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Prevalence of depression and its associated factors in patients with type 2 diabetes: A cross-sectional study in Dhaka, Bangladesh

Sheikh Mohammed Shariful Islam [a,b,*], Lal B. Rawal [c], Louis W. Niessen [d]

[a] Chronic Non-Communicable Diseases Unit, Center for Equity and Health Systems, International Center for Diarrhoeal Diseases Research, Bangladesh (icddr,b), 68, Shaheed Tajuddin Ahmed Sarani, Mohakhali, Dhaka 1212, Bangladesh
[b] Center for International Health (CIH), Ludwig-Maximilians-Universität (LMU), Leopoldstrasse 7, 80802 Munich, Germany
[c] Universal Health Coverage, Center for Equity and Health Systems, International Center for Diarrhoeal Diseases Research, Bangladesh (icddr,b), 68, Shaheed Tajuddin Ahmed Sarani, Mohakhali, Dhaka 1212, Bangladesh
[d] Centre for Applied Health Research and Delivery, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA, UK

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ABSTRACT

Depression is a common feature in patients with type 2 diabetes and often remains undetected and untreated, causing increased morbidity and mortality. We explored the prevalence of co-morbid depression and its associated factors, including major life-events among patients with type 2 diabetes in Bangladesh. We conducted a cross-sectional study among 515 patients with type 2 diabetes between September 2013 and July 2014 in a tertiary hospital in Dhaka city. We assessed depression using Patient Health Questionnaire-9 (PHQ-9) with predefined cut-off scores of 5, 10, 15 and 20 to indicate minimal, mild, moderate, moderately-severe, and severe depression. Associations between depression and its associated factors were explored using univariate and multivariate regression. Overall, 61.9% participants had depressive symptoms, and the prevalence was higher among females (70.9%) compared to males (50.6%). One-third (35.7%) of participants had mild depression and 36.2% had moderate to severe depression. In the multivariate analysis, factors significantly associated with depression were: age $\leq$ 60 years (OR: 2.1, 95% CI = 1.2–3.6; $p \leq 0.006$), female gender (OR = 1.9, 95% CI = 1.3–3.0; $p \leq 0.002$), those having 1–3 complications (OR = 2.3, 95% CI = 1.2–4.3; $p = 0.010$), experienced loss of business or crop failure (OR = 2.1, 95% CI = 1.2–3.6; $p = 0.006$), major family conflicts (OR = 2.2, 95% CI = 1.4–3.5; $p \leq 0.001$), separation or deaths of family members or divorce (OR = 2.2, 95% CI = 1.4–3.5; $p \leq 0.001$), and those who experienced unavailability of food or medicines (OR = 2.2, 95% CI = 1.0–4.5; $p = 0.038$). Patients with diabetes, especially females, those having other complications, and major life-events should routinely be screened for symptoms of depression with adequate management of these conditions.

1. Introduction

In recent years, the prevalence of non-communicable diseases (NCDs) has increased dramatically, especially in developing countries, such as Bangladesh (Karar et al., 2009; Saquib et al., 2012; Shariful Islam et al., 2014). Diabetes and depression are two major NCDs that are expected to increase to epidemic level in several developing countries. Globally, around 382 million people are suffering from diabetes and this number is projected to reach 592 million by 2035, with more than a 70% increase in Southeast Asia (International Diabetes Federation, 2013). In the next two decades, the number of people with diabetes in Bangladesh is projected to reach 16.8 million, which will cause a significant burden on the existing health systems (International Diabetes Federation, 2013).

Patients with diabetes suffer from depression almost twice compared to those without diabetes (Anderson et al., 2001; Carney, 1998). Co-morbid depression causes worse prognosis of diabetes such as higher complications, treatment resistance and mortality. Moreover, patients with co-morbid depression report higher rates of medical symptoms and healthcare seeking, more hospitalizations, inpatient days, and higher healthcare expenditure, as well as impaired communication with healthcare provider and lower

* Corresponding author at: Center for Control of Chronic Diseases (CCCD), International Center for Diarrhoeal Diseases Research, Bangladesh (icddr,b), 68, Shaheed Tajuddin Ahmed Sarani, Mohakhali, Dhaka 1212, Bangladesh.
Tel.: +880 2 9827001 10; fax: +880 2 8823963.
E-mail addresses: shariful@lrz.uni-muenchen.de, shariful.islam@icddrb.org (S.M.S. Islam), lalrawal@icddrb.org (L.B. Rawal), Louis.Niessen@lstmed.ac.uk (L.W. Niessen).

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treatment satisfaction (Katon et al., 2005). Previous studies have demonstrated that depression not only affects the mood but also affects functioning of individuals (Katon et al., 1999; Wells et al., 1989). Evidence suggests that depression among patients with diabetes might cause poorer glycaemic control, decreased physical activity, increased obesity, decreased adherence to medication, and more serious complications (Ciechanowski et al., 2000; De Groot et al., 2001; Egede and Zheng, 2003; Katon et al., 2004; Lustman et al., 2000).

Both diabetes and depression can be managed through effective psychological and medical interventions, but under-detection and under-recognition of depression remains an important barrier to treatment in primary healthcare (Leone et al., 2012). The stigma of mental illness might be another barrier to the identification of depression. Information on the attributing factors of depression in patients with diabetes is essential to develop preventive strategies and management of this comorbid condition in the primary healthcare level. There is limited information on the prevalence and factors associated with depression among patients with type 2 diabetes in Bangladesh. This study aimed to assess the prevalence of depression, and its associated factors including life events among patients with type 2 diabetes in Bangladesh.

2. Material and methods

This study was conducted as part of a mobile phone intervention trial for increasing adherence to treatment for type 2 diabetes patients in Bangladesh, carried out between September 2013 and July 2014 at the Bangladesh Institute of Health Science (BIHS) hospital in Dhaka, Bangladesh. The study protocol has been published elsewhere (Islam et al., 2014a). In short, 515 consecutive patients with type 2 diabetes attending the outpatient department (OPD) of BIHS hospital were selected for the study. BIHS hospital is a tertiary care hospital offering quality care to outpatients and inpatients of all socioeconomic classes. Participants were recruited if they had been diagnosed as a patient with type 2 diabetes by the BIHS attending physician as per WHO criteria, were on oral medication therapy, living in Dhaka and registered with the BIHS hospital. We excluded patients with type 1 diabetes, gestational diabetes, those on insulin therapy and seriously ill patients not able to provide the interviews. Participants were briefed about the objective of the study, confidentiality, their rights to refuse to participate and responsibilities. Written informed consent was obtained from all participants before data collection. The study protocol approved by the Research Review Committee and Ethical Review Committees of ICDDR,B Dhaka, Bangladesh and the study was performed in accordance with the Declaration of Helsinki.

2.1. Data collection

Data were collected by the study team through face-to-face interview using a structured questionnaire. We pre-tested the questionnaire among 50 participants in another hospital in Dhaka and after necessary modification it was used for this study. Information was collected on the following variables: sociodemographic information such as age, sex, education, marital status, duration of diabetes, and self-reported complications. Anthropometric measurement of weight, height, waist and hip circumference were performed and waist–hip ratio (WHR) and body mass index (BMI) were calculated. Blood pressure was measured using digital blood pressure monitor (Omron, SEM-1, Omron Corp., Japan) in both arms after 5 min of rest in sitting position and the average of the two measurements were reported. Blood tests on FPG, OGTT, 2 h post-meal glucose (2hAFB) and Glycated Hemoglobin (HbA1c) were measured at the BIHS Research Laboratory. Anthropometric and blood pressure measurements were performed according to study protocol (Islam et al., 2014a). Diabetes was defined according to the WHO criteria by the BIHS physician: Fasting plasma glucose (FPG) $\geq$ 7.0 mmol/L (126 mg/dL) or, 75 g oral glucose tolerance test (OGTT) with FPG $\geq$ 7.0 mmol/L (126 mg/dL) and/or 2 h plasma glucose $\geq$11.1 mmol/L (200 mg/dL). Hypertension was defined as systolic blood pressure $\geq$140 mmHg and or diastolic blood pressure $\geq$90 mmHg as per JNC 7 guidelines.

2.2. Assessment of depression

To assess the depressive symptoms among the study participants we used the Patient Health Questionnaire-9 (PHQ-9). The PHQ-9 has been one of the most convenient tools used in primary healthcare for diagnosis of depression and yields a major depression diagnosis according to DSM-IV criteria with a continuous severity score. The PHQ-9 has shown a high agreement with major depression diagnosis based on structured interviews conducted with 78% sensitivity and 98% specificity (Kroenke et al., 2001; Spitzer et al., 1999). We used the standard cut-off scores with the PHQ-9 to classify no or minimal (0–4), mild (5–9), and moderate to severe ($\geq$10) symptoms of depression.

2.3. Data analysis

We analyzed the data using SPSS version 18.0 (SPSS Corporation, Texas, USA). Continuous variables were reported as mean $\pm$ SD and categorical variables as frequencies and percentages. We compared the differences between the groups using the *t*-test for continuous variables and chi-square tests for categorical variables as appropriate. Factors associated with depression scores $\geq$04 were analyzed using binary logistic regression. Multiple regression analysis were performed for factors that were significant in the univariate analysis. A p value of <0.05 was considered statistically significant.

3. Results

Of the 515 respondents, 288 (55.92%) were females with overall mean age $\pm$ standard deviation 49.94 $\pm$ 10.21 years. The majority of the participants were married (87.18%), completed higher secondary level education or above (40.48%) and had a family history of diabetes (68.0%). The overall sociodemographic information of the participants are described elsewhere (Islam et al., 2014b).

3.1. Prevalence of depression

Overall, 35.7% of participants had mild depression and 26.2% had moderate to severe depression (Fig. 1; Table 1). The association

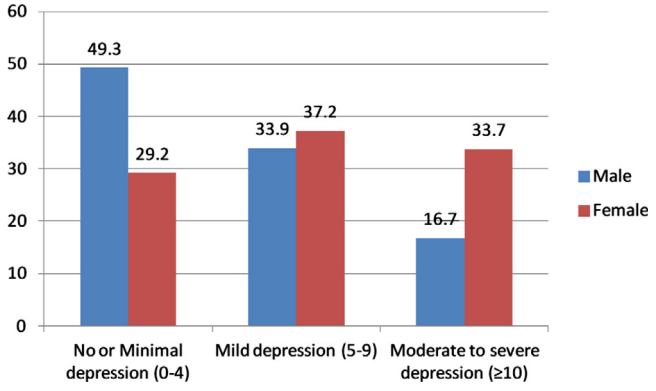

Fig. 1. Prevalence of depression among the study participants.