



Prevalence of Depression and Its Associated Factors among Diabetes Mellitus Patients in an Urban Primary Care Clinic

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Authors' contributions

This work was carried out in collaboration between both authors. Author MM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author KA performed the writing of the final draft of the manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: To determine the prevalence of depression among patients with Diabetes Mellitus and to identify its associated risk factors.

Study design: This is a cross sectional study.

Place of study: This study was conducted in an urban primary care clinic in a tertiary hospital in Malaysia.

Methodology: This study utilized a self-administered questionnaire, Hospital Anxiety and Depression scale (HADS-D) for the data collection. A total of 358 respondents were eligible to be included in this study.

Results: A total of 382 respondents were recruited in this study using universal sampling method. A total number of 358 eligible respondents were included in the final data analysis. The response rate for this study was 94%. Respondents' mean age was 60.8 years \pm 10.3, 56% females, 38% Malays, 76% were married, 37.7% had Diabetes for more than 5 years and 76.3% had completed secondary school education. This study concluded that 63.7% of participants had poor diabetes control and 26% had probable depression. On multiple logistic regression, respondents who

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earned income less than RM 500 per month were 2.6 times more likely to have probable depression (aOR: 2.64, 95% CI:1.29 -5.43). Patients who received no formal education were 4.5 times more likely to have probable depression (aOR: 4.51 95% CI:1.74-11.63). Respondents with co-morbid illness were almost 3 times more likely to have probable depression (aOR: 2.92, 95% CI: 0.1-0.8).

Conclusion: Prevalence of probable depression was high and there was a significant association between depression with income, education level and co-morbid illness. Thus, there is a need to identify and manage depression accordingly among diabetic patients.

Keywords: Depression; diabetes; screening; primary care; Malaysia.

1. INTRODUCTION

Diabetes Mellitus (DM) is a major global chronic health problem. In Malaysia, the prevalence of DM based on National Health Morbidity Survey (NHMS V) is 18.3%. [1] The improvement in diabetes care requires urgent attention from all healthcare professionals. Diabetes Mellitus is associated with many co-morbidities including mental health illness [1].

Depression has been shown to have relationship with chronic disease such as diabetes. [2] Results from previous research found that depression has been associated with hyperglycaemia [3] and complications related to diabetes [4].

Physicians are generally aware of the risk of depression in chronic illness such as DM. However, due to time constraints during the clinic and busy schedules, this problem tends to be ignored. The physicians are unable to allocate sufficient time and effort to focus on the psychological factors contributing to the patient's worsening of diabetic control. It is therefore important for primary care physicians to have a good screening tool to assess probable depression among patients with diabetes.

This study was conducted to determine the prevalence of probable depression among patients with DM and to identify the associated risk factors.

2. METHODS

This was a cross sectional study done in an urban primary care clinic in a tertiary hospital in Malaysia. A total of 382 respondents were recruited in this study using universal sampling method. The final total numbers of respondents that fulfilled the inclusion criteria was 358. The response rate for this study was 94%.

Hospital Anxiety and Depression (HADS-D) questionnaire was used as a screening tool to

identify probable depression among the DM patients. The HADS is a 14-item self-rating questionnaire that includes 7-items which screen for anxiety and another 7-items which screen for depression. It was developed by Zigmond and Snaith, specifically designed for use in non-psychiatric hospital departments. [5] However, it was also found to be a reliable instrument for screening anxiety and depression in patients attending non-psychiatric units, such as general medical clinics. This scale has been shown to be feasible for use in different settings, cultures and countries. [6,7] In this study only the depression part of the questionnaire was used for the study respondents. Wilkinson and Barczak [8] found that it has an excellent ability to detect DSM IV defined psychiatric morbidity. The HADS ROC curve showed a score of 8+ with a mean sensitivity of 0.83 and mean specificity of 0.79 for depression [9].

Patients that met the inclusion and exclusion criteria were approached and explained about the study using information sheets written in both English and Malay language. Patients consent was obtained using an informed consent form. Upon obtaining consent, patients were requested to complete the HADS –D questionnaires along with their demographic data. The researcher counterchecked all self-answered questionnaires to identify missing or incomplete data. The researcher reminded the respondents to complete all the questionnaires. At the end of the clinic session, the completed questionnaires were compiled. Data entry and analysis was done using Statistical Package for the Social Sciences (SPSS) version 25.0. Permission from the ethical committee was obtained for the study.

Data extracted from the questionnaires and results of sugar control that were collected from each respondent were entered into the study database. Continuous data such as age were analysed using mean and standard deviation.

Chi square test was used to study the association between categorical variables such as age, occupation and educational status against total of the HADS –D score. T-test analysis was used to analyse the prevalence of probable depression using the total HADS-D Score. Linear regression analysis was used to determine the correlation of the demographic variables and depression. Continuous variables of the demography of respondents were analysed using binary logistics regression to determine the association with depression. Statistically significant result was achieved when the p value was < 0.05 . The odds ratio was calculated within 95% confidence interval using regression analysis.

3. RESULTS

A total of 358 respondents completed the questionnaires and were eligible for data analysis. Respondents' mean age was 60.8 years \pm 10.3, and their ages ranged from 20 to 90 years. Demographic characteristic of the respondents in this study is as shown in Table 1. More than half (56.1%) were female respondents and 38% were of Malay ethnicity. Majority of the respondents (76%) were married and 37.7% of them were diagnosed with DM of more than 10 years duration. Majority of the respondents (76.3%) received secondary school education.

Table 1. Demography of the respondents (N=358)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	157	43.9
Female	201	56.1
Race		
Malay	136	38
Chinese	96	26.8
Indian	118	33
Others	8	2.2
Marital Status		
Single	27	7.5
Married/Couple	272	76
Divorce/separated/widow	59	16.3
Duration of Diabetes Mellitus		
≤ 5 years	122	34.1
5 – 10 years	101	28.2
≥ 10 years	135	37.7
Education level		
No formal education	19	5.3
Primary school education	66	18.4
Secondary school education and others	273	76.3

Table 2. Distribution of the HbA1c level of the respondents (N = 358)

HbA1c level	n (%)
HbA1 $> 7\%$	228 (63.7)
HbA1c $\leq 7\%$	130 (36.3)

Among the respondents, 63.7 % had a HbA1c level of more than 7%. The target for good control of HbA1c is $<6.5\%$ according to the World Health Organization (WHO) criteria.

Table 3. Distribution of the total HADS – Depression Score (N = 358)

HADS – Depression Score	Number of respondents (n)	Percentage (%)
Depression present	93	26
Depression absent	265	74

The HADS-D self-administered questionnaire identified 26% of respondents had probable depression

Table 4. Association between income, education level and co-morbidities with total HADS – D Score

Variables	Depression		aOR, 95% CI	p-value
	Present n (%)	Absent n (%)		
Income per month				
≤ RM 500	52 (31.0)	116 (69)	2.64(1.29 -5.43)	0.05
RM 500 -RM 1500	30 (26.3)	84 (73.7)		
≥ RM 1501	11 (14.5)	65 (85.5)		
Education level				
No formal education	10 (52.6)	9 (47.4)	4.51 (1.74-11.63)	0.05
Primary school education	29(43.9)	37 (56.1)		
Secondary school education and others	54 (19.8)	219 (80.2)		
*Co-morbid illness				
Only diabetes mellitus	36 (24.5)	111 (75.5)	2.92 (0.1-0.8)	0.05
1 co-morbid illness	49 (25.0)	147 (75.0)		
2 and more co-morbid illness	8 (53.3)	7 (46.7)		

Table 4 showed, the adjusted Odds ratio of the associated factors for depression among the respondents. Using multiple logistic regression analysis, there was a significant association between total income earned per month, education level and diabetic patients with co-morbid illness with probable depression.

Respondents who earned a total income less than RM 500 per month were 2.6 times more likely to have probable depression (aOR: 2.64, 95% CI:1.29 -5.43) compared to those who earned more. Respondents who had no formal education were 4.5 times (aOR: 4.51 95% CI:1.74-11.63) more likely to have probable depression compared to their peers with primary, secondary and other education. The result also showed that diabetic patients with co-morbid illness were almost 3 times more likely at risk of probable depression compared to patients who had only diabetes (aOR: 2.92, 95% CI: 0.1-0.8). We can conclude that respondents who earned lesser income were more likely to have probable depression. Furthermore, respondents who received no formal education were more likely to have probable depression. Hence, higher income and higher education level are protective factors to avoid depression.

4. DISCUSSION

Depression among patients with chronic diseases such as diabetes is escalating. Clinical

guidelines advise to do screening for depression in patients with diabetes. The Patient Health Questionnaire (PHQ-9) and the depression subscale of the Hospital Anxiety and Depression Scale (HADS-D) were commonly used in the primary care clinics for screening. [10] HADS is an appropriate questionnaire to be utilized in the primary care clinic setting for probable depression screening. [11]

Many studies have shown the link between depression and DM. A study by Anderson et al [11-15] concluded that the overall prevalence of depression was higher among the diabetes mellitus patients when compared to the non-diabetics. A meta-analysis conducted by Anderson et al. [12] concluded that diabetic patients were two times more likely to be depressed when compared to non-diabetics.

Depression rate was higher among the diabetic patients compared to the community dwelling Malaysian population, which was 2.3% in 2019 [1]. A study found that the prevalence of depression among oncology patients receiving chemotherapy was even higher at 34% [13].

There was a high prevalence rate (26%) of probable depression in this study compared to other published studies [16-18]. This could be due to the fact that the study was conducted in

an urban primary care clinic in a tertiary hospital. Patients who attended this clinic were a mixture of local residents and referrals from all over the country and many of whom were expected to have co-morbidities. Diabetic patients with co-morbidity are more vulnerable to become depressed. Patients who are newly diagnosed type 2 diabetes were more likely to be depressed [19,20]. A variety of other factors influences the severity of depressive symptoms. Evidence shows that the more uncontrolled one's diabetes is, the higher chances that those patients would have underlying depression. [21-24] Socio-economic factors are also associated with an increased risk of depression in diabetic patients. The results of this study concluded that the lower income patients were associated with a higher risk of probable depression compared to the higher income patients. A study by Gregory et al [25] concluded that high risk predictors in developing depression amongst diabetic patients include age, gender, ethnic groups, marital status, occupation, income earned per month, duration of diabetes mellitus and also education level. He also concluded that there was a significant association between depression and income earned per month as well as education level of the respondents. Data published in Diabetes Care 2001 [26] emphasized the impact of diabetes and other life stressors triggered depression and anxiety among the Latino and European-American (EA) patients with diabetes.

Non-exposure to formal education is a known predictor to develop depression amongst diabetic patients. The study concluded that those with formal education were at a lower risk of developing probable depression compared to those with no formal education. Wayne Katon et al. [21] looked at the description of behavioral and clinical factors associated with depression. The study results highlighted that lower education level is associated with an increased risk of depression. There are various reasons that explained the relationship between low-income, low education levels and the elevated risk of depression. In the urban settings, high cost of living will inevitably affect people with low-income level. There is a rising health care, medication as well as healthy diet costs.

The result of this study demonstrated that HbA1c level was more than 7.0% in 63.7% of respondents. This showed that majority had uncontrolled diabetes mellitus. The results of this study have highlighted evidence regarding multifactorial predictors of depression especially

among diabetes patients. A study led by Fortmann and his team [27] has used a social-ecological framework to examine predictors of depression, diabetes self-management, and clinical indicators of health risk among Hispanics with type 2 diabetes residing in the United States of America. His findings suggest that programs aiming to improve diabetes self-management and health outcomes in Hispanics with type 2 diabetes should consider multilevel, social, and environmental influences on health, behavior, and emotional well-being. The results obtained in this study may not be generalized in other primary care setting due to the differences in the study setting.

Recommended treatment, medication intake and dietary intervention among diabetics was not covered in the scope of this study. This was a cross sectional study, so it is unable to determine causality of probable depression among the diabetic patients. Clinical assessment is needed to confirm the diagnosis of depression.

5. CONCLUSION

This study concluded that there was a high prevalence of probable depression among diabetics. The risk factors associated with probable depression among the respondents were co-morbid illness, income and education level.

CONSENT

All authors declare that written informed consent was obtained for publication of this manuscript.

ETHICAL APPROVAL

Authors have obtained all necessary ethical approval from the Institution for the publication of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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