The Analysis of Knowledge, Adherence, and Clinical Outcome of Hypertensive Patients in Puskesmas Jetis Yogyakarta

(Analisis Pengetahuan, Kepatuhan, dan *Outcome* Klinis Pasien Hipertensi di Puskesmas Jetis Yogyakarta)

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Abstract: Hypertension has been an increasing global epidemic problem over years and considered as one of the deadly disease with a high cardiovascular complication risk. Knowledge and adherence play an important role in patient's clinical impact, which determined the level of medication's adherence. Thus, adherence level determines the achievement of clinical outcome. The optimum clinical optimum will be achieved if the adherence level is at good level. The method in this study was using observational analytics with a cross sectional approach. The sampling method was consecutive sampling. The subjects were the adult hypertensive patients at Puskesmas Jetis Kota from August until October 2020. Univariate analysis was conducted in patient's and medication characteristics. Kendal Tau test was used to analyze the relationship between adherence and clinical outcome. 81 hypertensive patients were included in this study. The highest prevalence of patient's characteristics were shown on the women's group: 45-59 years old, senior high school education background, and no occupation. Amlodipine was the highest medication used as a single therapy. It was found that there is no relationship between knowledge and adherence level. In addition to that, there was no relationship between adherence level and clinical outcome measured by systole and diastole.

Keywords: Adherence, clinical outcome, hypertension, knowledge, Puskesmas Jetis

Abstrak: Hipertensi telah menjadi masalah epidemi global yang mengalami peningkatan tiap tahunnya dan menjadi salah satu penyakit mematikan dengan komplikasi serius pada kadiovaskular. Pengetahuan dan kepatuhan adalah kunci optimalnya hasil klinis yang akan dirasakan oleh pasien. Tingkat pengetahuan merupakan salah satu faktor yang menentukan tingkat kepatuhan seorang pasien terhadap pengobatannya serta kepatuhan pengobatan seorang pasien akan menentukan hasil klinis yang akan dicapainya. Hasil klinis yang optimal akan dapat dicapai apabila kepatuhan pasien akan terapi yang dijalani bernilai baik. Metode yang digunakan adalah analitik observasional dengan pendekatan model *cross sectional.* Teknik pengambilan sampel menggunakan metode *consecutive sampling.* Subyek penelitian adalah pasien hipertensi dewasa di Puskesmas Jetis Kota dengan waktu penelitian di Bulan Agustus hingga Oktober 2020. Analisis univariat dilakukan pada deksripsi pasien dan pengobatan. Uji Kendal Tau dilakukan untuk menganalisis hubungan pengetahuan, kepatuhan, dan *outcome* klinis. Sebanyak 81 pasien hipertensi memenuhi kriteria masuk dalam penelitian ini. Prevalensi tertinggi penderita hipertensi adalah perempuan, usia 45-59 tahun, latar belakang pendidikan SMA, dan tidak bekerja. Pengobatan tunggal dengan amlodipin adalah terapi farmakologi yang banyak diberikan. Tidak ada hubungan antara pengetahuan dan kepatuhan serta tidak terdapat hubungan antara kepatuhan dan *outcome* klinis yang berupa ketercapaian sistol dan diastol.

Kata kunci: Hipertensi, kepatuhan, luaran klinis, pengetahuan, Puskesmas Jetis

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INTRODUCTION

THE PREVALENCE of hypertension was 30-45% and continued to increase by the age. Based on WHO, hypertension rate in developing countries were 47% and in developed countries were 49%. The amount of hypertensive adult patients was estimated to reach 60% in 2025[1]. The hypertension's management and control can be conducted by pharmacological therapy combination and lifestyle alteration. It was known that the control management of blood pressure seemed inadequate in many countries including Indonesia by 34.1% of hypertension prevalence[2]. Several causative factors of inadequate blood pressure control were demographic characteristics, perception of health, co-morbidities, and lack of hypertension knowledge[3].

Lack of hypertension knowledge could lead into the less of hypertension therapy awareness, disbelief of health care provider, and to discontinue medication when the symptoms didn't occur[4]. Previous observation showed that hypertensive patients have less knowledge upon the normal blood pressure and lifestyle modification that necessary to run alongside therapy program[5]. Patient's incomprehension about the disease they suffered would lead the hypertension into the long-term complication. The other side on lack of hypertension knowledge would decrease medication's adherence. Furthermore, this situation would have worsened patient's status.

Adherence was defined as patient's behaviour in medication consumption followed by lifestyle modification as regard to the agreement between patient and healthcare provider. The adherence of anti-hypertensive medications was decreased up until 50% in the first year treatment[6,7]. Poor adherence would earn disadvantage effect for patients as well as uncontrolled hypertension, deterioration condition to hypertensive crisis, blood pressure tension, infarct miocard, stroke, and chronic kidney failure. The uncontrolled hypertension was a high blood pressure that didn't achieve the target goal and tend to stay above the normal score. This mark could be used as one of the values to mark in order to assess clinical outcome in a patient. The assessment could be simply done by a measurement on blood pressure where provided by healthcare facilities.

Previous studies about hypertensive medication's adherence have been conducted that the knowledge and behaviour against blood pressure[8-10]. The novelty of the study is focusing on causal analysis of level of knowledge and level of adherence. In addition to that, the analysis will continue on level of adherence against clinical outcome.

Based on above background, this study was aimed to assess the correlation between knowledge and adherence of hypertensive patients and its clinical outcome regards to the achievement of blood pressure target goal. In sequence relationship, knowledge level will interfere medication adherence in individual. Therefore, adherence level will affect the result as well as blood pressure target. The achievement on therapy goal was expected to earn good outcome on patient's quality of life.

MATERIALS AND METHODS

MATERIALS. A questionnaire was used in this study, divided into knowledge questionnaire and adherence questionnaire. Patient's medical data record as secondary data was also obtained to complete research data.

Tools. Knowledge questionnaire was using Hypertension Knowledge Level Scale (HKLS) and Morisky Medication Adherence Scale (MMAS) was using as the adherence questionnaire.

METHODS. This study was using observational analytic methods along with cross-sectional approach. Sampling data technique was using consecutive sampling type. This research was taken place in Puskesmas Jetis Kota from August until October 2020. Inclusion criteria were adult patients (>18 yo), diagnosed with either stage 1 or stage 2, have already on medication therapy for 3 months minimum, willing to participate in the study by completing Informed Consent form.

Research procedures. An adult hypertensive-patients whom willing participate in the study was given informed consent form as the agreement proof. Once agreement procedure has been conducted, *Hypertension Knowledge-Level Scale* (HK-LS) questionnaire and *Morisky Medication Adherence Scale* (MMAS-8) questionnaire were delivered to determine the knowledge and adherence level, respectively. HK-LS and MMAS-8 questionnaire was translated into Bahasa Indonesia and have proven for its validity and reliability[11-14]. As the restriction of COVID-19 era, the fulfilment of questionnaire could be established at patient's dwelling whilst patient's attendance at Puskesmas Jetis Kota to obtain regular medication. The questionnaires were then obtained by researcher on patient's next attendance on the same site. The other relevant data as well as blood pressure and patient's characteristics were obtained from patient's medical record. Univariate analysis was conducted on patient's characteristics and medications. The data was served descriptively. Kendal Tau test as

bivariate analysis was using to evaluate the correlation of knowledge and adherence as well as adherence against clinical outcome.

RESULTS AND DISCUSSION

Patient's Characteristics. Patient's characteristics was involving age, sex, level of education, occupation, income, diagnose, physical activity, dietary pattern, and smoking habit. The description of patient's characteristic is shown on Table 1.

Previous data pointed on the highest prevalence of hypertension were on 75 years old above group, female patients, not having a formal education background, and unoccupied[2]. This study presented similar results on sex and occupation section. Woman was tended to experience hypertension due to the degradation of estrogen hormones parallelly on the

Table 1. Patient's characteristics in Puskesmas Jetis Kota.

Characteristics		n (%)
Sex	Male	23 (28.4)
	Female	58 (71.6)
Age	18-44 yo	5 (6.2)
	45-59 yo	38 (46.9)
	60-74 yo	34 (42)
	75-90 yo	4 (4.9)
Education Background	Not pass elementary school	17 (21)
	Junior high school	16 (19.8)
	Senior/ vocational high school	40 (49.4)
	Graduate	8 (9.9)
Occupation	Unoccupied	28 (34.6)
	Entrepreneur	13 (16)
	Government employee	4 (4.9)
	Pensionary	3 (3.7)
	Seller/ trader	15 (18.5)
	Farmer/ laborer	11 (13.6)
	Others	7 (8.6)
Income	<1,000,000	45 (55.6)
	1,000,000-2,000000	25 (30.9)
	>2,000,000	11 (13.6)
Dietary habit	Yes	35 (43.2)
	No	46 (56.8)
Physical activity	None	3 (3.7)
	Mild	51 (63)
	Moderate	27 (33.3)
Smoking	Yes	5 (6.2)
	No	76 (93.8)
Diagnose	Hypertension	35 (43.21)
	Hypertension and Hepatitis	1 (1.23)
	Hypertension and Diabetes Mellitus	13 (16.05)
	Hypertension and Rheumatoid	1 (1.23)
	Hypertension and Gastritis	8 (9.88)
	Hypertension and Asthma	1 (1.23)
	Hypertension and Hypercholesterolemia	5 (6.17)
	Hypertension and Heart Disorder	2 (2.47)
	Hypertension and Gout	1 (1.23)
	Hypertension and Neural Disorders	1 (1.23)
	Hypertension. Hypercholesterolemia. and Gastritis	2 (2.47)
	Hypertension. Gastritis. and Diabetes Mellitus	3 (3.70)
	Hypertension. Diabetes Mellitus. and Hypercholesterolemia	4 (4.94)
	Hypertension. Diabetes Mellitus. and Heart Disorder	1 (1.23)
	Hypertension. Diabetes Mellitus. and Gout	1 (1.23)
	Hypertension. Gout. and Hypercholesterolemia	1 (1.23)
	Hypertension. Diabetes Mellitus. Hypercholesterolemia. and Gastritis	1 (1.23)

increase of the age. The reduction of this hormone in woman's body could trigger hypertension since this hormone's function was to maintain the elasticity of blood vessel. There also a significance contribution of occupation status against hypertension (p=0.001) and hypertension was tend to occur 1.830 times higher in unoccupied patients[15]. Like this finding, the data in this study showed 34.6% hypertensive patients were unoccupied. A man with no occupation was likely to have less physical activity then the risk of hypertension could incline. On the other side, unoccupied status which common came along with no income could lead less motivation on health condition. Low-income participants in this study were more likely to experience hypertension (55.6%). Different result was shown by a study in 2014 where the high income had a strong relation to hypertensive status (p=0.039)[16]. This reverse discovery might happen due to the different life-style characteristics where sometimes high-income patients tended to waste their money on bad nutrition food without paying much attention on the bad effect. In the contrary, the low-income patients could not have an access to the good life-style condition and tended to careless on life-style ultimately. This study showed 56.8% patients had no good dietary habit and this data supported by a significant correlation (p=0.000) was found between diet and the incidence of hypertension in the elderly[17]. The dietary habit could play a significant role where some ingredients such as salt and sugar could generate an increase of blood pressure. It was supposed that activities could earn a great effect on hypertension where it could improve patient's status. The proof was revealed where an intense correlation (p=0.010) was found between physical activity and hypertension status in male adult patients[18]. In addition to that, they found that a male adult patient tended to experience hypertension 3 times higher than those with mild and heavy physical activity. However, the data in this study showed the other result where 63% patients with middle activity experienced hypertension. The difference result might due to the different subject characteristics between the studies where majority of the patients in this study were female. Smoking was generally known as one of the leading causes of hypertension in adults. This fact was also proven by a study in 2019 where a significant correlation was discovered between smoking habit and hypertension status (p=0.016)[19]. However, this study found different result where 93.8% patients were not a smoker or had no smoking habit. This distinct condition might due to the different patient's characteristics between two studies. In this study, female patients were the dominant characteristics and hormones system played the key role as the cause of hypertension. Eventually,

this fact could clear issue in this study why the most non-smokers participant experienced hypertension. In a global study, the number of hypertension could rise at Low Middle Income Country (LMIC) which has a strong relation to age, obesity, smoking habit, and sex[20].

Medication Characteristics. Hypertensive drugs could be delivered to maintain blood pressure stayed in target range. Pharmacological approach must fit into age and the comorbidities situation such diabetes mellitus or kidney disorder. Joint National Committee VIII (JNC VIII) algorithm on 2014 recommended on the use of Angiotensin Converting Enzyme Inhibitor (ACEI), Angiotensin Receptor Blocker (ARB), Calcium Channel Blocker (CCB), and diuretics[21].

As the data shown on Table 2, the most prescribed medication by physician was monotherapy with CCB group presented by amlodipine. Single therapy management has compatible on the standard guidance where the use of monotherapy must be optimized before additional agent was given. This occurrence earned the advantage to the patient through enhancing level of adherence and minimizing medication side effects. Amlodipine was utilized as the chosen drug since its benefit work on heart's smooth muscle to reduce heart's work-load in blood pumping. This mechanism would serve the reduction on blood vessel retention then blood flow could work slowly. This benefit came along with blood pressure lowering effect made amlodipine as the chosen first line agent of antihypertensive. In one systematic review by Jeffers et al (2015), the comparison of several antihypertensive groups such as CCB, diuretics, beta blocker, alfa blocker, ACEI, and ARB revealed that the efficacy of amlodipine (CCB) was as good as the other agents[22].

Correlation between Knowledge and Adherence. The knowledge of disease's definition, prevention, non-pharmacology treatment, pharmacology treatment, and complication were significant to discover. This knowledge was then expected to bring more awareness on the disease and encourage

Table 2. Medication's characteristics on hypertensive patients in Puskesmas Jetis Kota.

Antihypertensive agent	n (%)
Single therapy	73 (90.12)
2 Combinations	8 (9.88)
Total	81 (100)
Amlodipine	68 (83.95)
Captopril	8 (9.88)
Hydrochlorothiazide	2 (2.47)
Furosemide	2 (2.47)
Ramipril	1 (1.23)
Total	81 (100)

Table 3. Knowledge and adherence characteristics.

Characteristics	n (%)
Knowledge	
High	78 (96.3)
Low	3 (3.7)
Total	81 (100)
Adherence	
High	34 (42)
Moderate	32 (39.5)
Low	15 (18.5)
Total	81 (100)

Table 4. Correlation of knowledge and adherence.

Knowledge	Adherence			p
	Low	Moderate	High	
Low	1	0	2	0.705
High	14	32	32	

patient to adhere on their medication plan by far. Table 3 described the distribution of knowledge and adherence level whereas Table 4 described the correlation between knowledge and adherence.

Based on theory, a good knowledge was likely to bring good impact on medication's adherence. This theory has strengthened by the highest prevalence on knowledge and adherence level in this study which located on the high level. This data indicated that patient in this study was more likely to have a good comprehension about the disease and followed by a good adherence as the result. These conditions were believed to help patient to achieve their goal therapy. A research in Bali on 70 hypertensive patients exhibited that 58 respondents had a good knowledge level[23]. Similar result brought on hypertensive patients in Dokter Moewardi Hospital stated that 71% patients had a high knowledge level and 66% patients were adhere on their medication[24]. The correlation between knowledge and adherence was tested by Kendal Tau test and the p value > 0.05 which indicated there was no correlation between knowledge and medication adherence level. Based on data shown, this situation might occur due to the high level of knowledge still accommodate the low and moderate adherence. It means that even on the highest knowledge, low and moderate adherence might still occur. There are several factors that contribute to the adherence level such as counseling, reminder tool, and self-awareness. Patient's basic knowledge in this study might be inadequate to motivate their selves to

adhere on medication. It was pretty clear there has to be a further intervention as mentioned above such as counseling, reminder tool, or combination. Previous study discovered that the combination of pharmacist's counseling and reminder tool successfully enhanced the adherence level[25].

Correlation between Adherence and Clinical Outcome. The adherence on medication was expected to earn an optimum result marked by the achievement of therapy goal. On a non-complicated ≥ 60 years old hypertensive patient, blood pressure target was less than 150/90 mmHg. Otherwise, the goal therapy was less than 140/90 mmHg on a patient < 60 years old. Hypertensive patients with diabetes and or kidney failure complication had a blood pressure target less than 140/90 mmHg on all ages.

Table 5 showed the correlation between adherence and the achievement on blood pressure which assessed by Kendal Tau test, p value > 0.05 was obtained. It indicated that there was no correlation between adherence and the achievement on blood pressure target. On previous study also revealed the same result that the correlation between adherence and therapeutic achievement was very low by 18.03%[26]. The result came up with adherence level has no effect on the achievement of blood pressure target in older adult[27]. This result was caused by an education intervention was given to the participants in the study. Thus, the blood pressure target was more likely influenced by education. Intervention from Health Care Providers (HCPs) might contribute to escalate patient's adherence and clinical outcome. As a previous study in 2020 mentioned that the combination of pharmacist's counseling and reminder tool was more effective to increase the level of adherence in 138 diabetes and hypertensive patient[25]. Somehow, in certain studies revealed the contrary result. Investigation on 114 participants in Palangkaraya revealed that there was a significance difference between adherence level against the reduction of systolic and diastolic blood pressure[28]. Another discovery on 83 respondents in Samarinda showed similar result where a correlation was found between antihypertensive medication adherence and blood pressure on older adults[29]. This positive result exhibited that the good adherence will earn a good therapy result.

Table 5. Correlation of adherence and clinical outcome.

Adherence	Clinical outcome Systol		p	Clinical outcome Diastol	
	Unachieved	Achieved		Unachieved	Achieved
Low	2	13		0	15
Moderate	6	26	0.586	0	32
High	7	27		1	33

It was expected that good knowledge would bring good adherence in a patient. A good adherence then expected to bring good outcome therapy as marked by the achievement of blood pressure target in hypertensive patient. Nevertheless, the study found a reverse result compare to the theory. It was suspected that certain interventions could apply to the patients then all the values involving knowledge, adherence, optimum clinical outcomes could be reach.

CONCLUSION

The majority of patient's characteristics in the study were female, 45-59 years old, senior high school education background, unoccupied, and no smoking habit. Medication's characteristics with the highest prevalence was single therapy with amlodipine as the chosen drug. No correlation was found on hypertension knowledge and medication adherence level in hypertensive patients. There was also no correlation between adherence level and clinical outcome in hypertensive patients.

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