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Health locus of control is associated with medication adherence among outpatients with type 2 diabetes mellitus in Jakarta, Indonesia

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Abstract

Background: The increasing number of patients with type 2 diabetes each year indicates that early and sustained diabetes management is essential, particularly adherence to antidiabetic medication. Medication adherence in patients can be influenced by various factors, one of which is health locus of control.

Purpose: To determine the relationship between health locus of control and medication adherence among outpatients with type 2 diabetes mellitus.

Method: A cross-sectional design was applied. Participants were recruited through purposive sampling, yielding a total of 103 respondents. Data were collected using structured questionnaires and analyzed with descriptive statistics and Spearman's rho correlation test.

Results: Analysis revealed a significant correlation between health locus of control dimensions and medication adherence. The chance health locus of control dimension demonstrated the strongest association, with a moderate correlation coefficient ($r = 0.453$, $p = 0.001$). Internal health locus of control showed a weaker correlation ($r = 0.296$, $p = 0.004$), while the powerful others dimension also exhibited a weak correlation ($r = 0.296$, $p = 0.002$).

Conclusion: Among the three dimensions, chance health locus of control showed the largest observed correlation with medication adherence, showing a moderate correlation with medication adherence. These findings suggest that interventions should prioritize enhancing patients' awareness of controllable health factors to strengthen adherence to antidiabetic therapy.

Keywords: Health Locus of Control; Medication Adherence; Type 2 Diabetes Mellitus.

INTRODUCTION

Indonesia is currently facing a triple burden of disease in society, which includes not only communicable diseases that cause public health problems, but also a growing increase in non-communicable diseases and health issues arising from the interaction between the two (Listrikawati & Harti, 2021). One noncommunicable disease whose incidence continues to increase annually is Diabetes Mellitus (DM) (Febriany, 2023). Type 2 diabetes is the most common form of diabetes; it is characterized by a condition in which the body's cells lose sensitivity to the hormone insulin, disrupting blood glucose regulation, a condition known as insulin resistance (Nugroho, Ernawilis, Suheti, & Syamlan, 2023).

Global studies indicate that the prevalence of diabetes among the productive to elderly age group (20-79 years) reached 10.5% in 2021, equivalent to 536.6 million individuals. Projections show a significant increase, with an estimated 12.2% or 783.2 million people expected to be living with diabetes by 2045 (Sun, Saeedi, Karuranga, Pinkepank, Ogurtsova, Duncan, & Magliano, 2022). Indonesia, as one of the most populous countries, has also experienced a significant rise in diabetes cases. In fact, Indonesia ranks sixth worldwide in terms of the number of people with diabetes, and this number is predicted to continue increasing substantially over the

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coming decades, reaching 16.7 million people by 2045 according to the IDF (Harsismanto, Padila, Andri, Sartika, & Andrianto, 2021). The prevalence of diabetes mellitus in Jakarta Hospital, based on medical record data, shows a high number of visits by patients with type 2 diabetes mellitus at the Internal medicine outpatient clinic, with 1,365 patients recorded in October 2024.

Considering the increasing number of individuals with type 2 diabetes each year, early treatment is crucial to prevent dangerous complications such as kidney, nerve, eye, and foot damage. Lifestyle modifications and pharmacological therapy are required to achieve long-term blood glucose control (Triastuti, Irawati, Levani, & Lestari, 2020). However, long-term treatment regimens are often unsuccessful, as patients with type 2 diabetes mellitus frequently experience boredom and fatigue in adhering to therapies recommended by healthcare providers (Sutomo & Purwanto, 2023). Non-adherence to diabetes treatment remains a serious problem in the management of diabetes mellitus (Rismawan, Handayani, & Rahayuni, 2023). A large number of diabetes patients worldwide, including those in developed countries, do not adhere to prescribed medications; approximately 50% of patients fail to continue long-term treatment. With 75.5% of its population demonstrating low medication adherence, Jakarta is the province with the highest prevalence of diabetes mellitus in Indonesia (Prabhawaty & Herlina, 2023).

There are four components that influence patient adherence to treatment: patients' understanding of treatment instructions, the quality of patient-doctor interactions, social and family support, and patients' attitudes and psychological beliefs (such as locus of control and memory) (Nuraini, Salam, & Ro'isah, 2023).

The Health Locus of Control theory, adapted by Wallston from Rotter's social learning theory developed in the 1960s, discusses health-related phenomena as the degree to which individuals believe they can control their health behaviors, either due to internal factors or external influences (Banowo, 2023; Wallston, Wallston, & DeVellis, 1978).

Health locus of control consists of three main dimensions: internal health locus of control (IHLC), chance health locus of control (CHLC), and powerful others health locus of control (PHLC). Individuals with an IHLC believe that their health is determined by their

own actions, making them more likely to adhere to health management behaviors. Individuals with a CHLC believe that illness is a matter of fate, resulting in poor adherence to health maintenance. Conversely, individuals with a PHLC tend to depend on others and seek help when experiencing illness or health complaints. Health locus of control plays an important role in an individual's treatment adherence (Anggriani, Rudini, & Oktarina, 2024).

Adherence to medication is a crucial component of therapeutic success, and individual beliefs can influence adherence to antidiabetic medication regimens. Based on these considerations, the researcher is interested in conducting a study entitled "The Relationship between Health Locus of Control and Medication Adherence among Patients with Type 2 Diabetes Mellitus at the Jakarta Hospital."

RESEARCH METHOD

This quantitative study employed an analytic correlational design with a cross-sectional approach to investigate the relationship between health locus of control and medication adherence among patients with type 2 diabetes mellitus (T2DM). The study was conducted at Jakarta Hospital in December 2024. Ethical approval was obtained from the Health Research Ethics Committee of STIKes RSPAD Gatot Soebroto (Approval No. 002831/STIKes RSPAD Gatot Soebroto/2024). All participants provided written informed consent before enrollment.

The target population consisted of 1,365 patients diagnosed with T2DM. The required sample size was calculated using the Yamane formula (Yamane, 1967), with an additional 10% added to account for potential nonresponse or incomplete questionnaires, resulting in a final sample of 103 participants. Participants were recruited using purposive sampling.

Eligible participants were adults aged 30–80 years who had been diagnosed with T2DM for at least one year and were willing to participate in the study. Patients with impaired consciousness, severe diabetes-related complications that prevented participation, or those who declined participation were excluded.

The independent variable was health locus of control, while the dependent variable was medication adherence. Health locus of control was assessed using the Multidimensional Health Locus of Control

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(MHLC) Form A developed by Wallston and Wallston (1981). The instrument comprises three subscales: Internal Health Locus of Control, Chance Health Locus of Control, and Powerful Others Health Locus of Control.

Medication adherence was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8) developed by Morisky et al. (2008). The MMAS-8 is a widely used self-report instrument for assessing adherence to prescribed medication regimens among patients with chronic diseases.

Data were collected during outpatient visits in December 2024. After confirming eligibility and obtaining written informed consent, participants completed a structured questionnaire consisting of demographic information, the MHLC Form A, and the

MMAS-8. Trained research assistants were available to provide clarification when necessary while ensuring that participants completed the questionnaires independently.

Data were analyzed using descriptive and inferential statistics. Descriptive statistics were used to summarize participants' demographic and clinical characteristics, as well as scores for health locus of control and medication adherence. Because the variables were not normally distributed, the association between health locus of control and medication adherence was examined using Spearman's rank correlation coefficient (Spearman's rho). Statistical significance was set at $p < 0.05$. All statistical analyses were performed using IBM SPSS Statistics.

RESEARCH RESULTS

Table 1. Characteristics of Respondents (N = 103)

Variable	Results
Age (Mean $\pm$ SD)(Range)(Year)	(49.20 $\pm$ 11.97) (30–78)
Age (n/%)	
Early adulthood 30–35	22/21.36
Late adulthood 36–45	26/25.24
Early elderly 46–55	27/26.21
Late elderly 56–65	20/19.42
Senior age > 65	8/7.77
Gender (n/%)	
Male	41/39.81
Female	62/60.19
Occupation (n/%)	
Civil servant	8/7.77
Housewife	40/38.83
Trader	47/45.63
Soldier	8/7.77
Education Level (n/%)	
Elementary school	11/10.68
Junior/Senior high school	54/52.43
Bachelor's degree	38/36.89
Duration of Diabetes (n/%)	
1-5 Years	76/73.79
More than 5 Years	27/26.21

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Variable	Results
Internal Health Locus of Control (n/%)	
High	64/62.14
Moderate	37/35.92
Low	2/1.94
Chance Health Locus of Control (n/%)	
High	34/33.01
Moderate	64/62.14
Low	5/4.85
Powerful Others Health Locus of Control (n/%)	
High	39/37.86
Moderate	64/62.14
Medication Adherence (n/%)	
High	33/32.04
Moderate	57/55.34
Low	13/12.62

Table 1 indicates that the largest proportion of respondents were aged 46–55 years (26.21%), predominantly female (60.19%), engaged in trading occupations (45.63%), and had attained junior or senior high school education (52.43%). Most participants had been living with diabetes for 1–5 years (73.79%). In terms of health locus of control, the majority demonstrated a high internal orientation (62.1%; 64 individuals), a moderate chance orientation (62.1%; 64 individuals), and a moderate powerful others orientation (62.14%; 64 individuals). With respect to medication adherence, most respondents with type 2 diabetes mellitus fell within the moderate category (55.34%; 57 individuals).

Table 2. Distribution of Health Locus of Control and Medication Adherence (N=103)

Variable	Mean $\pm$ SD	Minimum–maximum
Internal HLC	1.40 $\pm$ 0.530	1-3
Chance HLC	1.72 $\pm$ 0.550	1-3
Powerful Others HLC	1.71 $\pm$ 0.554	1-3
Medication Adherence	1.81 $\pm$ 0.643	1-3

Table 2 summarizes the distribution of mean scores across the measured variables. The Internal Health Locus of Control demonstrated a mean of 1.40 (SD = 0.530), with observed values ranging from 1 to 3. The Chance Health Locus of Control yielded a mean of 1.72 (SD = 0.550), also within the range of 1 to 3. Similarly, the Powerful Others Health Locus of Control recorded a mean of 1.71 (SD = 0.554), with minimum and maximum values of 1 and 3, respectively. In relation to medication adherence, medication adherence exhibited a mean of 1.81 (SD = 0.643), with scores spanning from 1 to 3.

Table 3. Correlations Between Health Locus of Control Dimensions and Medication Adherence

Health locus of control/ Medication adherence	Correlation Coefficient	p-value
Internal health locus of control	0.281	0.004
Chance health locus of control	0.453	0.001
Powerful others health locus of control	0.296	0.002

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The Spearman correlation analysis revealed that the Chance Health Locus of Control dimension was significantly associated with medication adherence, demonstrating a positive correlation of moderate strength ($r = 0.453$, $p < 0.001$). Significant associations were also observed for the other dimensions of health locus of control. The Internal Health Locus of Control (IHLC) showed a weak but significant positive correlation with adherence ($r = 0.281$, $p = 0.004$), while the Powerful Others Health Locus of Control (PHLC) likewise exhibited a weak yet significant positive correlation ($r = 0.296$, $p = 0.002$).

DISCUSSION

Overview of the Characteristics of Respondents

Demographic characteristics contribute to medication adherence and health locus of control among patients with type 2 diabetes mellitus. Age influences adherence because older patients tend to have a greater perception of the risk of complications, supported by their experience in managing the disease and understanding the importance of treatment. Regarding gender, women are more likely to adhere to medication because they tend to be more proactive in seeking health information and undergoing regular medical check-ups. Educational level is associated with both medication adherence and health locus of control, as higher education improves patients' health literacy (Ningrum, 2020; Jannah, Bahri, & Fitriani, 2025).

The duration of diabetes also affects medication adherence and health locus of control. However, some patients may experience treatment fatigue due to long-term therapy, which can reduce adherence (Jannah et al., 2025).

Employment status and educational level further influence adherence and health locus of control. Employment is closely related to income level, access to healthcare services, time flexibility for routine follow-up visits, and the ability to obtain health information. These factors ultimately affect medication adherence and the development of a positive health locus of control (Haskas & Suryanto, 2019; Jannah et al., 2025).

Overview of Health Locus of Control

Health locus of control consists of three dimensions: Internal Health Locus of Control (IHLC), Chance Health Locus of Control (CHLC), and Powerful Others Health Locus of Control (PHLC). The study results indicate that the CHLC dimension was

more dominant than IHLC and PHLC. A total of 64 respondents (62.14%) were in the moderate category, indicating that health is perceived as being influenced by fate, luck, or chance factors (Hati, Fadillah, & Pase, 2021).

Individuals with CHLC tend to adopt a more passive attitude toward maintaining their health. They show less initiative, rarely seek information, and make limited efforts because they believe that health is beyond personal control (Arsad, Dungga, Hunawa, & Kidamu, 2023). This finding is consistent with the theory stating that individuals with a chance locus of control believe that doctors, medications, or coincidental events play a greater role in determining their health condition (Botha & Dahmann, 2024).

In the IHLC dimension, most respondents also demonstrated high scores, with 64 individuals (62.14%). Patients with high IHLC show better medication adherence because they believe disease progression can be controlled by themselves (Ansyar & Abdullah, 2022). Awareness and an optimistic attitude toward health encourage individuals to take better care of their health (Fang, Gao, Sun, Gao, Wang, & Hu, 2024).

Meanwhile, in the PHLC dimension, 64 respondents (62.1%) were in the moderate category. PHLC reflects the belief that health is determined by the role of others, such as healthcare professionals (Wallston & Wallston, 1981). Individuals with high PHLC are at risk of lower adherence if they do not receive support from trusted individuals (Pasha, Selfiana, & Fatin, 2023). However, other studies have shown that PHLC and IHLC may also be positively associated with medication adherence under certain conditions (Bąk-Sosnowska, Gruszczyńska, Wyszomirska, & Daniel-Sielańczyk, 2022).

Overview of Medication Adherence

The results showed that the majority of patients with type 2 diabetes mellitus had a moderate level of medication adherence, with 57 respondents (55.34%). This finding indicates that challenges remain in maintaining consistent and optimal medication use.

Medication adherence is defined as an individual's ability to follow medication rules and usage instructions as recommended by healthcare professionals. Adherence is a crucial factor in

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successful diabetes management, in addition to appropriate drug selection, correct dosage, and the adoption of a healthy lifestyle (Widiyoga, Saichudin, & Andiana, 2020).

Other studies have reported similar findings, where most respondents demonstrated a moderate level of adherence (55.60%) (Ariani, Alfian, & Prihandiwati, 2022). These findings emphasize that additional interventions are still required to improve patients' adherence to regular medication use.

Outpatients tend to have lower adherence levels because their clinical condition is perceived as more stable. This situation may lead patients to forget or neglect their medication obligations, potentially affecting the success of long-term therapy.

Relationship between Health Locus of Control and Medication Adherence

The analysis revealed a significant relationship between chance health locus of control and medication adherence ($p < 0.001$), with a correlation coefficient of 0.453, which falls into the moderate category. This indicates that the stronger an individual's belief in the role of fate or luck, the higher their adherence to taking medication for type 2 diabetes.

Compared to the IHLC and PHLC dimensions, CHLC showed a stronger correlation. Individuals with high CHLC tend to feel that they have little control over their health, leading them to rely more heavily on medication as the primary means of maintaining their health condition (Hati et al., 2021).

Further analysis showed a weak but significant relationship between PHLC and medication adherence (Sig = 0.002; $r = 0.296$). Individuals with strong trust in healthcare professionals may demonstrate adherence; however, their consistency is highly dependent on support and supervision from trusted parties (Pasha et al., 2023). In certain contexts, external influence from authoritative figures can encourage better health behaviors.

In the IHLC dimension, a weak but significant positive relationship with medication adherence was also found (Sig = 0.004; $r = 0.281$). Individuals with internal control tend to actively seek information and make health-related decisions (Ekayani, Widyastuti, & Indahari, 2021). However, other studies suggest that excessively high internal control in older adults may

reduce adherence due to increased stress and an excessive desire for control (Bąk-Sosnowska et al., 2022). Overall, CHLC was the most influential dimension affecting medication adherence in this study.

CONCLUSION

All three health locus of control dimensions were significantly associated with medication adherence among outpatients with type 2 diabetes mellitus. Chance health locus of control showed the largest observed correlation coefficient. However, the cross-sectional design does not establish causality. Further studies using multivariable and longitudinal analyses are needed to clarify the contribution of health beliefs to medication adherence.

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