

RESEARCH ARTICLE

The Impact of Diabetes Distress on the Treatment Outcome

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ABSTRACT:

Objective. The prevalence of diabetes mellitus is getting increased in Indonesia. The treatment and disease complexity may cause patients distress. The objective of this study is to determine the association between diabetes-related distress and the treatment outcome of T2D patients. **Methods.** This study used a cross-sectional design. Data were collected from diabetes patients at Abdul Azis Hospital, Singkawang, Meranti Hospital, Meranti County and DOK II Hospital Jayapura during 2017 and 2018. The inclusion criteria were patients diagnosed with T2DM, aged over 18, and under outpatient treatment at the hospitals in the aforementioned period. The clinical and socio-demographic data were taken from the patients' medical record. The Diabetes-Distress Scale (DDS) was used to measure the patients' distress. **Results.** The patient characteristic of this research showed that the mean of patients' age was 57.14 years old (SD = 9.4). Almost 59% among them was female, 92.6% was married, and 62.2% had a higher level of education. Around 54% of patients had a HbA1C of more than 7.5 with a mean 8.68 (SD=2.58). It also showed from the plasma glucose which 53% had more than 200 mg/dL (the average 219.64 (SD=85.11)), and 71% had 2-hours postprandial more than 200mg/dL. The significant associations were seen between all domains of distress and random blood glucose ($p<0.05$). The emotional and management related distress had the significant association with HbA1C ($p<0.05$). **Conclusion.** All the distress domains are related to the high level of random blood glucose. Furthermore, the emotional and management related distress is related with the HbA1C. The combination between pharmacological and psychological intervention is suggested to improve the clinical outcome.

KEYWORDS: Distress, diabetes, glycemic, control, Indonesia.

INTRODUCTION:

The prevalence of Diabetes mellitus (DM) in the world has markedly increased. It is estimated that in 2030 the number of DM sufferers in Indonesia will reach 21.3 million. According to reports of the Basic Health Research, the highest DM prevalence occurred in the provinces of Riau (1.0 %), West Kalimantan (0.8 %) and Papua (0.8%) [1].

The treatment of Type 2 Diabetes mellitus (T2DM) is not only depending on the medication but also depend on the self-care behaviors like diet and physical activity [2]. The change in behavior may influence the quality of life, especially in the social and financial support [3]. This situation can produce the complex life of diabetic patients.

Previous studies reported that the emotional distress due to the T2DM was associated with self-care behavior, non-adherence and glycemic control [4,5]. Another previous study also mentioned that diabetes-related distress was related with the depression symptoms [6].

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The objective of T2DM treatment is to control the blood sugar glucose in the normal range. Due to the chronic disease, quality of life also become one of the objectives of T2DM treatment [2]. During the long duration of disease and treatment, T2DM can influence patients' condition. Many instructions should be followed by the patients, thus emotional distress will appear due to the many limited activities [4].

Diabetes-related distress showed the patients' concerns about diabetes mellitus, included the disease, management, support, emotional burden and access to healthcare. The diabetes-related disease was assumed to be one of the risk factors of the treatment failure [4,7].

The previous study conducted in Saudi Arabia, using around 500 T2DM patients, given Diabetes-Distress Scale (DDS) questionnaire, showed that 25% T2DM patients had moderate to high Diabetes-related distress and 50% among them were more related to the emotional-related distress. This study also concluded that there were positive correlations between emotional distress and HbA1C value. This study also recommended the screening process of Diabetes-related distress to determine the best approach to reach the treatment outcome [8].

The objective of this study is to determine the association between diabetes-related distress and the treatment outcome of T2DM patients.

METHODS:

Participants:

This study used a cross-sectional design. Data were collected from diabetes patients at Abdul Azis Hospital Singkawang, West Kalimantan, Indonesia, Meranti Hospital, Meranti county, and DOK II Hospital Jayapura during 2017 and 2018. The target population was diabetes patients receiving outpatient services at the hospitals. Subjects who met the inclusion criteria were patients diagnosed with T2DM, aged over 18, and under outpatient treatment at the hospitals in the aforementioned period, whereas the ones excluded were patients who were unwilling to participate in this study and those who were illiterate.

Prior to gathering data from every subject, they were asked for their willingness to partake in this research and to provide informed consent. Data collection resumes only if the patient complies. To facilitate data collection through questionnaires, the researchers accompanied the patients in answering the questions. This study has received approval from the Ethics Committee of the Faculty of Pharmacy at Universitas Ahmad Dahlan Yogyakarta, Indonesia, Number 011701003.

Questionnaires:

The questionnaires utilized in this inquiry was the Indonesian version of DDS [9]. Polonsky et al. introduced the DDS on patients with type 1 and T2DM at various settings. Patients were asked to express their concern about for 1 month on a Likert scale from 1 (not a problem) to 6 (a very serious problem). This questionnaire has four domains, which are; emotional burden, physician-related distress, regimen-related distress and diabetes-related inter-individual distress [4]. This questionnaire was interpreted based on the calculation of the mean item score. The mean item score was calculated from the summing up of the items' scale then divided by the number of items in the scale. The worst distress level showed by the mean item score of ≥ 3 and the less distress showed by the mean score of less than 2.0. However, a score between 2.0 and 2.9 showed moderate distress [10].

Statistical Analysis:

Subsequently, analysis through Linear Regression was also applied to identify the association between DDS and treatment outcome.

RESULTS:

We recruited 213 T2DM patients with the characteristics as shown in Table 1.

Table 1. Patients' characteristics (n=217)

Characteristics	%	Mean (SD)
Age (yo)		57.14 (9.4)
Sex		
Male	41	
Female	59	
Education		
Lower than Senior High School	37.8	
Above the Yuniior High School	62.2	
Occupation		
Jobless	41.9	
Work	58.1	
Salary (IDR)		
< 2.2 million	44.7	
≥ 2.2 million	55.3	
Marriage Status		
Married	92.6	
Single	7.4	
Family History of DM		
Yes	42.4	
None	57.6	
Type of treatment		
Monotherapy	87.1	
Combination therapy	12.9	
Treatment duration (year)		
< 5	61.8	1.43 (0.59)
≥ 5	33.2	
Disease duration (years)		
< 5	52.5	1.47 (0.50)
≥ 5	47.5	
Complication		
Microvascular	25.8	
Macrovascular	57.1	
Micro and Macrovascular	16.6	
None	0.5	

Fasting Blood Glucose (mg/dl)		
<200	50.7	184.60 (80.43)
≥200	49.3	
Random Blood Glucose (mg/dl)		
<200	47	219.64 (85.11)
≥200	53	
2 hours postprandial Blood Glucose (mg/dl)		
<200	29	271.23 (22.7)
≥200	71	
HbA1C (%)		
4.4-6.4	16.1	8.68 (2.58)
6.4-7.4	15.2	
≥7.5	54.4	

The patient characteristic of this research showed that the mean of patients' age was 57.14 years old (SD = 9.4). Almost 59% among them was female, 92.6% was married, and 62.2% had a higher level of education. Around 52.5% of patients were diagnosed with diabetes for less than 5 years ago, and the mean duration of diabetes mellitus was 1.47 years (SD=0.50). However, 57.1% of patients already had macrovascular complications. According to clinical data, 54.4% patients had a HbA1C of more than 7.5 with a mean 8.68 (SD=2.58). It also showed from the plasma glucose which 53% had more than 200 mg/dL (the average 219.64 (SD=85.11)), and 71% had 2-hours postprandial more than 200mg/dL.

Table 2. DDS Score (n=217)

Domains	%	Mean (SD)
Emotional related distress		2.31 ± 1.28
No	34.2	
Moderate	27.6	
High	38.2	
Physician-related distress		2.35 ± 1.27
No	30.9	
Moderate	33.2	
High	35.9	
Management-related distress		2.55 ± 1.08
No	1	
Moderate	6.6	
High	40.1	
Interindividual-related distress		2.07 ± 1.25
No	43.3	
Moderate	27.6	
High	29.0	

Analysis of DDS score indicated that patients in this research have moderate distress, which is shown from the average of all domains is more than 2. Furthermore, 3 of 4 domains showed that patients in this research have high emotional-distress, high physician-related distress, and high management-related distress (38.2%; 35.9; and 43.3% respectively). By contrast, almost 43.3% of patients have no interindividual-related distress. The associations between distress and clinical outcome were already adjusted to the patients' characteristic. Only the type of treatment which had an association with 2 hours pp blood glucose. In the end, the association between management-related distress is still significant, after adjusted with the type of treatment (p<0.033)

Table 3. Association between DDS and Treatment outcomes

DDS domain	p-value			
	RBG	FBG	BG2jPP	HbA1C
Emotional-related distress	<0.001*	0.169	0.992	<0.001*
Physician-related distress	<0.001*	0.434	0.870	0.616
Management-related distress	<0.005*	0.185	0.617	<0.05*
Interindividual-related distress	<0.05*	0.348	0.918	0.113

*: significant association

Based on linear regression analysis, some of DDS domains have the significant relationship with random blood glucose and HbA1C. In detail, all domains have the significant association with random blood glucose, meanwhile only emotional and management related distress domains which have the significant association with HbA1C.

DISCUSSION:

Our study found that there is the significant association between diabetes-related distress and the clinical outcome. From the 217 subjects, we found that the clinical outcomes were not good. This situation can be explained by many factors, such as the used of monotherapy, the complication experienced by the patients or maybe the health illiterate, besides the diabetes-related distress.

Achieving glycemic control depends on a lot of factors such as the duration of diabetes, the complexity of the regimen, lifestyle changes, and also behavioral changes [3]. Research from Aljuaid in Saudi Arabia showed that patients who have complications have a significant relationship with emotional-related distress [8]. The mechanism between glycemic control and diabetes-related distress is related to cortisol levels which have a correlation with higher glucose concentrations [3,11].

Another study about the acute psychological stress stated that the acute psychological stress can increase the glucose level and also delay the decrease of the glucose level [11,12].

Regarding the HbA1C, research from Cumming showed that there was a significant difference between HbA1C in women whose had diabetes-related distress lower and stayed or deteriorated after 12 months follow up. In women who had lower diabetes-related distress after 12 months got the reduction of mean HbA1C around 0.34, while they who had stayed or deteriorated diabetes-related distress showed an increasing of HbA1C by an average 0.2 [3].

A method of mindfulness-based intervention was proven as the way to decrease the emotional level and to improve the emotional wellbeing. The treatment duration was 6 months, then the anxiety and depressive symptoms were significantly decreased [13].

A systematic review included 9177 participants mentioned that the impact of the psychological intervention on the diabetes-related distress was uncertain. These results are due to the quality of the evidence found during the systematic review [14]. However, previous systematic review about the impact of the pharmacological and psychological intervention to the depression symptoms of diabetic patients showed that combination between pharmacological and psychological intervention had moderate and clinically significant to decrease the depression symptoms. The glycemic control was improved better in the pharmacological intervention than the psychological intervention [15].

Our study has the limitation; we did not measure other behavioral factors such as, perception, knowledge, and adherence, which can affect the distress and the glycemic control. Further studies with considering the behavioral factors are needed.

CONCLUSION:

We found the diabetes-related distress can affect the glycemic control. All the distress domains are related to the high level of random blood glucose. Furthermore, the emotional and management related distress is related with the HbA1C. The combination between pharmacological and psychological intervention is suggested to improve the clinical outcome.

CONFLICT OF INTEREST:

The authors have no conflict of interest

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