Analysis of Counseling and Booklet Administration Effectiveness on Adherence Level and Blood Pressure Value in Hypertensive Patients

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Abstract: *Hypertension is widely known as a cardiovascular disease in which patients have higher blood pressure than normal pressure and is a chronic disease that needs to be treated promptly and continuously. Non-adherence treatment caused uncontrolled blood pressure, thereby increasing the risk of complications. Education is one of the ways to improve knowledge, behaviour, and adherence. Counseling by pharmacist is an effective way to maintain or to increase their adherence to the therapy. The government advocates booklet as a health promotion program in primary care. The objective of this study was to know how far the patients' counseling and giving booklet by pharmacist affected patients' adherence on taking their antihypertensive and systolic and diastolic blood pressure control in Solok Primary Care. Patients' adherence was measured by indirect method by using Morisky Medication Adherence Scale (MMAS-8) Questionnair. The sampe was hypertensive patient, collected from February to May 2019. The results showed that counseling was effective in enhancing adherence (p=0.000) and decreasing systolic and diastolic blood pressure (p=0.010 and p=0.072), whereas giving booklet was only effective in enhancing adherence (p=0.009). There were significant differences of decreasing MMAS-8 score between counseling group and booklet group (p=0.021); there were no significant differences of decreasing systolic blood pressure and diastolic blood pressure between counseling group and booklet group (p=0.186 and p=0.639).*

Keywords: MMAS-8, adherence, hypertension, counseling, booklet, pharmacist

I. Introduction

Hypertension is commonly recognized as a cardiovascular disease. It is a public health issue which needs serious treatment. If the disease is not treated properly, some dangerous complications will occur. The increase in blood pressure level above normal has a positive correlation with the risks of cardiovascular disease, stroke, and kidney failure [1,2]. According to WHO and the International Society of Hypertension (ISH), there are 600 million people with hypertension all around the world and three million of them die every year. World Health Organization also estimates that 1.56 billion adults will suffer hypertension by 2025 [3]. In Southeast Asian, around one third of all adult population number suffers hypertension [4].

Hypertension in Solok in 2017 was included into top 10 diseases which was mostly suffered by the people in Solok. In 2017, it was in the second rank with the number of case of 3.061 people. This case increases year by year. In the previous year, in 2016 specifically, the case of hypertension was in the fourth rank with the case of 2.240 people [5].

The increase of this hypertension prevalence year by year keeps giving impact and risk at influencing human survival, decreasing work productivity and increasing health care cost burden. Minimum Service Standard is a regulation regarding the type and the quality of basic service which are the compulsory governance business which is worth being obtained by every citizen in minimum level. The service can be in form of curative, rehabilitative, preventive, and promotive services. Medicine prescription and education giving are two of the services provided in the health facilities [6].

The development of science and technology provides new comprehension regarding the basic process of physiology and pathology in human until the molecular level; however, frequently, the doctors or the health practitioners fail to the expected therapy purposes [7]. In such condition, the patients' incompliance on treatment regimen is the main cause of therapy failure [3]. WHO explains that incompliance is the main cause why the blood pressure is uncontrolled on hypertensive patients and it is estimated that 50-70% patients do not use anti-hypertension as in line with the regulation determined by the doctor [3].

Compliance becomes the most essential thing for hypertensive patients in controlling blood pressure. Patients' compliance by consuming medicine is extremely supportive for the success of therapeutic rationality,

because without this, all treatment therapy will not achieve the expected results. This factor is mainly affected by the extent of the patients' behavior in an attempt to maintain their health and the knowledge of each patient. Incompliance in hypertensive patients potentially can increase morbidity, mortality, and treatment costs [8,9].

Some reasons why patients do not use anti-hypertension medicine are due to the disease feature which naturally does not cause symptoms, having long-term therapy, having medicine side effects, having complex therapeutic regimens, are lack of understanding of the management and risk of hypertension, and having treatment costs which are relatively high [10,11]. In Indonesia, with a lower level of awareness, the number of patients who are not aware that they suffer from hypertension and do not comply with taking medication is higher [12]. The Cochrane Collaboration recommends a more comprehensive and a more intensive approach to achieve blood pressure control which is optimal [13].

Based on the disease pattern of outpatients in Community Health Center in Solok City in 2017, hypertension was quite dominant. Therefore, efforts are essentially needed to increase the use of appropriate medicine. In this study, the efforts made are in the form of pharmacist intervention in terms of providing counseling and providing booklets to improve patients' compliance, especially hypertensive patients. The research regarding the effect of pharmacist intervention on compliance and therapeutic outcomes of hypertensive patients has never been done in Community Health Center in Solok City. This study aims to analyze the effectiveness of counseling and booklet administration on the level of adherence and blood pressure value in hypertensive patients in Solok Community Health Center.

II. Material and Methods

Research Location and Research Time
This research will be conducted in Community Health Center of Solok from February to May 2019 with the data collection period is between February and May 2019.

Research Sample and Research Population
The population in this study is all hypertensive patients who visit Community Health Center from February to May 2019. The sample is taken by using consecutive sampling method which means that every subject that meets the inclusion criteria is inserted in to the research until certain period of time so that the number of research subject needed is fulfilled. The sample size used is 30 samples.

Research Design
This is a quasi-experimental study with a Non-Equivalent Control Group design. In this design, the grouping of sample members in the counseling group and the booklet group is not done randomly. Thus, this design is also called Non Randomized Control Group Pretest-Postest Design. In this study, pre-test before intervention and post-test after intervention are conducted by using MMAS-8 (Morisky Medication Adherence Scale) questionnaire. While, for the booklet group, the booklet is given regarding the use of anti-hypertension medicine and things related to hypertension.

Inclusion Critera
1. Patients aged ≥ 19 years old;
2. Patienrs are able to read;
3. Patients diagnosed by the doctor in Community Health Center suffer from primary hypertension;
4. Patients who are on treatment at Solok Community Health Center, use antihypertension for hypertension therapy;
5. Patients have been using the same medicine a month before or more than that;
6. Patients are willing to be respondents in the study.

Exclusion Criteria
1. Patients having a history of other diseases besides hypertension, such as diabetes, heart failure, and kidney damage.
2. Patients with mental disorders or other chronic health problems, such as asthma, Parkinsonism, epilepsy, cancer and obstructive pulmonary disease.
3. Pregnant and breastfeeding women

Data Collection
The data collected is the result of adherence measurement subjectively and objectively. Subjective measurement is done by using questionnaire. Measurement with a questionnaire and blood pressure measurement result record are performed at the beginning of the study (pre-test) and at the end of the study

(post-test). Blood pressure value is obtained from the result of measurements made by a permanent doctor or paramedic at the Community Health Center.

Data Processing and Data Analysis

The data obtained from the questionnaire is processed by using a computer with phases such as: editing, coding, entrying, and data cleaning. The data analysis in this study consists of Univariate Analysis, Bivariate Analysis, and Multivariate Analysis

III. Results

The Effect of Pharmacist Intervention on Patients' Adherence Level

Regarding to the effect of counseling on adherence level, the mean of MMAS-8 before and after counseling was 5.20 and 3.26 (Table 1). There was a decrease in MMAS-8 scores in the counseling group by 2.06. The statistical test with Wilcoxon test for samples paired with 95% CI was conducted to know the differences in the mean of MMAS-8 before and after counseling, p = 0,000 (Table 1). There was a significant difference in the mean of MMAS-8 before and after counseling (p <0.05); therefore, it can be stated that counseling can increase hypertensive patients' adherence to their medication. A decrease in MMAS-8 score of 2.06 shows an increase in respondents' adherence.

Besides, regarding to the effect of booklets on patients' adherence level, the mean of MMAS-8 before and after booklet administration was 5.11 and 4.34 (Table 1). There was a decrease in MMAS-8 score in the booklet group of 0.77. The statistical test with Wilcoxon test for samples paired with 95% CI was done to see differences in MMAS-8 scores before and after counseling; thus, p = 0.009 was obtained (Table 1). There were significant differences in the mean of MMAS-8 before and after booklet administration (p < 0.05). These results indicate that the administration of hypertension booklets can increase the hypertensive patients' adherence to their medication.

The booklets administration for education purpose for the patients provides many advantages; one of them is to replace the role of health workers in providing information related to disease and therapy. Patients can read the booklet every day even if they do not visit the Community Health Center. The more frequent they read, the stored memories will be stronger, so the patients are expected to understand the disease and its treatment and then continue to obey the rules of therapy.

Table 1: MMAS-8 score, mean of systolic and diastolic blood pressure before and after the intervention.

Variable	Counseling		*p*	Booklet		*p*
	Before	After		Before	After	
Adherence Level	5,20	3,26	0,000[a]	5,11	4,34	0,009[a]
Systolic Blood Pressure (mm Hg)	164,00	155,43	0,010[a]	161,43	159,43	0,807[a]
Diastolic Blood Pressure (mm Hg)	96,29	93,14	0,072[a]	96,29	94,86	0,197[a]

Remark: [a] The result of statistical test by using Wilcoxon test.
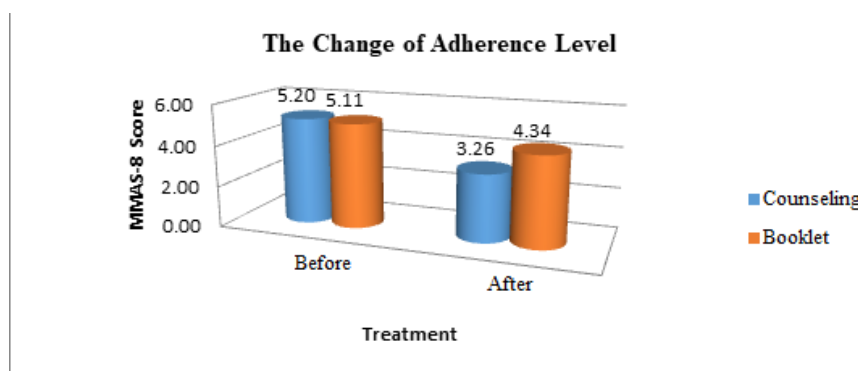
Figure 1: Graph of adherence level change before and after pharmacist intervention.

Figure 1 reveals that the effect of counseling shows more decrease in MMAS-8 score than booklet; in this case, counseling is better than intervention through booklet.

The Effect of Pharmacist Intervention on Systolic Blood Pressure Value

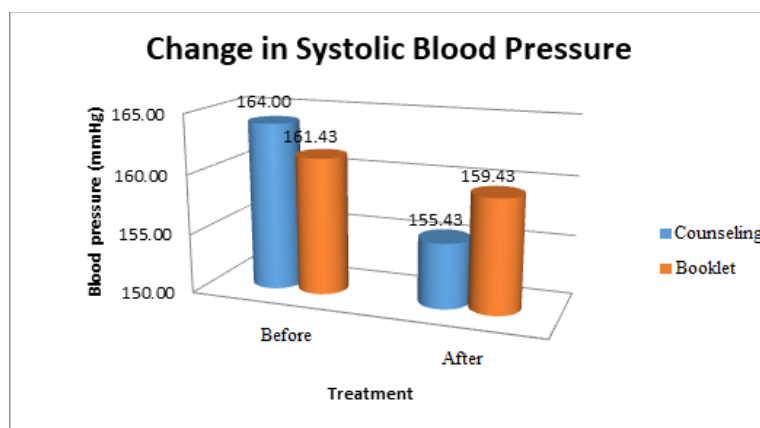**1. The Effect of Counseling on Systolic Blood Pressure Value**

The mean of systolic blood pressure before and after counseling were 164.00 mm Hg and 155.43 mm Hg (Table 1). There was a decrease in systolic blood pressure value after counseling of 8.57 mm Hg. The statistical test with Wilcoxon test with 95% CI was conducted to see differences in the mean of systolic blood pressure before and after counseling in which p = 0.010 was obtained (Table 1). There was a significant

difference in the mean of systolic blood pressure before and after giving counseling ($p < 0.05$); therefore, it can be stated that counseling by a pharmacist can reduce the systolic blood pressure value.

2.   The Effect of Booklet on Systolic Blood Pressure Value
    The mean of systolic blood pressure before and after booklet administration were 161.43 mm Hg and 159.43 mm Hg (Table 1). There was a decrease in systolic blood pressure value after booklet administration of 2 mm Hg. The statistical test with Wilcoxon test with 95% CI was done in order to see differences in the mean of systolic blood pressure before and after booklet administration in which $p = 0.807$ was obtained (Table 1). There was no significant difference in the mean of systolic blood pressure before and after booklet administration ($p > 0.05$). The statistical test results showed that the booklet administration did not affect the decrease in systolic blood pressure.
    The insignificant decrease in systolic blood pressure in the booklet group occured due to lack of information that could be understood by the patients regarding to the disease and its treatment. Conducting education to patients with hypertension or other chronic diseases is commonly done directly by health workers. Unlike the counseling group, information in the booklet group is given indirectly.

Figure 2: Graph of systolic blood pressure change before and after pharmacist intervention.

    Figure 2 shows that the effect of counseling reveals more decrease in systolic blood pressure than booklet; in this case, counseling is better than intervention through booklet.

The Effect of Pharmacist Intervantion on Diastolic Blood Pressure Value
1.   The Effect of Counseling on Diastolic Blood Pressure Value
    The mean of diastolic blood pressure before and after counseling were respectively 96.29 mm Hg and 93.14 mm Hg (Table 1). The decrease in mean of diastolic blood pressure after counseling was 3.15 mm Hg. The statistical test with Wilcoxon test with (95% CI) was conducted to know the differences in the mean of diastolic blood pressure before and after counseling in which $p = 0.072$ was obtained (Table 1). There was no significant difference in the mean of diastolic blood pressure before and after counseling ($p < 0.05$). The results of this statistical test showed that counseling by a pharmacist can reduce the diastolic blood pressure value.

2.   The Effect of Booklet Administration on Diastolic Blood Pressure Value
    The mean of diastolic blood pressure before and after booklet administration were respectively 96.29 mm Hg and 94.86 mm Hg (Table 1). There was a decrease in diastolic blood pressure value after booklet administration of 1.43 mmHg. The statistical test with Wilcoxon test (95% CI) was done to know the differences in the mean of diastolic blood pressure before and after the booklet administration where $p = 0.197$ was obtained (Table 1). There was no significant difference in the mean of diastolic blood pressure before and after the booklet administration ($p > 0.05$). The results of this study revealed that the booklet administration did not have an effect on the decrease of diastolic blood pressure value.
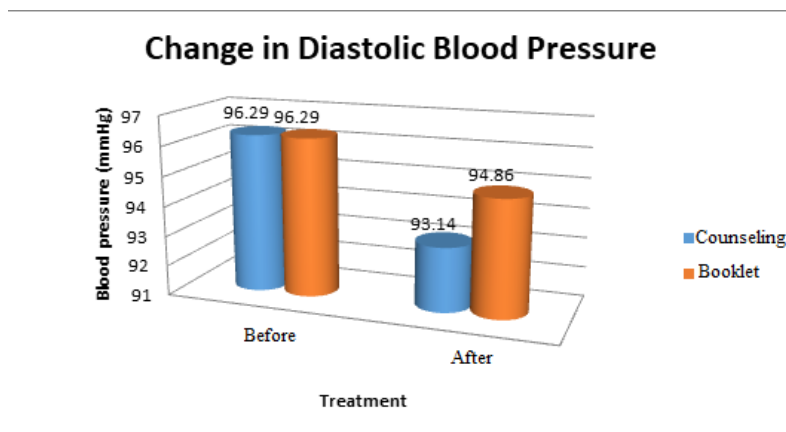
Figure 3: Graph of diastolic blood pressure change before and after pharmacist intervention.

Figure 3 shows that the effect of counseling reveals more decrease in diastolic blood pressure than booklet; in this case, counseling is better than intervention through booklet.

The Effect of Pharmacist Intervention on Lifestyle Modification
1.   The Effect of Counseling on Lifestyle Modification
Based on the interview results with respondents after counseling respectively, it is found that 24 respondents (68.6%) did sports, 26 respondents (74.3%) did salt diet, 3 respondents (8.6%) had a smoking habit, 24 respondents (68.8%) had used antihypertension appropriately and 3 respondents (9.4%) were still taking herbal medicine as the supplement of their antihypertension therapy (Table 2). There was a change in lifestyle after counseling done by the pharmacist, namely the number of respondents doing sports increased by 5 respondents, salt diet increased by 6 respondents, and consuming medicine appropriately increased by 20 respondents. Furthermore, there was no change in the number of respondents who had smoking habit and herbal medicine consumption (Table 2).

The statistical test with Wilcoxon test (95% CI) was conducted to see lifestyle changes or modifications after counseling done for each variable. From the result of statistical test, it was known that the number of respondents who used the medicine appropriately before and after counseling was significantly different (p = 0,000). There was no significant difference in the number of respondents who did sports, restricted salt consumption, had smoking habit and consumed herbal medicine (p = 0.096; p = 0.058; p = 1.000; and p = 1.000) (Table 2).

The result of the statistical test revealed that counseling can affect the lifestyle modification of hypertensive patients, especially on how to take medication. Lifestyle modification is not easy to be intervened. There are many things that still become problems, mainly in patients with lower middle socio-economic level. Under these conditions, the pharmacist needs to conduct ongoing counseling to ensure that the patients understand the nature of the disease, pharmacological and nonpharmacological therapies, to communicate the benefits of the therapy (for example, the benefits to be gained if the patient does sport, restricts salt consumption and stops smoking), to assess the patients' readiness in undergoing the therapy and to discuss the problems faced to remain compliant with the therapy [14].

Table 2: Respondents' lifestyle before and after intervention

Variable	Counseling (n, %)		*p*	Booklet (n, %)		*p*
	Before	**After**		**Before**	**After**	
Doing Sport						
Yes	19 (54,3)	24 (68,6)	0,096[a]	17 (48,6)	21 (60,0)	0,046[a]
No	16 (45,7)	11 (31,4)		18 (51,4)	14 (40,0)	
Diet on Salt						
Yes	20 (57,1)	26 (74,3)	0,058[a]	22 (62,9)	26(74,3)	0,046[a]
No	15 (42,9)	9 (25,7)		13 (37,1)	9(25,7)	
Smoking Habit						
Yes	4 (11,4)	3 (8,6)	1,000[a]	4 (11,4)	3 (8,6)	1,000[a]
No	31 (88,6)	32 (91,4)		31(88,6)	32 (91,4)	
Way to take medication						
Appropriate	4 (11,4)	24 (68,6)	0,000[a]	5 (14,3)	7 (20,0)	0,564[a]
Inappropriate	31 (88,6)	11 (31,4)		30 (86,7)	28 (80,0)	
Herbal medicine						
Yes	3 (8,6)	3 (8,6)	1,000[a]	2 (5,7)	2 (5,7)	1,000[a]
No	32 (91,4)	32 (91,4)		33 (94,3)	33 (94,3)	

Remark: [a] The result of statistical test by using Wilcoxon test

2. The Effect of Booklet on Lifestyle Modification

Based on the result of respondents' interview after giving booklets respectively, it is known that 21 respondents (60.0%) did sports, 26 respondents (74.3%) did salt diet, 3 respondents (8.6%) had smoking habit, 7 respondents (20.0%) used antihypertension appropriately and 2 respondents (5.7%) were still taking herbal medicine as the supplement of their antihypertension therapy (Table 2). There was a change in lifestyle after the booklet administration done by the pharmacist, namely the number of respondents doing sports increased by 4 respondents, salt restriction increased by 4 respondents, and consuming medicine appropriately increased by 2 respondents. The complete results can be seen in Table 2.

Wilcoxon test with 95% CI was done to see the changes in each lifestyle variables after booklet administration. The result of statistical test showed that the number of respondents who did sports before and after the booklet administration was significantly different, namely $p = 0.046$ ($p < 0.05$). The number of respondents who restricted salt consumption before and after the booklet administration was significantly different ($p = 0.046$, $p < 0.05$). There was no significant difference in the number of respondents who consumed the medicine appropriately, had smoking habits and who took herbal medicine before and after the booklet administration ($p = 0.564$; $p = 1.000$; $p = 1.000$; and $p > 0.05$) (Table 2).

The result of the statistical test revealed that booklet administration is quite effective in affecting lifestyle modification, especially doing sport and restricting salt consumption ($p > 0.05$). The lack of patients' interests in reading booklets is one of the causes why patients do not know much about the disease and hypertension therapy. In case like this, the booklet functions more as a tool to remind. Printed media will significantly help the dissemination of information. However, the most important thing is the doctor's attention on the importance of educating hypertensive patients [15]. In a lower middle socio-economic level society, the trust factor in doctor's advice still plays an important role in obtaining adherence and clinical outcomes expected [16].

The Comparison between Counseling and Booklet Administration Effects on the Change of MMAS Score, Systolic and Diastolic Blood Pressure Value

To know the differences in the impact of the intervention provided by the pharmacist (counseling and booklet), Mann-Whitney test was conducted on change of MMAS-8 score, systolic and diastolic blood pressure for data that are not normally distributed and independent sample t-test for normally distributed data.

Table 3: The change of MMAS-8 score, mean of systolic and diastolic blood pressure after intervention.

Variable	Change of Mean after Intervention		*p*
	Counseling	Booklet	
MMAS-8 Score	1,94	0,77	0,021[a]
Systolic Blood Pressure	8,57	2,00	0,186[a]
Diastolic Blood Pressure	3,14	1,43	0,639[a]

Remark: [a] The result of statistical test with Mann-Whitney test;

The mean change in MMAS-8 score after counseling and booklet administration is significantly different from $p = 0.021$ (Table 3). The result of this statistical test indicated that intervention in the form of counseling is better than booklet administration in increasing hypertensive patients' adherence with their therapy. In terms of statistical test result on mean change of systolic and diastolic blood pressure, $p = 0.186$ and $p = 0.639$ ($p > 0.05$) are obtained. The results of this statistical test indicate that there is no significant difference between the effect of counseling and booklet administration on systolic and diastolic blood pressure (Table 3). The sample size which is too small, the study time which is too short, the average systolic and diastolic blood pressure at the start of the study which is greater in the booklet group than in the counseling group and small change in the mean of blood pressure are predicted as the causes why the different effects of the two interventions are insignificant.

Although it is statistically insignificant, the decrease in systolic and diastolic blood pressure in the counseling group is bigger than the decrease in systolic and diastolic blood pressure in the booklet group. On the whole, it can be stated that intervention by giving counseling is better in increasing adherence and lowering systolic and diastolic blood pressure than giving booklet by pharmacists.

The Correlation between Adherence and Systolic and Diastolic Blood Pressure Value

The correlation among adherence, seen from MMAS-8 score, systolic and diastolic blood pressure values is tested by using the Spearman correlation test. The test results show that there is a positive but not significant correlation among the adherence level and a decrease in systolic blood pressure and diastolic blood pressure. The complete results can be seen in Table 4.

Table 4: The correlation between MMAS-8 score and systolic and diastolic blood pressure value

Correlation	R	*p*
MMAS-8 – Systolic Blood Pressure	0,107	0,380[a]
MMAS-8 – Diastolic Blood Pressure	0,175	0,148[a]

Remark: [a] The result of Spearman correlation test

Some clinical tests have proven that good hypertension management is effective in reducing cardiovascular risk. However, hypertensive patients frequently have problems in using the medicine regularly. The research data of Schroeder reveal that some individuals with poor blood pressure control are associated with low level of adherence [17].

The Effect of Confounding Variables on Adherence Level, Systolic and Diastolic Blood Pressure
1. The Effect of Confounding Variables on Adherence Level
Based on statistical analysis using Chi-Square test to know the effect of confounding variables on adherence level (the decrease of MMAS-8 score), p> 0.05 is obtained, meaning that there are no confounding variables (gender, age, education, occupation, hypertension duration, total antihypertension, and medicine side effects) that significantly affect the adherence level (Table 5).

Table 5: The Effect of confounding variables on the decrease of MMAS-8 score.

Confounding Variables	*P*
Gender	0,637[a]
Age	1,000[a]
Education	1,000[a]
Occupation	0,567[a]
Hypertension Duration	0,246[a]
Medicine Side Effect	1,000[a]
Number of Medicine	0,291[a]

Remark: [a] The statistical analysis test with *Chi Square* test

In this study, gender, age, education, occupation, number of drugs, hypertension duration, and medicine side effects do not represent as factors that affect adherence. It is strengthened by the results of observations done by Borzecki et al stating that the effects of socio-demographic factors are weak and inconsistent on adherence [18].

The factors that affect adherence are reported various by many studies. The adherence level of hypertensive patients increases in line with age, hypertension duration, and the number of antihypertension received by the patient. In addition, the other factors that also affect it are education level, knowledge, patients' perception of the disease and its treatment, other diseases and lifestyle modification [19].

2. The Effect of Confounding Variable on Systolic and Diastolic Blood Pressure
Based on statistical analysis with the Chi-Square test to obtain the effect of confounding variables (salt diet, sport, number of drugs, herbal medicine and way to take medication) on systolic blood pressure, the variables of number of drugs (p = 0.025) and sport (p = 0.022) are found significantly to affect systolic blood pressure value (Table 6). Besides, the Chi-Square test result on confounding variables and diastolic blood pressure reveals that salt diet affects diastolic blood pressure significantly (p = 0.002). The complete result can be seen in Table 6.

The result of the bivariate analysis is continued to multivariate analysis. Multivariate analysis has a purpose to describe the correlation between confounding variables (number of drugs, way to take medication, herbal medicine, salt diet and sport) on the decrease of systolic blood pressure and the correlation between confounding variables and the decrease of diastolic blood pressure collectively. Variables that become the candidates for the multivariate model are confounding variables with p value of < 0.25 in the Chi-Square analysis. Hence, multivariate analysis is done to analyze the correlation among the variables of the number of medicine, herbal medicine, salt diet and sport (p = 0.025, p = 0.189, p = 0.094 and p = 0.022) on systolic blood pressure and to analyze the correlation among the variables of the number of medicine, way to take medication, and salt diet (p = 0.220, p = 0.159 and p = 0.002) on diastolic blood pressure (Table 6).

Table 6: The effect of confounding variable on the decrease of systolic and diastolic blood pressure

Confounding Variables	*p*	
	The decrease of Systolic blood pressure	The decrease of Diastolic blood pressure
The number of medicine	0,025[a]	0,220[a]
Way to take medication	0,767[a]	0,159[a]
Herbal medicine	0,189[a]	0,316[a]
Salt diet	0,094[a]	0,002[a]
Sport	0,022[a]	0,961[a]

Remark: [a] The statistical analysis result with *Chi Square* test

The result of multivariate analysis reveals that the number of medicine and sport significantly affect the decrease of systolic blood pressure ($p = 0.024$ and $p = 0.038$). Besides, diastolic blood pressure is significantly affected by salt diet ($p = 0.005$). The complete result can be seen in Table 7.

Table 7: The result of binary logistic regression of confounding variables and the decrease of systolic and diastolic blood pressure.

Dependent Variable	Confounding Variables	*p-Wald*
Systolic Blood Pressure	Number of Medicine	0,024
	Sport	0,038
Diastolic Blood Pressure	Salt Diet	0,005

The result of this study is in accordance with the Schroeder study reporting that the number of medicine is as one of the factors that affects blood pressure control in hypertensive patients [17]. Complex therapeutic regimen (number of medicine) usually becomes the reason for the patient's non-adherence with the therapy being undergone which will result in not achieving the blood pressure target (8, 15, 19). Simple therapeutic regimen (for example, the use of a single antihypertension as a therapeutic option), but inappropriately, will make the expected clinical outcome never be achieved [2, 18]. Some studies mention that more than two-third of hypertensive patients do not get good blood pressure control with only one type of antihypertension and most of them are in need of two or more anti-hypertension combinations from different groups [2]. In addition to the number of medicine, the type of antihypertension also plays an important role in achieving the expected blood pressure target. The lack of doctor's attention to the guidelines for choosing antihypertension medicine in the initial treatment of hypertensive patients is one of the factors that makes blood pressure control weak in hypertensive patients, especially in primary health care facilities [20].

In this study, doing sport comes as a factor that affects blood pressure. Regular aerobic exercise for at least 30 minutes/day for several days per week is ideal for most patients. Studies reveal that aerobic exercise, such as jogging, swimming, walking, and bicycling can decrease systolic blood pressure 4-9 mm Hg [2]. The result of this study also shows that the limitation of salt consumption affects the decrease in blood pressure. It is in accordance with Appel's research reporting that salt consumption restriction of no more than 100 meq/L (2.4g sodium or 6g sodium chloride) is proven to be able to decrease blood pressure by 2-8 mm Hg [21].

Research Limitation

The adherence measurement in this study is subjective so that it has a bias. Some things that cannot be ascertained in subjective measurement are the patients' answers do not necessarily describe the actual use of the medicine yet. Subjective measurement also cannot ensure whether the patients provide answers honesly or not, forget or not. Patients can answer with answers that illustrate that they are patients who adhere to the treatment; thus, the measurement of non-adherence becomes underestimated.

The analysis of blood pressure value is based on two measurements namely the beginning of the study and one month after the intervention. The result of blood pressure measurements cannot describe the blood pressure control strength in hypertensive patients. Besides, the pressure measurement in this study is only done once in each patient visit to the Community Health Center. Such measurements do not follow the standards or guidelines for blood measurement recommended by JNC 7, in which it is a minimum of two measurements per patient visit. Therefore, there is a high possibility that the blood pressure measurement result will be invalid.

The small number of samples and the short research time cannot describe the effect of adherence and the blood pressure control well. It also makes the affecting factors in this study unclear.

IV. Conclusions

1. Counseling done by pharmacists can significantly increase the adherence level ($p = 0,000$) and can significantly decrease systolic blood pressure ($p = 0.010$), but it does not significantly decrease diastolic blood pressure ($p = 0.072$) at the Community Health Center in Solok;
2. Booklet administration provided by pharmacists can significantly increase adherence ($p = 0.009$), but it has not been able yet to decrease systolic blood pressure ($p = 0.807$) and diastolic blood pressure ($p = 0.197$) significantly;
3. Counseling given by pharmacists is better than booklet administration in increasing adherence ($p = 0.021$), while decreasing systolic blood pressure value ($p = 0,186$) and diastolic blood pressure value ($p = 0,639$); counseling is not significantly different from booklet administration in hypertensive patients at the Community Health Center of Solok.

V. Suggestions

1. To improve and to modify communication technique, information and education both verbal and non verbal are needed to help to enhance clinical outcomes and special space for pharmacist consultation is needed as well.
2. Blood pressure measurement of hypertensive patients should be conducted according to the recommended guidelines or standards to obtain valid measurement results.

References

[1]. Al-Dabbagh SA, Phil D, Aswad, SM. Compliance of hypertensive patients to management in Duhok Governorate using morisky-green test. Duhok Med Journal, 2010; 4(1): 28-39.
[2]. Chobanian AV, Bakris GL, Black HR, Cushman WC, Lee AG, Izzo JL, Jones DW, Materson BJ, Oparil S, Wright JT, Roccella ED, National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure. Journal of the American Heart Association, 2003; 42: 1206-1252.
[3]. WHO-ISH Hypertension Guideline Committee. Guidelines of the management of hypertension. Journal Hypertension, 2003; 21(11): 1983-1992.
[4]. World Health Organization. Hypertension Fact Sheet. New. Delhi: World Health Organization, (2011).
[5]. Dinas Kesehatan Kota Solok. Profil Dinas Kesehatan Kota Solok.Solok: Dinas Kesehatan Kota Solok, 2018.
[6]. Departemen Kesehatan Indonesia. Pedoman Konseling Pelayanan Kefarmasian Di Sarana Kesehatan. Direktorat Jendral Bina Farmasi,Jakarta, 2007.
[7]. Palaian, S., Prabhu, M., & Shankar, P.R. Patient counseling by pharmacist: a Focus on chronic illness. *Pak. J. Pharm*, 2006; 19(1): 62-65
[8]. Fung V, Huang J, Brand R, Newhouse JP, Hsu J. Hypertension treatment in a medicare population: Adherence and systolic blood pressure control. Clinical Therapeutics, (2007); 29(5): 972-984.
[9]. Ogedegbe G, Tobin JN, Fernandez S, Gerin W, Diaz-gloster M, Cassells, A, Khalida C, Pickering T, Schoenthaler A, Ravenell J. Counseling African Americans To Control Hypertension (CAATCH) trial: a Multi-level intervention to improve blood pressure control in hypertension blacks. Journal of The American Heart Association, (2009); 2: 249- 256
[10]. Morgado M, Rolo S, Castelo-Branco M. Pharmacist intervention program to enhance hypertension control: a randomised controlled trial.International Journal of Clinical Pharmacy, 2011; 33: 132–140.
[11]. Lin Y, Huang Y, Yang Y, Wu J, Chang C, Lu F. Adherence to antihypertensive medications among the elderly: a Community-based survey in Tainan city, Southern Taiwan. Taiwan Geriatr Gerontol, 2007; 2(3): 176-189.
[12]. Departemen Kesehatan Republik Indonesia. Pharmaceutical Care Untuk Penyakit Hipertensi. Jakarta: Departemen Kesehatan Republik Indonesia, 2006.
[13]. Glynn LG, Murphy AW, Smith SM, Schroeder K, Fahey T. Interventions used to improve control of blood pressure in patients with hypertension. USA: Wiley, 2010.
[14]. Krueger KP, Berger BA, Felkey B. Medication adherence and persistence: a Comprehensive review, 2005; 22(4): 313-356.
[15]. Hashmi SK, Afridi MD, Abbas K, Sajwani RA, Saleheen D, Fossard PM, Ishaq M, Ambreen A, Usman A. Factor associated with adherence to antihypertensive treatment in Pakistant. *PLoS ONE*, 2007; 2(3): e280.
[16]. Alhalaiqa F, Deane KHO, Nawafleh AH, Clark A, Gray R. Adherence therapy for medication non-compliant patients with hypertension: a Randomised controlled trial. *Journal of Human Hypertension*, 2012; 26: 117-126.
[17]. Schroeder K, Fahey T, Hay AD, Montgomery A, Peters TJ. Relationship between medication adherence and blood pressure in primary care: Prospective study. *Journal of Human Hypertension*, 2006; 20: 625-627.
[18]. Borzecki AM, Oliveria SA, Berlowitz DR. Barriers to hypertension control. *Am Heart Journal*, 2005; 149: 785-794.
[19]. Osterberg L, Blaschke T. Adherence to medication. *New England Journal of Medicine*, 2005; 353: 487-497.
[20]. Poluzzi E, Strahinja P, Vargin A, Chiabrando G, Silvani MC, Motola D, Cellini GS, Vaccheri A, Ponti FD, Montanaro N. Initial treatment of hypertension and adherence to therapy in general practice in Italy. *Eur J Clin Pharmacol*, 2005; 61: 603-609.
[21]. Appel LJ. Effects of comprehensive lifestyle modification on blood pressure control: Main results of the premier clinical trial. *JAMA*, 2003; 289 (16), 2083-2093.