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Self-perceived Anxiety Symptoms and its Associated Factors among Type 2 Diabetic Patients in Rural Communities of Malaysia

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ABSTRACT

Introduction: Little is known about anxiety symptoms among diabetic patients, especially among those who are living in rural areas in Malaysia. Thus, the aim of this paper is to investigate the prevalence of anxiety among diabetic patients and factors associated with anxiety in rural communities in Malaysia. **Methods:** A cross-sectional study involving 464 diabetes mellitus patients in rural health districts and outpatient clinics in Malaysia was conducted. Each participant was interviewed using the Hospital Anxiety and Depression Scale. **Results:** Respondents consisted of 193 (41.6%) males and 271 (58.4%) females. The mean age of participants was 59.65 ± 10.16 years and the mean duration of diabetes mellitus was 6.9 ± 6.3 years. Results indicate that 15% of the participants have anxiety symptoms. Multiple logistic regression analysis revealed that patients with history of ischemic heart disease and depression and those who were underweight have higher anxiety scores with adjusted OR 5.06 (95% CI 1.79 to 14.27), 27.71 (95% CI 14.23 to 53.98) and 14.6 (95% CI 2.49 to 84.82), respectively. **Conclusions:** This study suggests that although the prevalence of anxiety among diabetics is low, primary care physician should be trained to identify high risk patients and to manage their condition in order to improve the clinical outcome.

KEYWORDS: Anxiety, rural, type 2 diabetes mellitus, cross-sectional

INTRODUCTION

The co-morbidity of physical and mental illness, particularly depression and anxiety has been widely studied [1-4]. Chronic illnesses such as cancer, diabetes and hypertension have been affiliated with higher prevalence of mood disorders [2, 5, 6]. The existence of both physical and mental illnesses simultaneously, provide special challenges to patients in terms of poor disease management, higher health-care costs, more days of missed work and mortality [7-10].

Diabetes mellitus is one of the major leading causes of mortality in the world. According to the WHO report on non-communicable diseases, it is projected to be the 7th leading cause of death in 2030 [11]. About 382 million people worldwide have been diagnosed with diabetes, with an estimate of 5.0 million people having died from the consequences of high blood sugar [12]. In Malaysia, approximately 15.2% (2.6 million) adults aged 18 years and above suffer from diabetes [13].

The majority of diabetic adults have at least one co-morbid chronic disease. Among all, depression and anxiety have been shown to be associated with hyperglycemia, and diabetic patients are almost twice as likely to suffer from anxiety and depression as compared to the general population [14]. In another study conducted on 119 patients receiving treatment for diabetes or hypertension at primary health care clinics in the Western Cape, patients reported experiencing anxiety symptoms such as feeling extremely tense, trembling, nervousness, shakiness and restlessness [15].

Studies on the prevalence of anxiety among diabetic patients in non-western countries are limited compared to the industrially developed countries.

Huang et al. reported that the 1-year prevalence rate of anxiety disorders among diabetic patients in the year 2000 was 128.76 per 1000, and the cumulative prevalence increased to 289.89 per 1000 by the year 2004. The prevalence rate was higher than the general population throughout the observation period. Factors like age 55 years and above, female sex and a low income were associated wither higher prevalence of anxiety [16].

Most studies on mental disturbances involving diabetic patients have focused on depression and very few provided information on the prevalence of anxiety disorders among diabetics. Furthermore, most of these studies were conducted in Western countries or in urban areas. Therefore, this study aimed to investigate the prevalence of anxiety symptoms among diabetic patients and the associated factors in rural communities in Malaysia.

METHODS

This cross-sectional study was conducted among patients with type 2 diabetes mellitus in outpatient clinics within rural health districts in Malaysia between January to June 2015. Prior ethics approval was obtained from the Universiti Teknologi MARA (UiTM) ethics committee. The sample size was calculated using OpenEpisoftware(http://www.openepi.com/OE2.3/menu/openEpiMenu.htm) based on the prevalence rate of 30.5% from the study by Kaur et al. [17] (alpha at 0.05 and power at 80%), and the required sample size was 326. Taking into consideration an attrition rate of 20% and incomplete information, the final sample size was selected as 500.

Consecutive patients attending 10 outpatient clinics were screened for eligibility to participate. The purpose of the study and the procedures involved were explained to potential respondents. Eligible respondents who volunteered to participate were approached for written consent. The inclusion criteria were patients aged 30 years and above with known history of type 2 diabetes mellitus. Patients who refused to participate, with known diagnosis of depression, anxiety or other psychiatric illnesses were excluded.

The socio-demographic data, age, gender, ethnicity, religion, marital status, educational level, occupation, household income, smoking status were recorded. Detailed medical history (hypertension, diabetes mellitus, hypercholesterolemia, ischemic heart disease, stroke, respiratory disease, psychiatric diseases, latest blood pressure reading, glycosylated hemoglobin (HbA1c), weight, height and current medication were extracted from the medical records.

The validated Malay version of Hospital Anxiety and Depression Scale (HADS) questionnaire was used to assess anxiety and depression through face-to-face interview [18] . The questionnaire is a 14 item instrument with two subscales providing separate measures of anxiety and depression (possible ranges from 0 to 21; higher scores on this scale denote more anxious and depressive symptoms). Anxiety and depression were assessed as separate components, each with seven items that were rated from 0 (‘no, not at all’) to 3 (‘yes, definitely’); following which the scores were totaled for each component. A score of 8 and above of the depression subscale or the anxiety subscale of the HADS were considered depressed or anxious respectively.

Statistical Analysis

Data were entered manually into Statistical Package for Social Sciences version 18 (SPSS Inc, IBM, Chicago, IL, USA) and cleaned before analyses. Both descriptive and inferential were used. Univariate statistics were derived for continuous and categorical variables. Bivariate and multivariate analyses were used to measure the strength of association between the variables and identify predictors for the outcome of interest. All test were two-tailed with significance defined as $p < 0.05$. Odds ratios along with 95% confidence levels were derived where appropriate.

RESULTS

Out of the 500 participants recruited, 464 completed the questionnaires (response rate of 92.8%). The baseline characteristics of respondents are shown in Table 1. Respondents consisted of 464 diabetic patients, of which 193 (41.6%) were males and 271 (58.4%) were females. The mean age was 59.65 ± 10.16 years and the mean BMI was 27.7 ± 5.6 kg/m^2. The mean duration of diabetes mellitus was 6.9 ± 6.3 years. The majority of respondents were Malays (64.2%), followed by Chinese (20.1%) and Indians (15.7%). The mean HADS anxiety

and HADS depression scores were 4.14 ± 3.26 and 4.13 ± 3.35 respectively. The prevalence of anxiety as defined by anxiety items score of above 8 was 14.9% (95% CI 12, 18). Only 18.9 % had HbA1c < 6.5%.

Table 1 Distribution of participants by sociodemographic and clinical information

Characteristics	n	(%)	Mean (SD)
Age (years)			59.65 (10.16)
Gender			
Male	193	41.6	
Female	271	58.4	
Ethnicity			
Malay	298	64.2	
Chinese	93	20.1	
Indian	73	15.7	
Employment			
Employed	130	28	
Others	334	72	
Hypertension			
Yes	353	76	
No	111	24	
High cholesterol			
Yes	198	42.7	
No	266	57.3	
Ischemic heart disease			
Yes	198	42.7	
No	266	57.3	
Psychiatric illness in family			
Yes	4	0.9	
No	460	99.1	
Anxious			
Yes	73	15.7	
No	391	84.3	
Depression score			4.13 (3.3)
BMI (kg/m^2)			
Underweight (< 18.5)	8	1.7	27.7 (5.6)
Normal (18.5 - 24.9)	150	32.3	
Overweight & Obese (≥ 25)	306	66	
HbA1C			
≥ 6.5 %	305	81.1	
< 6.5 %	71	18.9	

Table 2 exhibits the factors associated with anxiety among diabetic patients. Patients who were unemployed had higher prevalence of anxiety compared to those who were employed (p = 0.033). Higher prevalence of anxiety were also observed among patients with ischemic heart disease (IHD) (p = 0.002) and depression (p < 0.001). The prevalence of anxiety was higher among underweight patients compared to patients with normal or over-weight (p = 0.002).

Table 2 Prevalence of anxiety according to socio-demographic and other variables

Characteristics	Anxiety n (%)	No Anxiety n (%)	χ^2	*p*
Age (years)				
< 70	53 (13.8)	332 (86.2)	2.179	0.140
≥ 70	16 (20.3)	63 (79.7)		
Gender				
Male	24 (12.4)	169 (87.6)	1.548	0.213
Female	45 (16.6)	226 (83.4)		
Ethnicity				
Malay	38 (12.8)	260 (87.2)	3.469	0.176
Chinese	19 (20.4)	74 (79.6)		
Indian	12 (16.4)	61 (83.6)		
Employment				
Employed	12 (9.2)	118 (90.8)	4.538	0.033
Unemployed	57 (17.1)	277 (82.9)		
Hypertension				
Yes	53 (15)	300 (85)	0.024	0.877
No	16 (14.4)	95 (85.6)		
High cholesterol				
Yes	34 (17.2)	164 (82.8)	1.445	0.229
No	35 (13.2)	231 (86.8)		
Ischemic heart disease				
Yes	34 (17.2)	164 (82.8)	9.399	0.002
No	35 (13.2)	231 (86.8)		
Depressed				
Yes	45 (61.6)	28 (38.4)	149.71	0.000
No	24 (6.1)	367 (93.9)		
BMI				
Underweight (<18.5)	5 (62.5)	3 (37.5)	12.512	0.002
Normal (18.5-24.9)	27 (18)	123 (82)		
Overweight & Obese (≥25)	37 (12.1)	269 (87.9)		
HbA1C				
≥ 6.5 %	34 (11.1)	271 (88.9)	1.030	0.310
< 6.5 %	11 (15.5)	60 (84.5)		

Table 3 shows the factors associated with anxiety among diabetes mellitus patients. Using simple logistic regression, patients who were unemployed, with history of ischemic heart disease (IHD), depression and underweight were found to have higher anxiety scores with OR 2.02 (95% CI 1.05 - 3.91), 3.35 (95% CI 1.49 -7.57), 24.58 (95% CI 3.13 - 46.00) and 10.21 (95% CI 2.38 to 43.76) respectively. However, using multiple logistic regression, only patients with history of IHD, depression and underweight were found to have higher anxiety scores with adjusted OR 5.06 (95% CI 1.79 - 14.27), 27.71 (95% CI 14.23 - 53.98) and 14.6 (95% CI 2.49 - 84.82) respectively.

Table 3 Factors associated with anxiety among diabetic patients

Variable	Simple logistic regression				Multiple logistic regression		
	B (SE)	p	OR	95% CI	Adj. Beta (SE)	p	Adj. OR (95% CI)
Employment							
Employed	Ref						
Unemployed	0.705 (0.336)	0.036	2.023	1.047 - 3.910	-	-	-
Ischemic heart disease							
No	Ref						
Yes	1.210 (0.415)	0.004	3.354	1.487 - 7.566	1.620 (0.53)	0.002	5.06 (1.79 - 14.27)
Depressed							
No	Ref						
Yes	3.2020 (0.320)	0.000	24.576	3.129 - 46.00	3.322 (0.34)	0.000	27.71 (14.23 - 53.98)
BMI (kg/m^2)							
≥ 18.5	Ref						
< 18.5	2.323 (0.743)	0.002	10.208	2.381 - 43.76	2.678 (0.899)	0.003	14.6 (2.498 – 84.82)

DISCUSSION

This study is among the few to use outpatient data to determine the prevalence of anxiety and related factors among diabetic patients in Malaysia, in particular, among the rural population. The results showed that the prevalence of anxiety was 14.9%. Our finding was consistent with the prevalence study by Huang et al [16], who reported that the 1-year prevalence rate was higher in patients with combined anxiety disorders and diabetes 12.9%. The findings are similar to those from other studies using the HADS questionnaire in patients with diabetes and showing that 32% of the patients exceed the HADS threshold cut-off score of 'mild to severe' anxiety [19]. However, it should be noted that there were differences in the instruments and methodology used in these previous studies compared to this study. Another study by Kaur et al [17] also showed a higher prevalence of anxiety (30.5%) among type II diabetic outpatients in Klang Valley. However, this aforementioned study was done using a different instrument, DASS (Depression, Anxiety and Stress Scale), and involved patients from urban areas.

Our study revealed that unemployment, depression, IHD, and being underweight were significant factors associated with anxiety. These findings were consistent with other studies which also showed that unemployment [16, 17], depression [16, 20], IHD and BMI [21] have significant association with anxiety among diabetics. The result revealed unemployment as one of the predictors of anxiety symptoms. According to Erikson's psychosocial stages of life, a healthy personality and emotional development during adulthood is required of a person to contribute a meaningful life to their family and community. Otherwise, a feeling of low self-esteem and instability during unemployment could lead to anxiety and self-doubt [22]. Unemployment influences a person's mental health. Work can improve the quality of mental and physical activities of individual in terms of use of skills, decision making, interpersonal contact and social status [23]. Thus, it is believed that working men and women are psychologically healthier than the unemployed. However, this finding needs further research.

Another significant factor that was associated with anxiety was depression. Many studies had demonstrated the association between depression and diabetes mellitus [14, 17, 20, 21, 24], which further deteriorates the patient's quality of life, causing greater distress and risk of suicide [24]. The symptoms of depression such as mood disturbances, anhedonia, insomnia, anxiety i.e. fear of the future, worries, avoidance or compulsion, may help initially to suggest for psychiatric conditions.

Anxiety symptoms are common in patients with major depression [25]. People who worry about diabetes and its adverse effects, may negatively impact disease management and glycemic control. Patients may start to create more intensive insulin regimes which increase the frequency of hypoglycemia [26]. Furthermore, frequent worries or fears may intrude into the patient's focus or concentration, which may later develop into diabetic complications. Long term complications such as retinopathy and nephropathy can affect daily life, such as poor work performance, personal relationships and recreational activities. Thus, the emotional health of patients with diabetes should be critically examined in order to achieve optimal health and quality of life outcomes.

With regards to medical illness, IHD was found to be significantly associated with anxiety. This reflects the fact that the likelihood of anxiety increases among patients who have complications. Several studies have suggested that chronic anxiety is associated with increased incidence of coronary heart disease (CHD) [27-29]. Anxious patients are more likely to have unhealthy behavior such as smoking, overeating, and insufficient physical activities [30]. Barger & Sydeman [27] found that generalized anxiety disorder independently predicted increased CHD risk, particularly for major risk factors such as smoking and hypertension. A meta-analysis by Roest and colleagues [29], found an association between anxiety and incidence of CHD with a 26% increase in risk. Anxiety was also specifically associated with cardiac mortality, with anxious persons having a 48% increased risk of cardiac death. Further research is needed to investigate if the psychological treatment of anxiety such as cognitive behavior therapy has beneficial impact on the incidence of cardiac disease.

With regards to BMI, past research have shown an inverse relationship between BMI and anxiety [31]. Underweight patients have been reported to have high levels of anxiety at 62.5% compared to overweight patients at only 12.1%. [32]. It was found that underweight people had a higher incident rate of anxiety compared to their other counterparts, if factors such as physical health, physical activity, social support, duration of education and financial factors were controlled. Therefore, those who are underweight and have a negative well-being have a greater risk of anxiety and depression.

Limitations of the Study

Since this is a cross-sectional study, the cause and effect relationship cannot be established. The HADS questionnaire is only a screening tool and is not diagnostic for specific psychiatric disorders.

CONCLUSIONS

This study revealed that the prevalence of anxiety symptoms was relatively high among rural diabetic patients. Unemployment, past history of IHD, being depressed and underweight are predictors of anxiety symptoms. Primary care physicians should be trained to identify high risk patients in order to manage the condition better in order to improve the clinical outcomes.

Conflict of Interest

Authors declare none.

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