Factors Related to Anxiety Scores in Diabetes Mellitus Outpatients at the Universitas Sumatera Utara Hospital

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Abstract

BACKGROUND: Diabetes mellitus (DM) is a serious chronic disease caused by the inability of the pancreas to produce enough insulin. It is estimated that people with diabetic are at twice the risk of anxiety compared to the general population. Diabetic patients with anxiety have been related to increased risk of comorbidities, which can interfere with daily living activities, and life quality increased health costs, and many other complications when compared with the general population.

METHODS: This study is a predictive type multivariate study with a cross-sectional approach to 111 subjects in the outpatient clinic of Universitas Sumatera Utara hospital. The tests carried out in this study were the bivariate test, multivariate linear regression test to determine what factors are related to anxiety scores in DM patients, using the Hospital Anxiety and Depression Scale (HADS-A) as a measurement tool.

RESULTS: After conducting the multivariate analysis test, it was found that the variables associated with anxiety scores in people with DM were length of education ($p < 0.001$), body mass index ($p < 0.001$), duration of illness ($p < 0.001$), work status ($p < 0.001$), and comorbidity ($p = 0.021$).

CONCLUSION: By knowing the factors that influence anxiety scores in people with DM, it is hoped that clinicians will pay more attention to the symptoms of anxiety in people with DM, especially in the early days of diagnosis, so that intervention can be carried out.

Background

Diabetes is an important health problem in society, it is one of the four priority non-communicable diseases world leaders must target for action. Globally, an estimated 422 million adults are diagnosed with diabetes in 2014 and in 2018 there were around 500 million people with diabetes worldwide [1]. The prevalence of diabetes has increased rapidly in low-income and middle-income countries than in high-income countries over the last decade. Patients with diabetes are more likely to have an increased economic burden on health care. In 2017, it was estimated that globally 850 billion USD was spent on the care of people with diabetes [2].

People with diabetes are estimated to be at twice the risk of suffering from anxiety than the general population. Anxiety in people with diabetic has been related to increased risk of comorbidities, which can interfere with daily activities, and life quality increased health costs, and many other complications when compared to the general population [3]. Anxiety symptoms are significant risk factors for the development of diabetes. The overall anxiety disorder (free-floating anxiety) prevalence rate was found to be about three times higher in individuals with diabetes than population in general [4]. Anxiety that is comorbid with diabetes is affect the severity of diabetes [5]. Poor self-care and medical care, poor glycemic control, and more diabetes complications compared to diabetic patients without comorbid anxiety [6]. This study will look at the factors associated with anxiety in people with diabetes.

Methods

This study is a multivariate type of predictive study with a cross-sectional approach. The research diagnosis for the main question in this study is a linear regression with a predictive conceptual framework because this study seeks to find the relationship of several independent variables to the dependent variable and the dependent variable in this study with a numerical scale, namely depression score [7].

This study was conducted at the University Hospital of North Sumatra, where the subjects of this study were 110 subjects. The sample size in this study was 98 subjects. Where to determine the sample size of the research subject is determined based on a preliminary study. The sampling method for 8 subjects in this study is based on non-probability sampling, namely

consecutive sampling, where each research subject who comes consecutively who meets the inclusion and exclusion criteria and is willing to participate in the study will be given informed consent and will then be included in this study [7]. This research succeeded in controlling confounding variables well by means of restrictions. The inclusion criteria in this study were (1) patients diagnosed with diabetes mellitus (DM), (2) DM patients who were on outpatient treatment, (3) age 25–60 years, (4) able to read and write, and (5) understand Indonesian. The exclusion criteria in this study were (1) having other medical disorders: renal dysfunction and severe cardiovascular disease, (2) having a history of psychiatric disorders, and (3) patients on corticosteroid and other psychotropic medication.

Demographic and clinical characteristics

Demographic characteristics include age, gender, marital status (married/other), employment status, length of education, and ethnicity. Data regarding clinical characteristics, comorbidity with other chronic diseases, body mass index (BMI), smoking, and dialysis duration were collected from interviews and hospital records.

Questionnaires

Measurement of depressive symptoms

The Hospital Anxiety and Depression Scale (HADS) was divided into the anxiety subscale (HADS-A) and the depression subscale (HADS-D) which both contained seven interrelated items. To prevent "confusion" from somatic disorders on the score, anxiety symptoms, or depression symptoms that are also associated with physical distress, such as dizziness, headache, insomnia, and fatigue, were excluded from the study. Symptoms related to severe mental disorders were excluded as well, as such symptoms are less common in patients visiting non-psychiatric hospital clinics [9]. HADS has been translated and used widely in many countries since it was first developed in the general population, hospital patients, in cancer treatment, and in people with HIV. The HADS has been translated into Indonesian and has been tested for reliability by Rudy *et al*. in 2015. The results showed that the Kappa coefficient value on the HADS scale on the anxiety subscale was 0.706 ($p < 0.01$) and the depression subscale was 0.681 ($p < 0.01$) with good agreement value interpretation on both subscales [10].

Statistical analysis

For the analysis of categorical independent variables, the analysis plan is descriptive analysis and normality test using the Kolmogorov–Smirnov test; if the categorical variables are distributed normally, an independent t-test will be carried out and if it is not distributed normally, the Mann–Whitney U test will be carried out. If the analysis results have a value $p < 0.25$, then the independent variable qualifies for inclusion in the multivariate linear regression analysis [11], [12].

Linear regression test steps for numerical independent variables are to test for normality using the Kolmogorov–Smirnov test if at least one of the independent variables or numerical variables is distributed normally, a Pearson test will be performed and if the two variables are not distributed normally, the Spearman test will be carried out. If the correlation of the independent variables has a value of $p < 0.25$, the independent variable meets the requirements for inclusion in the multivariate linear regression analysis and vice versa, there is no correlation between the independent variable and the dependent variable. After that, the independent variables that meet the criteria $p < 0.25$ will be entered into multivariate linear regression analysis for analysis [11], [12].

Results

Description of demographic patients

The study sample was comprised of 110 patients (gender 53.2%, working 52.3%, married 59.9%, smoking 55.9%, and Batak ethnicity 51.4%), while for the most comorbidity was 60 subjects. About 54.1%, age has a mean of 44.57 ± 8.35. The median value of the length of education variable is 12, with a minimum value of 6 and a maximum value of 18. The median value of the BMI variable is 23.3 with a minimum value of 18.5 and a maximum of 32.3. The median value of the length of illness variable is 5 with the minimum value is 5 and the maximum value is 15 (Table 1).

Table 1: Demographic characteristics

Demographic characteristic	n (%)	p-value
Gender		
Male	52 (46.8)	<0.001
Female	59 (53.2)	
Employment status		
Employee	58 (52.3)	<0.001
Unemployed	53 (47.7)	
Marital status		
Married	66 (59.5)	0.704
Unmarried	45 (40.5)	
Status Merokok		
Merokok	62 (55.9)	<0.001
Tidak Merokok	49 (44.1)	
Ethnicity		
Batak	57 (51.4)	0.763
Non Batak	54 (48.6)	
Comorbidity		
With	60 (54.1)	<0.001
Without	51 (45.9%)	
Age	44.57 ± 8.35	<0.001
Length of education	12 (6–18)	<0.001
BMI	23.3 (18.5–32.3)	<0.001
Duration of illness	5 (1–15)	<0.001

BMI: Body mass index.

In the multivariate linear regression analysis, it was found that there was a significant relationship

between anxiety scores and length of education (p < 0.001), BMI (p < 0.001), duration of illness (p < 0.001), employment status (p < 0.001), and comorbidity in people with diabetes with an anxiety score (p < 0.021) (Table 2).

Table 2: Multivariate analysis of factors related to anxiety scores in diabetes mellitus outpatients at the Universitas Sumatera Utara Hospital

Factors related to anxiety	Correlation coefficients	Multivariate Regression β	p
Constant		4.91	0.041
Duration of education	−0.20	−0.36	<0.001
BMI	0.31	0.39	<0.001
Duration of illness	−0.17	−0.29	<0.001
Employment status	0.34	3.47	<0.001
Comorbidity	0.12	1.27	0.021

Adjusted R^2 = 82.5%. BMI: Body mass index.

Discussion

The results of the study show that the variables of length of education, BMI, duration of illness, and work status are associated with anxiety scores in people with DM. The results show that the length of education has a negative coefficient of correlation with the anxiety score, which means that the higher the length of education is associated with a lower anxiety score. The BMI variable has a positive correlation coefficient of anxiety score, which means that the higher BMI in people with DM is associated with a higher anxiety score. While the length of illness variable has a negative correlation coefficient of anxiety score, which means that the higher the duration of illness is associated with lower anxiety scores. Meanwhile, the variable of job status, namely not working compared to working, has a positive correlation coefficient, which means that unemployment is associated with higher anxiety scores.

Higher levels of education appear to have protection to anxiety that accumulates throughout life. Education is fairly stable after young adulthood and have tendency to have good mental health. Education is part of a person, not outside of that person. Education may precede and influence employment and income. And also, education enables people to be successful generally and possibly effective in pursuing life goals, including emotional well-being [13]. Education leads patients to a better in understanding the mechanisms of a disease and its complications, leading to increased adherence to treatment so as to produce better results [14]. It seems that higher education person tend to use health services more than those with less education. Better education will help reduce their tendency to unhealthy behavior such as smoking and obesity [6].

Obesity is a strong factor affecting DM manifestations. A study has shown that the risk of DM increases with increasing BMI and when these two factors are present together, the person becomes more

burdened with anxiety. Obesity is also often associated with decreased self-esteem with economic, social, and psychological problems. The participants reported improved psychological status and reduced anxiety, which significantly contributed to the improvement in clinical parameters [15]. This is in line with the results of a 2010 study conducted by Bener in Qatar, where there was an association between obesity and anxiety scores in people with diabetes (p = 0.001) [16].

Work or job status can cause depression and anxiety. People with no job are more prone to anxiety. There are couple rational reasons for describing the relationship between work status and anxiety, sociologically and economically. Unemployed people have reduced sociological functions such as time structure, status and identity, social contact, participation in earning a living, and regular activities. The association between work status and mental health among people with diabetes was assessed in a study and it was confirmed that glycated hemoglobin levels were higher among unemployed people with diabetes than employed people with diabetes [6]. This is also in line with the results of a 2017 study by Nawaz *et al*. in Pakistan which found that there was a relationship between occupational status and the anxiety score of people with type 2 DM (p < 0.001).

The duration of illness is related to anxiety in people with DM. This is associated with a number of challenges, including adjusting to a new diagnosis, diabetes stress that interferes with the management of self, insulin resistance, and the fear of low blood sugar level. In addition, various disorders in psychiatry can arise which contribute to more complexity in assessment and also treatment. Furthermore, many people scared and anxious about having to self-inject or does not have confidence to manage their blood glucose with insulin. The challenges that accompany the diagnosis of diabetes include an adjustment for disease, participation in treatment, and psychosocial difficulties both with themselves and with others [17]. The prevalence of high levels of anxiety symptoms among women recently diagnosed with DM indicates this early period of increased susceptibility to diabetes. Anxiety, which can be decreased over time as you become more familiar with diabetes and with the daily routines associated with diabetes management. Although the disorder may never go away completely, you may experience less daily diabetes-related anxiety over time. The qualitative data also support this hypothesis, the case of women who initially felt "sad" because they had to give up sweet foods but later felt that it had become a "habit," and this is a common pattern. Regardless of how recently a woman is diagnosed with diabetes, restriction of daily performance is a consistent predictor of anxiety symptoms. Limitations in daily functioning are a key factor relating diabetes to psychiatric disorders, and the effect is greater in people with diabetes who are newly diagnosed [18], [19].

Comorbidity such as hypertension which is one of the cardiovascular diseases has been known as a factor for anxiety in many studies among diabetics. Hypertension was also associated with anxiety. These results show that the likelihood of anxiety increases with the development of complications among diabetics [19]. Several studies have shown that the development of comorbidities in diabetics leads to increase disease severity, complications, disability in working, poor life quality and increased use of medical services, and health care costs which leads to increasing anxiety scores [20].

In this study, it can be seen that the results of the study show that the variables of the length of education, BMI, duration of illness, and work status are related to anxiety scores in people with DM. These results were found through multivariate analysis so that what the anxiety scores in people with DM can be seen. Therefore, the variables associated with anxiety scores should be considered as psychopathology in people with diabetes.

Limitations in this study, in assessing symptoms of anxiety only using the HADS-A questionnaire where in diagnosing anxiety, the gold standard is structured interviews based on the DSM-V.

Conclusion

Anxiety symptoms are recognized as a significant risk factor for the development of diabetes. By knowing the factors that influence anxiety scores in people with DM, it is hoped that clinicians will pay more attention to the symptoms of anxiety in people with DM, especially in the early days of diagnosis, and provide intervention as soon as possible.

AQ3 References

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