The Effect of Medication Therapy Management (MTM) on Adherence and Quality of Life of Hypertension Patients in Puskesmas Banyumas Regency

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Abstract

Background: Hypertension is one of the most common cardiovascular diseases in Indonesia and in the world. Hypertension requires a long-term treatment process, and compliance in taking medication is needed for blood and to improve patients' quality of life. Medication Therapy Management (MTM) is a pharmaceutical service method that can enhance individual hypertension patient compliance. This study aims to determine the effect of pharmaceutical services based on Medication Therapy Management (MTM) on hypertensive patients' adherence and quality of life at the Health Center in Banyumas Regency.
Methods: This research is an experimental method used in Randomized Controlled Trials (RCT). The variable measured was patient compliance with pill counts, while the quality of life was measured with the EQ-5D-5L questionnaire. Data collection will take place one month after the first data collection. Data were analyzed statistically using the Wilcoxon test to determine differences in results before and after the intervention.
Results: This study was attended by 180 people. Most of the respondents were female (90%), the average age was 55-64 years (44.4%), the average education was an elementary school (70%), and the length of time the patient had suffered from hypertension was 3 years at most (33,3%). The highest number of drugs received by respondents was one type of drug (43.3%), more respondents were without comorbidities (84.4%), and more respondents were working (60%). Pharmaceutical services based on Medication Therapy Management (MTM) at the Health Center in Banyumas Regency have been proven to be able to increase the compliance level of hypertensive patients, namely 0.54 ± -0.353 with a p-value of 0.000 and have been proven to improve the quality of life of hypertensive patients, namely 5.38 ± 2.962 with a p-value of 0.000.
Conclusion: Medication Therapy Management (MTM) has a significant influence on increasing hypertensive patients' adherence and quality of life.

Keywords: *Adherence, Hypertension, Medication Therapy Management, Quality of Life.*

Introduction

Hypertension is a very important public health challenge but remains a significant cause of modifiable morbidity and mortality[1], significantly increases the risk of heart, brain, kidney disease, and other diseases. Based on the 2023 Indonesian Health Survey or *Survei Kesehatan Indonesia* (SKI), hypertension is the fourth highest risk factor for death, with a percentage of 10.2%[2]. Around 1.28 billion people aged 30 to 79 years suffer from hypertension worldwide, with low to middle-income countries suffering from hypertension the most[3]. Efforts to improve the quality of life of hypertensive patients are related to their compliance with taking antihypertensive medication as recommended[4]. However, patients' obstacles are often forgetting (11.5%), consuming herbal medicine (14.5%), not having regular treatment (31.3%), and feeling healthy (59.8%)[5]. This is a challenge that reduces patient medication adherence. Therefore, a method is needed that can overcome this problem[6].

Pharmacists play an essential role in reducing the incidence of hypertension by practicing pharmaceutical care by identifying, preventing, and resolving drug therapy problems, including selecting the proper method[6]. Medication Therapy Management (MTM) can be the answer to overcome problems related to medication adherence. MTM is a health management service provided by pharmacists[7]. Pharmacists can conduct MTM in patient care[8], especially patients with hypertension[9], such as doing comprehensive therapy reviews, finding solutions, and preventing drug-related problems, as well as adverse drug events. The significant improvement in patient blood pressure control is one of the reasons why MTM is needed. The MTM treatment method involves all health workers working together with an acceptable approach for patients. The main goal of MTM is to optimize therapeutic outcomes through improved drug use and to reduce the risk of side effects[10].

There are several stages to achieve maximum results when applying this method. The first is

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Medication Therapy Review (MTR), Personal Medication Record (PMR), Medication-related Action Plan (MAP), intervention, and documentation[11]. After applying the MTM method to patients, compliance with taking medication was measured using the pill count method. The pill count method, or pill calculation[12], is a method of assessing patient compliance by calculating the patient's remaining medication to achieve a percentage of compliance using the modified Grymonpre formula[13]. The pill count method is an indirect method that measures the patient's medication adherence ratio in a simple, low-cost manner and is easy to apply in various formulations. This method can assess daily adherence or adherence patterns[14]. The application of the MTM method in pharmacies for hypertension patients has quite good results in increasing patients' quality of life[4].

After the MTM method is applied, an assessment is carried out using a questionnaire to determine the effect of this method on the patient's quality of life. A person's quality of life can be measured with the EQ-5D-5L questionnaire from Euroqol[15,16]. The EQ-5D-5L questionnaire can be used in clinical trials, observational studies, population health surveys, routine outcome measurements, and many other types of studies to determine the patient's health status. There are five dimensions in this questionnaire, namely regarding mobility, self-care, daily activities, pain or discomfort, and anxiety or depression[17].

Along with the development of the Medication Therapy Management (MTM) method in optimizing patient therapy, this approach has also been applied in the healthcare system in Indonesia. *Badan Penyelenggara Jaminan Sosial* (BPJS) *Kesehatan*, as the organizer of national health insurance, has adopted the MTM concept in various chronic disease management programs to improve the therapy effectiveness and patients' quality of life[18]. This application not only focuses on monitoring drug use, one of which is patient medication compliance, but also involves assessing the patient's quality of life, so using instruments such as the EQ-5D-5L to measure the impact of therapy comprehensively can be an alternative.

BPJS uses the MTM method with patient book documentation as *Program Rujuk Balik* (PRB), known as the Referral Program service for hospital referral patients who then continue routine control at basic health facilities[19]. However, pharmacists' roles have not been maximized in its implementation. One reason is that pharmacists' workloads in community health centers are quite large. Therefore, it is necessary to add pharmacists who can implement the MTM method in a comprehensive manner. The hope is to increase patient compliance, improve patient quality of life, and obtain savings in medical costs.

Previous research related to the influence of MTM on adherence to therapy for hypertension patients in Yogyakarta city health centers was attended by 44 people; 63.6% of respondents were women; the dominant age was between 55 and 64 years (40.9%); and the research results showed an increase. The average knowledge score after receiving MTM-based services was initially 14.3 ± 3.766, then became 20.32 ± 2.399 with a p-value of 0.000, and there was a decrease in the average compliance score from 1.64 ± 1.464 to 0.39 ± 0.920. In this study, education and counseling were conducted on pharmaceutical services using the MTM method, which was adapted to the conditions of the research site, and simplification was done, focused on MTM-based services by BPJS[20].

This research aims to determine the effect of the MTM method on the compliance and quality of life of hypertensive patients in community health centers in the Banyumas district.

Materials and Methods

The type of research used in this study was a Randomized Controlled Trial (RCT) in hypertensive patients. Patients in the intervention group received pharmaceutical services using the MTM method. Information, education, and counseling were provided to patients using a documentation book kept by the patient and pharmacist. Hypertensive patient compliance was calculated using the pill count method and the EQ-5D-5L questionnaire at the beginning before the intervention (pretest) and one month after the provision of MTM-based pharmaceutical service intervention (posttest). This study analyzed the relationship between education and counseling in pharmaceutical services with the MTM method and hypertensive patients' compliance and quality of life. The population in this study came from three health centers with high cases of hypertension in the Banyumas area. The number of patients receiving treatment/intervention is as many as 100, and control patients are as many as 90 patients each. The sample inclusion criteria were hypertensive patients who had undergone routine treatment for more than 1 year. Data was collected prospectively on hypertensive patients at health centers in the Banyumas area for 2 months. The pill count method is used to measure compliance, which calculates the percentage of compliance with the

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number of drugs at the beginning before the intervention using the MTM method and at the end after the intervention using the MTM method. The EQ-5D-5L questionnaire measures quality of life. Five dimensions are considered: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The statistical analyses used are the Wilcoxon test and the ANOVA test.

The pharmaceutical service intervention method uses the MTM method, namely *Bu Mentry* (Medication Management Therapy Book) and *Ku-Siap* (pharmacist's documentation book), a pharmacist's documentation book on patient medication and conditions. Begins with the pharmacist assessing the patient (Medication Therapy Review element) recorded in patient books documented in these books (Personal Medication Record element). Then, the patient can consult with the pharmacist regarding medication after obtaining the medication (intervention and follow-up element). Here, the patient can also receive education regarding matters related to the medication and the progress of using the medication using brochures (Medication Related Action Plan element). After the patient has been educated, before going home, the *Ku-Siap* book is given to be filled in independently by the patient. The book is easy to fill out by themselves, such as when to take medication, and the book is brought back during check-ups. *Bu Mentry* and *Ku-Siap* are made by referring to the BPJS MTM form in 2018.

This study contains modifications to the MTM documentation that should be addressed to patients who are research subjects or respondents. The documentation contains personal identity, medication and disease history, medication consumption control sheets, and educational information related to hypertension, which is something to consider in evaluating compliance[21]. This book aims to document patient progress and patient treatment in a concise manner. This study collected data twice, namely at the pretest before MTM was carried out and at the posttest one month later when the patient was in control.

Before starting the study, patients filled out informed consent and demographic data and completed the EQ-5D-5L quality of life questionnaire. This questionnaire contains a health assessment by patients on five dimensions regarding mobility, self-care, daily activities, pain, and anxiety, and each dimension has five levels of severity. The questionnaire also contains a visual analog scale assessment, where patients give a score for assessing their health on a scale of 0-100. The higher the number, the better their health. After that, the

answers to the five dimensions are converted into numeric codes. This score can be converted to a utility value using a specific value table for each country in Indonesia, using the Indonesia Value Set. Meanwhile, the calculation of patient compliance with treatment uses the pill count method, namely by calculating the difference between the remaining medicine at the end of the data collection and the remaining medicine at the beginning of the data collection (pretest) divided by the amount of medicine that should be consumed.

Result

From Table 1, it is known that the majority of subjects in this study were female; the age of the patients was dominated by patients with an age range of 55-64 years. Based on education level, the majority of patients had low education (elementary school). In terms of work, the majority were retired or no longer working. The duration of patients diagnosed with hypertension was most often 3 years, and the number of drugs consumed was 1 type of drug. It was found that there were more patients without comorbidities than those diagnosed with hypertension with comorbidities, which was 76 patients.

Based on Table 2, the dimension of mobility or the patient's ability to move or walk for the intervention group, there was an increase from 48.9% to 60%; there was an increase from patients who found it a slight to walk reduced from 50% to 40%, patients who found moderate to walk were no longer there at the time of the post-test assessment. In the self-care dimension, there was an increase in patients who did not experience difficulty performing self-care, from 41.1% to 53.3%. Likewise, there was a health improvement in patients with little difficulty, and none were included in the category of slight problems in self-care. In the dimension of daily activities, there was an increase in health from 41% to 52%, although there were still patients who found moderate problems with daily care. For the dimension that includes the patient's pain condition, there was an increase in health from 18.9% to 33.3%, which affected the points below it. Meanwhile, the dimension of anxiety or sadness in patients also increased from 55.6% to 67.8%, followed by the points below it. Patients already understand that anxiety can affect their illness. This anxiety can come from the patient's illness, for example, pain that does not go away, taking medication for a long time, or dependence on other people when carrying out daily activities.

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Table 1. Respondents' Characteristics

No	Variable	Intervention		Control	
		Number (N=90)	**Percent (%)**	**Number (N=90)**	**Percent (%)**
1	Gender				
	Male	9	10	24	73.3
	Female	81	90	66	26.7
2	Age (Year)				
	< 45	5	5.6	2	2.2
	45 – 54	28	31.1	14	15.6
	55 – 64	40	44.4	50	55.6
	65 – 74	17	18.9	24	26.7
3	Education				
	Elementary School	63	70	59	65.6
	Junior High School	17	18.9	20	22.2
	Senior High School	10	11.1	11	12.2
4	Occupation				
	Work	36	40	42	46.7
	Doesn't work	54	60	48	53.3
5	Number of drugs				
	1 type of drug	39	43.3	40	44.4
	2 types of drug	36	40.0	31	34.4
	3 types of drug	15	16.7	15	16.7
	4 types of drug	0	0	4	4.4
6	Length diagnostic				
	1 year	11	12.2	10	11.1
	2 year	21	23.3	19	21.1
	3 year	30	33.3	26	28.9
	4 year	24	26.7	34	37.8
	5 year	4	4.4	1	1.1
7	Comorbidities				
	Yes	14	15.6	14	84.4
	No	76	84.4	76	15.6

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Table 2. Distribution of EQ-5D-5L questionnaire results

Dimensions of EQ-5D-5L	Control		Intervention	
	Pretest N(%)	Postest N (%)	Pretest N(%)	Postest N (%)
Mobility				
I have no problems in walking about	57 (63,3)	56 (62,2)	44 (48,9)	54 (60)
I have slight problems in walking about	31 (34,4)	33 (36,7)	45 (50)	36 (40)
I have moderate problems in walking about	2 (2,2)	1 (1,1)	1 (1,1)	0
I have no problems in walking about	0	0	0	0
I am unable to walk about	0	0	0	0
Self-Care				
I have no problems washing or dressing myself	49 (54,4)	52 (57,8)	37 (41,1)	48 (53,3)
I have slight problems washing or dressing myself	40 (44,4)	38 (42,2)	52 (57,8)	42 (46,7)
I have moderate problems washing or dressing myself	1 (1,1)	0	13 (14,4)	0
I have severe problems washing or dressing myself	0	0	0	0
I am unable to wash or dress myself	0	0	0	0
Usual Activities				
I have no problems doing my usual activities	40 (44,4)	49 (54,4)	41 (45,6)	52 (57,8)
I have slight problems doing my usual activities	50 (55,6)	39 (43,3)	45 (50)	35 (38,9)
I have moderate problems doing my usual activities	0	2 (2,2)	4 (4,4)	3 (3,3)
I have severe problems doing my usual activities	0	0	0	0
I am unable to do usual activities	0	0	0	0
Pain/Discomfort				
I have no pain or discomfort	19 (21,1)	30 (33,3)	17 (18,9)	30 (33,3)
I have slight pain or discomfort	69 (76,7)	52 (57,8)	60 (66,7)	54 (60)
I have moderate pain or discomfort	2 (2,2)	8 (8,9)	13 (14,4)	6 (6,7)
I have severe pain or discomfort	0	0	0	0

Based on Table 2, the dimension of mobility or the patient's ability to move or walk for the intervention group, there was an increase from 48.9% to 60%; there was an increase from patients who found it a slight to walk reduced from 50% to 40%, patients who found moderate to walk were no longer there at the time of the post-test assessment. In the self-care dimension, there was an increase in patients who did not experience difficulty performing self-care, from 41.1% to 53.3%. Likewise, there was a health improvement in patients with little difficulty, and none were included in the category of slight problems in self-care. In the dimension of daily activities, there was an increase in health from 41% to 52%, although there were still patients who found moderate problems with daily care. For the dimension that includes the patient's pain condition, there was an increase in health from 18.9% to 33.3%, which affected the points below it. Meanwhile, the dimension of anxiety or sadness in patients also increased from 55.6% to 67.8%, followed by the points below it. Patients already understand that anxiety can affect their illness. This anxiety can come from the patient's illness, for example, pain that does not go away, taking medication for a long time, or dependence on other people when carrying out daily activities.

Table 3. The Effect of Medication Therapy Management on patient quality of life

	Quality of Life Category	Mean ± SD	Δ (Posttest-Pretest)	P value
Intervention	Pretest	0,701 ± 0,093	0,113 ± -0,003	0,000*
	Postest	0,814 ± 0,0990		
Kontrol	Pretest	0,763 ± 0,101	0,010 ± 0,000	0,260*
	Postest	0,773 ± 0,101		

note: *p = level of trust 5% (p <0,05); used Wilcoxon Test

Next, the measurement of the patient's quality of life uses the EQ-5D-5L questionnaire consisting of 5 dimensions, and then the answers from the five dimensions are converted into numeric codes (example: 1-2-3-1-4). This score can be converted to a utility value using a specific value table, namely the Indonesian value set. The normality test was then carried out. The results obtained were not normally

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distributed, so the analysis was continued with the Wilcoxon test to determine the difference in the average of two paired samples. The significance value obtained between the pretest and posttest in the intervention group was 0.000. Because the p-value < 0.05 statistically, there is a significant difference in quality, so this MTM method has a significant effect on the quality of life of hypertensive patients.

Table 4. The effect of the Medication Therapy Management method on patient adherence

	Adherence Category	Mean ± SD	Δ (Posttest-Pretest)	P value
Intervention	Pretest	74,985 ± 6,719	6,224 ± -0,077	0,000*
	Postest	81,209 ± 6,642		
Control	Pretest	73,250 ± 6,335	0,969 ± 0,331	0.350*
	Postest	74,219 ± 6,004		

note: *p = level of trust 5% (p <0,05); used Wilcoxon Test

The results of the measurement of respondents' medication adherence using the Pills Count method involved calculating the amount of medication consumed at the beginning and comparing it with the remaining medication at the end of the assessment. The adherence score was then determined and analyzed using a normality test to assess the data distribution. The results indicated that the data were not normally distributed; therefore, the Wilcoxon test was applied to compare the means of two paired samples. The test results showed a significance value of 0.000 between the pretest and posttest in the intervention group.

Table 5. Visual Analog Score (VAS)

	Quality of life category	Mean Score ± SD	Δ (Posttest-Pretest)	P value
Intervention	Pretest	0,721 ± 0,096	0,022 ± 0,033	0,000*
	Postest	0,780 ± 0,118		
Control	Pretest	0,762 ± 0,101	0,016 ± 0,006	0,130*
	Postest	0,778 ± 0,107		

Discussion

In the results in the characteristic table, the number of female respondents is greater than that of male respondents. In theory, men are more susceptible to hypertension, but if the number of female residents in the Banyumas area is greater, this allows the number of female respondents who suffer from hypertension to be high, Similar to other studies which state that more female respondents experience hypertension[22]. Men often experience signs of hypertension in their late 30s. However, after women enter menopause, the prevalence of hypertension will increase, and the risk of suffering from hypertension is higher. Research explains that more women suffer from hypertension because during menopause, women experience hormonal changes, namely a decrease in the ratio of estrogen and androgen, which causes an increase in the release of renin, which can trigger blood pressure[23].

The largest age group in this study was the 55-64 year group. As age increases, the risk of hypertension increases, so elderly patients are more at risk than younger patients[24]. Structural changes in the arteries are the cause of increased blood pressure occurring in advanced age, namely over 50 years of age[25]. The education level data obtained by researchers in conducting this research showed that the largest number of respondents were at the elementary school education level, 63 people (70.0%) of the person's intellectual level, so they received the information more quickly and more easily and had a better mindset, both disease and therapy[26].

There are two categories of patient employment status data: working and not working. The results obtained showed that 54 people (60.0%) were not working. Inactive individuals tend to have a higher heart rate, as a result of which the heart muscle has to work harder, and the greater pressure placed on the arteries causes an increase in blood pressure[27].

The duration of being diagnosed with hypertension is calculated from when the patient is declared to be suffering from hypertension until the research is carried out. Based on the table, the highest number of respondents in the 3-year variable for intervention respondents was 30 people (33.3%).

Based on the results of the data, it was found that the number of drugs given to patients as therapy for hypertension among respondents was mostly 1 type of drug, which was 39 people (43.3%). The same thing was also mentioned in a previous study[20]. This is because the patients studied were in primary care, so the patient's condition was mild to moderate, and they were already routinely using antihypertensive drugs.

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The effect of MTM on compliance and quality of life in hypertensive patients

Results of measuring respondents' medication adherence using the Pills Count method. The results obtained showed that the data was not normally distributed, so the analysis was continued using the Wilcoxon test to determine the difference in the averages of two paired samples. In the test results, to determine the compliance of respondents in the intervention group, there were 8 respondents with decreased compliance because the posttest score was lower than at the pretest. Then, 46 respondents' compliance increased during the posttest compared to the pretest, and 36 values were the same between the pretest and posttest. The significance value obtained between the pretest and posttest in the intervention group was 0.000. Because the p-value < 0.05 statistically indicates a significant difference in the quality of life, this data can be seen in Appendix Table 4. This means it was found that there was an improvement in the quality of life of hypertensive patients after implementing the MTM methods. This study shows an increase in compliance with taking medication with the application of the MTM method, which is considered capable of increasing patient medication adherence[6].

To determine the effect of patient quality of life on the MTM method, the EQ-5D-5L questionnaire was used to determine five dimensions, namely mobility, self-care, daily activities, pain, and anxiety. Each dimension has a severity score of one to five. The higher the number, the worse the patient feels. The results in the form of numbers obtained match the Indonesian value set; each country has a different value. After obtaining the score, the analysis was continued using the normality test to determine the data distribution. Because the data obtained were not normally distributed, the Wilcoxon test was continued to compare the means of two paired samples. The test results showed a significance value of 0.000 between the pretest and posttest in the intervention group.

The same thing happens in the measurement of visual analog scale values. The assessment is done subjectively by the patient, how healthy they are from 0-100. The data obtained is then analyzed using the normality test to determine the data distribution. The data obtained is not normally distributed, then the Wilcoxon test is continued to compare the means of two paired samples. The significance value obtained was 0.000 between the pretest and posttest in the intervention group. This shows that there is a significant effect before and after the intervention with MTM[7].

The impact of uncontrolled hypertension is one of the causes of an increase in the incidence of heart disease, stroke, and kidney failure. These diseases are classified as catastrophic diseases, namely diseases that require long and high-cost medical care. Suppose hypertension rates can be reduced by implementing the Medication Therapy Management (MTM) method in basic health facilities such as community health centers. In that case, the country can save quite a lot of money. However, achieving a reduction in hypertension rates needs to be supported by pharmacists who are skilled in managing hypertension using the MTM method to increase patient compliance. This will not only decrease the morbidity rate, but also increase the quality of society and people's welfare because they will be more productive.

The limitations of this study are based on the time span for seeing that the intervention has not yet reached optimal levels, namely 30 days after treatment is given, so further study is needed regarding the effect of the MTM method on patient compliance and quality of life. The number of pharmacists is also limited, so it is not comparable to the number of patients who seek treatment at the health center.

Conclusions

Medication therapy management has a significant influence on patient medication adherence and quality of life. This MTM method helps patients gain knowledge not only of the disease they are suffering from but also of its progress, using the documentation available to them. Likewise, pharmacists who serve patients have complete records of patient treatment. This can minimize errors and facilitate evaluation. From this study, it was concluded that the use of this MTM method can increase compliance and improve the quality of life of patients.

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Author Contribution

Study design	:	DSA, IH, BR
Data acquisition	:	DSA
Data analysis	:	DSA
Manuscript writing	:	DSA, IH, BR

Ethical Consideration

The Health Research Ethics Commission of Muhammadiyah University of Purwokerto (KEPK-UMP) has examined the related research design based on the principles of ethical research. With document number KEPK/UMP/04/XI/2022.

Competing Interests

The authors declare that there are no conflicting interests in this particular study or subject. However, we comply with the journal's materials and data-sharing guidelines.

Abbreviation

BPJS	:	*Badan Penyelenggara Jaminan Sosial*
Bu Mentry	:	Medication Management Therapy Book
Ku-Siap	:	Pharmacist's documentation book
MAP	:	Medication-related Action Plan
MTM	:	Medication Therapy Management
MTR	:	Medication Therapy Review
PMR	:	Personal Medication Record
PRB	:	*Program Rujuk Balik*
RCT	:	Randomized Controlled Trials
SKI	:	Indonesian Health Survey
VAS	:	Visual Analog Score

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