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Systematic Review

The prevalence of depression among diabetic patients in Sub-Saharan Africa and its impact on their glycaemic control: a systematic review

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ABSTRACT

Type 2 diabetes poses a major global health challenge, especially in Sub-Saharan Africa, where healthcare systems are often weak and the condition's prevalence is increasing. A common but frequently overlooked complication in Sub-Saharan Africa is depression, which often goes undiagnosed and untreated. Depression is often associated with poor adherence to medication and self-care routines, leading to adverse outcomes like poor glycaemic control. Recognising how common depression is among diabetes patients and understanding the factors affecting glycaemic management in this region are crucial steps toward creating targeted interventions to improve type 2 diabetes mellitus treatment and enhance patients' quality of life. The study aimed to determine how common depression is among patients with type 2 diabetes mellitus in Sub-Saharan Africa and to examine the impact of depression on their glycaemic control. We conducted a comprehensive search of PubMed, PsycINFO, Scopus, ScienceDirect, Cochrane Library, Embase, Medline, and Google Scholar for studies on depression in individuals with type 2 diabetes mellitus in Sub-Saharan Africa and its impact on glycaemic control. Only peer-reviewed, English-language primary research articles published from January 2014 to January 2024 were eligible. Two reviewers independently selected and evaluated the articles using the Critical Appraisal Programme Tool and extracted data in accordance with preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. The review analysed 12 studies involving 3,709 participants across eight Sub-Saharan African countries. The reported rates of co-morbid depression varied, likely due to differences in sample size rather than regional factors. Five studies included gender data, showing a significant association between depression and being female. Glycaemic control rates ranged from 11.9% to 89.7%. Overall, the results demonstrated a strong link between depression among type 2 diabetes mellitus patients and poor glycaemic control (HbA1c >7%), although some studies found no such connection. The study revealed a high overall rate of comorbid depression among patients with type 2 diabetes in Sub-Saharan Africa. It also highlighted that diagnosing depression in these patients is usually associated with poor glycaemic control. Therefore, public health policymakers in the region should develop targeted strategies for screening, diagnosing, and treating depression in individuals with type 2 diabetes.

Keywords: Depression, Type 2 diabetes, Glycaemic control, Sub-Saharan Africa

INTRODUCTION

Type 2 diabetes mellitus (T2DM) has become a global health crisis, characterised by its epidemic spread and significant financial burden on individuals, communities, healthcare systems, and governments. Although the rise in cases has been unprecedented worldwide, it has been uneven, with developing countries bearing the brunt of the impact.[1,2] By 2030, the number of adults with T2DM in Sub-Saharan Africa (SSA) is expected to reach 40.7 million—a 162.5% increase from 15.5 million in 2017—and is likely to surpass that of other regions.[2,3] This surge

in SSA may partly be due to overconsumption of high-energy foods linked to urbanisation and Western influence.[4-6] The rising burden of T2DM in SSA impacts individuals' health and strains healthcare systems.

Previous research indicates that patients with T2DM often experience mental health issues, particularly depression.[7-9] These individuals are twice as likely to suffer from depression compared to those without T2DM.[10-12] It is estimated that 20-40% of T2DM patients, including those from SSA, face psychological disorders during their illness.[2,11] Recent studies also reveal a strong link between depression and T2DM, with depression often impeding effective self-care in managing the condition.[13-15] This can lead to poor glycaemic control and diabetes-related complications over time.[16,17] Therefore, accurate diagnosis of depression in T2DM patients is essential, as proper detection can enhance self-care and reduce the risk of vascular issues.[13,18]

Depression is a significant public health concern, ranking as the second leading cause of the global disease burden and affecting about 350 million people of all ages.[19] The WHO predicts that by 2030, depression will cause more years of life lost to disability than any other disease.[20] Reports highlight that the psychological needs of patients with T2DM are often neglected, particularly in developing countries where treatment guidelines mainly focus on medication, diet, and exercise for self-care.[21,22] Studies indicate that access to psychological support for T2DM patients in these areas is limited, and healthcare providers often lack the skills to address psychological issues during consultations.[23,24] In Sub-Saharan Africa, long-term monitoring and psychological support for T2DM patients are frequently inadequate due to financial constraints, leading to reduced quality of life, poor self-management, and higher early mortality.[11,25-28] Consequently, it is essential to gather evidence on how comorbid depression affects T2DM in the SSA region to guide policy and ensure healthcare services meet the population's current health needs.

Given the health risks associated with co-occurring depression and T2DM, managing both conditions are essential for optimal blood sugar control. Maintaining blood glucose within target levels is crucial in T2DM care, as it helps prevent or delay complications. Globally, about 50% of T2DM patients reach their glycaemic targets, but this proportion is lower in SSA.[29] Therefore, effective blood sugar management offers an opportunity to reduce the impact of T2DM in SSA.[29,30] This study investigates the influence of depression on glycaemic control in T2DM patients and examines how common depression is among them.

The following research questions guide the review: what is the prevalence of depression among people with T2DM in SSA and what is the impact of depressive illness on glycaemic control in patients with T2DM.

METHODS

The systematic review was registered in the International Prospective Register of Systematic Reviews (PROSPERO) in January 2023 (registration number: CRD42023383610).

Search strategy

An initial limited search was conducted across MEDLINE, EMBASE, and SCIENCE DIRECT, followed by an analysis of text words in titles and abstracts, along with the index terms used to describe the articles. A subsequent search used all identified keywords and index terms across key databases, including CINAHL, Cochrane, and Scopus. The reference lists of all identified articles were then examined to find additional studies. We focused on studies published from January 2014 to January 2024 to include recent research from the past decade, which aligns with the rapid rise of T2DM in SSA during that period. The search was restricted to peer-reviewed, English-language studies. Although Arksey and O'Malley suggest including grey literature, practical time constraints led us to exclude it.[31] The detailed inclusion and exclusion criteria are presented in Table 1.

Table 1: Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Primary research, peer-reviewed studies, articles published between 2014 and 2024, English language publications, T2DM among individuals in SSA, comorbid depression and T2DM among individuals in SSA, and report on glycaemic control	Reports, letters, editorials, conference papers, abstracts, expert opinions, book chapters and systematic reviews, not peer reviewed, published before 2014, written in languages other than English, studies reporting on type-1 and gestational diabetes, and studies done outside the SSA region

Selection process

The next step in the review involved selecting articles. The search results were first screened by title, then by abstract, and finally by full text. This selection process is summarised in the PRISMA flow diagram (Figure 1). All articles were assessed to see if they met the review's inclusion criteria.

Assessing the quality of papers

The 2014 Critical Appraisal Skills Programme (CASP) tool was used to evaluate the quality of the quantitative studies included in this review. It was chosen for its structured approach to assessing the rigour of the reviewed articles.[32,33] A score was given to each article based on responses to screening questions, with 0 for 'no' and 1 for 'yes'.[34] These scores were then converted into a percentage

of the total questions. None of the studies scored a perfect 100%, and all scored above 50%. All studies were kept in the review, as they were considered of adequate quality.

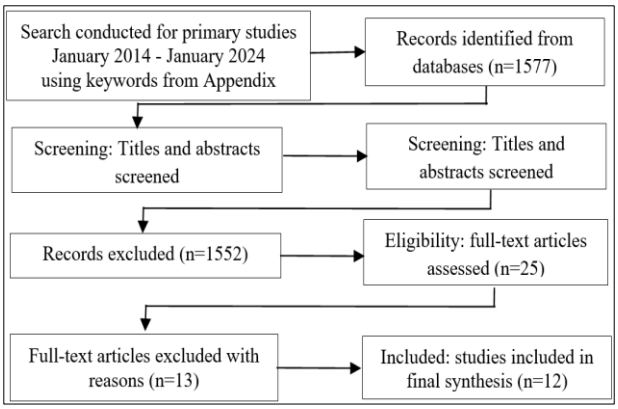

Figure 1: PRISMA flow diagram.

Data extraction

After assessing the quality of each paper, data from eligible studies were recorded in a Microsoft Excel file. The first reviewer extracted information from all selected articles, while the second reviewer randomly checked 20% of the data. Disagreements were resolved through consensus. The extracted data included the first author's last name, publication year, study type, country, study population, total sample size, glycaemic control, and the proportion of individuals with depressive illness.

RESULTS

General description

This review included 12 studies involving 3,709 patients with T2DM. These studies were conducted across eight SSA countries: Cameroon (2), South Africa (1), Ghana (2), Ethiopia (2), Kenya (2), Botswana (1), Sudan (1), and Guinea (1). Many of the studies (7, or 58%) were conducted in the last 7 years (2018-2023). Of the 12 studies, 11 (92%) were cross-sectional, with one being a case-control study. The sample sizes ranged from 177 to 491 participants. Participants in all studies were aged 16 years or older.

The characteristics of the included studies are summarised in Table 2.

Table 2: Characteristics of included studies.

First author's last name	Study setting	Study type	Publication year	Study population	Sample size
Ali et al[21]	Ethiopia	Cross-sectional	2023	T2DM patients aged 18 and over	278
Akpalu et al[35]	Ghana	Cross-sectional	2018	T2DM patients aged 30-65 years	400
Agyekum et al[41]	Ghana	Case-Control	2023	T2DM patients and non-diabetic control	200 (diabetic participants)
Aroke et al[40]	Cameroon	Cross-sectional	2020	T2DM patients aged 38-80 years	177
Azeze et al[39]	Ethiopia	Cross-sectional	2020	T2DM patients aged 18 years and over	418
Camara et al[36]	Guinea	Cross-sectional	2014	T2DM patients aged 16 years and over	491
Balde et al[10]	Cameroon	Cross-sectional	2017	T2DM patients aged 16-85	261
Kanu et al[38]	Kenya	Cross-sectional	2016	T2DM patients aged 30 years and over	220
Moshomo et al[17]	Botswana	Cross-sectional	2022	T2DM patients aged 21 years and over	260
Omar et al[42]	Sudan	Cross-sectional	2021	T2DM patients aged 18 and over	350
Ramkisson et al[37]	South Africa	Cross-sectional	2016	T2DM patients aged 18 and over	401
Shirey et al[12]	Kenya	Cross-sectional	2015	T2DM patients 18 years and over	253

Prevalence of depression

The reviewed studies highlighted that depression is a common issue among T2DM patients. Five studies reported participants' gender, with a significant association found between female gender and the prevalence of depression.[12,17,35-37] One study, however, found no significant gender difference; it noted that fewer females showed depressive symptoms compared to males.[38] Table 3 illustrates the variation in depression prevalence among T2DM individuals across the dataset, ranging from 25.9% in Guinea to 60% in Cameroon. The prevalence data from the selected studies are summarised in Table 3.

Assessment of glycaemic control

The glycaemic control targets varied across the studies examined. Optimal control was generally defined as an HbA1c below 7%, whereas an HbA1c ≥7.0% was considered uncontrolled.[42] Some studies set a target HbA1c >7%.[12,17,35,36,38,42] Additionally, Shirey et al, Moshomo et al, Akpalu et al, and Camara et al reported that the proportion of participants with HbA1c levels exceeding 9% was also observed.[12,17,35,36]

Table 3: Prevalence of depression among T2DM patients.

Research study authors	Country of study	Prevalence of depression among study participants (%)
Ali et al[21]	Ethiopia	47.1
Agyekum et al[41]	Ghana	31.5
Akpalu et al[35]	Ghana	31.3
Aroke et al[40]	Cameroon	29.4
Azeze et al[39]	Ethiopia	29.3
Camara et al[36]	Guinea	25.9
Balde et al[10]	Cameroon	60
Kanu et al[38]	Kenya	32.3
Moshomo et al[17]	Botswana	30.4
Omar et al[42]	Sudan	35.6
Ramkisson et al[37]	South Africa	44
Shirey et al[12]	Kenya	55

Table 4: Prevalence of poor glycaemic control.

Authors	HbA1c outcome measure	Prevalence of poor glycaemic control (%)	Country of study
Ali et al[21]	>7% (poor glycaemic control)	66.8	Ethiopia
Akpalu et al[35]	<7%	NR	Ghana
Agyekum et al[41]	>7% (poor glycaemic control)	61	Ghana
Aroke et al[40]	>7% (poor control)	65.2	Cameroon
Azeze et al[39]	≤7 (optimal control)	51.6	Ethiopia
Camara et al[36]	>7% (poor glycaemic control)	84.3	Guinea
Balde et al[10]	>7% (poor control)	72.8	Cameroon
Kanu et al[38]	<7% (good/optimal control)	NR	Kenya
Moshomo et al[17]	<7%	62.3	Botswana
Omar et al[42]	<7%	89.7	Sudan
Ramkisson et al[37]	>7% (poor glycaemic control)	11.9	South Africa
Shirey et al[12]	>9.5% (p=0.0025)	NR	Kenya

HbA1c=Haemoglobin A1C, NR=not recorded

Prevalence of glycaemic control

Poor glycaemic control was significantly linked to depression among diabetic patients. The prevalence of poor glycaemic control, reported in nine studies, ranged from 11.93% to 89.7%. In individuals with T2DM, poor glycaemic control was strongly associated with depression, with those experiencing uncontrolled blood sugar having more than six times higher odds of untreated depression compared to those with better control.[10,39] A study from Botswana found that higher HbA1c levels increased the likelihood of depression.[17] Similarly, an Ethiopian study linked poor glycaemic control, diabetic complications, and longer disease duration to depressive illness.[21] In Cameroon, depression among T2DM patients was closely associated with significant life events, neuropathy, and poor glycaemic control.[40] Conversely, three studies in this review indicated no association between glycaemic control and depression in T2DM patients.[35,41,42] Table 4 displays the prevalence of poor glycaemic control across the selected articles.

DISCUSSION

Depression is the second leading cause of disease burden worldwide, affecting approximately 340 million people of all ages.[19,43] Despite its widespread occurrence, depression is often overlooked, untreated, and undiagnosed among patients with T2DM in SSA.[17,39,44] Diagnosing and managing depression in T2DM patients pose significant challenges.[39] The literature shows a bidirectional relationship between depression and T2DM, with the risk of depression in a T2DM patient roughly doubling that of the general population.[45,46] Importantly, living with T2DM frequently causes considerable distress, which can contribute to adverse mental health outcomes.

This review aimed to examine how common depression is among T2DM patients in SSA and its impact on glycaemic control over the past decade (2014-2024). Our findings indicate that depression is prevalent among these patients, with prevalence rates between 25.9% and 60%, surpassing the global rate of 3.8% reported by WHO.[19] Similarly, studies in SSA show depression rates in T2DM patients ranging from 30% to 50%, which are higher than the approximately 5% observed in Europe (UK).[17,21,47] The higher depression prevalence in SSA compared to European countries like the UK may be linked to factors such as low education levels, unemployment, socioeconomic challenges, alcohol abuse, poor T2DM management, and a high rate of co-morbidities.

This study identified a significant link between depressive illness and gender. Female patients with T2DM reported higher levels of clinically relevant depressive symptoms than men. These findings align with earlier research on depression among T2DM patients.[48-50] Since women in SSA often adopt more traditional domestic roles, managing a chronic condition like T2DM—which requires consistent self-care and medication—may increase their

daily burdens. These results emphasise the need for interventions tailored to the specific needs of female T2DM patients.

The prevalence of depression reported in studies showed notable differences, likely due to variations in participant demographics. These participants represented diverse populations with different social, cultural, and economic backgrounds across various countries.[51] Another reason for this variation could be that the studies employed different criteria for defining depression and encountered a range of psychosocial stressors specific to each community in the countries where the research was conducted.[52]

Previous research indicates that depressed individuals with T2DM tend to have poorer treatment adherence and self-care practices compared to those without depression.[53,54] This often results in worse health outcomes and faster development of diabetic complications, such as poor glycaemic control and increased healthcare expenses. In this study, depressed T2DM patients also showed poor glycaemic control, consistent with findings from an extensive study involving 21 developing countries and independent research in Peru, Indonesia, Egypt, and North Sudan.[55,56] Poor glycaemic control may be linked to medication non-adherence and a decreased quality of life, including inadequate dietary habits and sedentary lifestyles, which can heighten the risk of psychological distress, mood swings, and dissatisfaction with life.[57,58] The observed high prevalence of poor glycaemic control might be due to insufficient diabetes care resulting from weak management protocols and fragmented healthcare systems in the region.[10,11] However, three studies included in this review found no association between glycaemic control and depression in T2DM patients, aligning with earlier research that also reported no link.[35,59,60]

Implications for practice

Our findings suggest important implications for SSA countries and similar health systems that currently do not screen for depression in patients with T2DM. With the rising burden of T2DM in SSA and the generally poor self-care—often due to limited funding and weak healthcare systems—this review underscores the urgent need for robust protocols for depression screening and consistent HbA1c measurement as part of diabetes self-management. It may therefore be important to update diabetes management strategies to include depression screening and treatment for T2DM patients.

CONCLUSION

This review shows that depression is a common mental health issue associated with poorly managed T2DM in SSA. Many diabetic patients with depression in SSA also struggle with poor glycaemic control, creating a public health and socio-economic burden on the region's already strained healthcare systems. These results emphasise the importance of more regular HbA1c monitoring and early identification and treatment of depressive symptoms in T2DM patients during routine follow-up visits at health clinics.

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