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Review article

The burden of suicidal ideation among persons with type II diabetes: A scoping review

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ABSTRACT

Objective: Diabetes is a major global health concern. People with diabetes have worse mental health outcomes than those without diabetes. Researchers have recently sought to examine the relationship between diabetes and suicidal ideation. The aim of this study is to determine the burden of suicidal ideation among adults with type II diabetes from existing literature.

Methods: We conducted a scoping review of published literature in PubMed, PsycINFO, CINAHL, Web of Science, and Google Scholar published before March 2017. To identify relevant literature, search terms included *suicidal ideation* and *type II diabetes*. The search was limited to English language peer-reviewed journal articles. The main outcome of interest was suicidal ideation captured on a validated scale in a population with type II diabetes.

Results: This review resulted in 10 relevant studies, which reported the prevalence of suicidal ideation ranging from 2.5–51.4% with a median prevalence of 18.6% among adults with diabetes. Across the five studies reporting the associated risks, all but one study found a significant risk for persons with diabetes to endorse suicidal ideation and only three studies adjusted for depression.

Conclusions: This review demonstrates the need for future studies to investigate potential mechanistic pathways of suicidality among persons with diabetes.

1. Introduction

Diabetes mellitus is a growing major global health concern [1,2]. The prevalence of diabetes ranges from 6 to 13% and is highest in low-income countries [3]. Between 2005 and 2015, the incidence of diabetes increased at an alarming pace, from 333 million cases to 435 million cases [4], and more than 700 million adults are expected to have diabetes by the year 2025 [5]. The global cost of diabetes in 2014 was estimated at $825 billion annually [5]. Given the increased incidence of diabetes and its associated cost, it is important to better understand the disease as it relates to other conditions.

Among persons with diabetes, mental health problems are well documented, and depression is the most common problem [6]. In fact, persons with diabetes are twice as likely to experience depression compared to those without diabetes [7]. A large body of research finds the relationship between diabetes and depression is bidirectional, where depression is associated with decreased metabolic control and diabetes may increase depressive symptoms [8]. Studies have also shown that depressive illness in those with diabetes is associated with increased risk for medical complications, disability, and mortality [9–12].

One lesser-known correlate of depression is suicidal ideation, or thoughts of self-harm, which can lead to suicide attempts. To date, the majority of the research on diabetes and suicidality is on adolescents experiencing type I diabetes (T1DM) [13]. For example, in a longitudinal cohort study of suicide victims with insulin dependent diabetes, the standard mortality rate (SMR) was 2.98 among men ages 20–24 [14]. In a sample of adults in Taiwan, the SMR was 1.38 among patients with diabetes [15]. In a Finnish population study of all suicides, over 3% had diabetes at time of death. Among the Finnish adults with diabetes who completed suicide, 34.6% had type I diabetes and 65.4% had type II diabetes (T2DM) [16]. These studies demonstrate the importance of cross-checking suicides by diabetes status and the need to recognize the risks associated with mental health problems among those with T2DM.

Suicidal ideation is often a precursor to suicides. Assessing suicidal ideation is a strategy for identifying those at risk for suicide both in population studies and in health services research. One of the most

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common approaches to identify suicidal ideation is through examining specific symptoms included on depression screens. For example, item nine on the Patient Health Questionnaire (PHQ-9) asks *"Thoughts that you would be better off dead, or of hurting yourself in some way (over the last 2 weeks)?"* In the academic literature, most of the findings on suicidal ideation are derived from depression scales. However, many existing population registry studies of diabetes and suicidal ideation might not account for the potential mediating effects of depression.

Although recent reviews of the relationship between diabetes and suicidal ideation have either focused on T1DM or included both types of diabetes [17,18], no reviews have synthesized the state of knowledge on the burden of suicidal ideation and T2DM in adults. Currently, T2DM is far more common than T1DM and affects a growing segment of the global population. A review is necessary to establish the extent of SI and T2DM in order to improve targeted interventions and clinical practices. Moreover, depression is associated with SI and this might explain some of the effects (if any) between SI and T2DM. The aim of this study is to determine the extent of the problem of suicidal ideation among adults with T2DM through a scoping review of existing literature. Furthermore, this study intends to describe potential mediating effects (if any) of depression and suicidal ideation among persons with diabetes.

2. Methods

This scoping review used Arksey and O'Malley's methodological framework for conducting scoping reviews [19]. There are five stages in conducting the scoping review according to their framework, which include: 1) identifying the research question; 2) identifying relevant studies; 3) study selection; 4) charting the data; and 5) collating, summarizing, and reporting the results. In addition to the scoping review framework, we performed a quality assessment of included studies.

2.1. Identifying relevant studies

Five electronic databases were searched in order to identify both health and social science literature: PubMed, PsycINFO, CINAHL, Web of Science, and Google Scholar. In addition, reference lists were reviewed for all studies that met the criteria of this scoping review to identify potentially relevant studies.

2.2. Selecting literature

Search terms were developed by the research team to capture articles that might include the prevalence of our topic. Keywords were used in any combination with "suicidal thoughts" AND "diabetes"; "suicidal ideation" AND "diabetes"; "suicidality" AND "diabetes"; "suicide" AND "diabetes"; "suicidal ideation" AND "type II diabetes"; "suicide" AND "type II diabetes." Our inclusion criteria included: a measure of suicidal ideation, participants with T2DM, and published in English language.

2.3. Study selection

After an initial search, 261 articles were identified. All titles were extracted and entered into a spreadsheet. Two authors (K.T. and N.P.) reviewed each title and selected articles for abstract review. A total of 20 articles remained for an abstract review. Twelve full texts were reviewed with 10 studies included for our scoping review (Fig. 1) .

2.4. Charting and summarizing the data

Table 1 provides the study characteristics and prevalence of suicidal ideation among persons with diabetes. Table 2 provides the point estimates and confidence intervals for any of the remaining articles that used multivariate statistics to assess the strength of the association between suicidal ideation and diabetes.

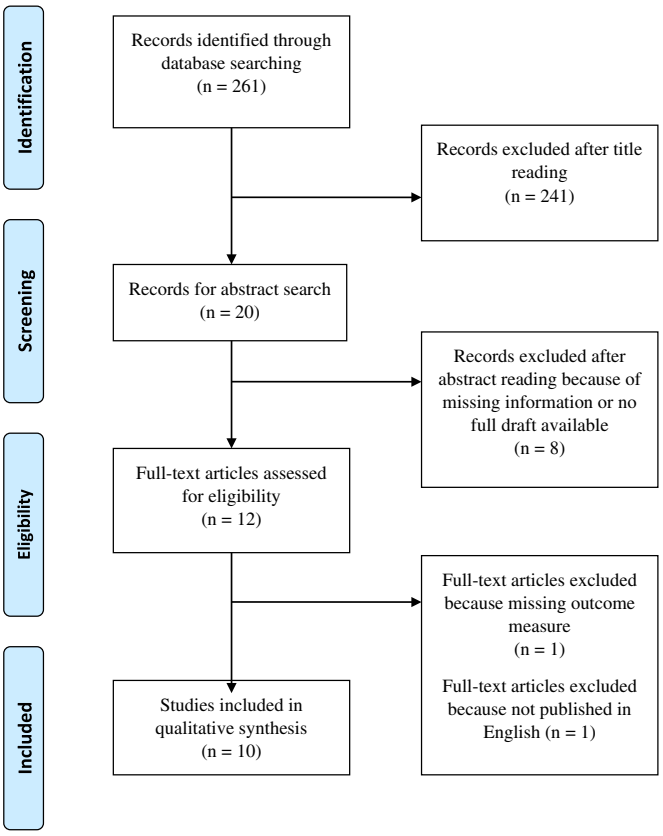

Fig. 1. Flow chart of study selection.

2.5. Quality assessment

After completion of the searches, the remaining studies were assessed for quality using a modified version of the National Heart, Lung, and Blood Institute for Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies [20]. We created an additional question: "Was depressive illness controlled for in the study?" Articles were assigned a category of low, medium, or high risk of bias, with 15 representing the lowest bias and 0 representing the highest bias. Article scores ranged from 6 to 15, with a mean score of 11. Articles with a quality score ranging from 6 to 9 were noted as high risk of bias. Articles with a quality score from 10 to 13 were noted as medium risk of bias. Articles with a quality score of 14–15 were considered to be low risk of bias.

3. Results

The results are organized and presented by the measures used and frequency found in the literature. The majority of study samples were from South Korea and one study used a multinational sampling framework. All but one study reported the prevalence of SI, which ranged from 2.5–51.4% with a median of 18.6%. Five of 10 studies conducted multivariable regression analyses to measure the association between SI and diabetes. Four of the five studies found that persons with diabetes were more likely to experience SI compared to those without diabetes (Table 2). Only three studies [21,22,24] sought to examine the mediating role of depression among persons with diabetes and found even after adjusting for depression that there was a significant association between SI and T2DM.

Across the 10 studies, there were six different types of screening instruments used to measure suicidal ideation. They include the Patent