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Illness Beliefs and Its Relationship with Diabetes Self-Care Practice in Patients with Type 2 Diabetes Mellitus in Indonesia

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ABSTRACT

Diabetic patients in Indonesia have poor self-care practices. Illness belief might affect diabetes self-care practice in Indonesia. However, up to date, the illness belief of Indonesian diabetic patients toward self-care is still unclear, and whether illness belief and its domains are the predictors of diabetes self-care practice in Indonesia is still unknown. Therefore, this study aimed to assess the illness belief and to assess whether illness belief and its domains are the predictors of diabetes self-care in the Indonesian context. A cross-sectional study was conducted on 625 T2DM patients from public health centers in Purwokerto City, Indonesia. A Brief Illness Perception Questionnaire (BIPQ) and Summary Diabetes Self-Care activities (SDSCA) were used to assess illness beliefs and diabetes self-care behaviors respectively. A hierarchical multiple regression analysis was conducted to identify the predictors of diabetes self-care behaviors. The scores of IBPQ domains (i.e., consequences, timeline, personal control, treatment control, identity, concern, understanding, and emotional response) were 5.00 ± 2.65, 4.84 ± 2.59, 6.16 ± 1.92, 7.21 ± 1.97, 5.00 ± 2.07, 4.91 ± 2.61, 5.31 ± 2.01, and 4.64 ± 2.51, respectively. The regression analysis showed the predictors of diabetes self-care behaviors to be consequences ($p < .05$), personal controls ($p < .05$), and duration of DM ($p < .05$). This study provides evidence that two domains of illness beliefs are predictors of diabetes self-care behaviors in Indonesia. The domains are consequences and personal control. There is a need to design educational programs focusing on illness beliefs to improve diabetes self-care behaviors in Indonesia.

Introduction

Diabetes mellitus (DM) is one of the most serious health conditions in the world [1]. There were 422 million patients globally with DM in 2014 and in 2012, 1.6 million people died from the disease [2]. DM has become a huge problem in Indonesia, which had the 7th highest number of DM patients in the world in 2019 [3]. In 2011, there were 8.5 million people living with DM in Indonesia, but this raised to 10.7 million

by 2019 [2], [4]. Studies have shown that mortality due to DM-related complications is high in Indonesia [2]. Based on this data, clinicians in Indonesia should design programs to reduce complications and mortality rate in their DM patients.

In order to avoid complications, diabetic patients should perform various self-care activities, including monitoring blood glucose levels, regulating diet, engaging in physical exercise, adhering to medication, adopting a healthy lifestyle, developing good coping skills, and carrying out risk-reducing behaviors [5]. Successful diabetes self-care practices will result in reduced complications and improved quality of life [6-8]. Previous studies showed that 63.8% of patients with DM in Indonesia have poor diabetes self-care behaviors [9].

Several factors have been reported to affect diabetes self-care behaviors [9- 11]. One previous study showed that factors related to diabetes self-care behaviors included age, level of education, and self-efficacy [11]. Another study showed that factors affecting diabetes self-care behaviors were self-efficacy, communication, motivation, attitude, and knowledge [12]. A recent study showed the factors related with diabetes self-care behaviors were treatment, perceived self-efficacy, and situational influences [9]. These factors account for 20.8 % variance in diabetes self-care behaviors. Since a previous study showed the predictors of diabetes self-care behaviors could only explain of 20.8 % of the variance, we therefore hypothesize that another factor affecting diabetes self-care behaviors in patients with DM in Indonesia could exist.

Illness beliefs can be conceptualized in the Common-Sense Model of Self-regulation [13]. Based on this theory, people's beliefs about their disease determine their behaviors. Illness beliefs can be broken into five categories: beliefs about disease symptoms (identity), beliefs about the progress and duration of the disease (timeline), beliefs about the effects of the disease (consequences), beliefs about the cause of the disease (cause), and belief about how behaviors can influence the diseases (cure/control) [14]. Previous studies showed that illness beliefs can influence medication adherence and management of diabetes [15], and that illness belief is strongly affected by cultural contexts [16].

However, it is still unclear whether domains of illness beliefs are related to diabetes self-care behaviors in an Indonesian context since studies in Indonesia are still very limited. To our knowledge, no study has investigated whether domains of illness beliefs are predictors of diabetes self-care behaviors in Indonesia. It is important to investigate how such beliefs influence diabetes self-care behaviors since findings can guide nurses in Indonesia to develop specific interventions in order to improve diabetes self-care practices in their patients. Therefore, the purpose of this study was two-fold. We first investigated the illness beliefs of diabetic patients in Indonesia, and then investigated whether the domains of illness beliefs are predictors of diabetes self-care behaviors in such patients.

2. Methodology

2.1 Study design

A cross-sectional study was carried out to assess the illness belief and to investigate whether domains of illness belief are predictors of diabetes self-care practice.

2.2 Study population

A total of 625 patients with type 2 diabetes mellitus (T2DM) attending the outpatient clinic in 14 public health centers, Purwokerto City, Indonesia, between 12 August 2020 to 5 February 2021 were recruited using a simple random sampling method. Inclusion criteria were patients aged 18 years or older with a

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diagnosis of T2DM from their physician. Exclusion criteria were patients unable to perform diabetes self-care practices without assistance and patients with cognitive dysfunction or dementia. Patients' clinical data were obtained from their medical records. Using a 95% confidence level, an absolute precision of 3%, a proportion of 13.4 %, and the response rate of 80 %, the total sample size was estimated to be 625 patients.

2.3 Data collection

We conducted face-to-face questionnaire-based interviews in the outpatient clinics of 14 public health centers in Purwokerto City, Banyumas Regency, Indonesia. Each participant was approached by researchers while awaiting a consultation. Since the time in clinic is short, the researchers and patients made appointment to interview at their home. The data collected were socio-demographic details including age, gender, marital status, level of education, employment status, and clinical characteristics including duration of DM, and data regarding patients' illness beliefs and diabetes self-care practice.

Illness beliefs were assessed using a brief illness perceptions questionnaire (BIPQ) that was developed by [14]. This questionnaire has been widely used among patients with chronic diseases such as cancer, heart disease, DM, and rheumatoid arthritis [14]. It consists of nine questions. Five of the questions assess cognitive illness (consequences, timeline, personal control, treatment control, identity) and two assess emotional representations (concern and emotions). One question assesses illness comprehensibility and one assesses causal representation. All of the items except item 9 (the causal representation question) are rated on a 10-point scale. Assessment of the causal representation is by an open ended response item. The consequences domain refers to patients' beliefs about the outcome of their illness. The timeline domain refers to patients' beliefs about the duration of their disease. The personal control domain refers to the patients' beliefs about how they can influence or control the disease. The treatment control domain refers to patients' beliefs about the effectiveness of the treatment, which in this study is self-care. The identity domain refers to patients' beliefs about the symptoms they experience. The concern domain refers to patients' understanding of their illness. The emotional domain refers to the emotional impact of the disease on patients. Finally, the causal domain refers to patients' beliefs about what caused their disease. This questionnaire has been validated in Indonesia. Cronbach's alpha of the Indonesian version of the IBPQ is 0.75 [17].

The level of diabetes self-care already carried out by participants was assessed using the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire developed by [18]. The questionnaire includes 11 items which measure patients' diet management, physical exercise, blood glucose monitoring, foot care, and smoking. Respondents answer by marking the number of days (0-7) in the past week they performed certain practices. A higher score means better diabetes self-care behaviors. This questionnaire has been used in many countries and has a good Cronbach's alpha [18- 21], being 0.72 in the Indonesian version [9].

2.4 Data Analysis

Descriptive statistics were calculated to describe the univariate data of the demographic and clinical characteristics data. In order to investigate the predictors of diabetes self-care behaviors, a hierarchical multiple regression analysis was performed. SPSS version 23 was used to conduct all analyses. A statistical significance was defined as a p-value of <.05 A tolerance of < 0.2 and variance inflation factor >5 indicated multicollinearity [22].

2.5 Ethical consideration

Prior to the administration of the questionnaire, the participants were informed of the details of the study, including the study aims, benefits they may experience, and their freedom to withdraw from the study at

any time without penalty. Written informed consent forms were gathered from each participant. The study was carried out in compliance with the Declaration of Helsinki and was approved by the institutional ethical committee of the Faculty of Health Sciences at Universitas Jenderal Soedirman, Purwokerto, Indonesia.

3. Results

Table 1 shows the characteristic of the participants. There were 625 participants, most of whom were in the age range of 55-64 (40.80 %), female (77.12 %), married (80.16%), educated to primary school level (58.72%), had an income below 120 USD, were not employed (56.96%), and had had diabetes for less than five years (61.44 %).

Table 1. Demographic and clinical data of respondents.

Variable	N	%
Age		
<45	28	4.48
45-54	141	22.56
55-64	255	40.80
≥65	201	32.16
Gender		
Female	482	77.12
Male	143	22.88
Marital status		
Married	501	80.16
Not married	10	1.60
Divorced/widow	114	18.24
Formal education		
No formal education	39	6.24
Primary	367	58.72
Secondary school	97	15.52
High school	76	12.16
University	46	7.36
Income		
Below 120 USD	540	86.40
120-200 USD	52	8.32
Higher than 200 USD	33	5.28
Occupation		
Active employment	211	33.76
Retired	58	9.28
No employment	356	56.96
Diabetes duration		
Less than 5 years	384	61.44
5-9 years	143	22.88
≥10 years	98	15.68

Table 2 showed the IBPQ scores for each domain. The results show that most patients perceived DM not to

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be a serious condition (consequence) and that it would not last forever (timeline). Participants tended to believe themselves to be in control of their DM (personal control) and that DM can be controlled with good management or treatment (treatment control). Participants reported not experiencing many DM- related symptoms (identity). They had a good understanding of DM (understanding) and were not severely concerned about it (concern). Having DM did not deeply affect their emotional responses (emotional response).

Table 2. IBPQ scores for each domain

Item	Mean ± SD
Consequences	5.00 ± 2.65
Timeline	4.84 ± 2.59
Personal control	6.16 ± 1.92
Treatment control	7.21 ± 1.97
Identity	5.00 ± 2.07
Concern	4.91 ± 2.61
Understanding	5.31 ± 2.01
Emotional response	4.64 ± 2.51

Table 3 shows that when the domains of illness belief were entered into a regression model (model 1), only personal control, treatment control, and understanding were predictors of diabetes self-care. These variables accounted for 17.30 % of the variances. When the demographical variables and duration of DM were included in the analysis (model 2), consequences, personal control, and duration of DM were significant predictors of diabetes self-care behaviors. These three factors accounted for 29.10 % of the variances.

Table 3. Predictors diabetes self-care behaviors

Model	Variables	*B*	*β*
Model 1	Constant	3.324	
	Consequences	.092	.019
	Timeline	.325	.067
	Personal control	.582*	.089*
	Treatment control	1.374**	.216**
	Identity	-.396	-.065
	Concern	-.291	-.061
	Understanding	1.488**	.238**
	Emotional responses	.186	.037
	$F = 16.15$; $R^2 = 17.3$, $p < .001$		
Model 2	Constant	28,644	
	Consequences	1.750*	.277*
	Timeline	-.365	-.058
	Personal control	1.929*	.246*
	Treatment control	1.804	.197
	Identity	-1.107	-.165
	Concern	-.689	-.117
	Understanding	.020	.003
	Emotional response	.896	.162
	Age	.049	.038
	Gender	2.570	.095
	Marital status	-.852	-.028
	Education	.466	.057

	Income	.245	.038
	Occupation	-.240	-.021
	Duration of DM	-12.048*	-.230*
	$F = 2{,}137\ R^2 = 29.1, p = .016$		

4. Discussion

This study was the first study carried out to investigate whether domains of illness belief is predictors of diabetes self-care practice in Indonesia. Based on our findings, we found that most patients perceived DM not to be a serious condition and that it would not last forever, and believe DM can be controlled with good management or treatment. They also had a good understanding of DM (understanding) and were not severely concerned about it, and having DM did not deeply affect their emotional responses. Our study also showed that that consequences, personal control, and duration of DM are predictors of diabetes self-care practices in an Indonesian context.

According to our findings, the majority of diabetes patients believe that the disease can be cured. Our finding is in accordance with previous study in other countries [23], [24], Although such a mindset can increase a patient's drive to engage in diabetic self-care practice, the patient must recognize that diabetes is incurable. Patients must be educated by health care practitioners in order for them to comprehend the nature of diabetes.

One of the predictors of diabetes self-care practice in this study was domain of consequences. The domains of consequences refer to the effects which patients expect to experience because of DM. In our study, the perception that DM would severely affect patients was associated with better diabetes self-care behaviors. Having an understanding of DM's possible complications might cause patients to want to perform diabetic self-care properly. Patients appear to realize that the complications of DM might occur as a result of inappropriate diabetes self-care practices. However, our results did not correspond with those from a previous study which showed that perceived severe consequences of DM were linked to less diabetes self-care practices [16]. It might in the previous study, the fear of severe consequences might cause distress to patients that resulted in them performing less diabetes self-care practices. In our study, such psychological factors might not have become barriers to the performance of diabetes self-care practices.

Another predictor of diabetes self-care behaviors was found to be personal control, which refers to the perception that patients themselves have the ability to control their disease. Participants with high personal control perceived they could manage the disease properly. Our findings showed the higher level of personal control a participant had, the higher their diabetes self-care behaviors were. These findings correspond with a previous study that showed patients who have high personal control have better diabetes self-care practices [25]. The good levels of personal control seen in this study might be due to participants' high self-efficacy toward the treatment and management of DM, giving them the confidence to perform diabetes self-care practices.

In this study, disease duration was also seen to be a predictor of diabetes self-care behaviors. Patients who had had DM for a short time performed better diabetes self-care practices, while patients who had had DM for longer performed lower diabetes self-care practices. There are two possibilities for such results. It could be that new DM patients have more knowledge related to diabetes self-care practices than those who have had DM for longer. Newer patients might be more proactive in finding new information about DM, while longer-term DM patients may consider diabetes self-care practices to be a common or usual activity that does not need any specific knowledge.

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Our study has several limitations. Because it was a cross-sectional study, we are not able to draw any causal inferences between variables. Furthermore, because we only investigated illness beliefs and clinical characteristics as a predictors of self-care practices, we can't conclude on other factors that might contribute to self-care DM practices in an Indonesian context. Finally, since this study was carried out in Indonesia, its findings cannot be extrapolated to other countries. Despite its limitations, our study also has strengths. It is the first study to investigate whether domains of illness beliefs could be predictors of DM self-care behaviors in an Indonesian context. Secondly, by including a significant number of DM patients, we increased the generalizability of our study population. Finally, our study provides critical evidence that nurses can utilize to develop educational programs in Indonesia to enhance DM self-care practices.

5. Conclusions

This is the first study to investigate whether domains of illness belief could be a predictor of diabetes self-care behavior in Indonesia. Our results show that consequences, personal control, and duration of DM are predictors of diabetes self-care behaviors in Indonesian patients. The results can be used as guidance for nurses creating programs to improve diabetes self-care practices in patients with DM.

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