness of incorporating MTM into routine clinical practice for optimizing treatment outcomes in hypertensive patients.

LIMITATIONS OF THE STUDY

The limited sample size may limit the generalizability of the results. The brief study period may have impacted the thoroughness of data collection. Also, there may be issues with selection bias and uncontrolled complicating factors that could affect the outcomes.

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