PREVALENCE AND DETERMINANTS OF DIABETES DISTRESS AMONG TYPE 2 DIABETES MELLITUS (T2DM) WITH INSULIN THERAPY IN A PRIMARY HEALTH CARE CENTRE

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Abstract

Individuals with diabetes mellitus experience psychological issues associated with their disease and involve multiple states related to diabetes management. Insulin distress is a significant contributor to diabetes distress. The objective of this study is to identify the prevalence and determinants of diabetes distress among type 2 Diabetes Mellitus (T2DM) with insulin therapy in the setting of primary health care. Methods: This cross-sectional study was conducted from 1st August 2022 to 30th December 2022 at Sungai Buloh Health Clinic, Selangor, Malaysia. 300 T2DM with insulin therapy were recruited and screened for diabetes distress status. Their sociodemographic and relevant medical profiles were recorded, and the Diabetes Distress Scale (DDS) was used to measure diabetes distress. Results: Diabetes distress was prevalent among insulin respondents at a rate of 24.3%, with 13.2% of patients experiencing emotion-related distress, 7.7% experiencing regimen-related distress, 2.3% experiencing interpersonal-related distress, and 1.1% experiencing physician-related diabetes distress.The significant determinants for diabetes distress among diabetic cases were education with (OR = 0.248, 95% CI: 0.116-2.101), diabetes duration (OR = 0.415, 95% CI: 0.235- 0.735), exercises (OR = 17.91, 95% CI: 2.337-137.32), FBS (OR = 0.517, 95% CI: 0.283- 0.945), HbA1c (OR = 2.774, 95% CI: 1.249-6.159).Conclusion: The present study shows that diabetes distress prevalence is present among T2DM with insulin therapy. Then, suggested components of diabetes distress should be implemented as screening strategies among T2DM with insulin therapy to prevent the late detection of psychiatric disorders. The study highlights comprehensive planning, holistic collaboration, and integrated strategies to improve patient adherence and health outcomes.

Keywords: Diabetes distress, Insulin Therapy, Type 2 Diabetes Mellitus, Glycated Haemoglobin

Introduction

Malaysia has one of the highest prevalences of diabetes in the world and the highest rate in the Western Pacific area, with an annual cost of almost US$600 million (1, 2). Patient with diabetes distress has a unique response, often hidden emotional stresses and anxiousness when dealing with a serious, challenging chronic illness such as diabetes (3). Diabetes distress lasts longer than clinical depression and differs from coping with the disease (3-5). According to a prior study, those with high depressive affect do not have clinical depression but feel extremely distressed because of their diabetes (4, 6). According to research, the prevalence of diabetes distress ranges from 18% to 35%, and 17.2% of diabetic patients did not have diabetes distress at the time of their initial assessment but did over the subsequent 18 months (7). When a person is diagnosed with diabetes, their daily life changes, and patients may become anxious and stressed because they struggle to cope with the disease (8). Studies show that insulin is one of the major contributors to diabetes distress (9). Primary health care is one of the main doors for providing health care services in Malaysia. Family medicine specialists in primary health care manage chronic diseases such as T2DM, hypertension, and dyslipidemia. The components of diabetes distress are important among diabetes patients; however, the number of studies on diabetes distress prevalences among T2DM with insulin is still low. Most previous studies highlight the

emotional coping among Type 1 Diabetes Mellitus (T1DM). In addition, the high prevalence of diabetes results in the high number of consultations during clinic session, inducing low screen of diabetes distress among the population. All these factors highlight the significance of diabetes distress in diabetes management, and assessing factors for diabetes distress is crucial to implementing effective intervention strategies to get the best outcome (10). Therefore, our study aimed to determine the prevalence and contributing factors of diabetes distress in Malaysian primary care patients with T2DM receiving insulin therapy.

Methodology

Study design and setting

A total of 300 individuals with type 2 diabetes Mellitus (T2DM) at the Sungai Buloh health clinic in Selangor, Malaysia, participated in this cross-sectional study conducted between 1st August 2022 and 30th December 2022. Sungai Buloh health clinic was chosen due to one of Selangor's most active patients with T2DM. The number of active patients is estimated at 3,500 (National Diabetes Registry, 2022).

Sampling and sample size

The sample size is determined from the number of patients who received insulin therapy in Sungai Buloh health clinic, with an estimated 1,350 patients. Using Raosoft calculation with a 5% margin error, a 95% confidence level recommended 300 respondents as the sample size. Using non-purposive sampling, respondents were recruited from Monday until Friday during their appointment clinic session. The researcher personally approaches the respondents while waiting for the consultation queue. All patients were received the patient information sheet (PIS) form regarding the study, and meanwhile the questionnaire given once the patient agreed and signed the consent form. All participants were informed that all data would be kept private and confidential.

The inclusion criteria of this study were all patients diagnosed with T2DM, who received insulin therapy for more than one year, used insulin pens as devices and aged more than 18 years old, male and female. The exclusion criteria are gestational diabetes mellitus (GDM), type 2 diabetes mellitus (T1DM), using a syringe as a method of insulin injections and presenting with psychiatric illness.

Instrument

To measure the variables in this study, which is prevalence and determinants of diabetes distress, the researcher used a set questionnaire with Malay and English version to determine the study's objective. These instruments consist of three section which is section one for sociodemographics (gender, education level, age, income, occupation), section two for medical profile (height, weight, body mass index, waist, duration of use diabetes, numbers injections per day, HbA1c, fasting plasma glucose, exercises record), and section three for diabetes distress score. Using Diabetes Distress Scale (DDS) (11). The diabetes distress part consists of 17 items that address emotional distress, physician-related distress, regimen-related distress, and interpersonal distress. Each of the 17 items was scored based on how much it distressed or bothered diabetics in the previous month. Each item had six responses: (1: Not a problem, 2: A slight Problem, 3: A moderate Problem, 4: Somewhat of a serious problem, 5: A serious problem, 6: A very serious problem). The total score was calculated by summing all the item scores and dividing the result by 17. The mean item score of more than 3 (> 3) indicates distress requiring clinical attention (12).

Data statistical analysis

The information compilation was entered into Microsoft Excel and analysed using IBM SPSS Statistics version 26. Descriptive statistical analysis was conducted to determine the prevalence of diabetes distress; meanwhile, a binary logistic regression model was used to determine the predictors of diabetes distress. Findings were reported as frequency (n), percentage (%), odds ratio (OR) and confidence intervals of 95%. (CI). The significance level was defined as $P < 0.05$ in all the tests.

Result

Demographic and clinical variables of participants

Table 1 shows the result of the Demographic and Clinical Variables of Participants. This study enrolled a total of 300 patients.; 93 (31%) are male, 207 (69%) are female, and 34.74 (SD = 1.48) years. The majority of respondents' educational background is secondary school 132 (44%), and 120 (40%) respondents are unemployed. The majority of the respondent has controlled glycated haemoglobin (HbA1c < 7%), with 170 (56.7%) and 130 (43.3%) having uncontrolled glycated haemoglobin (HbA1c > 7%).

Table 1: Basic demographic and clinical data

Characteristics	N (%); mean±SD
Gender [b]	
Male	93 (31%)
Female	207 (69%)
Education[b]	
Degree/Master/PhD	79 (26.3%)
Diploma	31 (10.3%)
Primary school	44 (14.7%)
Secondary School	132 (44%)
No formal education	14 (4.0%)
Age (in years) [g]	24-36,34.74 ± 1.48
Income (RM/months) [g]	3271 ± 6.07
Occupation[b]	
Employed	141 (47%)
Unemployed	159 (53%)

Table 1: Basic demographic and clinical data (continued)

Characteristics	N (%); mean±SD
Height(cm) [a]	158.35 ± 9.86
Weight(kg) [a]	73.14 ± 15.61
BMI(Kg/m^2) [a]	28.95 ± 5.44
Waist (cm) [a]	97.40 ± 11.15
Duration of diabetes(years) [a]	10.50 ± 6.54
Numbers of injections(per/days) [a b]	2.96 ± 1.12
1 time/day	24 (8%)
2 times/day	120 (40%)
4 times/day	156 (52%)
HbA1c (%) [a]	8.38 ± 1.82
Fasting plasma sugar(mg/dl) [a]	6.85 ± 1.72
Exercises (150min/week) [b]	
Perform	217 (72.3%)
Not Performed	83 (27.7%)

Note: [a] Mean ± standard deviation; [b] frequency (%).

Prevalence of diabetes distress

Table 2 shows the prevalence of diabetes distress. In the study, 300 diabetic individuals were assessed for diabetes distress. Of 300 respondents, 73(24.3%) reported having diabetes distress. Among those, 40(13.2%) reported emotional distress, 23(7.7%) reported regimen-related distress, 7(2.3%)reported interpersonal distress, and 3(1.1%) reported physician-related distress. Female respondents show the highest prevalence of diabetes distress, with 49(16.33%) compared to men 24(8%). A total of 57 (19%) show distress with four-time insulin injections per day, 14 (11.7%) for twice injections per day and two (2.7%) with a single injection per day.

Table 2: Prevalence of diabetes distress

Characteristics	N (%)
Absent of diabetes distress	227 (75.7)
Present of diabetes distress	73 (24.3)
Emotional distress	40 (13.2)
Regimen-related distress	23 (7.7)
Interpersonal distress	7 (2.3)
Physician-related distress	3 (1.1)

Note: frequency (%).

Predictors of diabetes distress

Table 3. displays the results of a logistic regression study as a predictor of diabetic distress among patients with diabetes mellitus. The predictors of diabetes distress are education with (OR = 0.248, 95% CI: 0.116-2.101), diabetes duration (OR = 0.415, 95% CI: 0.235-0.735), exercises (OR = 17.91, 95% CI: 2.337-137.32), FBS (OR = 0.517, 95% CI: 0.283-0.945), HbA1c (OR = 2.774, 95% CI: 1.249-6.159). The highest odds ratio is for exercises, with 17.91, followed by HbA1c (2.774), fasting plasma sugar (0.517), diabetes duration (0.415) and 0.248 for education level.

Table 3: Results of logistic regression analysis as a predictor of diabetes distress among T2DM with insulin therapy.

Diabetes Distress				
Independent Variables	Odds ratio	95% CI for OR		*P-value*
		Lower	Upper	
Education level	0.248	0.116	0.529	0.000*
Diabetes durations	0.415	0.235	0.735	0.003*
Exercises	17.91	2.337	137.32	0.005*
Fasting plasma sugar	0.517	0.283	0.945	0.032*
HbA1c (%)	2.774	1.249	6.159	0.012*

**Significant at level P < 0.05. B, coefficient; CI, confidence interval; OR, odds ratio*

Discussion

Prevalence of diabetes distress

This investigation aims to investigate the prevalence and determinants of diabetes distress among T2DM with insulin. The findings reveal that the prevalence of diabetes distress was 24.3%, whereas the range in the previous studies was between 18% and 35%.(7, 13-15). Emotional diabetes distress shows the highest prevalence in this study. This result could be due to difficulty adapting to diabetes management, psychological response towards disease progress and merging daily routine with insulin injections (16). In addition, applying insulin injection induces an emotional response due to the recommendation to use insulin, discomfort, depression, or refusal due to a perceived failure to meet the insulin therapy criterion (9). Meanwhile, the mean age range of respondents using insulin therapy in this current study is between twenty-four and thirty-six years old. This situation induces emotional coping by merging with the lifestyle, working routine, myths of insulin, cost of insulin needles, and diverse social, psychological, and physical pressures faced by young adults were contributory (17). This current study shows that the prevalence of diabetes distress is higher among females than males (16.3% vs 8%), where these factors may induce higher emotional diabetes distress. This could be because of the pregnancy experienced, menstrual cycle changes, and the time after giving birth, as well as other stressors like work and home responsibilities, being a single parent, taking care of children, and caring for elderly parents, which are all of these things can cause emotional distress (5). Through this study indicates that diabetes distress induces an emotional response towards the complexity of the regimes, adaption to starting insulin in treatments and denial phase toward insulin therapy. This currents study

parallels with another study in which diabetes distress causes emotional responses due to regime variation and the denial phase to adapt (9). The current study revealed that diabetes distress presents higher among respondents with four-time insulin injections per day compared to twice per day and a single injection per day. This current study proves the presence of diabetes distress among T2DM with insulin therapy. However, the overwhelming prevalence of diabetes in Malaysia results in low screening for diabetes distress among T2DM. Early screening is important to reduce the risk of developing late-onset of mental illnesses such as depression. A randomised study was conducted to compare the Penn Resilience Program for type 1 diabetes (PRP T1D) with Advanced Diabetes Education, and the results PRP T1D is significant in preventing the late state of depression by identifying early symptoms of diabetes distress (18). In addition, education programs are able to reduce diabetes distress by providing information towards disease coping (19). Another study shows the effectiveness of education in changing behaviours on emotional coping strategies (20).

Determinants of diabetes distress

In the current study, level of education, duration of diabetes, physical activity, fasting plasma glucose, and haemoglobin A1c were revealed to be the most significant predictors of high diabetes distress scores among diabetes patients. Interestingly, a recent study found that exercise strongly predicts diabetes distress. Previous studies also found exercise as a strong predictor (5), which indicates diet and physical activity have a strong relationship with diabetes distress (21). This current study result shows a significant relationship between exercise and diabetes distress may contribute to the high number of respondents in this study who perform exercises (150 min/week). In addition, diabetes distress may present due to inducing emotional coping, where all of them need to merge with the daily routine, working and, at the same time, need to perform exercises.

This current study shows that education is one of the predictors of diabetes distress. The result may be attributed due to a low level of education that results in poor knowledge of the diseases. Poor knowledge can increase the risk of poor compliance and poor adaption to dietary routines (14). As a result of poor knowledge, outcomes are poor self-diabetes care management leading to the risk of developing diabetes complications. A previous study reported that diabetes distress was higher among those with low education background and developed high numbers of diabetes complications (7).

The current study highlights the same finding as various studies where HbA1c and fasting plasma glucose are significant determinants of diabetes distress (4, 6, 7). However, it is challenging to understand the intricate relationships between blood glucose levels, diabetes symptoms and diabetic distress. Previous study indicates that the data linking A1C level, fasting, and depression is inconsistent, where it found that diabetes distress and depression happened among control and uncontrol glycaemic level respondents (22)depression symptoms and diabetes symptoms. Therefore, further research needs to implement to see the actual relationship between the inconsistence result between glycaemic control and diabetes distress.

Another determinant of diabetes distress is the duration of diabetes. Participants with diabetes for more than ten years had a lower risk of diabetes distress compared to those with DM within five years (11). As the disease seld coping management, there is an improvement to adjusting, adapting, learning the diseases skills and awareness towards managing the disease.

Significant and limitations of this study

This study indicates that diabetes distress screening is an important component to be integrated into the diabetes management routine. The earlier intervention of diabetes distress is able to help patients from developing late symptoms of mental illness such as depression. In addition, this study highlights that diabetes stress is higher among 30 to 40 years respondents compared to age more than 60 years old. Therefore, modification intervention approaches need to be empowered among dedicated diabetes teams to provide holistic care, especially for T2DM with insulin therapy. In addition, the number of studies in this same scope still needs to grow in Malaysia. It can be used as guidelines to facilitate and provide expanded research in future.

However, there is a limitation of this study where the study design is cross-sectional, causing a limit in determining the causality of the relationship. In addition, this study did not record some critical variables such as family history, duration of insulin use, number of drug prescriptions, and social support. The sample size only represents the populations of this study setting only. However, the result is still able to indicate the presence of prevalence of diabetes distress among T2DM with insulin

Conclusion

The present study provided evidence of the prevalence of diabetes distress among T2DM, particularly those receiving insulin therapy. Then, suggestions for diabetic patients with insulin receive screened for diabetes distress as part of the diabetes care management routine. Components of psychological support need to be integrated into diabetes management as part of earlier interventions to detect emotional stress, which may lead to mental illness. The study provides insight into collaborative, comprehensive, and integrative diabetes care for better adherence and health outcome for the patient's management.

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Conflict of interest

The authors declare that they have no competing interests.

Ethical clearance

Ministry of Health Malaysia (MOH) Medical Research and Ethics Committee (MREC) has granted ethical permission for this study: NMRR ID-22-00862-UHA (IIR) and REC/07/2022 (PG/FB/16) from the UiTM Research Ethics Committee.

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