

## **Evaluation of Anxiety and Depression Levels in Patients with Diabetes Mellitus Presenting for Dental Treatment: A Preliminary Study**

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### **Abstract**

**Aim:** To evaluate the degrees of anxiety and depression among type 2 diabetic mellitus patients who are seeking dental treatment.

**Method:** In a preliminary investigation, 20 individuals diagnosed with type 2 diabetes mellitus who presented for dental treatment underwent assessment using the Hospital Anxiety and Depression Scale (HADS) to measure anxiety levels. The HADS questionnaire analyses anxiety and depression based on a predefined set of 14 items. Results from the HADS scoring categorize patients into normal, borderline abnormal, and abnormal anxiety levels.

**Results:** The average anxiety score among participants with diabetes mellitus was 11.4, while the depression score was 12. Elevated anxiety and depression scores were notably observed among female participants, older individuals, those with a longer duration of diabetes, and patients with both diabetes and other health conditions. The original English version of the HADS scale was translated into the local regional language for this study.

**Conclusion:** Depression and anxiety rates are notably elevated among diabetic patients seeking dental care. The presence of diabetes often compromises quality of life, emphasizing the critical need for timely diagnosis and effective management of anxiety and depression in individuals with type 2 diabetes mellitus to enhance overall well-being.

**Key words:** HADS scale, depression, anxiety, diabetes mellitus, type 2 DM.

### **INTRODUCTION**

The Hospital Anxiety and Depression Scale (HADS) stands out as a widely used questionnaire in fields like endocrinology and oncology, primarily focusing on emotional distress. Originally designed to spot anxiety and depression in non-psychiatric medical settings, it sets out somatic symptoms associated with physical illnesses and treatments, like headaches or weight loss, to hone in on emotional anguish.<sup>1</sup>Comprising 14 items, it's crafted for self-reporting and was initially tailored for medical outpatient settings, featuring separate subscales for depression and anxiety, each with 7 items. HADS proves to be a reliable tool

for psychiatric screening in general hospital outpatient settings, boasting strong internal consistency and external validity, thanks to its high sensitivity and specificity. Depression, with a lifetime prevalence ranging from 11% to 15% across different income brackets, remains a widespread and critical medical concern, affecting about half of the population at some point in their lives, potentially impairing their work and productivity.<sup>2</sup>

In developed nations, diabetes ranks as the eighth leading cause of disability-adjusted life years (DALYs), while depression and anxiety hold the fourth and fifth positions, respectively, in terms of DALYs. Researchers have put forward hypotheses regarding the role of hormones and endocrine disorders in the development of psychiatric conditions. Multicenter studies are investigating the physiological pathways associated with endocrine function to elucidate traditional psychiatric illnesses, given the interplay between hormone regulation and the central nervous system feedback mechanisms.<sup>3</sup> A prominent example in this realm is the intricate relationship between depression and diabetes mellitus. However, this connection is intricate and varied.<sup>4</sup>

The collective's wealth of knowledge and research proficiency is demonstrated through a range of high-caliber publications. In order to explore this concept further, a study was initiated at the dental college, concentrating on patients with a medical history of Type 2 diabetes mellitus.

## **Materials and Methods:**

### **Study design**

The preliminary investigation took place at the Department of Periodontology and Rama Dental College Hospital and Research Centre. Twenty patients seeking dental treatment and having a systemic history of type 2 Diabetes Mellitus, either solely or with other accompanying conditions, were enrolled. All 20 patients had random blood glucose levels exceeding 200 mg/dl, indicating their glycemic status. The Hospital Anxiety and Depression Scale (HADS), a 14-item self-administered tool with separate anxiety and depression subscales, was employed to gauge the prevalence of anxiety and depression among these patients. Each subscale comprises seven items, with a scoring system: 0-7 signifies "no anxiety/depression," 8-10 indicates "moderate anxiety/depression," and 11-21 suggests "severe anxiety/depression." Additionally, a Demographic Performa was devised, gathering patient data such as gender, age, disease duration, anti-diabetic medication, and any

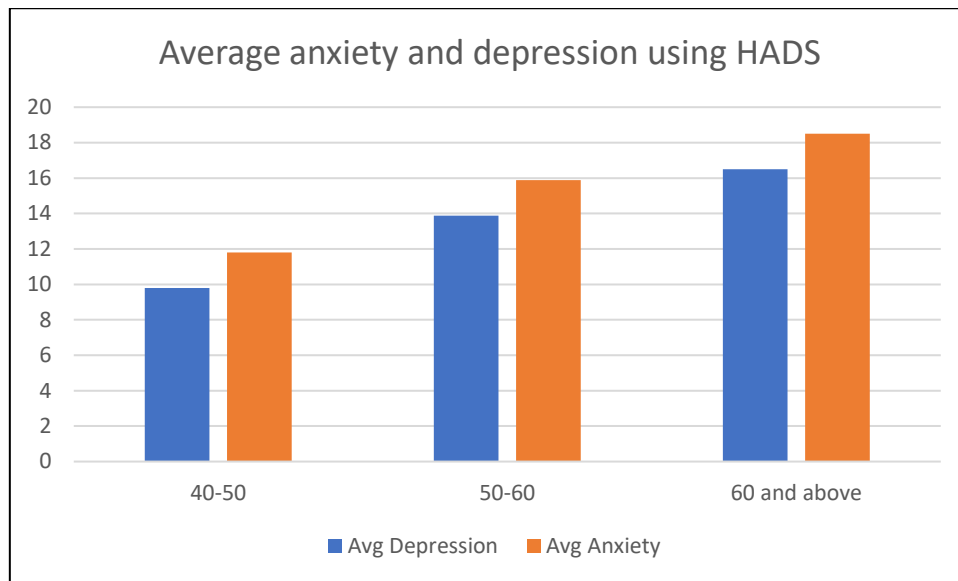
concurrent comorbidities. To facilitate comprehension, the original HADS scale was translated into the local language.

**Table 1: Summary of Patient demographic and health characteristic**

Summary Point	Details
Number of Patients	20
Age Range	Majority (15) aged between 40-60, 2 under 40, and 3 over 60
Gender Distribution	10 male, 10 female
Marital Status	12 married, 3 single, 3 divorced, 2 widowed
Sleep Patterns	10 regular, 7 irregular, 3 not specified
Interest in Music	15 patients interested in music, 5 not interested
Systematic Illness	9 patients with hypertension, 7 with hypertension & coronary heart disease, 4 with carcinoma
Anxiety Scores	Mean anxiety score: 13.1, ranging from 9 to 19
Depression Scores	Mean depression score: 11.2, ranging from 7 to 1

## Results

The average anxiety score among the participants was 13.1, while the average depression score was 11.2. Among female patients with type 2 diabetes mellitus aged 50-60 years and a disease duration exceeding 10 years, there is a heightened likelihood of experiencing anxiety and depression. Comorbidities such as hypertension were observed in 9 patients, while hypertension and coronary heart disease were present in 7 patients. Additionally, a history of carcinoma was noted in 4 patients. Out of the 20 patients, only one was undergoing insulin therapy, while the rest were prescribed oral antilipemic medication.



**GRAPH 1 :Average anxiety and average depression score of patients using HADS**

### Discussion:

Diabetes, as outlined in the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders (DSM-5), is regarded as a mood disorder with a constellation of symptoms that impair an individual's functioning.<sup>5</sup> Depression affects emotions, cognition, and behavior. According to DSM-5 criteria, a diagnosis of major depressive disorder requires the presence of a core symptom—either a persistently diminished/irritable mood or a loss of interest/pleasure—along with at least four of the following symptoms: feelings of guilt or worthlessness, fatigue or loss of energy, difficulty concentrating, suicidal ideation, significant weight change, and changes in psychomotor activity.<sup>6,7</sup> The linkages between endocrine disorders and mental health concerns have garnered significant attention for various reasons.<sup>8</sup> The co-occurrence of diabetes and depression presents a complex and often overlooked clinical challenge. Approximately one-third of individuals with diabetes experience depressive symptoms, which not only diminish their quality of life but also pose obstacles to effectively managing diabetes.<sup>9,10</sup> It is incumbent upon healthcare professionals to identify and promptly address depression in diabetic patients to optimize treatment outcomes for them.<sup>11,12,13</sup> Given that many healthcare facilities are ill-equipped to handle this comorbidity, novel care approaches are imperative to tackle this significant public health concern. Integrated care, encompassing both psychotherapeutic and pharmacotherapeutic interventions delivered within primary care settings, has been shown to alleviate the severity

of depressive symptoms.<sup>14</sup> However, it does not appear to directly impact glycemic control. Thus, a treatment strategy combining psychotherapy and pharmacotherapy may be necessary to improve glycemic control in addition to addressing depression.<sup>15,16</sup> Nevertheless, further research is warranted to determine the most effective approach to treating depression alongside Type 1 diabetes and Type 2 diabetes.<sup>17</sup> Although there are certain limitations, this study aids in understanding how depression and diabetes are related. It is unclear, however, whether connected comorbidities with diabetes also affect the psychological state. Small sample size was analysed because it was a pilot study.<sup>18</sup>

**Conclusion:**

Long-term illness undoubtedly impacts one's quality of life. The decline in overall health contributes to inadequate oral hygiene among these individuals. This research contributes valuable insights to the existing body of literature by highlighting elevated levels of anxiety and depression among patients with Diabetes Mellitus, which may impede their willingness to seek dental treatment.

**References:**

1. Panchal V, Jeevanandan G, Subramanian E. Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal treatment of primary teeth: A randomized controlled trial. *J Indian Soc Pedod Prev Dent* 2019; 37: 75–79.
2. Palanivelu, J., Thanigaivel, S., Vickram, S., Dey, N., Mihaylova, D., & Desseva, I. (2022). Probiotics in functional foods: survival assessment and approaches for improved viability. *Applied Sciences*, 12(1), 455.
3. Felicita AS. Orthodontic extrusion of Ellis Class VIII fracture of maxillary lateral incisor - The sling shot method. *Saudi Dent J* 2018; 30: 265–269.
4. Annunziata MA, Muzzatti B, Bidoli E, Flaiban C, Bomben F, Piccinin M, Gipponi KM, Mariutti G, Busato S, Mella S. Hospital Anxiety and Depression Scale (HADS) accuracy in cancer patients. *Support Care Cancer*. 2020 Aug;28(8):3921-3926.
5. Bădescu SV, Tătaru C, Kobylinska L, Georgescu EL, Zahiu DM, Zăgrean AM, Zăgrean L. The association between Diabetes mellitus and Depression. *J Med Life*. 2016 Apr-Jun;9(2):120-5

6. Tichomirowa MA, Keck ME, Schneider HJ, Paez- Pereda M, Renner U, Holsboer F, Stalla GK. Endocrine disturbances in depression. *J Endocrinol Invest.* 2005 Jan;28(1):89-99.
7. Ali S, Stone MA, Peters JL, Davies MJ, Khunti K. The prevalence of co-morbid depression in adults with Type 2 diabetes: a systematic review and meta-analysis. *Diabet Med.* 2006 Nov;23(11):1165-73.
8. Holt RI, de Groot M, Golden SH. Diabetes and depression. *Curr Diab Rep.* 2014 Jun;14(6):491.
9. Roy T, Lloyd CE. Epidemiology of depression and diabetes: a systematic review. *J Affect Disord.* 2012 Oct;142 Suppl: S8-21.
10. Ramesh A, Varghese S, Jayakumar ND, et al. Comparative estimation of sulfiredoxin levels between chronic periodontitis and healthy patients - A case-control study. *J Periodontol* 2018; 89:1241–1248.
11. Vijayashree Priyadharsini J. In silico validation of the non-antibiotic drugs acetaminophen and ibuprofen as antibacterial agents against red complex pathogens. *J Periodontol* 2019; 90: 1441–1448.
12. Priyadharsini JV, Vijayashree Priyadharsini J, Smiline Girija AS, et al. In silico analysis of virulence genes in an emerging dental pathogen *A. baumannii* and related species. *Archives of Oral Biology* 2018; 94: 93–98.
13. Teja KV, Ramesh S, Priya V. Regulation of matrix metalloproteinase-3 gene expression in inflammation: A molecular study. *J Conserv Dent* 2018; 21: 592–596.
14. Manohar MP, Sharma S. A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists. *Indian J Dent Res* 2018; 29: 716–720.
15. Nandakumar M, Nasim I. Comparative evaluation of grape seed and cranberry extracts in preventing enamel erosion: An optical emission spectrometric analysis. *J Conserv Dent* 2018; 21: 516–520.
16. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students. *J Dent Educ* 2019; 83: 445–450.
17. Panchal V, Jeevanandan G, Subramanian E. Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal

treatment of primary teeth: A randomized controlled trial. *J Indian Soc Pedod Prev Dent* 2019; 37: 75–79.

18. Palanivelu, J., Thanigaivel, S., Vickram, S., Dey, N., Mihaylova, D., & Desseva, I. (2022). Probiotics in functional foods: survival assessment and approaches for improved viability. *Applied Sciences*, 12(1), 455.