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## Influence of Self-Motivation and Health Locus of Control on Adherence to Medication Among Hypertension Patients

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### Abstract

Hypertension is one of the more common comorbidities among patients infected with the Sars-CoV-2 virus, which causes COVID-19, but many hypertensive patients do not comply with taking medication. This study analyzed the relationship of self-motivation and health locus of control with self-management (medication adherence) among hypertensive patients during the COVID-19 pandemic at Private Hospital Surabaya, Indonesia. The research adopted a correlative analytic design with a cross-sectional approach, and the study's population comprised 74 hypertensive patients recruited by simple random sampling who were treated at Private Hospital Surabaya, Indonesia. The instruments used included the Treatment Self-Regulation Questionnaire to measure self-motivation, the Multidimensional Health Locus of Control Scale to measure locus of control, and the Morisky Medication Adherence Scale-8 to measure self-management (medication adherence). Spearman's rank correlation coefficient was employed for data analysis to measure the relationships between self-motivation, locus of control, and with self-management (adherence to taking medication). The results reveal a relationship between self-motivation and adherence to medication at a level of  $p = 0.000$  and a relationship between health locus of control and adherence to taking medication at a level of  $p = 0.000$  among hypertensive patients during the COVID-19 pandemic at Private Hospital Surabaya, Indonesia. The findings suggest the value of efforts to provide motivation to patients and support their being more responsible in controlling their health conditions by adherence to medication.

**Keywords:** adherence to medication, locus of control, hypertension patients, self-motivation

### Abstrak

*Pengaruh Motivasi Diri dan Locus of Control pada Kepatuhan Minum Obat Pasien dengan Hipertensi. Hipertensi merupakan salah satu penyakit dengan komorbiditas tertinggi pada pasien yang terinfeksi virus Sars-CoV-2 penyebab COVID-19, diperparah dengan masih banyaknya pasien hipertensi yang tidak patuh minum obat. Penelitian ini bertujuan untuk menganalisis hubungan motivasi diri dan health locus of control dengan self-management (kepatuhan minum obat) pada pasien hipertensi pada era pandemi COVID-19 di rumah sakit swasta Surabaya. Desain penelitian ini adalah analitik korelatif dengan pendekatan cross-sectional. Populasi penelitian ini adalah pasien hipertensi yang dirawat di rumah sakit swasta Surabaya Indonesia dengan simple random sampling sebanyak 74 orang. Instrumen yang digunakan dalam penelitian ini adalah the Treatment Self-Regulation Questionnaire untuk mengukur motivasi diri, Multidimensional Health Locus of Control Scale untuk mengukur locus of control, dan Morisky, Medication Adherence Scale untuk mengukur self-management (kepatuhan pengobatan). Analisis data yang digunakan untuk mengukur self-motivation, locus of control dengan self-management (kepatuhan minum obat) adalah tes Rank Spearman. Hasil penelitian menunjukkan bahwa ada hubungan antara motivasi diri dengan kepatuhan minum obat pada pasien hipertensi di era pandemi COVID-19 di rumah sakit swasta Surabaya dengan taraf ( $p = 0,000$ ), dan ada hubungan antara locus kesehatan dengan pengendalian dan kepatuhan minum obat bagi pasien hipertensi di era pandemi COVID-19 di rumah sakit swasta Surabaya ( $p = 0,000$ ). Hasil penelitian menunjukkan bahwa upaya dengan memberikan motivasi dan dukungan untuk lebih bertanggung jawab dalam mengontrol kondisi kesehatannya (patuh minum obat).*

**Kata Kunci:** kepatuhan minum obat, locus of control, pasien hipertensi, self-motivation

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## Introduction

Patients with hypertension, better known as high blood pressure, must routinely take medication to stabilize their blood pressure, but many people with hypertension do not comply with their medication regimen. Hypertension is one of the more common comorbid diseases or comorbidities, and, like everyone, hypertensive patients are susceptible to being infected with the Sars-CoV-2 virus, the cause of COVID-19. The latest data shows that the comorbid disease of COVID-19 is hypertension, namely 56.6% occurs in the United States, China (58.3%), Italy (49%), and Indonesia (50.5%). Hypertension is a comorbid disease often found in COVID-19 patients. Approximately 15% of cases of hypertension are found in this population. Hypertension is a comorbidity often found in COVID-19 patients, with about 15% of hypertension in Iraqi population (Salih et al., 2020). In 406 patients over the age of 60 years who died of COVID-19 infection, the overall proportion of hypertension was 39.7% (Kreutz et al., 2020). According to the World Health Organization (2013), the global prevalence of hypertension is 22% of the population, and less than a fifth of patients control their blood pressure. Africa has the highest rate of hypertension at 27%, followed by the Eastern Mediterranean with 26%, and South-east Asia has the third-highest prevalence at 25% (Turk-Adawi et al., 2018).

A preliminary study of medical records by researchers at Private Hospital Surabaya, Indonesia from January through May 2021 found that 455 hypertensive patients visited during that time, with an average of 91 patients per month. According to health workers' information, many hypertensive patients do not follow treatment according to the treatment schedule, so their blood pressure increases due to not adhering to a medication regimen. Interviews with 20 patients suffering from COVID-19 revealed that 50% had a history of hypertension, 30% had a history of diabetes mellitus and 20% had no comorbid diseases. Of the 10 (50%) hypertension sufferers who were exposed to COVID-19, 5

patients were obedient to taking hypertension medication, and 5 patients did not adhere to taking the medication, because they were late for control to the hospital so they did not take medication the reason was that patients were afraid to go to the hospital during the COVID-19 pandemic.

The impact of not adhering to medication is that patients' blood pressure becomes uncontrolled, worsening their quality of life and, in the worst scenario, causing death due to complications. Hairunisa and Amalia's research (2020) found that hypertension has a relationship with Covid-19. Hypertension can exacerbate Covid-19 infection. The virus will bind to angiotensin-converting enzyme 2 (ACE2) in the lungs and then penetrate cells; Antihypertensive drugs work inside cells, namely by converting angiotensin-converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) in controlling hypertension (Kreutz et al., 2020).

Motivation is a crucial factor in enabling someone to take action to achieve a desired goal (Muslim and Rahayu, 2021). Therefore, to minimize nonadherence to hypertension medication, it is necessary to be motivated to change the habit of noncompliance with the medication regimen. In addition to motivational factors, adherence to taking hypertension medication is influenced by the health locus of control (HLOC) (Listiana et al., 2020), which is an individual's set of formative beliefs about what is good and bad for health. The HLOC comprises two components, namely internal HLOC (IHLC) and external HLOC (EHLC) (Mohebi et al., 2018). The present research analyzed the correlation of self-motivation and HLOC with self-management (medication adherence) among hypertensive patients during the COVID-19 pandemic at Private Hospital Surabaya.

## Methods

This research adopted a correlative analytic design with a cross-sectional approach. The population was hypertension patients at Private Hos-

pital Surabaya, and simple random sampling was employed to recruit patients who met the following inclusion criteria: patients who have 35 – 60 years old, patient with a diagnosis of hypertension for at least one year, the patient was conscious, able to communicate well, and agreed to participate in this study. The sample comprised 74 respondents, and the research was conducted from April through May 2022. The Treatment Self-Regulation Questionnaire was used to measure self-motivation (Looti, 2023). This questionnaire assesses the degree to which a person's motivation for a health behavior is relatively autonomous, so the wording varies slightly depending on which behaviors are being investigated. The Multidimensional Health Locus of Control Scale) measured locus of control (Wallston & Wallston, 2020), and the Morisky Medication Adherence Scale–8 measured adherence to medication). The researchers tested the validity and reliability of the questionnaires used in this study on 15 respondents. In testing the TSRQ, statement 13 was found to be invalid, but, after it was discarded, the questionnaire proved valid and reliable, with an alpha of .918

and an  $R^2$  of 0.481. The MHLC also proved reliable and valid, with an alpha of .967 and an  $R^2$  of 0.413, and the MMAS-8 proved valid and reliable with an alpha of .83 and an  $R^2$  of 0.344. The data were collected using Google Forms.

This study's independent variables were self-motivation, locus of control, and, and the dependent variable was adherence to medication. The data analysis used the Spearman's rank test to measure the association of self-motivation and locus of control with adherence to medication.

The research was deemed ethically acceptable by the Health Research Ethics Committee of Lembaga Chakra Brahmada Lentera (CANDLE) (Certificate no. 009/020/IV/EC/KEP/Lemb.Candle/2022). The participants provided informed consent before the data collection, and their names were anonymized for the study.

## Results

This study found that the majority of hypertensive patients at Private Hospital Surabaya during

Table 1. Respondents' Characteristics by Gender, Age, Length with Hypertension, Self-Motivation, Locus of Control, and Adherence to Medication

Characteristics	N	%
Gender		
Male	35	47.3
Female	39	52.7
Age		
35–48	20	27
49–60	54	73
Length with hypertension		
5–10	30	40
>10	44	60
Self-motivation		
Strong	61	82.4
Middle	5	6.8
Weak	8	10.8
Locus of control		
High	56	75.7
Middle	7	9.5
Low	11	14.9
Adherence to medication		
High	57	77
Middle	12	16.2
Low	5	6.8

Table 2. The Correlation of Self-Motivation and HLOC in Relation to Adherence to Medication Among Hypertensive Patients (N = 74)

Variables	Adherence to Medication						Total		p	R
	High		Middle		Low		Σ	%		
	n	%	n	%	n	%				
Self-motivation										
Strong	53	87	7	12	1	1	61	100	.000	0.353
Middle	3	60	2	40	0	0	5	100		
Weak	1	12.5	3	37.5	4	50	8	100		
Locus of control										
High	51	91	5	19	0	0	56	100	.000	0.840
Middle	4	57	3	43	0	0	7	100		
Low	2	18	4	36	5	46	11	100		

Note: Spearman's rank analysis

COVID-19 had a hypertension diagnosis for more than 10 years. Based on Table 1, 52.7% were female, and 82.4% had self-motivation in the *strong* category. A majority had an HLOC in the *high* category (75.7%), and a majority showed a *high* level for the variable of adherence to medication (77.0%). The results of the Spearman's rank correlation test show that the correlation between self-motivation and medication adherence was  $p = .000$  ( $R = 0.353$ ), and the correlation of locus of control and medication adherence was  $p = .000$  ( $R = 0.840$ ) (see Table 2).

## Discussion

This study found that the majority of hypertension sufferers (52.7%) in the COVID-19 era at Private Hospital Surabaya were female. Most of the women in this study were already menopausal, a condition that makes women more susceptible to hypertension, as it is related to increased blood pressure. Menopause decreases the hormone estrogen, which protects blood vessels from damage (Rosdiana & Cahyati, 2019), and the American College of Cardiology states that the decline of estrogen levels at menopause is the main trigger of hypertension in women (Zhao et al., 2018). Meanwhile one of the factors that can cause hypertension in men is smoking. The nicotine in cigarettes affects blood pressure either through the formation of athero-sclerotic plaques, a direct effect of

nicotine's inhibiting the hormones epinephrine and nor-epinephrine, or through the effect of CO in increasing red blood cells.

Most respondents in this study were aged 49 – 60 years (73%). Age influences hypertension through problems associated with a decline in bodily functions, such as thickening of the heart valves and decreased elasticity of the blood vessels, which increases systolic and diastolic blood pressure (Fadlilah et al., 2020). Older people are more likely to comply in medication treatment, however Rikmasari et al. (2020) found that old age is a factor that supports adherence to taking antihypertensive medication. In his study, it showed that the odds ratio was 5.43, meaning that older patients (> 65 years) were 5.43 times more adherence to take medication. Older people are more obedient in taking medication because they fear disease symptoms and death (Rikmasari et al., 2020).

A majority of our respondents had hypertension for more than 10 years, so they had experienced feeling the discomfort of symptoms and knew how to solve them, but in this private Hospital Surabaya provides health education to patients every two weeks, so they frequently hear about the symptoms and complications of the disease. It was expected to increase their motivation to get healthy. But in the other hand in this study, there was respondent who have low adherence of medication. The reasons were because they

have felt healthy, preferring to take traditional medicines or other therapies if they have complaints, forgetting to take their medication being unable to afford medicine, and fear of medication's side effects. According to Listiana et al. (2020), the duration of hypertension is related to patients' anxiety levels.

Our results show that the majority of hypertension sufferers in the COVID-19 era at Private Hospital Surabaya had motivation in the high category (82.4%), indicating a strong internal and external drive to comply with taking hypertension medication. Motivation is defined as encouragement from within and outside an individual to comply with taking hypertension medication (Nakata et al., 2019). It has three main elements: needs, drives, and goals (Phillips & Guarnaccia, 2020). Needs occur when individuals experience an imbalance between what they have and what they expect. Drive is a matter of mental strength that is oriented toward fulfilling expectations or achieving goals (Lens & Vansteenkiste, 2020).

Goal-oriented drive is fundamental to motivation (Green et al., 2020), which is a predictor of adherence to therapeutic regimens and blood pressure control. Human motivation believes in the cognitive and goes through the process of thinking based on knowledge possessed by individuals, who will be motivated to pursue an action if it meets their purpose, plans, and expected results. Some research indicates that those with high motivation show positive results in hypertension management, such as improved participation in a physical exercise program and low reported depressive symptoms (Cartagena et al., 2021).

One factor that influences motivation is the desire to recover, as adherence to taking medication greatly affects the number of hypertension symptoms that reappear (Leventhal et al., 2020). Motivation comes from individuals to encourage behavior to fulfil needs and get satisfaction (Taylor, 2021). Intrinsic factors of motivation are personality, attitude, experience, education,

and hopes for the future (Duan et al., 2020). Higher education strengthens self-motivation for taking medication regularly and enhances positive behavior. The theory of motivation defines it as a drive to achieve certain goals that manifests in the form of behavior, while the behavior itself arises from a process involving human interaction with the environment.

This research found a relationship between motivation and adherence to medication, because patients who wish to have a strong desire to recover will take medication regularly. This contradicts Tania et al.'s (2019) finding that motivation does not influence the adherence to medication, because patients get tired of taking antihypertensive medication every day and they feel that taking medication everyday did not show the better condition. Hypertension sufferers may also believe that drugs cannot cure or eliminate hypertension, so motivation and self-efficacy can be increased by improving patients' knowledge through structured health education. Another way to improve adherence to medication is for family support to patients in managing and modifying their lifestyles. Family support has a big role in improving self-motivation and adherence to medication and preventing depressive symptoms. This is supported by research by Yeni et al. (2016), who found that family support was correlated with compliance in hypertensive patients ( $KD = R^2 = 61.8$ ). It means that family support affects compliance in hypertensive patients (61.8%) and 38.2% is influenced by other factors (Yeni et al., 2016).

This study found that the majority of hypertension sufferers in the COVID-19 era at Private Hospital Surabaya had an HLOC in the high category (75.7%). It showed that high locus of control can do the high adherence of medication. Frank et al. (2019) state that part of the drive to behave in a given way is determined by the environment and part by the individual. HLOC is a source of control that plays a role in supporting beliefs. HLOC is a source of control that plays a role in supporting beliefs (Afsahi &

Kachoei, 2020). Patients with hypertension who have an IHLC will have confidence that they have control over their own health and consequently will take responsibility for their health by complying with recommendations for stable blood pressure. Hypertensive patients at Private Hospital Surabaya during the pandemic perceived that their individual health was under their control. Humans have a locus of control or center as a person's belief to control the events. This study found that a majority of the respondents had a high level of adherence (77.0%). Compliance in taking hypertension medication in this case represents a person's level in carrying out a recommended rule or behavior (Zahroh et al., 2023). Medication adherence comprises following the right dose, method of drug administration, time of drug administration, and period of taking medication (Jain, 2020). We found that the majority of hypertension sufferers in our sample were very obedient in following the recommended rules and behaviors as described. The adherence of medication was one of the self-management for hypertension (Sadang et al., 2021).

While most of our respondents adhered to taking medication, 6.8% had low adherence. Possible causes of nonadherence in taking medication include incomplete information, information from health workers not being understood by the respondents, shame or fear about asking for repeated explanations (because the health workers explanation was not understood), and feeling fatigued in the process of treatment because taking medication requires regularity over a long period of time. Men are at greater risk of nonadherence to treatment than women because women are more patience than men in undergoing treatment.

The results of the Spearman's rank correlation test reveal a significant positive relationship between motivation and adherence to medication in patients with hypertension, with the correlation strength (R) value of 0.353. The positive sign obtained indicates correlation in the same direction, namely, the higher the motiva-

tion, the higher the adherence to taking medication. High motivation springs from a patient's need to achieve a goal, namely, to recover from illness, and from the patient's desire to undergo regular treatment. The relationship between patients' motivation and adherence to taking hypertension medication reveals differences in medication adherence in patients with high, medium, and low motivation. Patients with high motivation show high adherence to taking medication, and those with low motivation have a low level of adherence. Adherence to the treatment program is strongly influenced by self-motivation and self-awareness in complying with the treatment guidelines, as self-motivation to maintain health is very influential in patients' behavior in controlling their disease (Poulter et al., 2020). According to researchers, a person with strong motivation has positive expectations, high expectations, and high confidence in carrying out activities related to the problems faced, in this case the problem of treating hypertension. Individual motivation to maintain health strongly influences the behavior of patients in controlling their disease (West et al., 2018).

Individuals with a high health locus of control work hard to take action to heal, always seek solutions to problems, always think as effectively as possible, and perceive that recovery requires hard work (Charles, 2020). HLOC has two aspects, namely IHLC and EHLC. Individuals with a high HLOC desire to get better and make decisions to improve their health status (Boyd & Wilcox, 2020). Those with IHLC believe they have control over their health conditions, so they tend to be more responsible for health and comply with recommendations to increase the effectiveness of treatment. Those with EHLC believe that external factors influence their personal health; they do not feel involved or take full responsibility for the treatment process.

Individuals with a high locus of control believe that they can control their health conditions and tend to learn from previous experiences. Indi-



dual with a high HLOC will seek and analyze alternatives that can support their health status. HLOC is very important, because it can make a sense of responsibility for controlling the healthy and self-care. According to Suryani et al. (2021), males typically have a stronger IHLC than females, who tend to have an EHLC, as they have less perception of their health and are more prone to depression in comparison men (Ainiyah & Wijayanti, 2019). Women are sometimes busy taking care of the household, and a lack of motivation can affect women in maintaining control over their own health. An IHLC can prevent recurrence because attitude will prevent signs of hypertension from occurring (Ainiyah & Wijayanti, 2019).

Families can support adherence to taking medication regularly. Those with hypertension need family support to follow treatment that requires the long-term consumption of internal medicine. From a socioeconomic standpoint, the family can provide adequate information, a sense of security, and comfort in recovery so that sufferers can feel protected and focus on treatment. Family support also provides encouragement for patients to recover by undergoing therapy as recommended by a health professional. The patient has to live with the condition in the long term, but families supporting can make the treatment will be monitored (Wulandari & Puspita, 2019).

The results imply that hypertensive patients can better adhere to medication by increasing self-motivation and locus of control. The locus of control can be strengthened by controlling blood pressure regularly, knowing one's blood pressure, not using over-the-counter drugs, knowing the side effects of the drugs one is taking, and taking medication regularly and according to a doctor's advice. A limitation in this study was the limited number of samples taken because the data collection was conducted during an ongoing pandemic.

## Conclusion

The study confirmed a correlation of self-motiva-

tion and locus of control with medication adherence. Self-motivation can be strengthened by upgrading patient knowledge through structured health education and through social support, especially from the family. The locus of control can be improved by controlling blood pressure regularly, being aware of blood pressure, not using over-the-counter drugs, knowing about hypertension drugs, and using medication reminder alarms on a smartphone. The results of this study are expected to be a consideration for health services to provide counseling to hypertensive patients to remain compliant with treatment programs, provide important information to comply with the treatment process and can improve motivation in the treatment process.

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