Illness Perception in Adult Patients with Diabetes Mellitus in Surabaya: A Cross-Sectional Study

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ABSTRACT Disease perception is a factor that affects self-care practices, psychological distress, and other health outcomes in people living with diabetes mellitus (DM). A positive perception of the disease can affect the patient's self-care and health status. This study aims to determine the correlation between characteristic factors and illness perception in patients with DM. This study was correlational research with a cross-sectional approach. The sample size was 175 adult patients with DM recruited from 4 health centres in Surabaya in July–August 2024 using a simple random sampling technique. Data analysis uses linear regression with a significance level of 0.05. This study shows that most (59.42%) patients with DM have a high illness perception. The factors that had a positive correlation with illness perceptions were age (p=0.021), disease history (p=0.027), and comorbidity (p=0.023). Age, disease history, and comorbidities are factors that are positively correlated with illness perception. This requires vigilance for patients at risk of DM, so they are conditioned to perceive the disease positively. As part of health workers, nurses must provide continuous education and counselling about patients' diseases.

INDEX TERMS: Comorbidity, Diabetes Mellitus, Illness Perception, Self Care.

I. INTRODUCTION

An estimated 537 million adults aged 20-79 worldwide (10.5% of all adults in this age group) have diabetes mellitus (DM). By 2030, 643 million, and by 2045, 783 million adults aged 20-79 are projected to live with diabetes [1]. Often, DM disease goes undetected, most of the affected population is unaware of their DM status, and many people with diabetes are unaware of the complications they are experiencing due to uncontrolled blood glucose levels [2][3][4]. Furthermore, the WHO linked T2DM to kidney failure, heart attack, stroke, and blindness, in addition to 1.6 million deaths in 2016 due to high blood glucose. The prevalence is higher in older adults and patients with high blood glucose, and other risk factors for T2DM include lack of physical activity, unhealthy diet, high body mass index (BMI) or weight, and smoking [5][6].

Effective self-management of type-2 diabetes mellitus (T2DM) is essential for reducing the risk of diabetes-specific complications, such as hypertension, amputation, nephropathy, neuropathy, retinopathy, cardiovascular disease, impotence, and skin lesions. Self-management activities include adherence to dietary and nutritional advice, physical activity, taking medication as prescribed, and weight and stress management [7]. In addition, foot self-care

management is also an essential part of the process because it can prevent the development of diabetic foot ulcers (DFU) [8].

Many factors affect the implementation of DM management, including the patient's psychological condition. Research that describes the psychological condition of patients with DM that affects patient self-care is self-efficacy, self-confidence, diabetes distress, and illness perception. This psychological condition can affect DM patients in managing their disease and preventing complications [9] [10] [11][12]. Illness perception has been identified in several studies as a significant factor influencing self-care practices, psychological distress, and other health outcomes in people living with T2DM. The perception of the disease constantly evolves and adjusts as the patient goes through the daily life experience, especially with chronic diseases. Patients may have very different perceptions of the same disease and respond with other behaviors, resulting in different outcomes [13]. The relationship between illness perception and health outcomes can be explained by involvement in self-care practice involving complex decision-making that relies on the patient's representation of their disease in terms of controllable, understood, curable, cyclical, and severe [7].

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Broadbent et al. [14] found that the perception of patients with diabetes affects their adherence to medication, diet, and exercise.

Li et al. (2020) [15] consider the perception of disease as a source of depressive symptoms among patients with both types of diabetes. Patients develop negative beliefs about their ability to cope with symptoms and the severity of complications arising from the condition. Perceptual traits may influence overall compliance behaviour among patients with T2DM. The impact of disease perception is not limited to overall disease perception, as other researchers have found specific domains, such as timeline, control, severity, and coherence of disease, to predict diabetic self-care practices among a sample of diabetic patients in developed countries [16].

Existing research shows that Illness perception affects adherence to treatment, diet, and exercise, which is part of self-care [17][14]. In addition, some studies also show that illness perception affects self-regulation [18]. Because Illness perception significantly affects the implementation of self-care, patients must have a positive perception of their illness and take care of it. Research on factors related to illness perception is still minimal, so this study will explore it. Factors that can be suspected to be related to illness perception are age, gender, duration, disease history, regularity of medication, random blood sugar levels, and comorbidities. If these factors can be recognized early, the possibility of negative perceptions can be immediately overcome, so that health workers can motivate patients to continue self-care regularly and adequately.

This study aims to determine the correlation between characteristic factors and illness perception in patients with DM. Based on distinguishing factors, this research is needed to immediately change the patient's negative perception of the disease at the beginning of the disease course to accelerate recovery.

II. METHODE

A. STUDY DESIGN
This study uses a correlational analysis design with a cross-sectional approach. This study explains several factors related to illness perception in patients with DM. Factors suspected to be related to illness perception are age, gender, duration, disease history, medication regularity, random blood sugar levels, and comorbidities, further referred to as independent variables. In contrast, illness perception is referred to as a dependent variable.

B. POPULATION AND SAMPLE
This study focuses on adult DM patients. The research sample consisted of 175 people determined using a formula and taken from the Community Health Centre in Surabaya using a simple random sampling technique, where every patient who comes to the community health centre has an equal opportunity to be selected as a respondent. The inclusion criteria for selecting the sample were patients > 30

years old, exposed to DM for more than 1 year, and able to read and write. Exclusion criteria were patients with DM who were pregnant, had mental disorders, or had aphasia.

This study shows that most patients have a high perception of illness. This means that the patient has an awareness of the condition of the disease he is carrying. This study identified eight illness perception domains: consequences, time, personal control and care, identity, attention, understanding, and emotional response. The description of illness perception in this study shows that the indicators that most patients have a high perception of are Consequence, Identity, Concern, and Emotional Response. Meanwhile, timeline, personal control, treatment control, and coherence indicators all have low perception.

This study shows that DM patients' age factors, disease history, and comorbidities significantly relate to illness perception. For patients of older age, these factors can be explained by various concepts. The age factor found that older patients tended to have a higher perception of illness.

C. DATA COLLECTION PROCEDURES
The study was conducted in the Community Health Centres in Surabaya City. The data collection period is from June to August 2024. All patients who met the inclusion criteria were recruited as study respondents. Next, they explained the research's objectives, benefits, and procedures. Patients willing to voluntarily become respondents were asked to complete a willingness form. If, during the study period, the patient wishes to resign for some reason, then the researcher is welcome.

D. INSTRUMENTATION OR TOOLS
Data collection used a questionnaire containing data on the characteristics of patients with DM and Illness Perception. Characteristic data consisted of age, gender, history, duration, taking medication, blood glucose levels, and comorbidities. The Disease Perception Questionnaire is modified from the B-IPQ, developed by Broadbent et al. (2006) [19]. Used to assess the perception of disease of patients with DMT2 in Indonesia. Illness perception in this study uses 8 question items and has eight domains: consequences, time (timeline), personal control, care control, identity, attention, coherence/understanding, and emotional response. The question items in this instrument have passed a Cronbach's Alpha validity test of 0.85 and a reliability test with values from 8 domains in sequence of 0.767, 0.582, 0.719, 0.460, 0.626, 0.751, 0.794, and 0.723.
The score of each question uses a Likert scale from a score range of 0 to 10, where a higher score in each domain reflects a more disease-threatening view in that domain. Based on the results, the score is categorised as low if < mean and high if ≥ mean. The analysis of the research data used a frequency distribution table.

E. DATA ANALYSIS
Linear regression was used to analyze the relationship between age, gender, medical history, duration of treatment, blood glucose levels, and comorbidities with disease

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perception. The research data must meet the requirements of the linear regression test, namely, normality and linearity. These factors indicate a relationship if the significance value is less than 0.05 or the calculated t value is greater than the t table (1.98).

F. ETHICAL APPROVAL
The Health Research Ethics Commission has approved this study No. EA/2288/KEPK Poltekkes Sby/V/2024. The data collection procedure was explained to the respondents, and their written consent was obtained.

III. RESULTS

A. DESCRIPTION OF ILLNESS PERCEPTION
The number of successfully recruited respondents was 175 adult patients with DM. The description of illness perception in this study shows that the indicators that show that more than the majority (> 60%) of patients have a high perception are Consequence (70.86%), Identity (62.86%), Concern (64.57%), and Emotional Response (69.71%). Meanwhile, the indicators of the timeline (45.71%), personal control (40.57%), treatment control (41.71%), and coherence (44%) show values that must be watched out for interfering with self-care because almost all of them have low perception values (TABLE 1).

TABLE 1
Description of illness perception

Indicator	Category	Frequency	Percentage
Consequence	High	124	70.86
	Low	51	29.14
Timeline	High	95	54.29
	Low	80	45.71
Personal Control	High	104	59.43
	Low	71	40.57
Treatment Control	High	102	58.29
	Low	73	41.71
Identity	High	110	62.86
	Low	65	37.14
Concern	High	113	64.57
	Low	62	35.43
Coherence	High	98	56.00
	Low	77	44.00
Emotional Response	High	122	69.71
	Low	53	30.29

B. CHARACTERISTICS OF DIABETES MELLITUS PATIENTS AND ILLNESS PERCEPTIONS
The characteristic data that can be described are the age of the participants in this study, most (54.29%) ≥ 60 years, and 73.14% are female. Duration of suffering from DM 43.43% ≥ 6 years, 37.14% have a family history, 76% routinely take medication, 72% have random glucose levels ≥ 200 mg / dL, and 58.86% have comorbidities. Cross-tabulation between characteristics and illness perception shows that almost all patients (40.57%) have low illness perception. The highest percentage of low illness perception (30.86%) is owned by patients who do not have a history of heredity. Furthermore, in sequence, patients who have low illness perception are patients who have blood sugar levels > 200 mg / dL

(29.14%), patients who are on regular medication (29.14%), patients who are > 60 years old (26.86%), and women (26.86%) (TABLE 2).

TABLE 2
Cross-tabulation of characteristics of diabetes mellitus patients with illness perceptions

Characteristics	Illness Perception				Total	
	Low		High			
	f	%	f	%	f	%
Age (years)						
< 60	24	13.71	56	32.00	80	45.71
≥ 60	47	26.86	48	27.43	95	54.29
Gender						
Male	24	13.71	23	13.14	47	26.86
Female	47	26.86	81	46.29	128	73.14
Duration of DM (years)						
<6	42	24.00	57	32.57	99	56.57
≥ 6	29	16.57	47	26.86	76	43.43
History of heredity						
Yes	17	9.71	48	27.43	65	37.14
No	54	30.86	56	32.00	110	62.86
Taking medication						
Regular	51	29.14	82	46.86	133	76.00
Irregular	20	11.43	22	12.57	42	24.00
Random blood glucose (mg/dL)						
≤200	20	11.43	28	16.00	48	27.43
>200	51	29.14	76	43.43	127	72.57
Comorbid						
Yes	35	20.00	68	38.86	103	58.86
No	36	20.57	36	20.57	72	41.14

C. ANALYSIS OF FACTORS RELATED TO ILLNESS PERCEPTION
The analysis showed that age factors, a family history of diseases, and comorbidities were related to illness perception. This is indicated by the significance value of > 0.5, which is 0.021, 0.027, and 0.023, respectively (TABLE 3).

TABLE 3
Analysis of factors related to illness perception

Characteristic	Exp(B)	95% Confidence Interval	Wald (t)	Sig.
Age	0.440	0.219-0.883	5.333	0.021
Gender	1.491	0.726-3.062	1.185	0.276
Duration of DM	1.320	0.667-2.613	0.637	0.425
History of heredity	0.447	0.219-0.914	4.863	0.027
Taking medication	0.626	0.297-1.319	1.518	0.218
Random blood glucose	0.991	0.474-2.072	0.001	0.981
Comorbid	2.163	1.114-4.197	5.199	0.023

IV. DISCUSSION
When dealing with a disease, patients usually create an image of the disease and its treatment process in their minds, which

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is defined as illness perception [18]. Illness perception significantly influences an individual's lifestyle and behavior in managing their illness. This concept effectively improves behavioral change and health outcomes [20].

This study shows that most patients have a high perception of illness. This means that the patient has an awareness of the condition of the disease he is carrying. This study identified eight illness perception domains: consequences, time, personal control and care, identity, attention, understanding, and emotional response. The description of illness perception in this study shows that the indicators that most patients have a high perception of are Consequence, Identity, Concern, and Emotional Response. Meanwhile, timeline, personal control, treatment control, and coherence indicators all have low perception.

This study shows that DM patients' age factors, disease history, and comorbidities significantly relate to illness perception. For patients of older age, these factors can be explained by various concepts. The age factor found that older patients tended to have a higher perception of illness.

This low perception of the disease must be watched out for because it can affect diabetes self-care behavior. Based on research by Eshete et al. (2023) [17] several disease perception domains were significantly related to treatment adherence. These domains include acute/chronic timeline perception, diabetes consequence perception, personal control perception, and emotional representation perception. Illness perceptions include perceived symptoms associated with the condition (identity), beliefs about the timeline of the condition, its consequences, perceived ability to control the condition and the extent to which treatment is effective in preventing the condition, understanding or understanding of the condition, emotional responses and concerns about the condition, and beliefs about possible causes of the condition [21]. Chronically ill individuals most often formulate perceptions about their illness through their experience of bodily symptoms, previous experience with the disease, and information they have gathered from trusted individuals such as family, friends, and healthcare professionals [21]. Illness perceptions describe the disease and its treatment process created by patients in their minds when dealing with a disease. Some factors that can affect a person's perception of the disease are poor blood sugar control, the length of treatment, the presence or absence of complications causing emotional reactions, and disturbances in self-management. In other words, patients living with diabetes perceive their disease as a threat, and this belief leads to poor perception of the disease and, ultimately, depression. How people perceive a disease (disease perception) plays a role in adapting to their illness. Therefore, assessment of disease perception in such patients should be considered part of health services [18].

Treatment control in this study showed that some patients had low nursing control. This condition is one of the domains of illness perception that must be considered because of the possibility of a low relationship between patients and doctors or health workers in managing their disease. Based on the results of existing research, it is shown that the ability of

doctors to empathize with patients is essential to research because it is known that empathetic doctors will get greater satisfaction in their work, thereby reducing the risk of burnout. In contrast, patients who feel understood will have more trust in doctors and increased compliance [22].

This study's results align with other studies that show that age is correlated with illness perception [23]. Illness perceptions do not change with age or worsen disease severity, but disease perceptions can develop during aging [24]. Older age is often known to have a clear relationship with medication adherence [25][26]. A similar study showed a positive correlation between illness perception and medication adherence in older patients with hypertension [27]. This can be explained by the fact that increasing age shows readiness to accept and adapt to the disease.

Patients with a family history of illness have a higher illness perception than those who do not. The most commonly indicated factors that influence the onset and development of T2DM are hereditary and genetic, stress and other psychological pressures, and poor and inadequate nutrition [28].

In this study, most of them had comorbidities with DM. This result is supported by other studies that also show the same thing: Patients with DM who have comorbidities have a higher perception of illness than those who do not. This can be explained because patients with DM who have comorbidities feel that their illness will last for a long time, affect their lives, experience many symptoms other than the symptoms of DM, need treatment forever, and feel worried about their condition. The perception of illness is more negative when a person has more diseases and is more dependent, which in turn affects their quality of life [28]. Based on these factors, patients can be helped to manage their perception of the disease, and they must manage their disease properly.

This research has several limitations. First, the researchers obtained illness perception and characteristic data through direct reports from patients rather than through direct observation. Second, data were obtained through cross-sectional surveys. For the above reasons, patients with DM must get the correct information to understand it effortlessly. This study shows that patients with DM must be directed to have a positive illness perception so that they accept their condition and can manage their disease well. Collaboration between nurses and other teams of healthcare professionals is still needed to achieve successful DM management.

Future research could explore psychosocial factors that influence illness perception. Another interesting research area to be developed is effective educational and intervention strategies, such as psychological counseling programs or disease management training, to increase patients' favorable perception of their disease.

V. CONCLUSION

Illness perception in DM patients still requires a therapeutic approach to controlling the disease. The low perception of

diabetes can interfere with the patient's psychological condition in managing his disease. Age factors, family history of diseases, and comorbidities are factors that are positively correlated with illness perception. This must be vigilance for patients at risk of DM, so they are conditioned to perceive the disease positively. As part of health workers, nurses must provide continuous education and counselling about patients' diseases.

REFERENCES

[1] International Diabetes Federation, *IDF Diabetes Atlas 10th edition*, 10th ed. 2021.

[2] F. Hadaegh, M. R. Bozorgmanesh, A. Ghasemi, H. Harati, N. Saadat, and F. Azizi, "High prevalence of undiagnosed diabetes and abnormal glucose tolerance in the Iranian urban population : Tehran Lipid and Glucose Study," vol. 2, pp. 4–10, 2008, doi: 10.1186/1471-2458-8-176.

[3] R. Safari-faramani *et al.*, "Prevalence, Awareness, Treatment , Control, and the Associated Factors of Diabetes in an Iranian Kurdish Population," *J. Diabetes Res.*, vol. 2019, pp. 1–9, 2019, doi: https://doi.org/10.1155/2019/5869206 Research.

[4] F. Moradpour, S. Rezaei, B. Piroozi, G. Moradi, and Y. Moradi, "Prevalence of prediabetes , diabetes , diabetes awareness , treatment , and its socioeconomic inequality in west of Iran," *Sci. Rep.*, pp. 1–11, 2022, doi: 10.1038/s41598-022-22779-9.

[5] P. A. M *et al.*, "Colombia Médica Clinical practice guideline for the prevention , early detection , diagnosis , management and follow up of type 2 diabetes mellitus in adults," vol. 47, 2016.

[6] S. Alharbi and A. Alhofaian, "Illness Perception and Medication Adherence among Adult Patients with Type 2 Diabetes Mellitus : A Scoping Review," pp. 71–83, 2023.

[7] N. Kugbey, K. O. Asante, and K. Adulai, "Illness perception, diabetes knowledge and self-care practices among type-2 diabetes patients: a cross - sectional study," *BMC Res. Notes*, pp. 1–7, 2017, doi: 10.1186/s13104-017-2707-5.

[8] A. Joeliantina, D. A. Norontoko, A. A. Adinata, A. Ragayasa, and I. N. Hamid, "Self-care of chronic illness prevents the risk of diabetic foot ulcers in patients with diabetes: a cross-sectional study," *J. Ners*, vol. 19, no. 1, pp. 39–46, 2024, doi: 10.20473/jn.v19i1.48387.

[9] A. Joeliantina, "Self-Efficacy of Patients with Type 2 Diabetes Mellitus Who Consume Herbs," *Heal. Notions*, vol. 5, no. 7, pp. 242–247, 2021.

[10] J. German *et al.*, "Factors Associated With Diabetes Distress Among Patients With Poorly Controlled Type 2 Diabetes," *J. Endocr. Soc.*, vol. 7, no. 5, pp. 1–8, 2023, doi: 10.1210/jendso/bvad031.

[11] A. Joeliantina, D. A. Norontoko, S. H. Wuryaningsih, and Padoli, *Self-confidence and Foot Self-care Behavior in Patients with Diabetes Mellitus: A Cross-sectional Study*, no. ICoHPS. Atlantis Press International BV, 2023.

[12] M. de Groot, S. H. Golden, and J. Wagner, "Psychological Conditions in Adults With Diabetes Mary," *Am Psychol.*, vol. 71, no. 7, pp. 552–562, 2016, doi: 10.1037/a0040408.Psychological.

[13] K. J. Petrie, D. Taylor, C. Paton, and K. R. T. Maudsley, "Why illness perceptions matter," vol. 6, no. 6, pp. 536–539, 2006.

[14] E. BROADBENT, L. I. D. Onkin, and JULIA C. STROH, "Illness and Treatment Perceptions Are Associated With Adherence to Medications, Diet, and Exercise in Diabetic Patients," vol. 34, no. September 2010, pp. 2010–2012, 2011, doi: 10.2337/dc10-1779.

[15] J. Li *et al.*, "Relationship between Illness Perception and Depressive Symptoms among Type 2 Diabetes Mellitus Patients in China : A Mediating Role of Coping Style," *Hindawi J. Diabetes Res.*, vol. 2020, 2020.

[16] A.-R. Abubakari, M. C. Jones, W. Lauder, A. Kirk, J. Anderson, and D. Devendra, "- Associations between knowledge illness perceptions self-management and.pdf," *J Nur Heal. Chron Illn.*, vol. 3, no. 3, pp. 245–256, 2011, doi: 10.1111/j.1752-9824.2011.01098.x.

[17] A. Eshete *et al.*, "Association between illness perception and medication adherence in patients with diabetes mellitus in North Shoa, Zone: cross-sectional study," *Front. Public Heal.*, vol. 11, no. December, 2023, doi: 10.3389/fpubh.2023.1214725.

[18] F. Abdollahi, H. Bikdeli, S. M. Zeabadi, R. R. Sepasi, R. Kalhor, and S. A. Motalebi, "Predicting role of illness perception in treatment self-regulation among patients with type 2 diabetes," *J. Prev. Med. Hyg.*, vol. 63, no. 4, pp. E604–E610, 2022, doi: 10.15167/2421-4248/jpmh2022.63.4.2727.

[19] E. Broadbent, K. J. Petrie, J. Main, and J. Weinman, "The Brief Illness Perception Questionnaire," vol. 60, pp. 631–637, 2006, doi: 10.1016/j.jpsychores.2005.10.020.

[20] J. Tang and A. Teacher, "Illness perceptions among patients with type 2 diabetes mellitus : A cross-sectional study," no. June, pp. 1–10, 2019, doi: 10.1111/ijn.12801.

[21] A. L. van Puffelen, M. J. W. M. Heijmans, M. Rijken, G. E. H. M. Rutten, G. Nijpels, and F. G. Schellevis, "Illness perceptions and self-care behaviours in the first years of living with type 2 diabetes; does the presence of complications matter?," *Psychol. Heal.*, vol. 30, no. 11, pp. 1274–1287, 2015, doi: 10.1080/08870446.2015.1045511.

[22] D. Fineschi *et al.*, "Game of Mirrors: Health Profiles in Patient and Physician Perceptions," *Int. J. Environ. Res. Public Health*, vol. 19, no. 3, pp. 4–11, 2022, doi: 10.3390/ijerph19031201.

[23] G. Branch, C. Reasearch, and D. Unit, "The relationship between illness perception and medication adherence in patients with diabetes mellitus type II : illness perception and medication adherence," no. 2014, pp. 966–971, 2021.

[24] S. Aberkane, "Illness Perceptions and Disability Levels among Older Adults with Chronic Illness," *Iran J Public Heal.*, vol. 45, no. 5, pp. 710–712, 2016.

[25] K. Hashimoto, K. Urata, A. Yoshida, R. Horiuchi, N. Yamaaki, and K. Yagi, "The relationship between patients ' perception of type 2 diabetes and medication adherence : a cross-sectional study in Japan," pp. 1–10, 2019.

[26] Y. Tominaga, T. Aomori, T. Hayakawa, N. Kijima, and D. E. Morisky, "Possible associations of personality traits representing harm avoidance and self- directedness with medication adherence in Japanese patients with type 2 diabetes," pp. 1–7, 2018.

[27] J. Rajpura and R. Nayak, "Medication adherence in a sample of elderly suffering from hypertension: Evaluating the influence of illness perceptions, treatment beliefs, and illness burden," *J. Manag. Care Pharm.*, vol. 20, no. 1, pp. 58–65, 2014, doi: 10.18553/jmcp.2014.20.1.58.

[28] L. Gosak, "Cognitive and Emotional Perceptions of Illness in Patients Diagnosed with Type 2 Diabetes Mellitus," *Healthcare*, vol. 12, no. 199, pp. 1–9, 2024.