ORAL HEALTH OF INDIVIDUALS WITH MENTAL HEALTH DISORDERS

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Palavras-chave: Depressão. Cárie Dentária. Saúde Mental. Doença Periodontal. Fumar.

RESUMO

Objetivo: Analisar o estado de saúde oral e dentária de uma população de pacientes com história de problemas de saúde mental. Conhecimento Prévio: Indivíduos com problemas de saúde mental só mais suscetíveis a doença oral relacionada a hygiene oral deficient, mudanças de comportamento, efeitos de medicações, e doenças sistêmicas. Saúde mental e oral afetam reciprocamente uma à outra. Problemas de saúde mental foram associados com falta de cuidado pessoal, boca seca, chance aumentada de uso de substâncias ilícitas, e risco aumentado de infecção oral. De forma semelhante, problemas de saúde oral afetam negativamente saúde mental. Halitose, cárie, perda de dentes, e problemas de fala podem agravar o estado de saúde mental relacionado com auto-estima e ansiedade. **Métodos**: The Dental Registry and DNA Repository (DRDR) da Faculdade de Medicina Dental da Universidade de Pittsburgh foi analisado na avaliação de pacientes com história de doença mental. Um total de 6.015 fichas de pacientes estava disponível no DRDR no momento dessa análise. Dessas, 1.068 eram fichas de pacientes com um problema mental. Prevalência de cárie, periodontite, atrição, edentulismo parcial e total, xerostomia, erosão, gengivite, disordem da articulação temporomandibular (TMD), e úlceras foram determinadas e comparadas com o resto do registro (N=4.947). Sexo e etnia foram também analisados. O teste to qui-quadrado com significância de 5% foi usado. **Resultados**: Dos 6.015 pacientes, 1.068 relataram história de problema de saúde mental. 59.2% reportou ter depressão, 16.7% ansiedade, 13.3% doença bipolar, 3.6% esquizofrenia, 2.3% transtorno de estresse pós-traumático (PTSD), e 2.3% problemas de alimentação. Doença mental estava significativamente associada com edentulismo parcial e total, cárie, atrição, xerostomia, erosão, TMD, ulceração, e gengivite. Doença mental também for significativamente associada com o sexo feminino e etinia branca. **Conclusões**: Problemas mentais signifcativamente afetam a saúde oral. Pessoas com problemas de saúde mental parecem ter risco aumentado à cárie, atrição, erosão, edentulismo, xerostomia, inflamcação das gengivas, e TMD. Esses resultados poderão ajudar a direcionar medidas de prevenção e tratamento dessas pessoas.

Keywords: Depression. Dental Caries. Mental Health. Periodontal Diseases. Smoking.

ABSTRACT

Objective: To analyze the oral and dental health conditions in a population of patients with a history of mental health disorders. Background: Individuals with mental health disorders are susceptible to dental disease related to poor oral hygiene, behavioral changes, medication effects, and systemic disease. Mental health and dental health reciprocally affect one another. Poor mental health has been associated with self-neglect, dry mouth, increased likelihood of substance abuse, and a higher susceptibility to oral infection. Similarly, poor dental health negatively affects mental health. Halitosis, dental caries, missing teeth, and affected speech can exacerbate mental health illness related to self-esteem and social anxiety. **Methods:** The Dental Registry and DNA repository (DRDR) at the University of Pittsburgh School of Dental Medicine was analyzed for patients with a history of mental health disorder. A total of 6,015 patient records were available from the DRDR at the time of this analysis. 1,068 patient records were available for individuals reporting a mental health disorder. We examined the prevalence of various dental conditions in a population of patients reporting a mental health disorder (N=1,068) in comparison to the rest of the registry (N=4,947), as well as the distribution of disorders and demographics. Mental health disorders included in this study are depression, anxiety, schizophrenia, bipolar disorder, post-traumatic stress disorder (PTSD), and eating disorders. Oral and dental health was assessed by dental caries, periodontal disease, gingivitis, tooth wear, complete and partial edentulism, xerostomia, coated tongue, gingivitis, oral ulceration, periapical lesions, and TMD. The prevalence of smoking, alcohol abuse, and substance abuse was also determined. Sex and ethnicity were also examined. **Results**: Of 6,015 patients, 1,068 reported a history of mental health disorder. 59.2% reported having depression, 16.7% reported anxiety, 13.3% reported bipolar disorder, 3.6% reported schizophrenia, 2.3% reported post-traumatic stress disorder (PTSD), and 2.3% reported an eating disorder. Mental illness was significantly associated with partial and complete edentulism, dental caries, tooth wear, xerostomia, erosion, TMD, ulceration, and gingivitis. Mental illness was also significantly associated with female sex and Whites. **Conclusions**: Mental health conditions can significantly affect the dental and oral health of affected individuals. Individuals with mental health conditions may be more susceptible to dental disease including dental caries, tooth wear, erosion, edentulism, dry mouth, gingival inflammation, and TMD. Understanding the association between mental and dental health can help direct prevention and treatment in a multidisciplinary setting.

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INTRODUCTION

Individuals with mental health disorders are increasingly susceptible to oral and dental disease related to oral hygiene, self-care, and systemic disease. The association between mental health and oral health is reciprocating, each with effects on the other. Poor mental health has been associated with dental caries, periodontal disease, dry mouth, behavioral changes, comorbid physical disease, smoking, alcohol and substance abuse, and susceptibility to oral infection. Additionally, poor oral health, including missing teeth, halitosis, and dental caries, can exacerbate the negative consequences of poor mental health.[1-6]

Kisely (2016) noted that individuals with common psychological disorders had greater rates of dental caries. Individuals with psychological disorders also had greater tooth loss than those without psychological disorders.[1-6] The association between periodontal status and psychiatric status has been debated. Although some studies suggest an association between periodontal status and psychiatric status,[7-9] others do not.[4-6] Increased rates of dental caries and tooth loss can be explained by drug-induced xerostomia associated with antipsychotics, antidepressants, and mood stabilizers.

The association between mental health and erosion is most clearly established in cases of self-induced vomiting, characterized by chemical erosion of the palatal surfaces of teeth.[4] Salivary dysfunction related to eating disorders can further potentiate dental caries. Furthermore, erosion can manifest in cases of high tobacco and alcohol use through gastroesophageal reflux.[6]

Piccoli et al. (2014) concluded that chronic neuroleptic drug use can lead to bruxism. It has been suggested that medications, disturbances in dopaminergic systems, and a psychological stress component are linked to bruxism in patients with psychological disorders. Tooth wear is more likely to be associated with bruxism than temporomandibular joint disorders (TMD). Nonetheless, symptoms of bruxism may include temporomandibular joint pain and myofascial pain.[10]

Smoking, alcohol, and substance abuse further exacerbate oral health issues of individuals directly through physiologic changes as well as indirect behavioral and motivational changes. Physiological effects include xerostomia, an urge for snacking, clenching and grinding, and erosion from application of substances, such as cocaine, directly onto the teeth. Indirect effects are related to lifestyle changes, such as a reduced interest in dental hygiene, access to care, poor nutrition, and infrequent and irregular dental visits.[11]

This study examines the prevalence of various dental conditions in a population of patients reporting a mental health disorder, as well as the distribution of disorders and some demographic variables. Mental health disorders included in this study are depression, anxiety, schizophrenia, bipolar disorder, post-traumatic stress disorder (PTSD), and eating disorders. Oral and dental health was assessed by dental caries, periodontal disease, gingivitis, tooth wear, complete and partial edentulism, xerostomia, coated tongue, gingivitis, oral ulceration, periapical lesions, and TMD. The prevalence of smoking, alcohol abuse, and substance abuse was also determined. Sex and ethnicity were also examined. Understanding the association between mental and dental health can help direct prevention and treatment in a multidisciplinary setting.

MATERIALS AND METHODS

The Dental Registry and DNA Repository (DRDR) at the University of Pittsburgh [University of Pittsburgh Institutional Review Board (IRB) approval # 0606091] was used. All patients reporting a history of mental health illness were included in the study. The database included a total of 6,015 patient records. 1,068 patients reported a history of mental health illness and were included in the study. The population included 428 males and 640 females, which included 844 Whites, 190 Blacks, eight Hispanics, five Indians, and 13 that reported “other.” The remaining 4,947 subjects in the registry were used as comparison.

Patients meeting inclusion criteria were analyzed for complete and partial edentulism, dental caries, periodontal disease, tooth wear, xerostomia, coated tongue, erosion, TMD, periapical lesions, oral ulceration, and gingivitis. The distribution of mental health conditions was determined. Prevalence values were compared between patients with and without mental health illness. Determination of prevalence was based on patients’ self-reported answers during the medical history survey recorded in the electronic health record. Sex, ethnicity, smoking, alcohol use, and other substance abuse were also analyzed and compared to the total DRDR population. Alcohol abuse was defined as having more than 15 drinks per week for males and more than 8

drinks per week for females. We defined substance abuse as the excessive use of psychoactive substances and illicit drugs. The chi-squared test was used to determine significance. P-values and 95% confidence intervals were determined for prevalence differences among patients reporting a history of mental health disorder and those that did not within the DRDR population.

RESULTS

The distribution of mental health disorders among the DRDR population was determined and shown in Figure 1. 59.2% reported having depression, 16.7% reported anxiety, 13.3% reported bipolar disorder, 3.6% reported schizophrenia, 2.3% reported PTSD, and 2.3% reported an eating disorder. Among 1,068 patients reporting a mental health disorder, 60% of patients reported as female and 40% reported male. Distribution of ethnicity among the population reporting a mental health disorder is shown in Figure 2. 80% reported as White, 18% as Black, and 2% as either Asian, Hispanic, or other. This frequency in Whites was higher than the expected frequency based on our DRDR data (65% Whites; $p<0.0000001$).

Prevalence values for complete edentulism, partial edentulism, dental caries, periodontitis, bruxism, attrition, xerostomia, coated tongue, erosion, TMD, periapical lesions, oral ulceration, and gingivitis were determined for patients reporting a history of mental health disorder. Prevalence differences in complete edentulism, partial edentulism, dental caries, attrition, xerostomia, coted tongue, erosion, TMD, oral ulceration, and gingivitis were statistically significant higher in individuals reporting mental disorders ($p<0.05$). Prevalence differences in periodontal disease, bruxism, and periapical lesions were not statistically significant ($p>0.05$) between the two comparison groups.

Figure 3 demonstrates the prevalence differences in dental and oral health conditions between patients with mental health disorder and patients without mental health disorder. 10.8% of patients with a history of mental health illness presented with complete edentulism compared to 5.6% of patients without mental health illness ($p<0.0001$; 95% confidence intervals 3.28, 7.31). 31.2% of patients with a history of mental health illness were partially edentulous compared to 26.2% of patients without a history of mental illness ($p=0.0009$; 95% confidence intervals 1.96, 8.12). Dental caries prevalence among patients with mental health disorder was 53.6% compared to 47.9% in patients without mental health disorder ($p=0.0007$; 95% confidence intervals 2.35, 9.03). 16.2% of patients with mental health disorder showed attrition compared to 9.8% in the remaining DRDR population ($p<0.0001$; 95% confidence intervals 4.07, 8.89). Of patients with mental health disorder, 24% reported xerostomia compared to 8.5% of patients without mental health disorder ($p<0.0001$; 95% confidence intervals 12.84, 18.28). 42.3% of patients with mental health disorder displayed a coated tongue upon oral examination compared to 37.4% of patients without mental health disorder ($p=0.003$; 95% confidence intervals 1.62, 8.21). Erosion was noted in 1.6% of patients with mental health illness compared to 0.7% of patients without mental health illness ($p=0.004$; 95% confidence intervals 0.18, 1.87). TMD was noted in 35.5% of patients with mental health illness compared to 30.2% of patients without mental health illness ($p=0.0007$; 95% confidence intervals 2.14, 8.52). 5.4% of patients with mental health illness presented with oral ulcers comparted to 3.4% of patients without mental health illness ($p=0.002$; 95% confidence intervals 0.61, 3.6). Gingivitis was noted in 28.2% of patients with mental health disorder comparted to 23% of patients without mental health illness ($p=0.0003$; 95% confidence intervals 2.26, 8.24).

Patients with a history of mental health disorder were also more likely to smoke, use alcohol excessively, and abuse substances. Figure 4 demonstrates prevalence differences in smoking, alcohol abuse, and substance abuse between patients with mental health disorder and patients without mental health disorder. Smoking was prevalent in 36.7% of patients with a history of mental health disorder compared to 23.3% in patients without mental health disorder ($p<0.0001$; 95% confidence intervals 10.26, 16.59). Prevalence differences in alcohol abuse, defined as greater than 15 drinks per week for males and greater than 8 drinks per week for females, was also statistically significant. 14.1% of patients with mental health disorder reported alcohol abuse compared to 10.1% of patients without a mental health disorder ($p=0.0001$; 95% confidence intervals 1.79, 6.37). Substance abuse was prevalent in 17.8% of patients with a mental health disorder compared to 11.6% of patients without a mental health disorder ($p<0.0001$; 95% confidence intervals 3.77, 8.78).

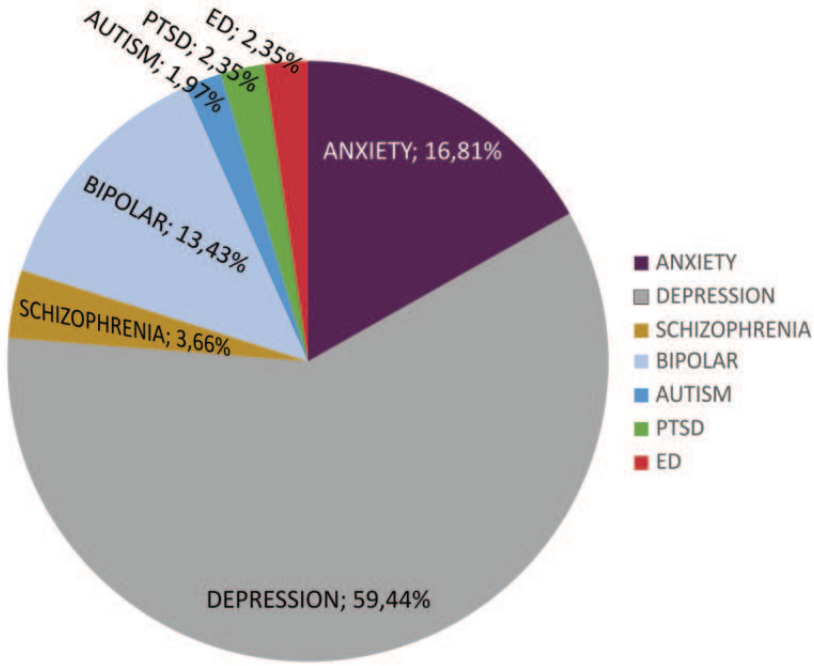


Figure 1: *Distribution of mental health conditions in patients reporting a mental health disorder (N=1,068) at the University of Pittsburgh School of Dental Medicine.*

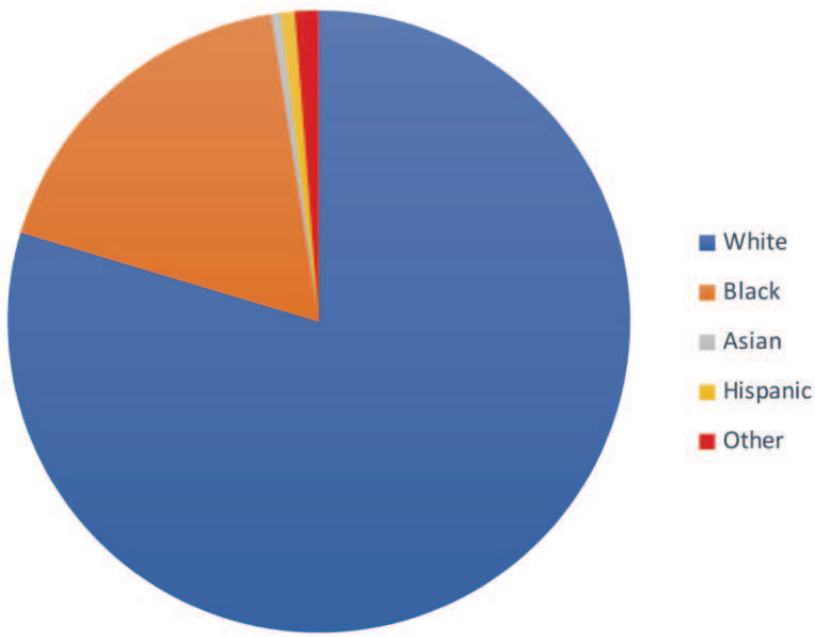


Figure 2. *Race Distribution of Patients reporting a mental health disorder at the University of Pittsburgh School of Dental Medicine.*

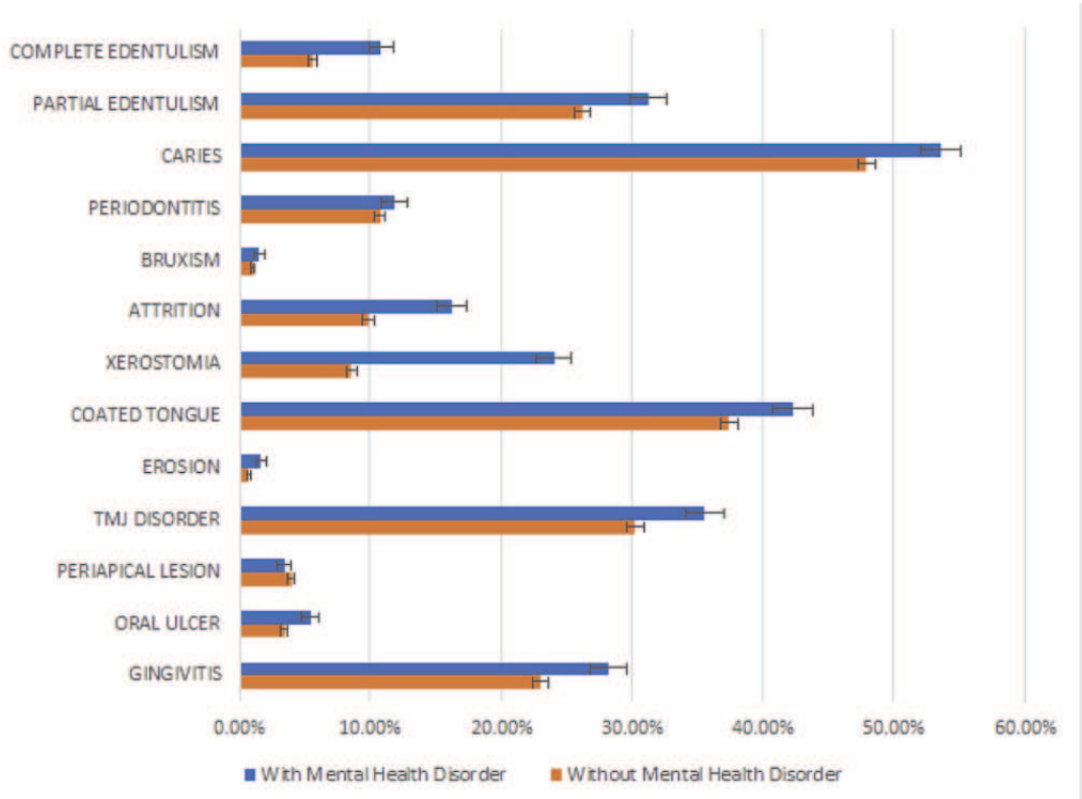


Figure 3: Prevalence differences of dental and oral conditions between patients with mental health disorder and patients without mental health disorder. Standard error bars are shown. p-value <0.05 for complete edentulism, partial edentulism, dental caries, attrition, xerostomia, coated tongue, erosion, TMD, oral ulceration,

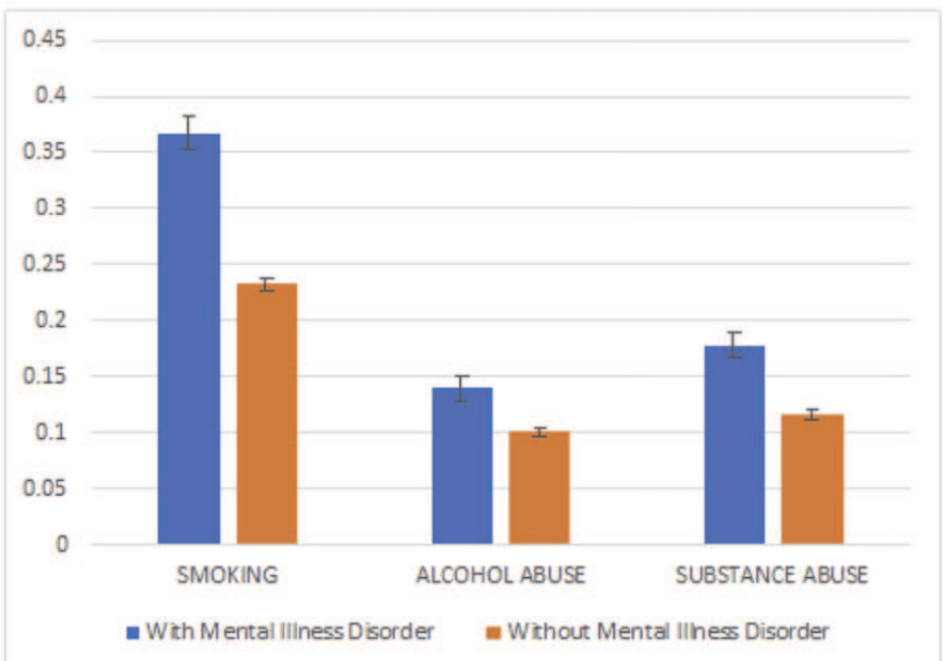


Figure 4: Prevalence differences in smoking, alcohol abuse, and substance abuse between patients with mental health disorder and patients without mental health disorder. Standard error bars are shown. There was a statistical significant difference (p-values <0.05) with individuals with underlying mental illness smoking, alcohol abusing, and substance abusing more often than individuals without a mental health disorder.

DISCUSSION

Individuals with mental health disorders are more likely to have dental and oral health concerns. Individuals with mental health disorders were more likely to show edentulism, dental caries, attrition, xerostomia, coated tongue, erosion, gingivitis, oral ulcers, and TMD. Periodontitis, bruxism, and periapical lesions were not significantly associated with mental health disorders in this study. The most frequent mental health disorder was depression, followed by anxiety. Individuals reporting a mental health disorder were more likely to be female and White.

Edentulism and tooth loss were significantly more prevalent in individuals reporting mental health disorders. Depression, specifically, has been associated with tooth loss linked to reduced self-care, number of medications being taken, and oral and systemic interplay.[5] Individuals with depression may be more likely to neglect esthetics and visit the dental professional less regularly. Furthermore, increased number of medications are directly related to xerostomia leading to dental caries and compromised oral hygiene. Similarly, dental caries was also more prevalent in individuals reporting a mental health disorder. Untreated dental caries is complicated by concurrent dental anxiety and phobia often exhibited by patients with psychological disorders.[4-6]

The association between mental health and periodontitis has been debated in the literature. In the present study, mental health disorders were not significantly related to periodontal disease. Similar studies did not find a significant association between mental health and periodontitis.[7,12] In other studies, depression has been considered an important risk factor for periodontitis.[8,13] Major depressive disorders may affect motivation and interest, as well as neuroendocrinological factors related to an impaired immune response.[14]

Erosion was noted more frequently in individuals reporting mental health conditions. Eating disorders and associated habits may be responsible for the increased incidence of erosion. However, Javadi and Shafikhani (2017) found that mental factors, specifically anxiety and depression, play important roles in the development of gastroesophageal reflux disorder (GERD).[15] Kamolz and Velanovich (2002) found that 60% of patients reported exacerbation of GERD symptoms during times of poor mental health.[16]

Baghaie *et al.* (2017) found that substance users suffered from greater dental caries and periodontitis. Despite more dental caries, individuals had fewer restored teeth suggesting reduced access to dental services.[11] Furthermore, individuals with alcohol dependency had lower salivary pH and higher prevalence of dental caries, periodontitis, and mucosal lesions compared to non-alcohol dependent controls.[17] Tobacco use and smoke exposure has been associated with dental caries as an acquired risk factor, related to salivary alterations and direct links to systemic disease.[18]

Psychological factors may affect temporomandibular joint function through muscle hyperactivity and biomechanical changes that can ultimately lead to pain.[19] Psychological factors can play a role in the etiology of facial pain and TMD symptoms. Conversely, chronic pain may cause depression and other psychological stressors. Individuals who reported chronic TMD pain had greater suicidal ideation, anxiety, and depression.[20] Nonetheless, Reiter et al. (2015) noted a less significant role of anxiety compared to depression. It is important to consider the reciprocal effects of psychological distress and oral health and their effects on one another.[21]

The choice of analysis is worth mentioning. We did not perform a regression analysis because the goal was not to understand which among the independent variables were related to the dependent variable, and to explore these relationships, maybe even to infer causal effects. We know that a deteriorated mental health status would lead to poorer oral hygiene that then leads to more severity of dental caries or the presence of gingivitis. Similarly, frequency of smoking is higher, which impacts periodontal status or dental caries. The demonstration that the presence of an underlying mental health disorder leads to higher frequencies of a number of oral health outcomes is noteworthy and should be enough to provide evidence that individuals with mental health disorders require personalized attention and likely different treatment approaches and preventive strategies to help stop worsening of oral health status.

Limitations of the study include small sample size and incomplete representation. A larger sample size encompassing a broader range of demographics and disorders would be more representative of the national population. It is also important to note that individuals often suffer from multiple mental disorders concurrently rather than just one. Future studies should investigate the specific behavioral changes affecting these individuals and their effect on dental health. It is important to understand the physical and physiological changes affecting patients with mental health disorders to deliver multidisciplinary treatment that meets their dental, oral, and psychological needs.

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REFERENCES

1. Cooper-Kazaz R, Levy DH, Zini A, Sgan-Cohen HD. Severity of psychiatric disorders and dental health among psychiatric outpatients in jerusalem, Israel. Isr J Psychiatry Relat Sci. 2015;52(2):119-120.
2. Heaton LJ, Swigart K, McNelis, G, Milgrom P, Downing DF. Oral health in patients taking psychotropic medications: results from a pharmacy-based pilot study. J Amer Pharmacists Assoc. 2016; 56(4), 412–417.e1. http://doi.org/10.1016/j.japh.2016.03.009
3. Kisely S, Baghaie H, Lalloo R, Johnson NW. Association between poor oral health and eating disorders: systematic review and meta-analysis. Br J Psychiatry. 2015 Oct;207(4):299-305. doi: 10.1192/bjp.bp.114.156323.
4. Kisely S, Baghaie H, Lalloo R, Siskind D, Johnson NW. A systematic review and meta-analysis of the association between poor oral health and severe mental illness. Psychosom Med. 2015 Jan;77(1):83-92. doi: 10.1097/PSY.0000000000000135.
5. Kisely S, Sawyer E, Siskind D, Lalloo R. The oral health of people with anxiety and depressive disorders - a systematic review and meta-analysis. J Affect Disord. 2016 Aug;200:119-132. doi: 10.1016/j.jad.2016.04.040.
6. Kisely S. No Mental Health without Oral Health. Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie. 2016;61(5), 277–282. http://doi.org/10.1177/0706743716632523
7.Solis AC, Lotufo RF, Pannuti CM, Brunheiro EC, Marques AH, Lotufo-Neto F. Association of periodontal disease to anxiety and depression symptoms, and psychosocial stress factors. J Clin Periodontol. 2004;31:633.
8. Saletu A, Pirker-Frühauf H, Saletu F, Linzmayer L, Anderer P, Matejka M. Controlled clinical and psychometric studies on the relation between periodontitis and depressive mood. J Clin Periodontol. 2005;32:1219–1225.
9. Peeran, S. W., Kumar, N. P. G., Azaruk, F. A. A., Alsaid, F. M., Abdalla, K. A., Mugrabi, M. H., & Peeran, S. A. (2014). Association between mental well-being, depression, and periodontal attachment level among young adults of the postwar Sebha city, Libya: A pilot study. Journal of Natural Science, Biology, and Medicine, 5(2), 308–312. http://doi.org/10.4103/0976-9668.136172
10. Piccoli, L., Besharat, L. K., Cassetta, M., Migliau, G., Di Carlo, S., & Pompa, G. (2014). Tooth wear among patients suffering from mental disorders. Annali Di Stomatologia, 5(2), 52–60.
11. Baghaie H, Kisely S, Forbes M, Sawyer E, Siskind DJ. A systematic review and meta-analysis of the association between poor oral health and substance abuse. Addiction. 2017 May;112(5):765-779. doi: 10.1111/add.13754.
12. Persson GR, Persson RE, MacEntee CI, Wyatt CC, Hollender LG, Kiyak HA. Periodontitis and perceived risk for periodontitis in elders with evidence of depression. J Clin Periodontol. 2003;30:691–696.
13. Da Silva AM, Newman HN, Oakley DA. Psychosocial factors in inflammatory periodontal diseases. A review. J Clin Periodontol. 1995;22:516–526.
14. Kumar A, Kardkal A, Debnath S, Lakshminarayan J. Association of periodontal health indicators and major depressive disorder in hospital outpatients. J Indian Soc Periodontol. 2015 Sep-Oct;19(5):507-511. doi: 10.4103/0972-124X.167161.
15. Javadi SAHS, Shafikhani AA. Anxiety and depression in patients with gastroesophageal reflux disorder. Electron Physician. 2017 Aug 1;9(8):5107-5112. doi: 10.19082/5107.
16. Kamolz T, Velanovich V. Psychological and emotional aspects of gastroesophageal reflux disease. Diseases of the Esophagus. 2002;15(3):199–203. doi: 10.1046/j.1442 2050.2002.00261.x.
17. Priyanka K, Sudhir KM, Reddy VCS, Kumar RK, Srinivasulu G. Impact of Alcohol Dependency on Oral Health - A Cross-sectional Comparative Study. J Clin Diagn Res. 2017 Jun;11(6):ZC43-ZC46. doi: 10.7860/JCDR/2017/26380.10058.
18. Chapple IL, Bouchard P, Cagetti MG, Campus G, Carra MC, Cocco F, et al. Interaction of lifestyle, behaviour or systemic diseases with dental caries and periodontal diseases: consensus report of group 2 of the joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. J Clin Periodontol. 2017 Mar;44 Suppl 18:S39-S51. doi: 10.1111/jcpe.12685.
19. Augusto VG, Perina KCB, Penha DSG, Dos Santos DCA, Oliveira VAS. Temperomandibular dysfunction, stress and common mental disorder in university students. Acta Ortop Bras. 2016 Nov-Dec;24(6):330-333. doi: 10.1590/1413-785220162406162873.
20. Sipilä K, Veijola J, Jokelainen J, Järvelin MR, Oikarinen KS, Raustia AM, Joukamaa M. Association between symptoms of temporomandibular disorders and depression: an epidemiological study of the Northern Finland 1966 Birth Cohort. Cranio. 2001 Jul;19(3):183-187.
21. Reiter S, Emodi-Perlman A, Goldsmith C, Friedman-Rubin P, Winocur E. Comorbidity between depression and anxiety in patients with temporomandibular disorders according to the research diagnostic criteria for temporomandibular disorders. J Oral Facial Pain Headache. 2015 Spring;29(2):135-143. doi: 10.11607/ofph.1297.