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Review

Depression and type 2 diabetes in low- and middle-income countries: A systematic review



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ABSTRACT

Eighty percent of people with type 2 diabetes reside in low- and middle-income countries (LMICs). Yet much of the research around depression among people with diabetes has been conducted in high-income countries (HICs). In this systematic review we searched Ovid Medline, PubMed, and PsychINFO for studies that assessed depression among people with type 2 diabetes in LMICs. Our focus on quantitative studies provided a prevalence of comorbid depression among those with diabetes. We reviewed 48 studies from 1,091 references. We found that this research has been conducted primarily in middle-income countries, including India ($n = 8$), Mexico ($n = 8$), Brazil ($n = 5$), and China ($n = 5$). There was variation in prevalence of comorbid depression across studies, but these differences did not reveal regional differences and seemed to result from study sample (e.g., urban vs rural and clinical vs population-based samples). Fifteen depression inventories were administered across the studies. We concluded that despite substantial diabetes burden in LMICs, few studies have reviewed comorbid depression and diabetes. Our review suggests depression among people with diabetes in LMICs may be higher than in HICs. Evidence from these 48 studies underscores the need for comprehensive mental health care that can be integrated into diabetes care within LMIC health systems.

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Contents

1. Introduction.....	277
2. Methods.....	277
2.1. Search strategy.....	277
2.2. Identification of studies.....	278

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2.3. Analysis	278
3. Results	278
3.1. Sub-Saharan Africa	279
3.2. East and South Asia	279
3.3. Europe and Central Asia	279
3.4. Latin America	279
3.5. Middle East	279
3.6. Depression Inventories	282
4. Discussion	282
5. Recommendations	283
Acknowledgements	283
References	283

1. Introduction

Two *Lancet* series published in 2007 and 2011 have drawn attention to recognize global mental health. The articles not only identified mental health as a cause of 14% of the global burden of disease but also emphasized the role of mental health in physical health conditions [1]. However, while they provided evidence for comorbidities between mental and physical health, including depression and type 2 diabetes, much of the evidence came from high-income countries (HICs). To date, few studies have systematically evaluated the role of mental health problems in chronic diseases in low- and middle-income countries (LMICs).

The International Diabetes Federation (IDF) estimated that 382 million people had type 2 diabetes in 2013 [2]. Diabetes is increasing in every country, but 80% of people with diabetes live in LMICs and around half of those are undiagnosed [2]. In 2011, the IDF projected that diabetes alone resulted in USD 465 billion dollars in healthcare expenditures, and 11% of all healthcare expenditures in adults between 20 and 79 years of age [3]. However, they failed to consider the relative import of depression and other common mental disorders in these health expenditures. Indeed, meta-analyses from HICs indicate that people with diabetes are twice as likely to be depressed when compared to people without diabetes [4] and that such depression contributes not only to increased diabetes disability and morbidity [5,6] but also to increased health system burden [7,8].

In HICs there is a documented bidirectional relationship between depression and type 2 diabetes [8–12]. While living with diabetes contributes to depression [13,14], depression among those with diabetes is associated with non-adherence to diabetes treatment [15–18], increased diabetes complications, [19] and poor glycemic control [20]. Biological and behavioral pathways also link depression to diabetes via neurohormonal pathways, alterations in glucose transport, increased immuno-inflammatory activation, behavioral pathways, and use of anti-depressants [21–23]. To date there is no concrete evidence to confirm the bidirectionality of depression and diabetes in LMICs, but one may hypothesize that a similar relationship holds true even in LMICs.

Similarly, little is known about who is most affected by depression and diabetes in LMICs or how social and healthcare experiences affect disease outcomes. Meta-analyses from HICs reveal that low-income groups with diabetes do not

necessarily have higher rates of acute depression when compared to the general population [24]. Rather, they suggest that poor access to depression care and the resultant chronicity of psychological distress among poorer people with diabetes contributes to adverse health outcomes [25]. Indeed, these meta-analyses suggest that comorbid depression among those with diabetes is more common among those who are poor, women, older age, overweight, and smoke [26,27]. Understanding who is most affected by comorbid depression among those with diabetes in LMICs is particularly important due to the residual effect of the double burden of diseases. In many cases, those with severe neurological problems, such as schizophrenia, lack sufficient mental health care [28] so providing depression care alone and together with diabetes care remains a challenge.

The relationship of diabetes and depression has not been reviewed in detail from LMICs. We conducted a systematic review of quantitative studies that have documented comorbid depression among people with type 2 diabetes in LMICs in order to situate the global problem of comorbidity on the map.

2. Methods

2.1. Search strategy

We searched Ovid Medline, PubMed, and PsychInfo databases, using Medical Subject Heading (MeSH) terms (or equivalent terms for PsychInfo) in February and March 2012 for published peer-review journal articles. We used combinations of the following MeSH terms: “Diabetes Mellitus” or “Diabetes Mellitus, Type 2,” and “Depression” or “Depressive Disorder.” We limited the broad search by including: NOT “United States.” We then reviewed all article titles in order to exclude those studies conducted in HICs according to the World Bank’s Human Development Index (HDI). Then, we repeated the search in Ovid Medline and PubMed with MeSH terms “Diabetes Mellitus” or “Diabetes Mellitus, Type 2”, and “Depression” or “Depressive Disorder”, and each country listed as a LMIC according to the HDI. For example, “Mexico” was used as a MeSH term. All countries in these categories had an HDI score of equal to or lesser value than 0.783 ($n = 140$ countries). The reference lists of previous meta-analyses and selected articles were also screened. There was no date limitation to the study; the earliest study found was published

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