Psychiatry Research 252 (2017) 45–50

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Diabetes-related distress and its associated factors among patients with type 2 diabetes mellitus in China

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ARTICLE INFO

Keywords:
Chinese
Diabetes
Diabetes-related distress
Self-efficacy
Sleep time, Insulin, Physical activity

ABSTRACT

Diabetes-related distress is one of the psychological disorders affecting patients with diabetes, yet there are few studies about diabetes-related distress in Chinese patients. To assess the level of psychological distress and examine its associated factors, we conducted a cross-sectional analysis of patients with type 2 diabetes mellitus from a Chinese tertiary hospital. The Diabetes Distress Scale (DDS) and the General Self-Efficacy Scale (GSES) were administered. There were 210 (57.85%) patients with little or no diabetes-related distress, 84 (23.14%) with moderate diabetes-related distress and 69 (19.01%) with high diabetes-related distress. Stepwise multiple linear regression showed that sleep time was significantly related to the DDS total score and the subscale scores of emotional burden (EB) (β=−0.190, −0.379), respectively. GSES was associated with the DDS total score (β=−0.128) and the EB score (β=−0.153). Oral medication plus insulin was significantly related to regimen-related distress (RD) (β=0.137), physician-related distress (PD) (β=0.152) and interpersonal distress (ID) (β=0.103). Physical activity (β=−0.185) and making meal plan with health care professionals(HCP) (β=−0.169) were associated with RD. The prevalence of diabetes-related distress among patients with type 2 diabetes mellitus was high in China. DDS and EB were associated with poorer sleep time and lower self-efficacy. Interventions to improve sleep are needed. Qualitative and longitudinal studies are required to understand why type 2 diabetic patients are not getting enough sleep.

1. Introduction

Living with diabetes can be challenging and stressful. Research has shown that anxiety disorders and depression are the most common psychological comorbid conditions among patients with type 2 diabetes mellitus (Kawada, 2016; Brieler et al., 2016). Particularly, the prevalence of depression among this group of patients is 1.5–3.0 times higher than that found in the general population (Munhoz et al., 2015; Park and Brown, 2015). Depression has been shown to adversely affect diabetes treatment outcomes and patient self-management behaviors. Diabetes-related distress includes negative emotional reactions to the diagnosis, the threat of complications and self-management demands that add much stress to patients' day to day living (Stanković et al., 2013). Diabetes-related distress, depression, and subclinical depression are all psychologic disorders affecting patients with diabetes (Chew et al., 2016; Zhang et al., 2013). Zhang et al. (2013) found that diabetes-related distress is a predictor of depression and plays an important role in treatment adherence. Therefore, screening for diabetes-related distress is important for primary prevention of depression and other psychologic problems in diabetes patients. There is evidence to suggest that poor sleep was related to a decline in the living quality of patients with diabetes (Luyster and Dunbar-Jacob, 2011). The relationship between depression and sleep has been widely studied in China (Zhao and Li, 2016; Zhang and Lou, 2016), yet there is no research about the relationship between sleep time and diabetes-related distress in China.

Maintaining an appropriate glycemic control is important to prevent complications of diabetes. The American Diabetes Association guidelines (American Diabetes Association, 2016) recommend that a reasonable HbA1c goal for type 2 diabetes mellitus

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http://dx.doi.org/10.1016/j.psychres.2017.02.049
Received 11 April 2016; Received in revised form 8 February 2017; Accepted 14 February 2017
Available online 24 February 2017
0165-1781/

patients is < 7%, but many people do not meet the treatment goal (Ali et al., 2013). Emotional distress made the required self-management of the disease more difficult and limited the patients' management of self-care activities necessary to achieve an adequate glycemic control (Aikens, 2012). In both cross-sectional and longitudinal analyses, Fisher et al. (2010) found that diabetes-related distress, but not clinical depression or depressive symptoms, is associated with HbA1c. Moreover, in patients with diabetes, the prevalence of distress is much higher than depression (Nicolucci et al., 2013), so it is crucial to evaluate the relationship between diabetes-related distress and HbA1c among patients with type 2 diabetes mellitus in China. Apart from HbA1c, other related factors such as age, gender, treatment adherence and social support have been examined (Polonsky et al., 2005; Ogbera and Adeyemi-Doro, 2011; Karlsen and Bru, 2014) in Caucasian, we found one study analyzed the relationship between diabetes-related distress and its related factors in China (Kong et al., 2013), but the subjects were type 1 diabetes patients. Therefore, the aims of the current study were to examine the prevalence of diabetes-related distress and evaluate its associated factors in patients with type 2 diabetes mellitus in China.

2. Methods

2.1. Design and participants

This cross-sectional survey was conducted at a tertiary hospital in Nanjing, Jiangsu Province, China using a convenience sample of patients with type 2 diabetes mellitus who visited the hospital between June and December 2014. The inclusion criteria were patients aged 18 years or older, had type 2 diabetes mellitus for at least 3 months and were able to communicate fluently and clearly. Exclusion criteria were pregnancy, type 1 diabetes, dementia, psychosis, or severe illnesses such as cancer. Patients who met the eligibility criteria and signed the informed consent were recruited to complete the surveys. This study was approved by the hospital's Ethics Committee. The five nurse researchers trained as data collectors used uniform instructions in order to guarantee the quality of data collection. Patients' demographic and clinical characteristics were collected from the medical records. The data collectors obtained further information face to face on sleep time, hypoglycemia and complications. All questionnaires were completed by patients in a quiet room with the assistance of a data collector. The same language guide was used when patients were completing the surveys.

Three hundred and sixty-three out of 384 eligible patients completed the questionnaires, representing a 94.5% response rate. Their ages ranged from 23 to 82 years of age. Age was divided into three groups according to age criteria for the classification of the World Health Organization. Mean age of the youth, middle-aged and elderly were 36.6 ± 6.3 y, 52.4 ± 4.1 y, and 66.2 ± 4.9 y.

2.2. Measurements

2.2.1. Chinese version of Diabetes Distress Scale (DDS)

The DDS was developed by Polonsky et al. (2005) to evaluate psychological distress of patients with diabetes. The scale has established reliability (Cronbach's alpha of 0.88–0.93). In 2010, Yang and Liu (2010) translated the scale into Chinese, and reported Cronbach's alphas of 0.84–0.95 and test-retest reliability of 0.849 in Chinese patients. The Chinese DDS includes 17 items measuring four dimensions: emotional burden (EB, 5 items), physician-related distress (PD, 4 items), regimen-related distress (RD, 5 items), and diabetes-related interpersonal distress (ID, 3 items). These items use a six-point Likert scale ranging from 1 (no distress) to 6 (high distress). A total score was calculated by adding the 17 items. Higher scores indicate greater distress (Graue et al., 2012). According to the revised rating system developed by Fisher et al. (2012), a mean item score < 2 indicates little or no distress; 2–3 indicates moderate distress; and > 3 indicates high distress.

2.2.2. Chinese version of General Self-Efficacy Scale (GSES)

The GSES, developed by Schwarzer and Born (1997), was used to evaluate patients' self-efficacy. After modification, the final version includes 10 items from the original 20 items. Yang and Liu (2010) translated the scale into Chinese. Each item contains 4 options: 1 (totally wrong), 2 (basically right), 3 (almost right) and 4 (absolutely right). The internal consistency reliability was 0.87, the test-retest reliability was 0.83 and the correlation coefficient among the total score and each item ranged from 0.60–0.77 (Zhang and Schwarzer, 1995).

2.2.3. Calculation of sleep time

The majority of Chinese people have a habit of taking a daily noon time nap, and nap is an important part of daily sleep for Chinese people. In our study, the sleep time included night sleep time and nap time (30–120 min). When we analyze the relationship between sleep time and diabetes-related distress and the dimensions of diabetes-related distress, we use the total sleep time (night sleep+nap).

2.3. Statistical methods

SPSS version 15.0 (SPSS Inc., Chicago, IL, USA) was used to carry out statistical analyses. Values were reported as mean ± SD or frequency and percent where applicable. We used Shapiro-Wilk test to examine the distribution of the measurement data. The independent two-sample T-test and analysis of variance (ANOVA) for multiple independent samples were performed for the data with a normal distribution. Non-parametric tests including Mann-Whitney *U* test and Kruskal-Wallis H test were used for data that did not exhibit a normal distribution. Spearman correlation was used to examine relationship between diabetes-related distress (with four subscales) and patient characteristics, which including diabetes duration, weight, BMI, times of diabetes education, physical activity, exercise time, making diet plan with medical staff, treatment regimen, lipid profile, SBP, DBP and HbA1c and GSES. A stepwise multiple regression model was performed. DDS and four subscales were the dependent variables. Independent variables were those that statistically correlated to diabetes-related distress. If the $\alpha \leq 0.05$, the variables were entered into the model, and the variables were ruled out with $\alpha \geq 0.10$. A two-tailed $\alpha = 0.05$ was considered significant. Standardized coefficients β were used to directly reflect to what extent the independent variables affect the dependent variables.

3. Results

3.1. DDS total scores in patients' overall features and 3 columns with patients' characteristics stratified according to the different diabetes-related distress categories

Demographic and clinical characteristics included Age (55.3 ± 11.7y), Male (58.1%), Female (41.9%), HbA1c (9.7 ± 2.6%), weight (67.2 ± 11.8 kg), BMI (24.5 ± 3.3 kg/㎡), SBP (129.7 ± 16.1 mmHg), DBP (80.6 ± 9.8 mmHg), Triglycerides (40.3 ± 34.9 mg/dl), Total cholesterol (44.5 ± 27.9 mg/dl), Low-density lipoprotein cholesterol (53.3 ± 25.4 mg/dl), High-density lipoprotein cholesterol (21.4 ± 13.1 mg/dl) and GSES (2.8 ± 1.0), duration of diabetes (7.1 ± 6.3y) and GSES (2.8 ± 1.0) for the total sample and also stratified according to the different diabetes-related distress categories are reported in Table 1. We compared the DDS total scores across groups of patients with different characteristics. Married patients had a lower score than those who were unmarried, widowed or divorced (P=0.033). Patients who did not use any medication to control blood glucose got the lowest scores, while those who used oral plus insulin got the highest scores (P=0.047). And inactive people got higher score (P=0.029).