



Implementation of Pharmaceutical Care or Hypertension Patients in Community Health Center of Lubuk Pakamdeli Serdang

Yosi Darmirani¹, Aminah Dalimunthe², Khairunnisa²

¹Master of Pharmaceutical Sciences Study Program, Faculty of Pharmacy, University of North Sumatra

²Department of Pharmacology, Faculty of Pharmacy, University of North Sumatra

*Corresponding Author: Aminah Dalimunthe

E-mail: aminah@usu.ac.id



Article Info

Article history:

Received 22 June 2024

Received in revised form 17

July 2024

Accepted 4 August 2024

Keywords:

Pharmaceutical care

Hypertension

DRPs

Outcometherapy

Adherence

Quality of life

Abstract

The objective of this research was to provide pharmaceutical care to patients with Hypertension and assess its effects on the occurrence of drug-related problems (DRPs), clinical outcomes, adherence levels, and quality of life of Hypertension patients at Puskesmas (Community Health Center) Lubuk Pakam. This research used a comparative experimental approach using a prospective cohort study design to assess the effects of an intervention on 73 individuals with Hypertension between March and August 2021. The PCNE V9.00 instrument was used to identify the occurrence of Drug-Related Problems (DRPs). Adherence level data was collected through the MMAS-8 questionnaire. Random blood glucose (RBG) data and Blood Pressure values were obtained by directly examining patients. The EQ-5D-3L questionnaire was used to gather data on the quality of life. The data were analyzed using the Wilcoxon Signed-Rank test and Friedman test in the SPSS V22.0 software. The findings indicated that the average occurrence of drug-related problems (DRPs) before the intervention was 1.436 ± 0.502 , however after the intervention, it decreased to 0.282 ± 0.456 ($\alpha < 0.05$). The mean blood pressure before the intervention was 278.58 ± 75.278 mmHg, whereas after the intervention it decreased to 179.68 ± 14.008 mmHg ($\alpha < 0.05$). There was a substantial rise in the mean adherence score before the intervention, from 5.00 ± 0.89 to 8.48 ± 0.77 ($\alpha < 0.05$). Similarly, the average quality of life score increased from 0.878 ± 0.176 to 1 ± 0.09 after the intervention ($\alpha < 0.05$).

Introduction

Hypertension is a non-communicable illness that may affect individuals of any age, characterized by systolic blood pressure over 140 mmHg and diastolic blood pressure exceeding 90 mmHg. It is important to be vigilant for this condition. Hypertension is classified as a degenerative condition, characterized by a progressive rise in blood pressure that often occurs with advancing age. Hypertension is often known as the "silent killer" due to its potential to cause death without the patient experiencing any noticeable symptoms (Dosh, 2001).

According to data from the World Health Organization (WHO) in 2015, around 1.13 billion individuals worldwide suffer with hypertension, indicating that one-third of the global population has been diagnosed with this condition. Hypertension, or high blood pressure, results in a death rate of 12.8%, affecting about 600 million individuals globally. Out of them, 3 million people succumb to the condition annually (WHO, 2001).

According to data from the North Sumatra Provincial Health Office, the prevalence of hypertension in 2013 was 6.7% among the whole population of North Sumatra, which amounted to 12.42 million individuals residing in various districts. The incidence of hypertension in the North Sumatra Province has been identified in the age group of 18 years and older, with a prevalence rate of 24.7%. In North Sumatra Province, the incidence of hypertension is greater in women (25.6%) compared to males (24.1%). The prevalence of the condition is positively correlated with advancing age (Riskesdas, 2007).

A research done at the Lubuk Pakam Health Center in 2018 revealed that hypertension is an illness that falls under the biggest group with a significant possibility for experiencing a high prevalence of DRP incidence (Setyoningsih & Zaini, 2022).

The researcher intends to investigate the implementation of Pharmaceutical Care in hypertensive patients at the Lubuk Pakam Health Center. The goal is to decrease the occurrence of Drug-Related Problems (DRP) and enhance the clinical outcomes of inpatients.

Methods

The design used in this study is a cohort analytical method of prospective studies before and after education for hypertensive patients at the Lubuk Pakam Health Center. The identification of DRPs was carried out retrospectively and prospectively with data starting from the March-August 2021 period. Data collection was carried out on direct patients, medical record data, patient referral book data (DRB), data from patient prescriptions, data from drug rooms and the data collected were DRPs, QOL, patient compliance and *clinical outcomes*. The identification of DRPs in this study used *the PCNE V9 instrument*, the patient's quality of life (QOL) was measured using the EQ-5D-3L questionnaire, Compliance was measured using the MMAS-8 questionnaire collected from the patient section and the administration of the Lubuk Pakam Health Center Then the data obtained was statistically analyzed using *the chi-square test, pair t-test and wilcoxon test* in the SPSS V22.0 program.

Research Venue

The research was conducted at the Lubuk Pakam Health Center, located on Jalan Diponegoro Lubuk Pakam, Deli Serdang Regency, North Sumatra.

Research Time

Research data collection was carried out from March 2021 to August 2021, with the division of time from March to May for data collection before the intervention, and from June to August for data collection after the intervention.

Research Population and Sample

Population

According to Arikunto, the population is the whole of the research subjects (Arikunto, 2013). Meanwhile, according to Sugiyono, population is a generalization consisting of objects/subjects that have certain qualities and characteristics that are determined by the researcher to be studied and then drawn conclusions. The population in this study is all Hypertension patients at the Lubuk Pakam Health Center for the March-August 2021 period.

Sample

The sample is a part or representative of the population that is studied, if the population is less than 100, then the sample is taken from the entire existing population so it is called population research (Arikunto, 2013). The sample in this study is a population that meets the inclusion criteria. and do not meet the exclusion criteria.

Sample Inclusion Criteria

Inclusion criteria are the general characteristics of the research subjects of a target population to be studied. The inclusion criteria for the sample in this study are: (1) Patients with hypertension at the Lubuk Pakam Health Center in March – August 2021; (2) Hypertension patients over the age of 18 years with or without complications and comorbidities.

Sample Exclusion Criteria

The exclusion criterion is to remove or exclude subjects who meet the inclusion criteria from the study for some reason. The exclusion criteria in this study are: (a) Patients who are not willing to be the subject of the study; (2) Patients who have a mental disorder or have died; (3) Hypertension patients under the age of 18 years with or without complications and comorbidities

Data Analysis

The data obtained is presented in the form of a table, then analyzed statistically using the SPSS V22.0 program. Data analysis was carried out using *the chi square* test method and *paired t-test* for paired comparative hypotheses, while data that were not normally distributed were tested using *the wilcoxon test*. The data that was statistically analyzed was the relationship between the independent variable and the bound variable, the variable that was measured, namely the influence of the free variable of education and no education with the bound variable the number of DRPs events, *clinical outcomes*, and QOL.

Result and Discussion

The target population in this study is all hypertension patients, both general patients and BPJS patients and Referral Patients (PRB) who redeemed prescriptions at the Lubuk Pakam Health Center, Jalan Diponegoro, Deli Serdang, North Sumatra Province, from March to August 2021, namely 112 people, and subsequently used as a research sample of 73 patients who met the inclusion criteria. Characteristics of Hypertension patients by gender, age, education level, occupation, length of illness, and comorbid diseases can be seen in Table 1.

Table 1. Characteristics of Hypertension patients

Characteristic	Category	Amount (Percentage/%)
Gender	Female	46 (63,01)
	Male	27 (36,98)
Age	45-65 years old	49 (67,12)
	> 65 years	24 (27,39)
Education Level	Elementy	14 (19,17)
	Junior	24 (32,87)
	High School	30 (41,09)
	Higher Education	5 (6,84)
Work	Civil Servants/Private	3 (4,10)
	Government/Traders/Non-Working	35 (47,94)
	Workers	27 (36,98)
	Retired	8 (10,95)
Duration of illness	<1 year	6 (8,21)
	1-5 years	41 (56,16)
	>5 years	26 (35,16)
Comorbidities	With Unaccompanied Attendants	40 (54,79)
		33 (45,20)

Based on Table 1, it can be seen that the majority of Hypertension sufferers are female as many as 46 people (63.01) while male as many as 27 people (36.98). According to data obtained from

RADINKES (2018) for North Sumatra Province, the prevalence of high blood pressure in women (25.6%) is higher than in men (24.1%). The prevalence is increasing as people get older. This is also in line with Ahmad & Oparil research (2017), which states that the majority of people with Hypertension are women at 45% while men are 25. This happens because physically, women have a greater chance of increasing blood pressure because they experience a decrease in estrogen followed by a decrease in HDL, so that blood pressure increases and this condition is also experienced by women who have gone through menopause.

The results of this study showed that the average age of Hypertensive patients with an age distribution of 45-65 years was 53 people (78.08%), and 20 people over 65 years old (27.39%). Denilay, et al. (2021) stated that people over 45 years old have higher risk factors compared to people under 45 years old for hypertension. Based on Riskesdas (2007), the prevalence of Hypertension shows an increase along with the increasing age of patients who reach the peak age from 45 years to over 75 years.

The proportion of hypertension patients in this study according to the level of education was dominated by high school education background as many as 33 people (45.20%), followed by junior high school education background as many as 22 people (30.13%), elementary school as many as 12 people (16.43%), and higher education as many as 6 people (8.21%).

Use of antihypertensive drugs

The management of hypertension begins with implementing a healthy lifestyle, timely use of drugs along with pharmacological intervention with oral antihypertensive drugs. The use of antihypertensive drugs is allowed to be given in a single form or in combination according to the needs of the patient's hypertension condition (Corrao et al., 2010). Pharmacist intervention on patient lifestyle modification is able to inhibit the progression of hypertension, but most patients need hypertension medication for life on the basis of selecting various types of anti-hypertension drugs on the market, so it requires clinicians to choose anti-hypertension drugs appropriately and effectively according to the patient's condition. The use of antihypertensive drugs in hypertensive patients before and after the intervention during the study period can be seen in Table 2.

Table 2. Anti-Hypertension Uses

Drug Name	Number (Patients)	Percentage (%)
Furosemide	7	6,80
Bisoprolol	6	5,82
Amlodipine	45	43,69
Captopril	1	0,97
Candesartan	18	17,48
Concor	17	16,51
Ramipril	6	5,82
Diltiazem	1	0,97
Nitrokarf Retard	1	0,97
Spironolakton	1	0,97

Table 2 shows that the majority of antihypertensive use in hypertensive patients is Amlodipine as many as 45 people (43.69%), followed by Candesartan therapy as many as 18 patients (17.48%), Concor 17 patients (16.50%), Bisoprolol and Concor each with 6 patients (5.82%), and then followed by Diltiazem, Nitrokarf Retard, Spironolaktone and Caprtoptil therapy where each of these drugs has 1 patient (0.97%).

Table 3. Use of drugs other than anti-hypertension in hypertensive patients

Drug Name	Number (Patients)	Percentage(%)
Allopurinol	6	5,00
Amoxixiline	1	0,83
Aptor	2	1,67
Simvastatin	21	17,50
Antacids	18	15,00
Mefenamic Acid	5	4,17
Aspilet	1	0,83
Bicnat	2	1,67
CTM	1	0,83
Glibenklamid	3	2,50
Hustab Syrup	5	4,17
ISDN	3	2,50
Lactos	1	0,83
Metformin	3	2,50
Metronidazol	1	0,83
Miniaspi	2	1,67
Diclofenac Sodium	12	10,00
Omeprazol	1	0,83
Paracetamol	7	5,83
Salbutamol	1	0,83
Vitamin B 12	5	4,17
Vitamin B Comp	3	2,50
Vitamin B6	15	12,50
Vitamin C	1	0,83

Based on Table 3, the number of patients who used hyperuricaries drugs of the xanthine oxidase group such as allopurinol was 6 people (5.00%). The same thing happened with hypolipidemic drugs of the statin group, namely simvastatin for 21 people (17.50%), then the use of oral hypoglycemic drugs (OHO), namely glibenclamide for 3 people (2.50%), Metformin for 3 people, the use of salbutamol for 1 person (0.83%), vitamin B6 for 15 people, vitamin c for 1 person (0.83%)

Drug related problems (DRPs) in hypertensive patients

DRPs are events or circumstances that involve drug therapy and can actually *or* potentially interfere with the desired therapeutic outcomes (Van Mil et al., 2019). *Drug Therapy Problems* are unwanted events experienced by patients related to drug therapy that can affect the outcome of targeted therapy. Unwanted events due to DRPs can be in the form of symptoms or medical complaints.

Potential drug-related problems are a condition that can cause morbidity or death if no action is taken, while actual drug-related problems are manifested by the presence of signs and symptoms (Martini et al., 2022). There are several classification systems presented in the literature on the classification of DRPs, in this study using a classification system based on PCNE version 9.00 because the problems and causes of DRPs are described in more detail so that it is easier to examine the interventions to be carried out. The incidence of DRPs is classified based on the category of problem groups and causes.

Incidence of DRPs before the intervention

Data on the results of DRPs identification of Hypertension patients before the intervention based on problem groups (*Problem/P*) and causes (*Cause/C*) can be seen in Table 4.

Table 4. Incidence of DRPs by problem group (*Problem/P*) and cause (*Cause/C*) before the intervention

No	Patient Classification	Number Of Patients	
1	No Drp	49 People	
2	Drp	24 People	
Total Amount		73 People	
No	Number Of Drp Events	Number Of Drp Patients	
1	1 Genesis	31 People	
2	2 Genesis	13 People	
3	3 Genesis	5 People	
Code	Problem Classification (<i>Problem/P</i>)	Before The Intervention	
		Number Of Incidents	Percentage (%)
P	Problem	56	100
P.1	Effectiveness	51	91,07
P1.2	The Therapeutic Effect Of The Drug Is Not Optimal	39	69,64
P1.3	Untreated Symptoms/Indications	12	21,43
P.2	Therapy Safety	5	8,93
P2.1	Adverse Drug Effects (<i>Adverse Drug Reaction</i>)	5	8,93
Code	Classification Of Causes (<i>Causes/C</i>)	Number Of Incidents	Percentage(%)
C	Cause	56	100
C.1	Drug Selection	6	10,71
C.2	Selection Of Drug Forms	5	8,93
C.3	Dosage Selection	3	5,35
C.4	Duration Of Treatment	8	14,28
C.6	Drug Use Process	5	8,93
C7	Patients Use Fewer Medications Than Prescribed Or Do Not Use Medications At All	23	41,07
C.9	Other	6	10,71

The results of this study showed that out of a total of 73 hypertension patients, as many as 62 people (84.93%) experienced DRPs and 11 people (15.07%) did not experience DRPs. The largest incidence of DRPs was found in the therapy effectiveness problem group (P.1) as many as 51 events (91.07%) with the majority of the classification of non-optimal drug therapy effects (P1.2) as many as 39 events (69.64%), followed by the classification of untreated symptoms/indications (P1.3) as many as 12 events (21.43%). In addition to the problem of therapy effectiveness, there was also a group of therapy safety problems (P.2) as many as 5 events (8.93%) with the classification of adverse drug effects (P2.1). The biggest problem related to the effect of suboptimal drug therapy can be seen from the blood pressure of patients who do not experience improvement.

Table 5. Incidence of DRPs by problem group (*Problem/P*) and cause (*Cause/C*) after intervention

No	Patient Classification	Number Of Patients
1	No Drp	62 People
2	Drp	11 People

Total Amount		73 People	
No	Number Of Drp Events	Number Of Drp Patients	
1	1 Genesis	11 People	
2	2 Genesis	-	
3	3 Genesis	-	
Code	Problem Classification (Problem/P)	Before The Intervention	
		Sum Event	Percentage (%)
P	Problem	56	100
P.1	Effectiveness	51	91,07
P1.2	The Therapeutic Effect Of The Drug Is Not Optimal	39	69,64
P1.3	Untreated Symptoms/Indications	12	21,43
P.2	Therapy Safety	5	8,93
P2.1	Adverse Drug Effects (Adverse Drug Reaction)	5	8,93
Code	Classification Of Causes (Causes/C)	Number Of Incidents	Percentage(%)
C	Cause	56	100
C.1	Drug Selection	6	10,71
C.2	Selection Of Drug Forms	5	8,93
C.3	Dosage Selection	3	5,35
C.4	Duration Of Treatment	8	14,28
C.6	Drug Use Process	5	8,93
C7	Patients Use Fewer Medications Than Prescribed Or Not Using Medication At All	23	41,07
C.9	Other	6	10,71

The incidence of DRPs decreased after the intervention. The results of this study showed that based on the data normality test using the *Kolmogorov-Smirnov* Test, a significance value of $p < 0.05$ was obtained, which means that the data was not normally distributed in the problem group and the cause group, then the *Wilcoxon Signed Ranks* test was carried out and obtained a value of $\alpha < 0.05$ ($\alpha = 0.000$), so it was concluded that there was a significant difference between the incidence of DRPs based on problem groups and cause groups before and after the intervention.

Table 6. Intervention groups given

Intervention Groups are given	Code	Classification	Number of Interventions	%
I.1 At Recipe Writer Level	I1.3	Intervention proposed to the author of the recipe	11	15,07
I.2 At Patient Level	I2.1	Patient counseling (medicine)	42	57,53
	I2.4	Delivered to members Family/ Caregiver	20	27,40
Total			73	100

Clinical outcomes in Hypertension patients

Outcome therapy is the result of interventions provided by the health system and medical personnel to those who are the target of intervention (WHO, 2013). Rational therapy in the

treatment of Hypertension can improve the achievement of *outcome* Clinical, namely controlled blood pressure. *Outcome* The clinical measure in this study is Blood Pressure.

Blood Pressure before the intervention

According to JNC VIII, one of the diagnostic criteria for hypertension is when blood pressure is above 140/90 mmHg in adults, then one of the indicators of therapy success can be seen if blood pressure is below 140/90 mmHg. The normality test of blood pressure before the intervention was statistically tested using the Kolmogorov-Smirnov test, a significance value of $p < 0.05$ ($p = 0.003$) which means that the data is not normally distributed.

Blood Pressure after the intervention

Blood pressure measurements are done only in the pre-intervention and post-intervention stages. These measurements were made at a time span of 3 months after the initial assessment in hypertensive patients. Blood pressure values before and after the intervention can be seen in Table 7.

Table 7. Blood Pressure Values in Hypertensive Patients Before and After Intervention

Clinical outcome parameters	Before Intervention (pretest)	After the Intervention (post test)	Wilcoxon Test (Asymp.Sig.)
Blood Pressure (%)	154.38 ± 16.20	144.04 ± 15.94	$\alpha = 0,00$

The statistical results of the normality test using *the Kolmogorov-Smirnov* test in the posttest obtained a significance value of $p < 0.05$ ($p = 0.005$) which indicates that the data is not normally distributed. Furthermore, a *Wilcoxon Signed Rank test* was carried out in the pre-test against the post test and a value of $\alpha < 0.05$ ($\alpha = 0.000$) was obtained, so it was concluded that there was a significant difference between the average blood pressure value before the intervention. This result is in line with a meta-analysis study conducted by Rikmasari et al. (2021) which stated that the intervention treatment given by pharmacists to hypertensive patients was able to reduce blood pressure by 90%.

Treatment adherence of Hypertensive patients

Compliance refers to the process by which people with Hypertension are able to take medication in accordance with the recommended rules of use to fulfill a therapeutic regimen, good and appropriate education will make patient awareness increase to carry out health recommendations (Liau et al., 2021). There are two methods that can be used to measure patient compliance, namely direct and indirect methods (Aziz et al., 2020). This study uses an indirect method, namely *self-report* using the MMAS-8 questionnaire. The level of drug adherence based on patient *self-reports* assessed by the MMAS-8 questionnaire was more able to capture barriers related to drug use compliance habits.

The level of treatment adherence before the intervention

Pre-intervention treatment adherence levels are presented in Table 8.

Table 8. Pre-intervention patient adherence levels

Patient Compliance Level	Before Intervention (Pre test)	
	(n=73)	Percentage (%)
High (score 8-9)	12	16,44%
Medium (score 6-7)	49	67,12%
Low (score <6)	12	16,44%

Table 9 shows that out of a total of 61 patients, the majority had a low compliance level of 49 people (80.33%) followed by a moderate compliance level of 12 people (19.67%). The majority of patients with low adherence levels are caused by the patient's inadequate knowledge of the

disease and its treatment and the patient's lack of understanding of the therapy in the treatment causes the patient to have low motivation to change behavior or lack of adherence in taking medication, the patient has no knowledge of the disease and is not aware of the consequences of non-compliance (Tesfaye et al., 2021).

Treatment adherence rate after the intervention

The level of post-intervention treatment adherence is presented in Table 9.

Table 9. The level of post-intervention patient treatment adherence

Valuation	Treatment Compliance Level			Friedman Test (Asymp. Sig.)
	Low	Keep	Tall	
	Number (%)	Number (%)	Number (%)	
Pre-Test	49 67,12%	12 16,44%	12 16,44%	$\alpha=0,00$
Follow Up I	25 34,25%	28 38,36%	20 27,40%	
Follow Up II	13 17,80%	18 24,65%	42 57,53%	
Follow Up III	0	16 21,92%	57 78,08%	
Post Test	0	7 9,59%	66 90,41%	

The statistical results of the normality test using *the Kolmogorov-Smirnov* test in the pre test, follow up I, follow up II, follow up III, and post test obtained a significance value of $p < 0.05$ ($p = 0.00$) which indicates that the data is not normally distributed. Furthermore, the *Wilcoxon Signed Rank test* was carried out in the pre test with follow up I, follow up I with follow up II, follow up II with Follow Up III, pre test with post obtained a significance value of $p < 0.05$ ($p = 0.00$) so that it was concluded that there was a significant difference between the average compliance score in the pre test, follow up I, and post test.

The results of *the Wilcoxon Signed Rank test* in follow-up II with the post test obtained a significance value of $\alpha > 0.05$ ($\alpha = 0.18$) which showed that there was no significant difference between the average follow-up II compliance score and the post test. This is because at the time of follow-up II, the percentage of patients with a high level of compliance has reached 78.08% and 90.41% in the post test. There was a decrease in the proportion of moderate compliance level in follow-up I with follow-up II because the majority of patients had changed their treatment behavior in follow-up I which caused a change in the compliance level from moderate (38.36%) to high (57.53%) in follow-up II, then there was an increase in high strata in follow-up III towards the Post Test with a score of 78.08% to 90.41% in the Post Test. The statistical results of *the Friedman test* obtained a significance value of $\alpha < 0.05$ ($\alpha = 0.000$) indicating that there was a significant difference in the influence of pharmacist intervention at each stage of assessment. The influence of pharmacist interventions in providing pharmaceutical care in the form of counseling, information, and education to patients during the study period led to a significant increase in patient compliance levels.

Quality of life of Hypertension patients

One example of a generic instrument for measuring quality of life is the EuroQoL 5-Dimensional (EQ-5D) questionnaire (Cardoso et al., 2016). This questionnaire has 5 dimensions, namely, 1) mobility/walking, 2) self-care, 3) usual activities, 4) pain/discomfort, 5) anxiety/depression with each dimension having 3 levels of questions, namely 1) no problem, 2) moderate problem and 3) severe problem. Each level in the dimension has a different coefficient. A value of 100% or 1,000 indicates perfect health. The patient's quality of life score

was grouped into 3 categories, namely the good category (\geq score 0.8), the adequate category (score 0.6 – 0.8), and the bad category (score $<$ 0.6).

Patient's quality of life before the intervention

Quality of life per dimension and level of hypertension patients before the intervention can be seen in Table 10.

Table 10. Quality of life of Hypertension patients before the intervention

Number of Patients	Dimension					Score (index value per patient)
	Mobility/walking	Self-care	Usual activities	Pain/no comfortable	Anxiety/depression	
30	1	1	1	1	1	0,919
9	1	1	1	1	2	0,848
6	1	1	1	1	3	0,414
5	1	1	1	2	1	0,796
5	1	1	1	2	2	0,725
6	1	1	2	2	2	0,689
3	2	1	1	1	1	0,850
3	2	1	1	1	2	0,779
4	2	1	1	2	1	0,727
2	2	1	1	2	2	0,656
Total (n=73)	Average score = 0.878 ± 0.176					

The quality of life categories of Hypertension patients before the intervention are presented in Table 11.

Table 11. Categories of quality of life of Hypertension patients before the intervention

Categories Quality of Life	Before Intervention (Pre test)	
	(n=73)	(%)
Good	42	57,53%
Enough	25	34,25%
Bad	6	8,22

Information: Good = (Score \geq 0.8)
 Enough = (Score 0.6-0.8)
 Bad = (Score $<$ 0.6)

Based on the results of the study, it was obtained that the quality of life of patients before the intervention was dominated by the good quality of life category of 42 people (57.53%), followed by the adequate quality of life category of 25 people (34.25%), and the poor quality of life category occurred in 6 people (8.22%). The average patient's quality of life index score before the intervention in this study was 0.849 ± 0.1266 , lower than the reported value for the general population in Indonesia which was at 0.91. There were 6 patients who had a low quality of life (index score of 0.414), where the dimension of anxiety/depression was in the category of severe problems. During the pre-test interview, the patient experienced severe depression and anxiety disorders related to the coronavirus outbreak (SARS-CoV-2) that was sweeping the world and was afraid to take treatment for a long time.

Patient's quality of life after the intervention

The patient's quality of life in the post-intervention stage is presented in Table 12 and the categories of the patient's quality of life in the pre-intervention, follow-up, and post-intervention stages can be seen in Table 12.

Table 12. Quality of life of Hypertension patients (n=73) EQ-5D-3L after intervention

Number Of Patients	Follow Up I					Score (Index Value Per Patient)
	Dimension					
	Mobility/Walking	Self-Care	Activities That Commonly Done	Pain/Uncomfortable	Anxiety/Depression	
29	1	1	1	1	1	0,919
20	1	1	1	1	2	0,848
15	1	1	1	2	1	0,796
9	2	1	1	2	1	0,850
Total (N=73)	Average Score = 1 ± 0.10					
Number Of Patients	Follow Up Ii					Score (Index Value Per Patient)
	Dimension					
	Mobility/Walking	Self-Care	Usual Activities Done	Pain/No Comfortable	Anxiety/Depression	
40	1	1	1	1	1	0,919
15	1	1	1	1	2	0,848
12	1	1	1	2	1	0,796
6	2	1	1	2	1	0,850
Total (N=73)	Average Score = 1 ± 0.07					
Number Of Patients	Post Test					Score (Index Value Per Patient)
	Dimension					
	Mobility/Walking	Self-Care	Usual Activities	Pain/Discomfort	Anxiety/Depression	
51	1	1	1	1	1	0,919
10	1	1	1	1	2	0,848
8	1	1	1	2	1	0,796
4	2	1	1	2	1	0,850
Total (N=73)	Average Score = 1 ± 0.09					

Based on Table 12, it can be seen that there is an improvement in each dimension of quality of life until after the intervention. The average quality of life index score after the intervention was 0.967 ± 0.0657 with a good quality of life level. These results are in line with a study conducted by Ministry of Health Malaysia (2008) in Malaysia for 6 months that pharmacist intervention has a great influence on improving the quality of life of Hypertension patients. There are several things that cause the quality of life of patients to improve in this study. Such as the factors of patients who comply with their treatment who have been given counseling, information, and education and are controlled starting from compliance with the use of drugs related to the therapy regimen, patient awareness to live a healthy life, and increased physical activity and exercise in their daily lives, and adherence to a healthy diet in hypertension. The influence of pharmacists' contribution in providing intervention as an element of pharmaceutical care in order to improve the quality of life of patients.

Benefits of the application of pharmaceutical care on the reduction of the incidence of DRPs, improvement of clinical outcomes, treatment adherence rates, and quality of life of hypertensive patients

Pharmaceutical care is a form of optimizing the role carried out by pharmacists towards patients in carrying out treatment therapy so that it can improve the patient's health degree. The results

of therapy can be in the form of healing from the disease, reducing the symptoms of the disease, inhibiting the development of the disease, or preventing the occurrence of the disease or symptoms of the disease. Pharmaceutical care is a comprehensive process carried out by pharmacists to patients related to the drugs they use. Pharmaceutical care practices have three important components, including: (1) identifying DRP both actually and potentially, (2) overcoming actual DRP, (3) preventing the possibility of potential DRP (ACCP, 2017).

The effect of the application of pharmaceutical care on the incidence of DRPs, *clinical outcomes*, treatment adherence, and quality of life in hypertensive patients can be seen in

Effect of the application of pharmaceutical care on the incidence of DRPs, *clinical outcomes*, treatment adherence rates, and quality of life in Hypertension patients

Table 13. Pre-test and Post-test Results with Wilcoxon Test

Test Parameters	Pre-test	After the Intervention (Post test)	Wilcoxon Test (Asymp. Sig)
DRPs	1,436 ± 0,502 events	0.282 ± 0.456 events	α=0,000
Blood Pressure (mmHg)	154.38 ± 75.27	144.04 ± 15.94	α=0,000
Average compliance score	5.55 ± 1.50	8.45 ± 0.73	α=0,000
Quality of life score Average	0.878 ± 0.176	0.927 ± 0.093	α=0,000

The application of pharmaceutical care in this study appears to have a significant improvement impact on the reduction of DRPs, improvement of *clinical outcomes* such as patient blood pressure, improvement of treatment compliance, and quality of life of patients. This can be seen from the statistical results of *the Wilcoxon Signed Rank test*, a significance value of $\alpha < 0.05$ ($\alpha = 0.00$) was obtained, so it was concluded that there was a significant relationship with the implementation of pharmaceutical care in the form of pharmacist intervention on *patient therapy outcomes*.

Counseling as part of the implementation of the concept of pharmaceutical care aims to provide additional knowledge about diseases, therapy options for diseases, the role of drugs in curing diseases, and help patients solve problems faced in carrying out therapy, so that it is expected to change behavior in the aim of increasing patient compliance in drug use and lifestyle changes, so that the desired therapeutic results can be achieved, namely a decrease in glucose levels in the blood, so that the occurrence of complications can be prevented. Education is provided by counseling on hypertension management which includes disease education, diet, exercise, and pharmacology. Education and counseling for patients can be carried out directly either individually or with the patient's family (Ahn et al., 2020).

Conclusion

Based on the results of the research and discussion, conclusions were obtained: (a) The application of pharmaceutical care can reduce the number of DRPs incidence of hypertension patients at the Lubuk Pakam Health Center; (b) The application of pharmaceutical care can improve *clinical outcomes* in hypertensive patients at the Lubuk Pakam Health Center; (c) The application of pharmaceutical care can improve *the Quality of Life* (QOL) in Hypertension patients at the Lubuk Pakam Health Center; (d) The implementation of pharmaceutical care can increase compliance in hypertensive patients at the Lubuk Pakam Health Center.

Suggestion

Based on the conclusion of this study, it is recommended that further researchers conduct research on other diseases that have a high prevalence in Indonesia such as stroke, Dibates

Mellitus, chronic kidney failure, and conduct further research related to the impact of pharmaceutical care on patients without pharmacist intervention.

References

- Ahmad, A., & Oparil, S. (2017). Hypertension in women: recent advances and lingering questions. *Hypertension*, 70(1), 19-26.
- Ahn, S., Romo, R. D., & Campbell, C. L. (2020). A systematic review of interventions for family caregivers who care for patients with advanced cancer at home. *Patient education and counseling*, 103(8), 1518-1530. <https://doi.org/10.1016/j.pec.2020.03.012>
- Arikunto, S. (2013). Contribution of Educational Management to Optimal Service of Educational Development. *Jurnal Bimbingan dan Konseling "PSIKOPEDAGOGIA*, 2(2), 70-77.
- Aziz, F., Malek, S., Ali, A. M., Wong, M. S., Mosleh, M., & Milow, P. (2020). Determining hypertensive patients' beliefs towards medication and associations with medication adherence using machine learning methods. *PeerJ*, 8, e8286. <https://doi.org/10.7717/peerj.8286>
- Corrao, G., Parodi, A., Zambon, A., Heiman, F., Filippi, A., Cricelli, C., ... & Mancia, G. (2010). Reduced discontinuation of antihypertensive treatment by two-drug combination as first step. Evidence from daily life practice. *Journal of hypertension*, 28(7), 1584-1590. <https://doi.org/10.1097/HJH.0b013e328339f9fa>
- Dosh, S.A. (2001). The Diagnosis of Essential and Secondary Hypertension in Adults. *J.Fam Pract.* 50(1): 707-712.
- Liau, S. J., Lalic, S., Sluggett, J. K., Cesari, M., Onder, G., Vetrano, D. L., ... & Bell, J. S. (2021). Medication management in frail older people: consensus principles for clinical practice, research, and education. *Journal of the American Medical Directors Association*, 22(1), 43-49. <https://doi.org/10.1016/j.jamda.2020.05.004>
- Martini, F., Fregna, L., Bosia, M., Perrozzi, G., & Cavallaro, R. (2022). Substance-related disorders. In *Fundamentals of Psychiatry for Health Care Professionals* (pp. 263-295). Cham: Springer International Publishing.
- Rikmasari, Y., Kristina, S. A., Andayani, T. M., & Endarti, D. (2021). An Economic Evaluation of Pharmacist Intervention to Improve Blood Pressure Control: A Systematic Review. *International Journal of Pharmaceutical Research* (09752366), 13(2).
- Riskesdas (2007). *Riset Kesehatan Dasar*. Jakarta:Departemen Kesehatan RI. Hal.110-112.
- Setyoningsih, H., & Zaini, F. (2022). Hubungan Interaksi Obat Terhadap Efektivitas Obat Antihipertensi di RSUD dr. R. Soetrasno Rembang. *Cendekia Journal of Pharmacy*, 6(1), 76-88.
- Tesfaye, W. H., Erku, D., Mekonnen, A., Tefera, Y. G., Castelino, R., Sud, K., ... & Obamiro, K. (2021). Medication non-adherence in chronic kidney disease: a mixed-methods review and synthesis using the theoretical domains framework and the behavioural change wheel. *Journal of nephrology*, 1-35. <https://doi.org/10.1007/s40620-020-00895-x>
- WHO. (2001). *Pengendalian Hipertensi*. Alih Bahasa: Prof. Dr. Kosasih Padmawinata. Bandung: Penerbit ITB. Hal. 14, 50-51.
- WHO. (2013). Department of Psychiatry Centre for Participant Report Outcomes. Diakses 02 Desember 2020.