Depression among diabetes mellitus patients: A study of the protective factors

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Article Info	ABSTRACT
	Diabetes mellitus is a chronic disease with patients that continue to increase per year. This study aimed to understand the role of self-esteem and religious orientation on depression with resilience as a mediator among patients with diabetes mellitus (DM). A total of 100 patients were recruited from four public health centers. The Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure depression. In contrast, self-esteem was measured using two aspects of Rosenberg's self-esteem scale, namely self-liking and self-competence. Religious orientation was measured using Allport and Ross's religious orientation scale, while resilience was measured using Connor and Davidson's resilience scale. The results were analyzed using path analyses. The study found that resilience mediated the relationship between self-esteem and depression among DM patients. Self-esteem was also shown to correlate with resilience, and resilience also showed a significant relationship with depression. In contrast to initial predictions, however, there was no significant effect of religious orientation on resilience. The research implications suggest that resilience serves as an important protective factor toward depression among patients suffering from DM.

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1. INTRODUCTION

In 2020, Wuhan was struck by a peculiar case of pneumonia caused by the Sars-Cov-19 virus [1]. Patients with a history of hypertension and diabetes mellitus are at particular risk from COVID-19 infection [2]. Diabetes is a chronic disease, and according to the International Diabetes Foundation, it constitutes a major severe disease. Diabetes occurs due to genetic abnormalities in metabolism, which result in increases in blood sugar levels; however, it may also be marked by deformities in insulin production [3]. As a result, the total number of diabetes patients is increasing, particularly in developing countries. Indonesia being among these developing countries, has shown that 6% of people with diabetes are above 15 years old; however, only 9% receive medical care [4].

Diabetes patients must undergo long-term medication to prevent complications in the body due to insulin imbalance [5]. However, prolonged medication may lead to deteriorating mental health marked by feelings of hopelessness and a fractured self-concept, leading to depression [6]. It is common among diabetes patients to experience emotional problems, such as stress due to lifestyle changes. Stress can also emerge among DM patients due to its symptoms, which may lead to depressive symptoms or worry since the patient is unable to carry on with normal life activities. A study on 74 DM patients in Surabaya found that 50% of

the patients experienced depression [7]. The stress which emerges due to the illness also impacts the personal management of diabetes [8]. This research showed that people with depressive symptoms were more likely to have poor compliance and poor abilities to control their glycemic concentration in their blood, while patients without depressive symptoms were more able to regulate their lives and glycemic concentration in their blood. This result indicates the importance of monitoring depressive symptoms among DM patients [9].

DM patients who have sufficient knowledge about their illness can also minimize the risks of developing depression [10]. Depression is a mood disorder that involves emotional problems (prolonged sadness), lack of interest in daily activities, cognitions (helplessness), and affects bodily functions (easily fatigued and loss of appetite) [11]. When diabetes patients experience depression, this leads to a poor diet and other complications and disorders, for example, psychological disorders and emotional problems. In addition, emotional problems can affect the quality of life, poor self-grooming, poor management of glycemic levels, and increases the risk of death [12].

Depression is a general clinical disorder; however, it is not easily detected like a physical illness, and therefore patients with depression are not seriously treated. Some factors affect the extent of depression in DM patients, namely economic condition, family status, obesity, smoking habits, and poor lifestyle [13]. The prevalence of depression among diabetes patients has increased twofold, where research has shown an increase of 24-30% [3]. In addition, the prevalence of comorbidities between depression and other chronic diseases is higher than the prevalence of depression [14]. This prevalence shows that having a chronic disease for a long period without the healing potential may lead to depression.

Each person has once experienced an adverse life event that leads to stress, and living with diabetes mellitus may constitute such a negative event. The stress experienced by each diabetes patient can lead to some negative impacts, for example, declines in well-being, post-traumatic stress disorder, anxiety disorders, and depression [15]. However, each person has different abilities in managing stress, otherwise known as resilience. Resilience has many meanings; however, it concerns positive adaptation in managing risk or stress [16]. Resilience refers to a person's ability to maintain a stable and healthy psychological and physical state when dealing with a stressful situation [17]. Resilience affects DM patients' ability to control glucose levels and protects them from the adverse risks of psychological distress on blood sugar levels [18].

Self-esteem significantly contributes to resilience [19]. Self-esteem refers to beliefs that one can think and survive in managing life's challenges and beliefs that one has the right to succeed, be happy and content, and enjoy the outcome of their achievements. According to some research, self-esteem plays a role in life quality and emotional health [20]. Among individuals with comorbid depression, there is a cycle between inferiority and tendencies to experience mental disorders [21].

A study in Iran found that religious orientation positively correlated with self-esteem [22]. The study evaluated the aspects that affected religious orientation, for example, anxiety and self-esteem. The psychological distress experienced by diabetes patients was associated with religious observance, whereby past research has shown that a lack of spiritual quality may lead to depression among patients [23]. Attitudes were associated with two religious aspects, namely intrinsic and extrinsic orientation [24]. Individuals tend to view religiosity intrinsically when their religious practices and motivation originate from personal beliefs. People who adhere to this way of life follow one that strictly aligns with their religion. The research has shown that religious beliefs play a role in dealing with unpleasant situations and therefore make it relevant to mental health [25]. In addition, religion and spirituality, which comprises beliefs of a divine relationship with God, increase a person's resilience [26].

The intrinsic aspect of religious orientation plays a key role in mental health because it can ameliorate stress [27]. Previous study found a relationship between religious orientation and positive subjective well-being consisting of life satisfaction, positive affect and negative affect [28]. Religiosity, particularly the self-oriented type, was associated with patients who have life goals, are motivated to engage with daily activities, and reduce the probability of experiencing depression [29].

It is important to understand the factors that affect depression among diabetes mellitus patients. Furthermore, this study tests the role of religious orientation, self-esteem toward depression among diabetes mellitus patients with resilience as the mediator that previous studies have not explored. Thus, the study may contribute to knowledge development, mainly related to protective factors of depression among patients with diabetes mellitus.

2. RESEARCH METHOD

The respondents in this study were diabetes mellitus patients aged from 21-65 years. Respondent were outpatients from four public health centres. (*Puskesmas*) in Yogyakarta, Indonesia namely *Puskesmas* Kotagede I, *Puskesmas* Gondomanan, *Puskesmas* Mergangsan, and *Puskesmas* Jetis. Table 1 shows the demographic data of the respondents. The scales were administered to the respondents directly in the public

health centers and using Google Forms distributed through WhatsApp groups. All respondents agreed to complete the scales and completed an informed consent form that the researcher provided. The Center for Epidemiologic Studies Depression Scale (CES-D) was used to measure depression. The scale was translated into Indonesian for this research. In this study, the item discrimination power ranged from .44-.54, with a reliability of .85. Furthermore, Rosenberg's self-esteem scale was used to measure self-esteem. The discrimination power of the items ranged from .415-.703 with reliability of .858. Religious orientation was measured using Allport and Ross's scale, which consists of 14 items, and the orientation scale had an item discriminatory power ranging from .385-.897 and a reliability of .86. Finally, resilience was measured using the CD-RISC, composed of 25 items and translated into Indonesia. In this study, the item's discriminatory power ranged from .560-.905 and had a reliability coefficient of .975. The current research used path analysis to analyze the data with IBM SPSS AMOS 22. Path analysis is a technique that analyzes causal relations when an independent variable affects a dependent variable not only directly but also indirectly. Path analysis is a development of the regression model used to test the fit of two models being compared.

Table 1. Demographic characteristics

Category	Frequency	Percentage
Gender		
Male	38	38%
Female	62	62%
Marital status		
Married	86	86%
Not married	14	14%
Most recent education		
Elementary school	24	24%
Junior high school	15	15%
Senior high school	36	36%
Diploma	3	3%
Undergraduate	17	17%
Others	5	5%
Duration as DM patient		
< 1 years	20	20%
1-5 years	43	43%
>5 years	37	37%
Treatment		
Medicine	83	83%
Insulin	16	16%
Others	1	1%
Diabetes type		
Type I	8	8%
Type II	22	22%
Others (Do not know)	70	70%

3. RESULTS AND DISCUSSION

Table 2 shows that a majority of the respondents experienced depression in the mild category (47%). In contrast, a majority of the subjects had high self-esteem (97%), high religious orientation (100%), and high resilience (97%). The subjects showed high self-esteem, which supports past research, which suggests that DM patients have high external motivation and can maintain their self-esteem. This condition is marked by a sense of appreciation that can minimize the risks of developing emotional problems, such as helplessness, anxiety, and depression among patients with chronic illness [30], [31]. In addition, the patients also showed high resilience, which indicates that patients have the insight to adapt their lifestyle to manage the adverse effects of diabetes. This resilience would motivate the patient to take care of themselves and further lead to resilience [32]. The religious orientation shown by the participants was also in the high category, where patients use religious orientation to affect all aspects of life. They are therefore able to control their anger and be accountable for their actions [33].

The path analyses shows that the structural model in Figure 1 meets the criteria for model fit, shown by the Chi-square value of 2.695 with a p=.260. Furthermore, the values of GFI=.987, AGFI=.934, NFI=.942, TLI=.948, and RMSEA=.059 indicates the indexes meets with the cut off. The overall goodness of fit index is presented in Table 3.

Table 2. Categorization of subjects based on hypothetical data

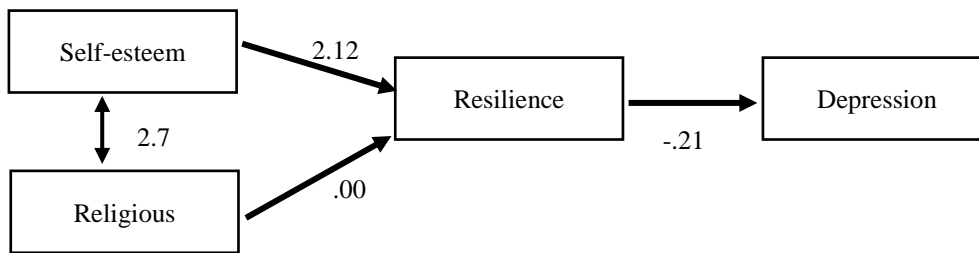| Scale	Category	Score intervals	Frequency	Percentage
Depression	Severe	>24	20	20%
	Moderate	$16 < X \leq 23$	33	33%
	Mild	< 16	47	47%
Self-esteem	High	>21	97	97%
	Moderate	$14 < X \leq 21$	3	3%
	Low	< 14	0	0%
Religious orientation	High	>28	100	100%
	Moderate	$17 < X \leq 28$	0	0%
	Low	< 17	0	0%
Resilience	High	>91	99	99%
	Moderate	$58 < X \leq 91$	0	0%
	Low	<58	1	1%

Figure 1. Results of analysis data using a path model

Table 3. Index of good fit for the structural equation model

Goodness of fit index	Value	Cut-off value	Conclusion
CMIN/DF	1.347	≤5.00	Fit
Probabilitas	.260	≥.05	Fit
GFI	.987	≥.90	Fit
AGFI	.934	≥.90	Fit
TLI	.948	≥.90	Fit
NFI	.942	≥.90	Fit
PGFI	.197	.0-1.0	Fit
RMSEA	.059	≤.08	Fit

Table 4 shows resilience has a negatively significant relationship with depression. The higher resilience among DM patients, the lower depression will be. This result is in line with the finding from previous research that resilience has a significant influence on reducing depression levels [34]. A person with resilience can have different views when facing problems, fostering strength to encounter the problems. A previous study on patients with breast cancer also found resilience to become a protective factor of depression [35].

This current study shows that most respondents have mild depression (47%), and only 20% have severe depression. Comorbid between depression and diabetes mellitus is common among adult patients, as they face multiple stressors in their life. For example, one condition is a denial of the illness among DM patients, resulting in their not adhering to diet control; therefore, their lifestyle is less effective [36].

Table 4. Regression weights

Variable			Estimate	S.E.	C.R.	P
Resilience	<---	Self-esteem	2.116	.417	5.069	***
Resilience	<---	Religious orientation	-.003	.404	-.009	.993
Depression	<---	Resilience	-.206	.067	-3.056	.002

Based on the results presented in Table 4, self-esteem has a significant relationship with resilience. Self-esteem refers to a person's evaluation of his or her characteristics and abilities, and it supports the performance of adaptive behaviors, which may strengthen resilience among DM patients [37]. Resilience is characterized by the ability to rebound and function normally following an unpleasant situation. Self-esteem is one of the characteristics of resilient people because it allows for better adaptation to the environment and

has a large capacity to confront stress [38]. In addition, a previous study among DM patients found self-esteem will encourage them to think positively [39].

The results showed that there was no relationship between religious orientation and resilience. Both extrinsic and intrinsic religious orientation did not affect resilience. Research in Africa showed that caregivers might negatively affect a person's resilience when they excessively communicate about religious ideas [40]. The current research is limited in that from the total 18 public health centers in Yogyakarta, and only four approved the research. Furthermore, more than half of the participants wanted the researcher to read the materials due to impaired vision.

4. CONCLUSION

There is a relationship between resilience and depression among DM patients. DM patients who can deal with and rebound from the DM diagnosis can positively adapt their physical conditions and prevent developing depression. In addition, self-esteem is associated with resilience. DM patients have good self-esteem, and they would try to make a positive image of themselves and adapt to the changes that occur around them, which provides the basis for a resilient individual. Self-esteem is one of the important factors in forming resilience. When individuals are confident of their abilities, this will increase their resilience, which eventually becomes a protective factor toward depression among DM patients.

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