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Mini Review

Exploring the Intersection: Type 2 Diabetes and Its Influence on Mental and Psychosocial Well-Being: Mini Review

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Abstract

This systematic review examines the common risk factors associated with cognitive impairment, depression, and psychosocial issues in individuals with type 2 diabetes (T2D), aiming to highlight the interrelated aspects of these conditions. Recognizing the elevated risk of cognitive disorders, including dementia, and their subsequent impact on hospitalization, falls, and premature mortality in T2D patients, we meticulously searched electronic databases for relevant studies published from 2016 onwards, complemented by manual searches in leading journals. Out of the initial pool, we are focusing on biological, psychological, social, and pharmacological determinants leading to neuropsychological complications in T2D.

The analysis revealed consistent risk factors across cognitive impairment, depression, and psychosocial challenges, including comorbid conditions, dysglycemia, sex differences, elevated anxiety levels, educational and socio-economic status, and medication effects. Notably, disease duration, obesity, and age were underscored as significant contributors to both cognitive and depressive disorders. The lack of a strong support network further emerged as a pivotal risk factor, exacerbating psychosocial and depressive symptoms. These findings underscore the complexity of T2D management, highlighting the necessity for comprehensive care approaches that incorporate psychosocial support, patient education, and tailored treatments. This review emphasizes the importance of addressing multifaceted risk factors to enhance the overall outcomes and quality of life for individuals with T2D.

Keywords: ***Type 2 diabetes, depression, cognitive, psychosocial problems.***

Introduction

This mini review is predicated upon the comprehensive systematic review "The Main Risk Factors in Type 2 Diabetes for Cognitive Dysfunction, Depression, and Psychosocial Problems: A Systematic Review," published in Diabetology in 2024 [1]. The original article offers an extensive examination of the intricate relationships between Type 2 Diabetes (T2D) and its significant psychological and cognitive repercussions, highlighting the pivotal risk factors contributing to cognitive dysfunction, depression, and various psychosocial challenges. The impetus behind the creation of this mini-review stems from a desire to distill and underscore the critical findings of Randväli et al.'s work, thereby providing a succinct yet profound overview of the paramount risk factors identified. This endeavor aims to facilitate a broader understanding among clinicians, researchers, and students who may not have the time or resources to engage with the comprehensive details of the original systematic review. Moreover, this condensed version seeks to enhance accessibility to this vital information, ensuring that key insights and recommendations are effectively communicated to a wider audience.

Type 2 diabetes (T2D) is a complex condition influenced by a myriad of factors including environmental, social, and psychosocial elements, which play a crucial role in the management and outcomes of the disease. The prevalence of comorbidities among individuals with T2D is high, with a significant number of older adults presenting multiple concurrent illnesses, underscoring the challenges in managing this condition amidst diverse demographic and psychosocial backgrounds. Moreover, T2D is associated with an increased risk of cognitive impairments and depression, conditions that exacerbate the difficulty in managing diabetes due to their impact on self-management and treatment adherence. Despite previous systematic reviews addressing cognitive and depressive disorders separately, there is a lack of comprehensive analysis on their interconnectedness with psychosocial issues within the T2D context. This review aims to bridge this gap by exploring the risk factors for cognitive impairment, depression, and psychosocial challenges (**Figure 1**) in T2D, highlighting their interrelations and shared risk factors [2-5].

Literature Review

Risk Factors for Cognitive Impairment in Type 2 Diabetes

Recent studies underline obesity, high body mass index (BMI), and particularly larger waist circumference as significant risk factors for cognitive decline and dementia in T2D patients, with notable impacts beginning in early middle age and peaking between 60 and 80 years. Gender differences suggest slightly higher dementia risk in women compared to men, with men facing greater risks of vascular dementia. Comorbidities like vascular diseases and elevated HbA1c levels further exacerbate cognitive impairments, highlighting the intricate link between metabolic control and brain health. Insulin therapy and cardiovascular issues, including hypertension treated with beta-blockers, have been associated with heightened risks of dementia, emphasizing the need for cautious management of these conditions in T2D patients [6-7].

Risk Factors for Depression in Type 2 Diabetes

The prevalence of depression in T2D patients is significantly correlated with obesity, poor glycemic control (HbA1c ≥ 7%), and the duration of diabetes. The onset of T2D at a younger age, gender differences with higher prevalence in women, and the presence of comorbid conditions like polyneuropathy and diabetic retinopathy further increase depression risks. Lifestyle factors, including obesity, alcohol abuse, smoking, and lack of physical activity, contribute to the incidence of depression, alongside socioeconomic variables like education level, family size, and unemployment. Insulin use has been particularly linked to higher depression and anxiety rates, underlining the psychological impact of diabetes management [8-9].

Risk Factors for Psychosocial Problems in Type 2 Diabetes

Women with T2D report higher depression rates and a greater need for social support. Poor glucose control, cardiovascular complications, and hypoglycemia are key predictors of psychosocial difficulties. Erectile dysfunction, neuropathy, and thyroid dysfunctions are among the comorbidities affecting mental health. Anxiety regarding complications, influenced by knowledge levels and social support, personality traits, economic conditions, and the level of education, plays a crucial role in patients' ability to cope with the disease. Support from family and friends emerges as a pivotal factor in managing diabetes-related challenges and maintaining mental health [10-11].

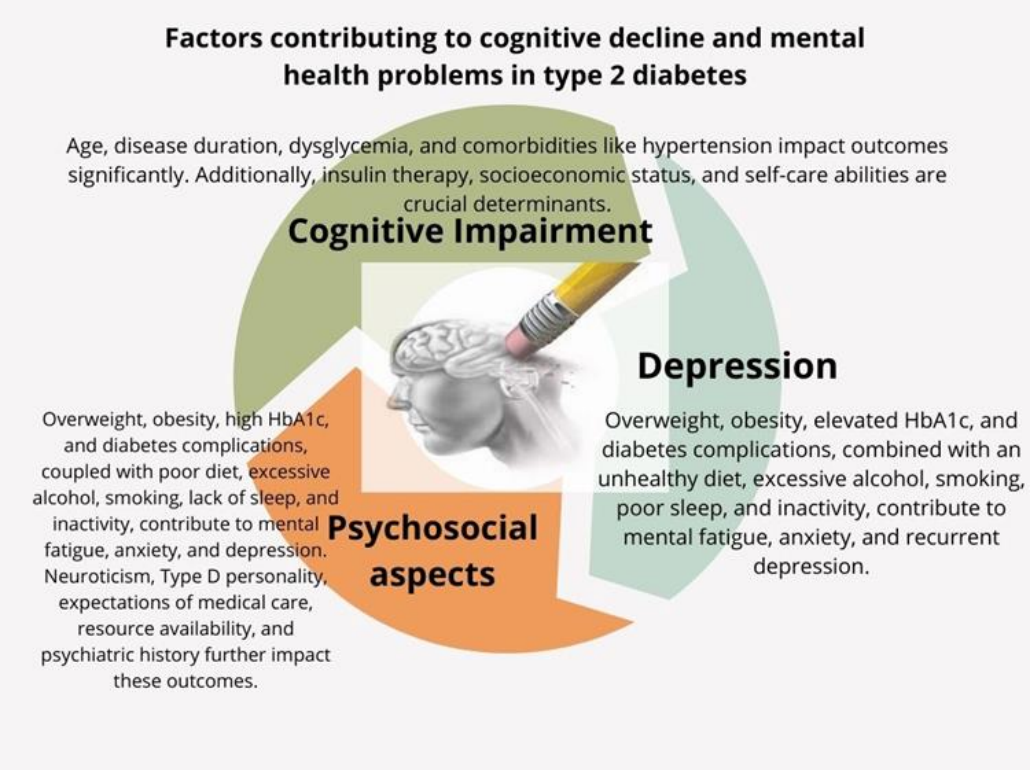

Figure 1: Factors contributing to cognitive decline and mental health problems in type 2 diabetes

Discussion

Our systematic review elucidates the intricate nexus between type 2 diabetes (T2D) and its influence on cognitive impairment and depression, underpinned by a complex interplay of biological, psychological, and socio-economic factors. The pathophysiology of cognitive decline in T2D patients is multifaceted, involving disruptions in insulin signaling, heightened inflammatory responses, and metabolic dysregulation, which are further compounded by age, disease duration, and glucose level fluctuations [12-13]. This cascade of events accelerates brain aging and increases the vulnerability to cognitive disorders and dementia, particularly in the presence of comorbid conditions such as hypertension and depression [7,14-15].

Similarly, the bidirectional relationship between T2D and depression underscores the compounded risk factors, including obesity, poor glycemic control, and lifestyle factors such as diet and physical inactivity, that exacerbate neurodegenerative changes in the brain [16]. Our review highlights the critical need for an integrated treatment approach that encompasses not only medical management but also lifestyle modifications and mental health support to mitigate these risks [17-18].

Socio-economic factors, notably education level and income, emerge as pivotal in influencing both the management of T2D and the susceptibility to cognitive impairment and depression. These factors necessitate a comprehensive support system to enhance coping mechanisms and disease management strategies, aligning with the American Diabetes Association's emphasis on integrated psychosocial care [19]. This discussion underscores the necessity of a holistic approach in treating T2D, recognizing the interdependence of biological, psychological, and socio-economic factors in shaping patient outcomes. Future research should aim to refine our understanding of these relationships, focusing on

personalized interventions that address the multifaceted challenges faced by individuals with T2D.

Conclusion

In summary, this mini review enhances and refines the foundational insights provided by Randväli et al., focusing on the intricate relationship between T2D and its psychological comorbidities. By distilling critical findings and highlighting essential risk factors, it advocates for an integrative care approach and underscores the significance of early detection and intervention strategies. This work broadens the understanding of T2D management, emphasizing the need for a comprehensive strategy that addresses both physical and psychological aspects to improve patient outcomes.

Furthermore, the review encourages further research and dialogue within the medical community, aiming to translate these insights into practical clinical applications and health policies. It serves as a catalyst for advancing a holistic approach to T2D care, ultimately contributing to enhanced quality of life and better health outcomes for individuals living with this condition.

Data Availability Statement

The findings of this systematic review are supported by data available in the public domain, accessible through PROSPERO at Record ID 451300. This study did not generate any new data; hence, all pertinent data underpinning the conclusions are derived from the articles reviewed and can be accessed through the specified PROSPERO link.

Authors' contributions

Conceptualization, M.R. and T.T.; methodology, and software, M.R..; formal analysis, M.R.; writing-original draft preparation, M.R.; writing-review and editing, M.R visual concept M.R.; supervision, T.T.; project administration, M.R.; funding acquisition, M.R. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

This systematic review consisted solely of analyses of secondary data from published studies and did not involve any original human or animal experimentation; therefore, no ethical approval was necessary for the work herein presented.

Conflicts of Interest

No potential conflicts of interest relevant to this article were reported.

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References

[1] Randväli, M.; Toomsoo, T.; Šteinmiller, J. The Main Risk Factors in Type 2 Diabetes for Cognitive Dysfunction, Depression, and Psychosocial Problems: A Systematic Review. Diabetology 2024, 5 (1), 40-59.

[2] Ali, M.K.; Pearson-Stuttard, J.; Selvin, E.; Gregg, E.W. Interpreting global trends in type 2 diabetes complications and mortality. Diabetologia 2022, 65, 3-13.

[3] Bellary, S.; Kyrou, I.; Brown, J.E.; Bailey, C.J. Type 2 diabetes mellitus in older adults: Clinical considerations and management. Nat. Rev. Endocrinol. 2021, 17, 534-548.

[4] Bellia, C.; Lombardo, M.; Meloni, M.; Della-Morte, D.; Bellia, A.; Lauro, D. Diabetes and cognitive decline. Adv. Clin. Chem. 2022, 108, 37-71

[5] Chen, F.; Wei, G.; Wang, Y.; Liu, T.; Huang, T.; Wei, Q.; Ma, G.; Wang, D. Risk factors for depression in elderly diabetic patients and the effect of metformin on the condition. BMC Public Health 2019, 19, 1063

[6] Cigolle, C.T.; Blaum, C.S.; Lyu, C.; Ha, J.; Kabeto, M.; Zhong, J. Associations of Age at Diagnosis and Duration of Diabetes with Morbidity and Mortality Among Older Adults. JAMA Netw. Open 2022, 5, e2232766.

[7] Dove, A.; Shang, Y.; Xu, W.; Grande, G.; Laukka, E.J.; Fratiglioni, L.; Marseglia, A. The impact of diabetes on cognitive impairment and its progression to dementia. Alzheimers Dement. 2021, 17, 1769-1778.

[8] Kec, D.; Rajdova, A.; Raputova, J.; Adamova, B.; Srotova, I.; Nekvapilova, E.K.; Michalcakova, R.N.; Horakova, M.; Belobradkova, J.; Olsovsky, J.; et al. Risk factors for depression and anxiety in painful and painless diabetic polyneuropathy: A multicentre observational cross-sectional study. Eur. J. Pain 2022, 26, 370-389.

[9] Rohde, C.; Nielsen, J.S.; Schöllhammer Knudsen, J.; Thomsen, R.W.; Østergaard, S.D. Risk factors associated with mortality among individuals with type 2 diabetes and depression across two cohorts. Eur. J. Endocrinol. 2022, 187, 567-577.

[10] Young-Hyman, D.; de Groot, M.; Hill-Briggs, F.; Gonzalez, J.S.; Hood, K.; Peyrot, M. Response to Comment on Young-Hyman et al. Psychosocial Care for People with Diabetes: A Position Statement of the American Diabetes Association. Diabetes Care 2016; 39:2126-2140. Diabetes Care 2018, 41, e33-e34.

[11] Adu, M.D.; Malabu, U.H.; Malau-Aduli, A.E.O.; Malau-Aduli, B.S. Enablers and barriers to effective diabetes self-management: A multi-national investigation. PLoS ONE 2019, 14, e0217771.

[12] Gaspar, J.M.; Baptista, F.I.; Macedo, M.P.; Ambrosio, A.F. Inside the Diabetic Brain: Role of Different Players Involved in Cognitive Decline. ACS Chem. Neurosci. 2016, 7, 131-142

[13] Zilliox, L.A.; Chadrasekaran, K.; Kwan, J.Y.; Russell, J.W. Diabetes and Cognitive Impairment. Curr. Diab. Rep. 2016, 16, 87

[14] Longo, M.; Bellastella, G.; Maiorino, M.I.; Meier, J.J.; Esposito, K.; Giugliano, D. Diabetes and Aging: From Treatment Goals to Pharmacologic Therapy. Front. Endocrinol. 2019, 10, 45.

[15] Yuan, X.Y.; Wang, X.G. Mild cognitive impairment in type 2 diabetes mellitus and related risk factors: A review. Rev. Neurosci. 2017, 28, 715-723.

[16] Meurs, M.; Roest, A.M.; Wolffenbuttel, B.H.; Stolk, R.P.; de Jonge, P.; Rosmalen, J.G. Association of Depressive and Anxiety Disorders with Diagnosed Versus Undiagnosed Diabetes: An Epidemiological Study of 90,686 Participants. Psychosom. Med. 2016, 78, 233-241.

[17] Al-Ayed, M.; Moosa, S.R.; Robert, A.A.; Al Dawish, M. Anxiety, depression and their associated risk factors among patients with diabetic foot ulcer: A two center cross-sectional study in Jordan and Saudi Arabia. Diabetes Metab. Syndr. 2021, 15, 237-242

[18] Bruce, D.G.; Davis, W.A.; Starkstein, S.E.; Davis, T.M.E. Clinical risk factors for depressive syndrome in Type 2 diabetes: The Fremantle Diabetes Study. Diabet. Med. 2018, 35, 903-910.

[19] Health Outcomes: Standards of Medical Care in Diabetes-2020. Diabetes Care 2020, 43 (Suppl. S1), S48-S65.