Original Research

Gender Differences in the Relationship between Anxiety Symptoms and Physical Inactivity in a Community-Based Sample of Adults with Type 2 Diabetes

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ABSTRACT

Objective: To examine the association between physical inactivity and anxiety symptoms in a community-based sample of men and women with type 2 diabetes mellitus.
Methods: Eligibility criteria included residents of Quebec, Canada aged between 40 and 75 years, having a diagnosis of type 2 diabetes ($\leq$ 10 years), being insulin-naive and having participated in a previous telephone-based survey of diabetes treatments. Of the 2028 eligible respondents, 1953 (96.3%) provided information on anxiety symptoms and were included in this analysis. Participants were interviewed and provided information on diabetes-related clinical and sociodemographic factors.
Results: A total of 27.3% of participants reported being physically inactive. The prevalence of mild to severe anxiety symptoms was 22.9%. Persons with mild anxiety symptoms and moderate to severe anxiety symptoms were 1.4 times and 1.7 times more likely to report being inactive than persons without anxiety symptoms, respectively. Subgroup analyses according to gender revealed that women who had mild anxiety symptoms were 1.5 times more likely to report being inactive compared with women who did not have anxiety symptoms, whereas men who had moderate to severe anxiety symptoms were 2.5 times more likely to be inactive than men who did not have anxiety symptoms.
Conclusions: Anxiety symptoms in the mild and moderate to severe range are a relevant clinical comorbidity in persons with type 2 diabetes, and men may represent a particularly vulnerable subgroup. Future research is recommended to further assess the relationship between anxiety symptoms and diabetes-related health behaviours.

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RÉSUMÉ

Objectif : Examiner le lien entre l'inactivité physique et les symptômes de l'anxiété d'un échantillon d'hommes et de femmes de la population générale ayant le diabète sucré de type 2.
Méthodes : Les critères d'admissibilité comprenaient les résidents du Québec, au Canada, âgés de 40 à 75 ans, ayant un diagnostic de diabète de type 2 ($\leq$ 10 ans) et étant insulino-naïfs, qui avaient participé à une précédente enquête par téléphone sur les traitements du diabète. Parmi les 2028 répondants admissibles, 1953 (96,3 %) répondants qui avaient fourni des détails sur les symptômes d'anxiété ont été inclus dans cette analyse. Les participants ont été interviewés et ont fourni des renseignements sur les facteurs cliniques et sociodémographiques liés au diabète.
Résultats : Un total de 27,3 % des participants ont rapporté être inactifs physiquement. La prévalence des symptômes d'anxiété légère à grave était de 22,9 %. Les personnes qui avaient des symptômes d'anxiété légère et des symptômes d'anxiété modérée à grave étaient respectivement 1,4 fois et 1,7 fois plus susceptibles de rapporter être inactives que les personnes n'ayant pas de symptômes d'anxiété. Les analyses en sous-groupes selon le sexe révélaient que les femmes qui avaient des symptômes d'anxiété

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légère étaient 1,5 fois plus susceptibles de rapporter être inactives que les femmes qui n'avaient pas de symptômes d'anxiété, tandis que les hommes qui avaient des symptômes d'anxiété modérée à grave étaient 2,5 fois plus susceptibles d'être inactifs que les hommes qui n'avaient pas de symptômes d'anxiété.

Conclusions : Les symptômes d'anxiété dans la fourchette légère et dans la fourchette modérée à grave représentent une comorbidité clinique pertinente chez les personnes ayant le diabète de type 2, et les hommes pourraient représenter un sous-groupe particulièrement vulnérable. D'autres recherches sont recommandées pour évaluer davantage le lien entre les symptômes d'anxiété et les comportements de santé liés au diabète.

Introduction

Diabetes mellitus (DM) is a chronic, progressive medical condition affecting approximately 6.4% of the Canadian population; type 2 diabetes comprises 90% to 95% of all DM cases in Canada (1,2). Standard treatment for type 2 diabetes is focused on glucose regulation and includes a combination of pharmacological and nonpharmacological interventions (3). Regular physical activity is an important component of diabetes treatment and is associated with many health benefits including improvements in glycosylated hemoglobin levels, improved lipid profiles (4—6), reduced incidence of nonfatal cardiovascular events and increased insulin sensitivity (7—9). Physical inactivity is considered to be a key risk factor for the development of a number of diseases including type 2 diabetes (10,11). For persons living with type 2 diabetes, physical inactivity is associated with a 1.7-fold increase in the risk of all-cause mortality (12).

The mental health of people with diabetes has been shown to be associated with physical inactivity. For example, in a review of 12 studies, a depressed mood in persons with type 2 diabetes was associated with a 1.2- to 1.9-fold increase in the risk of being physically inactive (13). Anxiety is particularly relevant as it is a common comorbidity among people with diabetes. The prevalence of anxiety disorders in diabetes has been estimated at 14%, and 40% of persons with DM report elevated levels of subsyndromal anxiety (14). Additionally, anxiety and depression are often comorbid in persons with diabetes (15).

Few studies to date have assessed the relationship between anxiety symptoms and physical activity in persons with type 2 diabetes. In a 2010 study by Khuwaja et al (16), subjects categorized as having anxiety were 1.47 times more likely to report being physically inactive (defined as participating in <20 minutes of exercise or a brisk walk fewer than 4 times per week) than subjects without anxiety. In another study, Balhara et al (17) assessed the univariate relationship between anxiety scores and the duration of daily physical exercise (measured in minutes) and found a moderate correlation (r=0.25) between the 2 variables. However, that particular study did not control for potential confounding variables. In both studies (16,17), participants were recruited from outpatient clinics and, therefore, the results may lack generalizability to the population. To the best of our knowledge, no study to date has investigated the relationship between anxiety and physical inactivity in a community-based sample of persons with type 2 diabetes.

The objectives of the current study are 2-fold. A first objective is to explore the relationship between anxiety and physical inactivity in a community-based sample of persons living with type 2 diabetes. Additionally, the relationship between anxiety symptoms and physical inactivity may differ according to gender. Women with type 2 diabetes are more likely than men to report clinically relevant anxiety symptoms (14,18,19) and are more likely to be physically inactive than men (20,21). Therefore, a second objective of this study is to assess the relationship between physical inactivity and anxiety symptom level according to gender.

Subjects

Participants in the current study took part in the baseline evaluation of the Evaluation of Diabetes Treatment (EDIT) study in 2011. The EDIT study is a longitudinal community-based survey of people with type 2 diabetes who are being followed up over 4 years to evaluate diabetes treatment, including transition to insulin therapy. Participants were recruited through mailing lists and random digit dialling (for more information, see Smith et al [22]). Inclusion criteria were being aged between 40 and 75 years of age, being insulin naive, a Quebec resident and having a self-reported physician's diagnosis of type 2 diabetes mellitus received within the previous 10 years. A total of 2028 subjects were identified as eligible and completed the interview process. Participants who did not provide answers to questions relating to anxiety symptom level or physical activity level were excluded from the analysis. A total of 1953 participants were considered for the final sample. This study uses baseline data collected in 2011.

Ethical approval and informed consent

The protocol was reviewed and approved by the Research Ethics Committee of the Douglas Mental Health University Institute, McGill University, Montréal. All participants were briefed as to the purpose of the study and gave their informed consent before survey commencement. Participants received a $10 monetary compensation for their participation.

Methods

Self-report instruments

Anxiety symptoms

The Generalized Anxiety Disorder 7-item scale (GAD-7) was used to assess anxiety symptoms (23). Participants were asked to rate the frequency/severity of 7 symptoms during the previous 2 weeks. Symptom severity categories were as follows: not at all, coded as 0; several days, coded as 1; more than half the days, coded as 2; and nearly every day, coded as 3. Summary scores on the GAD-7 are obtained by summing participant's responses on questions 1 through 7. The maximum score is 21, with higher scores indicating greater severity of symptoms. Scores between 5 and 10 on the GAD-7 indicate mild to moderate generalized anxiety symptoms, and scores greater than 10 reflect moderate to severe generalized anxiety symptoms. The GAD-7 has high specificity (82%) and high sensitivity (89%) when a cutoff of 10 is used to identify possible cases of generalized anxiety disorder (23). For all analyses, subject's anxiety scores were categorized into groups reflecting no anxiety symptoms, mild anxiety symptoms, or moderate to severe anxiety symptoms, in accordance with the cutoff values described above.

Physical inactivity

To determine physical inactivity, participants were asked to report the number of days over the previous month spent engaged