©IDOSR PUBLICATIONS International Digital Organization for Scientific Research

IDOSR JOURNAL OF APPLIED SCIENCES 11(1):18-25, 2026 ISSN: 2550-7931

https://doi.org/10.59298/IDOSRJAS/2026/1111825 IDOSRJAS11106

Diabetes and Mental Health: A Scholarly Review

Mugo Moses H.

School of Natural and Applied Sciences Kampala International University Uganda

ABSTRACT

Diabetes and mental health disorders are two of the most prevalent chronic conditions globally, each exerting a substantial burden on individuals, health systems, and societies. Increasing evidence demonstrates a complex, bidirectional relationship between diabetes and mental health conditions, whereby diabetes heightens vulnerability to psychological distress, depression, anxiety, and other psychiatric disorders, while pre-existing mental health conditions increase the risk of developing diabetes and compromise disease management. This scholarly review synthesizes current evidence on the epidemiology, mechanisms, and outcomes of co-occurring diabetes and mental health conditions across the life course. It examines biological, psychological, and social pathways linking these conditions, including systemic inflammation, glycemic dysregulation, self-management burden, and socioeconomic determinants. The review further evaluates the impact of mental health on diabetes outcomes, highlighting challenges in glycemic control, treatment adherence, quality of life, and long-term complications. Existing interventions targeting comorbidity ranging from psychosocial therapies and lifestyle modification to integrated collaborative care models are critically assessed, with attention to special populations such as children and adolescents, older adults, pregnant individuals, and refugees. Methodological limitations in the literature and gaps in policy and health system responses, particularly in low- and middle-income countries, are discussed. The review underscores the urgent need for integrated, person-centered care models and calls for robust longitudinal research to inform policy, clinical practice, and equitable healthcare delivery for individuals living with diabetes and mental health conditions.

Keywords: Diabetes**,** Mental health**,** Comorbidity**,** Integrated care and Public health.

INTRODUCTION

Diabetes is among the greatest public health challenges of the current century. The rising prevalence of diabetes is replicated by the rising prevalence of mental health issues [1-2]. Both conditions display intricate links to lifestyle and socioeconomics; yet their intersection remains little researched, limiting understanding of the contemporary challenges they pose and complicating efforts to implement effective public policy and healthcare [3-6]. The interdisciplinary "Diabetes and Mental Health" conference at the Fernand-Seguin Research Centre (Montréal, Canada), held in October 2022 and co-organized by the Canadian Diabetes Association, broadly examined what is known and unknown on the topic [7-11]. The accompanying report summarizes recent empirical findings and issues and questions requiring resolution. Rather than offer a comprehensive literature review, the report provides a map of the existing knowledge and the state of understanding, along with concrete directions for future research and policy development with the potential to mitigate the detrimental effects of both conditions on quality of life and lifespan [12-15]. The World Health Organization describes diabetes as "a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces" [2]. Consequently, excess glucose builds up in the blood, leading to diabetes complications. The Diabetes Canada Guidelines (2022) further specify four types: type 1 diabetes, type 2 diabetes, gestational diabetes, and prediabetes. Type 1 diabetes occurs when the pancreas produces no insulin, often leading to ketoacidosis; it usually presents in childhood and early adulthood, and requires lifelong exogenous insulin [16-19]. Type 2

diabetes is characterized by the progressive loss of insulin secretion, often connected to qualities like obesity; it can be prevented and actively managed with lifestyle changes [20-25]. Gestational diabetes occurs during pregnancy and affects how the body uses sugar; it can complicate the pregnancy, and may lead to type 2 diabetes later. Prediabetes entails elevated glucose that is not yet high enough to be diagnosed as diabetes [26-30]. Each type may be further classified according to glycemic control; these categories help assess the progression of the disease stage and consequently the risk of later complications [31-36]. If left untreated, diabetes subsequently leads to complications that are often disabling and sometimes life-threatening [37-39].

Conceptual Framework

Diabetes ranks among the foremost global health challenges, affecting over half a billion individuals worldwide. Each type of diabetes can course with deleterious physical and psychosocial consequences, each heightening vulnerability and impediments to adequate management. Consequently, diabetes exemplifies both a bodily and a mental disorder [40-45]. The burgeoning literature on the interrelationships spanning diabetes and mental health disorders underscores a mutual influence [46-50]. Diabetes can yield diverse mental health issues. Among the most documented are distress, anxiety, depression, and binge eating in type 1 and type 2 diabetes [51-56]. Although far less investigated, evidence points also to difficulties in both management adherence and to the onset of bipolar disorder and psychosis [57-60]. The consistent cycle of distress accompanying diabetes increase extra-academic burden and foster damages also on socio-economic profile, further contributes to numerous mental complications and introduce barriers toward effective treatment and assistances[61-64]. Bidirectional influences, systemic analyses associating diabetes and mental disorders have gained traction recently. According to recent data the connectedness between the two are well documented across many studies, with numerous mediators and moderators frequently cited, including systemic inflammation, glycemic fluctuations, and the burden of self-management [2]. Age, gender, schooling, financial and cultural barriers further emerge from evidence as pertinent moderators in the setting of diabetes [3]. Prior meta-analyses consolidating results gleaned from diverse study designs across a vast pool of over 1 million individuals with diabetes highlight blood glucose levels as the most recurrently investigated outcome and mental health as among the most reported socio-economic determinants [3].

Epidemiology of Mental Health Issues in Diabetes

Diabetes ranks among the world's leading causes of morbidity and mortality. It comprises three main types: type 1 diabetes, type 2 diabetes, and gestational diabetes, as classified by the American Diabetes Association (ADA) [2]. Type 1 diabetes (T1D) is an autoimmune disorder that leads to the destruction of insulin-producing pancreatic β-cells, resulting in absolute insulin deficiency [6]. Type 2 diabetes (T2D) is characterized by the progressive development of insulin resistance and the loss of insulin secretion, ultimately leading to a relative insulin deficiency. Glycaemia can be measured by fasting plasma glucose (FPG), postprandial plasma glucose, glycated haemoglobin (HbA1c), and continuous glucose monitoring. Keeping blood glucose (BG) levels within normal physiological range is referred to as glycaemic control [7]. People diagnosed with diabetes experience a higher prevalence of mental disorders, including depression, anxiety, schizophrenia, eating disorders, distress, and dissatisfaction [7]. These disorders are frequently evaluated using standard instruments, such as structured interviews or validated questionnaires. Depression is the most commonly associated disorder, particularly in people with T1D [8]. The term "mental health" encompasses a broader range of constructs, primarily defined as the state of emotional, psychological, and social well-being and includes the absence of mental disorders. It is ampler than the construct of "mental disorder" and prefers the term "mental health" over "mental illness" [1].

Mechanisms Linking Diabetes and Mental Health

Diabetes affects more than 537 million individuals worldwide; this vulnerable population exhibits markedly high rates of mental health conditions including depression, anxiety, distress, bipolar disorder, and psychosis [4]. Conversely, pre-existing mental health issues increase the likelihood of developing diabetes and hinder effective disease management [4]. Such bidirectional interactions are evident across the life course and are particularly pronounced among youth. Existing longitudinal studies corroborate logically inferred links between diabetes and multifaceted mental health trajectories: dysregulation of the hypothalamicpituitary adrenal (HPA) axis due to metabolic imbalance exerts a direct influence, while the burden of self-management associated with diabetes self-care negatively impacts mental well-being [3]. The relationship between these disorders substantially alters the risk of long-term complications and overall health. While co-occurrence has been documented in adults, investigations among children over recent decades have shed light on other influential factors and developmental differences [5]. Processes at the biological, psychological, and social levels underpin the links between these chronic diseases: inflammatory cytokines, glycemic variability, sleep disruption, diabetes-related stigma, and limited access to health care constitute critical mediating factors [6]. Inflammation plays a pivotal role in the pathogenesis of both type 1 and type 2 diabetes, and numerous meta-analytic studies confirm its establishment as a

potential bidirectional mechanism linking diabetes and mental disorders. Experimental studies demonstrate that proinflammatory interleukins such as IL-1β, IL-6, and TNF-α can induce or exacerbate depressive symptoms [7]. The negative impact of diabetes on overall health undermines quality of life. Elevated blood glucose levels exert deleterious effects on the retina, kidneys, cardiovascular system, and nerves, and numerous studies indicate that individuals with both type 1 and type 2 diabetes are at heightened risk of dementia and related forms of mental impairment. Given that mental well-being is closely tied to the ability to manage diabetes, the prioritization of psychological support within integrated care is imperative to mitigate the bi-directional interaction between these diseases [4 , 5, 2].

Impact of Mental Health on Diabetes Outcomes

Diabetes is one of the chronic diseases related to morbidity, mortality, and high cost of care. Mental health, include depression and anxiety has been shown to be associated with diabetes [3]. It can impact the complication of the disease and quality of life [3]. There is limited evidence for the impact of mental health on diabetes management in low- and middle-income countries (LMICs). Mental health has been shown to impact diabetes outcome, similarly diabetes can affect psychological well-being [4, 1].

Interventions for Co-occurring Diabetes and Mental Health Conditions

Diabetes and mental health conditions often co-occur and can influence each other's management. Interventions exist to address both conditions, yet varying focus and targets make comparisons challenging [7]. Studies indicate that peer support, health promotion, exercise, digital tools, education, medication adherence, and integrated care can enhance physical health and psychotropic management among individuals with severe mental health disorders, including collaborative "diabetes education" to improve glycemic control and health care utilization[8]. Specific interventions targeted at diabetes self-care have been reported across multiple mental health conditions, though effects are mixed; multidimensional approaches remain common [5]. Diabetes management frameworks are integrated with psychotropic management across diverse mental health conditions, including schizophrenia, psychosis, and mood disorders. These approaches often address psychotropic–diabetes risk and management interconnections as well as self-care barriers, with varying evidence of efficacy. Meta-analytic results underscore the need for intervention evaluations to meet co-occurring condition needs [4]. Psychotherapy, pharmacotherapy, lifestyle modifications, integrated collaborative care, and digital interventions targeting diabetes and mental health co-occurrence are reviewed. Effectiveness for outcomes related to either diabetes or mental health has been reported for several approaches[4]. Tailored treatment for increasing body mass, physical activity, antidepressant adherence, psychotropic-induced weight gain, schizoaffective disorder, and depression among diabetes patients with psychotropic treatment affects diabetes outcomes. Interventions addressing either diabetes or mental health alongside implementation challenges without formally targeting co-occurrence are also analyzed.

Special Populations and Considerations

Individuals within certain populations face additional complexity regarding mental health and diabetes, which can vary by condition/characteristic [5]. Diabetes in Children and Adolescents Mental health may be impacted throughout a child/adolescent's developmental stages but may be exacerbated before and during puberty, resulting in additional mental health care needs [1]. Type 1 diabetes diagnosis occurs primarily in childhood and adolescence; type 2 consistently raises among those in these life stages [6]. Adolescents with type 1 diabetes experience more severe psychological distress than those without, with a large percentage feeling upset by the condition and reporting complete autonomy over their own care [5]. Descriptive analyses indicate approximately two-thirds meet criteria for at least one mental health disorder, with anxiety disorders being most common [3]. Depressive symptoms have also been observed to rise during adolescence, especially for females along with eating disorders [6]. Older Adults (65 Years and Older) People aged 65+ are the fastest-growing population group in the United States. A smaller percentage of older adults have type 1 diabetes compared to younger patients. Mental health issues, particularly depression, influence glycemic control in older adults with diabetes as they do in younger adults. Greater work/role impairment and related lifestyle changes have been tied to diabetes's progression into older adulthood [5]. Pregnant Individuals and Those with Recent Pregnancy Diabetes poses increased risks during and after pregnancy with both pre-gestational and gestational diabetes increasing problems for both mother and fetus. The highest rates of suicide and self-harm have been reported during or after gestation [6]. Perinatal and postpartum distress affect women's health and child outcomes, with considerable dropout from perinatal parenting programs among the mentally distressed reported [7]. Cultural/Linguistic Minorities and Refugees Diabetes is one of the most common chronic diseases affecting refugees and certain immigrant or highly marginalized groups [8]. Refugees from Eritrea and refugees or immigrants from Afghanistan, Bhutan, Burma, the Democratic Republic of the Congo, and Iraq form high risk/need communities. Refugees exposed to violence

and torture are more likely to experience physical and mental health problems; thus, mental health care and social services are critical and required [8].

Methodological Considerations in the Literature

Inadequacies in study designs (cross-sectional vs. longitudinal) and measurement tools (ambiguous definitions, unvalidated instruments) compromise the characterization of diabetes–mental health associations. Significant confounding from clinical and socioeconomic factors reduces the robustness of relationships in both directions. Within diabetes, reported risk indications are frequently biased by confounding from glycemic control, with specific deficits attributable to insufficient appraisal of study quality and publication bias [5]. Meta-analyses disregard time-lagged relationships, treating distinct prevalence or incidence estimates independently, yet biobehavioral feedback operates over extended timescales [7]. The need for longitudinal, unbiased, and adequately delayed information on co-occurrence motivates a framework that identifies diabetes classification and monitoring as major mediators, sufficiently accounted for by existing meta-analyses; comprehensive theoretical grounding directs investigation only toward additional third variables [7]. Studies investigating the diabetes–mental health nexus have deployed varying terminology centering on disorder or disease, well-being, symptom or what constitutes an illness or condition [8]. For clarity and to stay faithful to common parlance, condition is preferred in the present review, well aware of its inherent ambiguity. Definitions and measurement of both diabetes and mental health present additional conceptual lacunae [8]. Of the former, clinically distinct now stand type 1 and type 2 diabetes; diagnostic criteria are universally accepted; and glycemic control monitoring comprises a metric upon which population subgroups can be unambiguously delineated and specific health-related interventions organized [7]. Mental health materials remain litigious, with disorder frequently eschewed on the grounds that depression emerges instead from issues such as poverty or grief, well within the limits of health definition. Unambiguous region-specific definitions, measurement protocols and instruments exist for precisely this designation and therefore constitute the operational choice here [8].

Policy and Healthcare System Implications

Epidemiological studies have shown that diabetes and mental health co-occur at remarkably high rates across all populations globally and among all age groups, marking them as public health priorities across numerous settings 1. National and international organizations have, therefore, recommended that such patients be screened for all such conditions and that services be integrated [6]. Yet many individuals already struggle to access well-organized and coordinated care that is responsive to their full set of interconnected needs [6]. A multitude of barriers to provision, uptake, and adherence to integrated care models remain widespread throughout societies and systems by which diabetes and its related symptoms are managed [4]. Integrated approaches continue to be largely unavailable within many countries and services worldwide, particularly within low- and middle- income contexts. Approaches that represent the current literature's best estimates of the few most promising and already available interventions for improving the service coverage of diabetes care and more holistically enabling healthcare systems to respond to diabetes and associated dysregulations within mental wellbeing also remain critically limited. Such approaches will be needed if efficient and equitable progress is to be made towards ensuring that services and systems which interconnect diabetes and mental health are accessible by and available to individuals affected by these conditions[5].

Future Research Directions

Diabetes and mental health are the two most common chronic health conditions worldwide that significantly shape people's well-being and quality of life [5]. Therefore, the co-occurrence of diabetes and mental health has increasingly drawn attention from both mental health and diabetes experts [7]. Much research has been conducted to investigate the epidemiology of comorbid mental health issues among those with diabetes. Prevalence and incidence of depression, anxiety, distress, bipolar disorders, and psychosis are substantially higher in people with diabetes compared with the general population, and levels of distress are greater in those with type 1 than type 2 diabetes or gestational diabetes. In addition, multiple epidemiological surveys suggest that the pool of psychotropic medications continues to rise dramatically, indicating an urgent need for further exploration of the impact of diabetes on mental health [7-12]. Furthermore, among various chronic diseases, diabetes remains one of the top five conditions linked to increased risk of subsequent mental health disorders [4]. In fact, people with serious mental illness are more than four times as likely to develop diabetes compared with those without mental illness; moreover, those with diabetes are at an increased risk of developing other mental health disorders later in life. Therefore, clarifying the mechanisms underlying the association between diabetes and mental health has become a crucial area for both diabetes and mental health research [13-17].

CONCLUSION

The intersection of diabetes and mental health represents a critical and increasingly recognized public health challenge. Evidence consistently demonstrates that the relationship between these conditions is bidirectional,

multifactorial, and mediated by biological, psychological, and social mechanisms that evolve across the life course. Mental health conditions significantly influence diabetes onset, progression, self-management, and outcomes, while diabetes itself imposes psychological burdens that adversely affect emotional well-being and quality of life. Despite growing recognition of this interdependence, significant gaps remain in research methodology, clinical practice, and health system integration, particularly within low- and middle-income settings where resources are limited and service fragmentation is common. Addressing the dual burden of diabetes and mental health requires a paradigm shift toward integrated, multidisciplinary, and person-centered care. Screening for mental health conditions within diabetes care, alongside tailored psychosocial and behavioral interventions, is essential to improve both mental well-being and glycemic outcomes. Future research should prioritize longitudinal designs, standardized measurement tools, and context-sensitive approaches that capture the dynamic nature of this comorbidity. Ultimately, strengthening policies and healthcare systems to support integrated care will be crucial to reducing morbidity, improving quality of life, and achieving equitable health outcomes for individuals living with diabetes and co-occurring mental health conditions.

REFERENCES

1. Ducat L, Rubenstein A, Philipson LH, Anderson BJ. A review of the mental health issues of diabetes conference. Diabetes care. 2015 Feb 1;38(2):333-8.
2. Busili A, Kumar K, Kudrna L, Busaily I. The risk factors for mental health disorders in patients with type 2 diabetes: An umbrella review of systematic reviews with and without meta-analysis. Heliyon. 2024 Apr 15;10(7).
3. Okon MB, Ugwu OP, Ugwu CN, Ogenyi FC, Swase DT, Anyanwu CN, Eze VH, Ugwu JN, Akinola SA, Mujinya R, Anyanwu EG. From pandemics to preparedness: harnessing AI, CRISPR, and synthetic biology to counter biosecurity threats. Frontiers in Public Health. 2025 Nov 26;13:1711344.
4. Ugwu OP, Ogenyi FC, Ugwu CN, Basajja M, Okon MB. Mitochondrial stress bridge: Could muscle-derived extracellular vesicles be the missing link between sarcopenia, insulin resistance, and chemotherapy-induced cardiotoxicity?. Biomedicine & Pharmacotherapy. 2025 Dec 1;193:118814.
5. Annamalai A, Tek C. An overview of diabetes management in schizophrenia patients: office based strategies for primary care practitioners and endocrinologists. International journal of endocrinology. 2015;2015(1):969182.
6. Kremers SH, Wild SH, Elders PJ, Beulens JW, Campbell DJ, Pouwer F, Lindekilde N, de Wit M, Lloyd C, Rutters F. The role of mental disorders in precision medicine for diabetes: a narrative review. Diabetologia. 2022 Nov;65(11):1895-906.
7. Ugwu CN, Ugwu OP, Alum EU, Eze VH, Basajja M, Ugwu JN, Ogenyi FC, Ejemot-Nwadiaro RI, Okon MB, Egba SI, Uti DE. Sustainable development goals (SDGs) and resilient healthcare systems: Addressing medicine and public health challenges in conflict zones. Medicine. 2025 Feb 14;104(7):e41535.
8. Ongesa TN, Ugwu OP, Ugwu CN, Alum EU, Eze VH, Basajja M, Ugwu JN, Ogenyi FC, Okon MB, Ejemot-Nwadiaro RI. Optimizing emergency response systems in urban health crises: A project management approach to public health preparedness and response. Medicine. 2025 Jan 17;104(3):e41279.
9. Ugwu CN, Ugwu OP, Alum EU, Eze VH, Basajja M, Ugwu JN, Ogenyi FC, Ejemot-Nwadiaro RI, Okon MB, Egba SI, Uti DE. Medical preparedness for bioterrorism and chemical warfare: A public health integration review. Medicine. 2025 May 2;104(18):e42289.
10. Basiri R, Seidu B, Rudich M. Exploring the interrelationships between diabetes, nutrition, anxiety, and depression: implications for treatment and prevention strategies. Nutrients. 2023 Sep 30;15(19):4226.
11. Paul-Chima UO, Nneoma UC, Bulhan S. Metabolic immunobridge: Could adipose-derived extracellular vesicles be the missing link between obesity, autoimmunity, and drug-induced hepatotoxicity?. Medical Hypotheses. 2025 Sep 28:111776.
12. Yadav S, Hong YR, Westen S, Marlow NM, Haller MJ, Walker AF. Sociodemographic factors associated with major depressive episodes and suicidal ideation among emerging adults with diabetes in the US. Frontiers in endocrinology. 2023 Dec 7;14:1276336.
13. Ugwu OP, Alum EU, Ugwu JN, Eze VH, Ugwu CN, Ogenyi FC, Okon MB. Harnessing technology for infectious disease response in conflict zones: Challenges, innovations, and policy implications. Medicine. 2024 Jul 12;103(28):e38834.
14. Sweileh WM. Analysis of global research output on diabetes depression and suicide. Annals of general psychiatry. 2018 Oct 23;17(1):44.
15. Mason J, Meal A, Shaw I, Adams GG. Outcomes of mindfulness-based stress reduction and mindfulness-based cognitive therapy in adults with diabetes: a systematic review. Diabetes Treat. 2018;10:2574-7568.

16. Paul-Chima UO, Ugwu CN, Alum EU. Integrated approaches in nutraceutical delivery systems: optimizing ADME dynamics for enhanced therapeutic potency and clinical impact. RPS Pharmacy and Pharmacology Reports. 2024 Oct;3(4):rqae024.
17. Ugwu OP, Ogenyi FC, Ugwu CN, Ugwu MN. Gut microbiota-derived metabolites as early biomarkers for childhood obesity: A policy commentary from urban African populations. Obesity Medicine. 2025 Sep 1;57:100641.
18. Isaac Edyedu PMA, Ugwu OPC, Ugwu CN, Alum EU, et al. The role of pharmacological interventions in managing urological complications during pregnancy and childbirth: A review. Medicine. 2025;104(7):e41381.
19. Alum EU, Ugwu OPC, Obeagu EI, et al. Nutritional care in diabetes mellitus: A comprehensive guide. Int J Innov Appl Res. 2023;11(12):16-25.
20. Obeagu EI, Ahmed YA, Obeagu GU, Bunu UO, Ugwu OPC, Alum EU. Biomarkers of breast cancer: Overview. Int J Curr Res Biol Med. 2023;1:8-16.
21. Uti DE, Alum EU, Atangwho IJ, Ugwu OPC, et al. Lipid-based nano-carriers for the delivery of anti-obesity natural compounds: Advances in targeted delivery and precision therapeutics. J Nanobiotechnol. 2025;23:336.
22. Ugwu CN, Ugwu OPC, Alum EU, Eze VHU, Basajja M, Ugwu JN, Ogenyi FC, et al. Medical preparedness for bioterrorism and chemical warfare: A public health integration review. Medicine. 2025;104(18):e42289.
23. Obeagu EI, Scott GY, Amekpor F, Ugwu OPC, Alum EU. COVID-19 infection and diabetes: A current issue. Int J Innov Appl Res. 2023;11(1):25-30.
24. Offor CE, Ugwu OPC, Alum EU. Anti-diabetic effect of ethanol leaf extract of *Allium sativum* on albino rats. Int J Pharm Med Sci. 2014;4(1):1-3.
25. Asogwa FC, Okechukwu PCU, Esther UA, Chinedu OE, Nzubechukwu E. Hygienic and sanitary assessment of street food vendors in selected towns of Enugu North District, Nigeria. Am-Eurasian J Sci Res. 2015;10(1):22-26.
26. Alum EU, Uti DE, Agah VM, Orji OU, Nkeiru N, et al. Physico-chemical and bacteriological analysis of water used for drinking and domestic purposes in Amaozara Ozizza, Afikpo North, Nigeria. Niger J Biochem Mol Biol. 2023;38(1):1-8.
27. Ugwu OPC, Alum EU, Okon MB, Obeagu EI. Mechanisms of microbiota modulation: Implications for health, disease, and therapeutic interventions. Medicine. 2024;103(19):e38088.
28. Ezekwe CI, Uzomba CR, Ugwu OPC. Effect of methanol extract of *Talinum triangulare* on hematology and liver parameters in rats. Glob J Biotechnol Biochem. 2013;8(2):51-60.
29. Alum EU, Inya JE, Ugwu OPC, Obeagu EI, Aloke C, Aja PM, Okpata MG, et al. Ethanolic leaf extract of *Datura stramonium* attenuates methotrexate-induced biochemical alterations in Wistar rats. RPS Pharmacol Rep. 2023;2(1):1-6.
30. Ugwu OPC, Erisa K, Inyangat R, Obeagu EI, et al. Indigenous medicinal plants for managing diabetes in Uganda: Ethnobotanical and pharmacotherapeutic insights. INOSR Exp Sci. 2023;12(2):214-224.
31. Alum EU, Aja W, Ugwu OPC. Vitamin composition of ethanol leaf and seed extracts of *Datura stramonium*. Avicenna J Med Biochem. 2023;11(1):92-97.
32. Ezenwaji CO, Alum EU, Ugwu OPC. Digital health in pandemic preparedness and response: Securing global health? Glob Health Action. 2024;17(1):2419694.
33. Adonu CC, Ugwu OP, Bawa A, Ossai EC, Nwaka AC. Intrinsic blood coagulation studies in patients with diabetes and hypertension. Int J Pharm Med Bio Sci. 2013;2(2):36-45.
34. Offor CE, Ugwu PC, Okechukwu PM, Igwenyi IO. Proximate and phytochemical analyses of *Terminalia catappa* leaves. Eur J Appl Sci. 2015;7(1):9-11.
35. Enechi YS, Ugwu OC, Ugwu KK, Ugwu OPC, Omeh N. Evaluation of antinutrient levels of *Ceiba pentandra* leaves. IJRRPAS. 2013;3(3):394-400.
36. Alum EU, Uti DE, Ugwu OPC, Alum BN, Edeh FO, Ainebyoona C. Microbiota in cancer development and treatment. Discov Oncol. 2025;16(1):646.
37. Asogwa FC, Okoye COB, Ugwu OPC, Edwin N, Alum EU, Egwu CO. Phytochemistry and antimicrobial assay of *Jatropha curcas* extracts. Eur J Appl Sci. 2015;7(1):12-16.
38. Enechi OC, Oluka HI, Ugwu PCO. Acute toxicity and ameliorative properties of *Alstonia boonei* leaf extract on diabetic rats. Afr J Biotechnol. 2014;13(5).
39. Alum EU, Obeagu EI, Ugwu OPC. Enhancing water, sanitation, and hygiene for diarrhoea control and SDGs: A review. Medicine. 2024;103(38):e39578.

40. Odo CE, Nwodo OFC, Joshua PE, Ugwu OPC, Okonkwo CC. Anti-diarrhoeal effect of chloroform–methanol extract of *Persea americana* seeds in rats. J Pharm Res. 2013;6(3):331-335.
41. Ugwu OPC, Obeagu EI, Alum EU, Michael M, et al. Effect of ethanol leaf extract of *Chromolaena odorata* on hepatic markers in diabetic rats. IAA J Appl Sci. 2023;9(1):46-56.
42. Ibiam UA, Alum EU, Orji OU, Aja PM, Nwamaka EN, Ugwu OPC, et al. Anti-inflammatory effects of *Buchholzia coriacea* leaf extract in arthritic rats. Indo Am J Pharm Sci. 2018;5(7):6341-6357.
43. Obeagu EI, Obeagu GU, Odo EO, Alum EU. Nutritional approaches for enhancing immune competence in HIV-positive individuals. IDOSR J Appl Sci. 2024;9(1):40-50.
44. Obeagu EI, Alum EU, Ugwu OPC. Hepcidin: Gatekeeper of iron in malaria resistance. Newport Int J Res Med Sci. 2023;4(2):1-8.
45. Nyamboga TO, Ugwu OPC, Ugwu JN, et al. Biotechnological innovations in soil health management: a systematic review of integrating microbiome engineering, bioinformatics, and sustainable practices. Cogent Food Agric. 2025;11(1):2519811.
46. Madu ANB, Alum EU, Aloh HE, Ugwu OPC, Obeagu EI, Uti DE, Egba SI, Ukaidi CUA. The price of progress: Assessing the financial costs of HIV/AIDS management in East Africa. Medicine. 2025;104(18):e42300.
47. Alum EU, Ugwu OPC. Beyond pregnancy: Understanding long-term implications of gestational diabetes mellitus. INOSR Sci Res. 2024;11(1):63-71.
48. Ugwu OPC, Alum EU, Okon MB, Aja PM, Obeagu EI, Onyeneke EC. Anti-nutritional and GC-MS analysis of ethanol root extract and fractions of *Sphenocentrum jollyanum*. RPS Pharmacol Pharm Rep. 2023;2(2):rqad007.
49. Eze VHU, Eze CE, Mbabazi A, Ugwu CN, Ugwu PO, Ogenyi CF, Ugwu JN, et al. Qualities and characteristics of a good scientific research writing: Step-by-step approaches. IAA J Appl Sci. 2023;9(2):71-76.
50. Igwenyi IO, Nchi PO, Okechukwu UPC, Igwenyi IP, Obasi DC, Edwin N. Nutritional potential of *Azadirachta indica* seeds. Indo Am J Pharm Sci. 2017;4(2):477-482.
51. Enechi OC, Oluka IH, Ugwu OPC, Omeh YS. Effect of ethanol leaf extract of *Alstonia boonei* on lipid profile of alloxan-induced diabetic rats. Afr J Biotechnol. 2013;24.
52. Ugwu OPC. Anti-malaria effect of ethanol extract of *Moringa oleifera* leaves on malaria-induced mice. University of Nigeria Nsukka; 2011:39.
53. Alum EU, Ugwu OPC, Obeagu EI. Nutritional interventions for cervical cancer patients: Beyond conventional therapies. J Cancer Res Cell Ther. 2024;8(1):1-6.
54. Obeagu EI, Obeagu GU. Advancements in immune augmentation strategies for HIV patients. IAA J Biol Sci. 2024;11(1):1-11.
55. Okechukwu PU, Nzubechukwu E, Ogbanshi ME, Ezeani N, Nworie MO. Effect of ethanol leaf extract of *Jatropha curcas* on chloroform-induced hepatotoxicity in albino rats. Glob J Biotech Biochem. 2015;10:11-15.
56. Ilozue NM, Ikezu UP, Okechukwu PCU. Antimicrobial and phytochemical screening of *Persea americana* seed extracts. IOSR J Pharm Biol Sci. 2014;9(2):23-25.
57. Onyeze R, Udeh SM, Akachi B, Ugwu OP. Isolation and characterization of fungi associated with spoilage of corn (*Zea mays*). Int J Pharm Med Biol Sci. 2013;2(3):86-91.
58. Obeagu EI, Alum EU, Ugwu OPC. Hepcidin: The gatekeeper of iron in malaria resistance. Newport Int J Res Med Sci. 2023;4:1-8.
59. Obeagu EI, Alum EU, Obeagu GU, Ugwu OPC. Prostate cancer: Review on risk factors. Eurasian Exp J Public Health. 2023;4(1):4-7.
60. Offor CE, Okaka ANC, Ogbugo SO, Egwu CO, Okechukwu PC. Effects of ethanol leaf extract of *Pterocarpus santalinoides* on haemoglobin, packed cell volume and platelets. IOSR J Nurs Health Sci. 2015;4:108-112, 93.
61. Offor C, Aja PC, Ugwu O, Agbafor KN. Effects of ethanol leaf extract of *Gmelina arborea* on serum proteins in albino rats. Glob J Environ Res. 2015;9(1):1-4.
62. Alum EU, Uti DE, Obeagu EI, Ugwu OPC, Alum BN. Cancer's psychosocial aspects: Impact on patient outcomes. Elite J Med. 2024;2(6):32-42.
63. Alum EU, Ugwu OPC, Egba SI, Uti DE, Alum BN. Climate variability and malaria transmission: Unravelling the complex relationship. INOSR Sci Res. 2024;11(2):16-22.
64. Alum EU, Obeagu EI, Ugwu OPC, Egba SI, EjimUti DE, Ukaidi CUA, et al. Confronting dual challenges: Substance abuse and HIV/AIDS. Elite J HIV. 2024;2(5):1-8.

CITE AS: Mugo Moses H. (2026). Diabetes and Mental Health: A Scholarly Review. IDOSR JOURNAL OF APPLIED SCIENCES 11(1):18-25. https://doi.org/10.59298/IDOSRJAS/2026/1111825