

ORIGINAL ARTICLE

Clinical outcomes: analysis of quality of life and direct medical costs of outpatient hypertensive patients at Panembahan Senopati Hospital, Indonesia

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ABSTRACT

Hypertensive patients need long-term therapy and control. Uncontrolled blood pressure can aggravate the incidence of hypertension and develop into a more dangerous disease that can have an impact on quality of life and medical costs. The study aimed to analyze the differences in clinical outcomes on quality of life and direct medical costs. The method employed was a cross-sectional study with 400 outpatient hypertensive patients in August 2023 at Panembahan Senopati Regional Hospital, Special Region of Yogyakarta, Indonesia. Data were collected by filling out questionnaires and observing medical and financial record data. Demographic data were analyzed descriptively and showed that the majority of female patients (65%), aged 46 - 65 years (51%) possessed a high school education (30%). Sixty-six percent of patients had hypertension with a duration of <5 years and 61% had comorbidities. This study attempted to measure the clinical outcomes on quality of life and direct medical costs of hypertensive patients. The EuroQol-5 Dimension (EQ-5D-5L) and Visual Analogue Scale (VAS) questionnaires were used to measure patients' quality of life. The data on direct medical costs included medications, laboratories, medical equipment, and administrative costs. Clinical outcome indicators were blood pressure measurements. The results showed that 316 of 400 patients showed uncontrolled clinical outcomes (79%) with an average score for a good quality of life based on the quality of life assessment with EQ5D5L and VAS and incurred direct medical costs of Indonesian Rupiah (IDR) 663,80. Based on the VAS measurement, there was a significant difference in quality of life between patients with controlled and uncontrolled clinical outcomes ($p < 0.001$). Patients with controlled clinical outcomes had higher quality of life and incurred lower costs. Altogether, controlling hypertension in all patients with or without complications can be practical and cost-effective.

Key words:

EQ-5D-5L; VAS; quality of life; direct medical costs

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INTRODUCTION

Hypertension has contributed to cardiovascular diseases. The World Health Organization (WHO) estimates that the global prevalence of hypertension is 22% of the world population.¹ Basic health research data in 2018 showed that the prevalence of hypertension in Indonesia was 34.1%. It had increased when compared to the prevalence of hypertension in 2013, which was 25.8%.²

Hypertension is defined as a chronic disease that requires a long-term therapy. The disease must be controlled to avoid the complications that can lead to death. The World Health Organization states that 36% of adults in Southeast Asia suffer from hypertension and it kills 1.5 million people every year.³

Blood pressure is an essential indicator in assessing the clinical outcome of hypertensive patients. The blood pressure value is the most effortless clinical outcome to be measured and it is practical and requires low costs. Additionally, the examination results can be identified quickly to assess the effectiveness of treatment and therapy.^{4,5} The presence of blood pressure values will indicate controlled and uncontrolled hypertension. A person is identified as hypertensive if the measurement results of systolic blood pressure ≥ 140 mmHg and / or diastolic blood pressure ≥ 90 mmHg following repeated examinations.⁶

Blood pressure control is one factor that affects the quality of life of hypertensive patients. Among 61 research samples, most of them (73.8%) were hypertensive patients whose quality of life was below average.⁷ In addition, other studies explain that anti-hypertensive treatment requires a long-term therapy; therefore, it can have side effects on the patient's quality of life.⁸ Another research reported that the emotional aspect has the most influence on the quality of life of hypertensive patients; therefore, proper

treatment and awareness of hypertension are needed for the patient's mental and emotional well-being.⁹

In addition, hypertensive patients affected the quality of life and imposed an economic burden on society.¹⁰ Data from the Ministry of Health of the Republic of Indonesia showed that the costs of Social Security Agency on Health (the Badan Penyelenggara Jaminan Sosial or BPJS) in 2018 were absorbed mainly by treatment of chronic diseases such as diabetes, hypertension, and heart disease, with expenses reaching 6.67 trillion.¹¹ Previous studies revealed that the average cost of outpatient hypertensive patients was Indonesian Rupiah (IDR) 213,284 to IDR 434,632 per month.¹² Another study stated that the cost of the burden of disease due to hypertension in the community within Kediri District was IDR 330,882,930,485. Thus, it can be concluded that the economic burden caused by hypertension is very high.¹⁰

A cross sectional study reported by Xiao et al. (2019) on 586 hypertensive patients in Chongqing, China showed that the economic burden of hypertension was the most common factor affecting patients' Health-Related Quality of Life (HRQoL). Female patients were more vulnerable than male patients.¹³ Health-related quality of life (HRQoL) is an important measure for non-communicable chronic diseases (NCDs), especially in hypertensive patients, for physical and mental health outcomes.^{14, 15} Based on the description of the problems above, this study thus aimed to analyze the differences in clinical outcomes based on the quality of life and direct medical costs of outpatient hypertensive patients at Panembahan Senopati Regional General Hospital, Bantul, the special region of Yogyakarta, Indonesia.

The urgency of selecting this hospital as a research location is due to the Indonesian hypertension prevalence data in the Special Region of Yogyakarta, which is

11.01%, higher than the national rate (8.8%).¹⁶ This prevalence places the Special Region of Yogyakarta in the fourth position nationwide. It occupies a position as a province with increased cases of hypertension. Hypertension (first place) and diabetes mellitus (second place) have always been among the top 10 diseases, as well as the top 10 leading causes of death in Yogyakarta for the last few years based on Integrated Disease Surveillance (IDS) and IDS Hospital.¹⁷

This study attempted to measure the clinical outcomes on the quality of life and direct medical costs of hypertensive patients. The EQ-5D-5L and VAS questionnaires were used to measure patients' quality of life. The direct medical cost data included medications, laboratory, medical equipment, and administrative costs. Clinical outcome indicators were blood pressure measurements. The purpose of this research was to reveal whether patient clinical outcomes had an impact on quality of life and direct medical costs. Therefore, this current research is expected to serve as a guide for health workers to carry out the effective treatment for hypertensive patients in order to improve the quality of life and reduce patient care costs.

METHODS

Research Design

This current research is an observational research study with a cross-sectional design. The independent variable was the patient's blood pressure for 3 months, while the dependent variables were the value of quality of life and direct medical costs for outpatient hypertensive patients. Four hundred respondents were recruited from the entire population of hypertensive patients in the outpatient installation of Panembahan Senopati Regional Hospital, Bantul, Special Region

of Yogyakarta, Indonesia in August 2023 who met the inclusion criteria composed of outpatient hypertensive patients aged ≥ 18 years; taking similar antihypertensive prescriptions for at least 3 months (renin-angiotensin system blocker, β -blocker, calcium channel blocker, and diuretics); patients aged less than 65 using the blood pressure target $< 130/80$ mmHg and those with age equal to or higher than 65 years using the blood pressure target $< 140/90$ mmHg⁶. The exclusion criteria were patients who were pregnant or breast feeding; those unable to communicate properly due to dementia or mild cognitive impairment.

Sampling and Data Collection

The study was conducted at the outpatient department of Panembahan Senopati Regional Hospital, Bantul, Special Region of Yogyakarta, Indonesia in August 2023. This study has obtained a permission from the Ahmad Dahlan University Research Ethics Committee with the number 022306073.

A purposive sampling technique was employed in this current research. The researchers employed the Slovin formula to determine the number of samples that would be the research target, where the average monthly outpatient hypertension cases at Panembahan Senopati Hospital were 1,700 patients. To anticipate the incomplete medical record data, the required sample size was increased by 20-30%; therefore, 400 respondents were identified.¹⁸

The study was conducted at Panembahan Senopati Regional Hospital, Bantul, Special Region of Yogyakarta, Indonesia on the internal medicine medical records, pharmacy unit, and hospital finance. The indicators were the quality of life and direct medical costs of hypertensive patients. The tools used to measure the patients' quality of life are EQ-5D-5L and

VAS. The EQ-5D-5L questionnaire evaluating the general quality of life was developed in Europe. The EQ-5D-5L questionnaire has been validated by Sari et al. (2015) for hypertensive patients at the Kotagede II Yogyakarta Health Center. The Cronbach Alpha value was 0.72.⁷

The EQ-5D-5L questionnaire assesses the patient's health-related quality of life, using five questions for each quality of life dimension. The quality of life dimensions measured in the EQ-5D-5L questionnaire are walking ability, self-care, common activities, pain/ discomfort, and anxiety/depression.¹⁸

Quality of life outcomes are assessed based on the score set. Quality of life is low if the score set ranges from 0.00 to 0.33. If it is medium, the score set ranges from 0.34 to 0.66 and if it is high, the score set ranges from 0.67 to 1.00.

In addition, the EQ-5D-5L questionnaire and the VAS were used to record the respondents' health assessments. A scale of 100 is defined as the 'best imaginable health state'. A scale of 0 is defined as the 'worst imaginable health state'. This quality of life component of the VAS in the HRQoL domain is included in the general health function question, which includes the patient's perception of their current health.^{19, 20} The use of VAS as a measurement of the quality of life of hypertensive patients has also been carried out in several studies, with one related study conducted in Saudi Arabia.²¹

The quality of life was assessed through the EQ-5D-5L questionnaire. Eligible participants agreed to sign an informed consent form before participating in this study. The observed clinical outcome data were blood pressure values collected over three consecutive months, which were obtained from medical records. Blood pressure values were obtained with the average of three consecutive readings at every visit using an automatic electronic blood pressure monitor (the model of HBP-1300, Omron).

Data related to medical costs were obtained directly from the records of the hospital finance department. Direct medical costs included antihypertensive drugs, complications, laboratory, and administrative costs. Descriptive statistics was used to analyze demographic information. Analysis of differences in clinical outcomes based on quality of life and direct medical costs was performed using the independent sample t-test.

RESULTS

Most hypertensive patients were females (n= 260; 65%) with the age between 46 and 65 years (n= 205; 51%). The majority reported the duration of having hypertension for less than 5 years (n= 269; 67%), and having comorbidities (n= 245; 61%). The majority had the high school education. (Table 1)

Table 1. Demographic characteristics of hypertensive outpatients at Panembahan Senopati Hospital

Criteria	(n=400) (%)
Gender	
Female	260 (65)
Male	140 (35)
Ages	
< 40 - 45 years	37 (10)
46 - 65 years	205 (51)
>65 years	158 (39)

Criteria	(n=400) (%)
Education*	
Not in school	4 (1)
Elementary School	112 (28)
Junior High School	64 (16)
High School	131 (33)
College	89 (22)
Duration*	
< 5 years	269 (67)
5 - 10 years	72 (18)
>10 years	59 (15)
Comorbidities	
Comorbidities present	245 (61)
Without comorbidities	155 (39)

Before running the independent t-test, all variables were checked for normality test using the Kolmogorov Smirnov test and it showed a normal distribution. Table 2 showed that the majority (n= 305; 76.25%) of patients had controlled clinical outcomes (blood pressure less than 140/80 mmHg).

Table 2. Blood pressure classification of controlled and uncontrolled hypertensive outpatients at Panembahan Senopati Hospital

Classification of Hypertension	n (%)	
	Controlled	Uncontrolled
Normal	27 (6.75)	0
Prehypertension	219 (54.75)	0
Hypertension stage 1	59 (14.75)	65 (16.25)
Hypertension stage 2	0	30 (7.5)

Table 3. Differences of types of the quality of life in patients with controlled and uncontrolled blood pressures at Panembahan Senopati Hospital

Types of quality of life	(Mean) ± SD		p-value
	Controlled	Uncontrolled	
EQ5D5L	0.74 ± 0.15	0.73 ± 0.12	0.916
VAS	83.5 ± 7.75	66.7 ± 13.5	0.000*

*= p < 0.05

The average score of the patient's overall quality of life ranged from 0.67 to 1.00, placing it in the excellent category. The average quality of life was obtained from the average score in mobility, self-care, daily activities, pain/discomfort, and

depression/anxiety. The average quality of life score based on the VAS score was in the excellent category (67 to 100) for patients with controlled blood pressure (83.5), while patients with uncontrolled blood pressure was in the moderate

category (34 to 66) with an average score of 66.7. Table 3 showed a significant difference between the clinical outcome and the average quality of life score based on VAS assessment ($p= 0.000$). Overall, patients with controlled clinical outcomes showed higher mean quality of life scores than patients with uncontrolled clinical outcomes.

The results of measuring the quality of life per dimension are presented in Table 4. That is, walking ability indicated that there were patients at the highest (level 5) of the patient's inability to walk/move in controlled and uncontrolled clinical

outcomes. In addition, the dimension of anxiety or depression also has four patients at level 5, signifying that the patient feels very anxious or depressed (sad) about the disease suffered.

The average direct medical costs incurred by patients were IDR 663,804, consisting of drug costs (IDR 511,162), laboratory costs (IDR 90,988), medical device costs (IDR 6,968), and administrative costs (IDR 54,686). In this study, drug costs were the most significant component affecting the direct medical costs.

Table 4. The EQ-5D-5L measurement for the quality of life hypertensive outpatients at Panembahan Senopati Hospital

Quality of life			Number	
Dimensions of Quality of Life			Controlled	Uncontrolled
Dimensions of Quality of Life	Walking/Moving Ability	1	127 (31.75%)	57 (14.25%)
		2	113 (28.25%)	23 (5.75%)
		3	43 (10.75%)	2 (0.5%)
		4	23(5.75%)	1 (0.25%)
		5	10 (2.5%)	1 (0.25%)
	Self-care	1	257 (64.25%)	72 (18%)
		2	49 (12.25%)	10 (2.5%)
		3	7 (1.75%)	2 (0.5%)
		4	3 (0.75%)	
		5		
	Common Activities	1	226 (56.5%)	67 (16.75%)
		2	74 (18.5%)	13 (3.25%)
		3	14 (3.5%)	4 (1%)
		4	2 (0.5%)	
		5		
	Pain/ discomfort	1	70 (17.5%)	18 (4.5%)
		2	178 (44.5%)	52 (13%)
		3	60 (15%)	13 (3.25%)
		4	8 (2%)	1 (0.25%)
		5		
	Anxiety/Depression	1	60 (15%)	17 (4.25%)
		2	116 (29%)	35 (8.75%)
		3	117 (29.25%)	27 (6.75%)
		4	19 (4.75%)	5 (1.25%)
		5	4 (1%)	

Table 5 shows that there was no significant difference in the total direct medical costs and other types of direct medical costs between hypertensive participants with controlled blood pressure

and those with uncontrolled blood pressure. However, there was a significant difference of the laboratory fees between these two groups ($p=0.044$). See Table 5.

Table 5. Differences of direct medical costs between patients with controlled as opposed to uncontrolled hypertensive outpatients at Panembahan Senopati Hospital

Average cost (IDR)	Direct Medical Costs		<i>p-value</i>
	Controlled	Uncontrolled	
Drug costs	IDR.512.753	IDR.509.572	0.839
Laboratory fees	IDR.86.385	IDR.95.591	0.044*
Medical device costs	IDR.7.539	IDR.6.398	0.541
Administrative costs	IDR.54.099	IDR.55.273	0.983
Direct medical costs	IDR.660.775	IDR.666.833	0.263

*= $p<0.05$

DISCUSSION

Most participants in this study were females with education levels equal to high school or college education, and their ages ranged between 46 and 65 years. Gender and age are non-modifiable risk factors for hypertension.⁶ This happens because women over 45 experience menopause.¹⁴ During menopause, there is a decrease in estrogen hormone secretion. Estrogen hormone affects blood pressure through the renin-angiotensin-aldosterone system. This causes women's blood pressure to be higher than men in the same age during menopause.¹⁵

In addition, most hypertensive patients sampled in this study were more than 45 years. According to the research results by Yoon et al. (2012), hypertension increases in prevalence with age.¹⁶ The increasing prevalence of hypertension with advancing age is associated with increased sodium sensitivity and increased vascular stiffness.¹⁷ Increased sodium sensitivity is caused by an increased need for sodium to maintain homeostasis. As age increases, there is a progressive decrease in blood vessel elasticity, leading to blood vessel

atherosclerosis. The atherosclerosis creates blockages that impede the smooth flow of blood, leading to an increase in blood pressure.¹⁸ Furthermore, most hypertensive patients in this current study had high proportion of high school and college education and the high proportion of controlled blood pressure. This could be interpreted as women with high education might have better concerns of their blood pressure levels, although the majority had comorbidities in addition to hypertension.²²

It is known that hypertension is the silent killer because there is no obvious signs or symptoms.^{23,24} This can lead to complications of hypertension such as cardiovascular diseases or stroke without notice.^{25,26} The finding in this study showed most hypertensive patients had duration of hypertension of less than 5 years with controlled blood pressure. This supports a previous study by Siti (2018), which reported that patients experiencing hypertension for less than 5 years had better compliance in controlling blood pressure levels than those experiencing hypertension for more than 5 years.²⁷ This current study also supports a previous international study stating that hypertensive patients who had

high compliance with medications in the short duration of hypertension had better possibilities of keeping their blood pressure levels under control.²⁸ This benefit should be shared with healthcare providers to raise awareness in patients with hypertension among both female and male patients with hypertension in Indonesia in order to control their blood pressure levels effectively. Furthermore, the policy makers might implement a national campaign for compliance to medications under side effects awareness. This initiative might help save direct medical costs in terms of preventing further complications from hypertension.

Although there was a small proportion (approximately 24%) of uncontrolled blood pressure in this study, the majority had comorbidities (61%) in addition to hypertension, especially diabetes mellitus. The higher the blood pressure, the greater the possibility of more severe comorbidities can worsen the quality of life of hypertensive patients.²⁹ In hypertensive patients with uncontrolled blood pressure, healthcare providers should find strategies to decrease blood pressure levels in order to reduce the risk of developing complications from hypertension, including cardiovascular diseases, kidney disorders, and cerebrovascular diseases.³⁰

In terms of types of the quality of life measured from the EQ-5D-5L and the VAS, there was no difference in patients with controlled as opposed to uncontrolled groups, while there was a significant difference of VAS between the controlled and the uncontrolled groups. Meanwhile, research conducted by Mansi et al (2023) on male hypertensive patients in India shows that quality of life was related to blood pressure. Quality of life measurements in this study used the Mini Cuestionario de Calidad de Vida en Hipertensión Arterial (MINICHAL) questionnaire and the findings showed that patients with controlled blood pressure had a higher quality of life score compared to

patients with uncontrolled blood pressure. One possible reason is that patients with uncontrolled blood pressure have higher body mass index (BMI) values.³¹

The finding of this study showed that patients who did not control their blood pressure properly would experience a decrease in quality of life compared to patients with blood pressure control. Moreover, the quality of life of patients measured with the VAS showed a significant difference between controlled and uncontrolled blood pressures.

The findings measuring the quality of life per dimension showed patients with the ability to walk/move and the presence of anxiety/depression/sadness, had the lowest quality of life (level 5). Hamid (2011) and Hayulita (2018) research reported that mental disorders would cause the disturbances in life vitality, social function, emotional state, and mental health.²³ Rohmah (2015) stated that psychological factors were the dominant factors affecting the quality of life of the elderly.²⁴

Apart from the Anxiety/Depression dimension, decreased mobility and daily activities are also problems in the quality of life of hypertensive patients. Hypertension is associated with a lower quality of life, with patients scoring lower in almost all dimensions including physical ability and vitality, compared to the general population. This affects patients' quality of life in the form of headaches, dizziness, depression, anxiety, and fatigue as well as impaired vitality, social function, mental health, and psychological function.³² In this study, uncontrolled hypertension also slightly affected the quality of life in the pain/discomfort dimension. These finding is relevant with a previous Nepali study.³³

Patients with hypertensive conditions can generally experience changes in the quality of life. Changes in the quality of life of hypertensive patients include clinical symptoms and complications caused by hypertension. The decrease in blood

pressure is influenced by various factors including accuracy in selecting antihypertensive drugs and the frequency and dose appropriate to the patient's condition, lifestyle modifications, dietary management, and patient compliance factors in treatment.²⁶ Health workers should monitor patients' quality of life undergoing long-term drug therapy for chronic diseases such as hypertension. Monitoring the patient's quality of life is needed to determine the right therapy according to the patient's clinical condition to achieve the therapeutic goal of improving quality of life.^{24,25}

In addition to quality of life, direct medical costs should impact the quality of life.¹⁰ Direct medical costs are directly related to hypertensive treatments. These include drug, laboratory, medical device, and administrative costs. When comparing direct medical costs between controlled and uncontrolled hypertensive patients, only laboratory fees in patients with uncontrolled hypertension were significantly higher than those with controlled hypertension. This suggests that patients with controlled hypertension may not require additional laboratory investigations and could save direct medical costs for hospitals and the country.⁴ Keeping the blood pressure under control is necessary. Although other types of direct medical costs might not differ between the controlled and uncontrolled hypertensive patients, it is still important to maintain a regular follow-up routine to avoid exceeding medical expenses charged to the patients.

The average direct medical costs in patients with controlled blood pressure are lower than those with uncontrolled blood pressure. This is because patients with uncontrolled blood pressure receive combination therapy, which increases the cost of treatments. In addition, patients with uncontrolled blood pressure will aggravate their disease and may even develop

comorbidities requiring additional treatments.

The most significant cost component in outpatient hypertensive patients was drug costs (77%). This percentage of drug costs is higher than the proportion of drug costs in the United States, which is only 10% of the total cost of therapy³⁴. It might be attributed to drug prices in Indonesia which are relatively expensive compared to those in other countries²⁷. Another cause is the use of several types of drugs that are not necessary, causing an increase in drug costs. The cost of drugs is one of the considerations in the selection of therapy because the cost factor will increase the economic burden in developing countries. The low per capita income of the community and the lack of availability of health insurance causes a mismatch in the selection of therapy with established guidelines, leading to less effective and efficient treatments.³⁵

RECOMMENDATIONS

Patients with controlled blood pressure have a better quality of life than those with uncontrolled blood pressure. In addition, based on the direct medical costs, patients with controlled blood pressure tend to require less treatment costs than those with uncontrolled blood pressure. Healthcare providers need to pay more attention to those with uncontrolled high blood pressure. Medication compliance is an important factor to control high blood pressure and can save direct medical costs from hypertensive complications along with other lifestyle modifications. National policy makers should collaborate with involved hospitals to campaign for medication compliance along with other lifestyle modifications, which might help reduce direct medical costs and improve the overall quality of life.

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ETHICS APPROVAL

This research received ethical approval number: 022306073 released by the Ethics Committee, Ahmad Dahlan University.

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