

A Pilot Study to Examine the Relationship between Oral Health and Mental Health in Individuals with Substance Use Disorder

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Article Information

Received: Mar 04, 2024

Accepted: May 05, 2024

Published: May 12, 2024

SciBase Critical Care and Emergency Medicine -

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Citation: Vadrevu A, Ray S. A Pilot Study to Examine the Relationship between Oral Health and Mental Health in Individuals with Substance Use Disorder. *SciBase Crit Care Emerg Med.* 2024; 2(2): 1009.

Abstract

Background: Substance abuse disorders are highly prevalent in the United States. Research increasingly indicates a strong correlation between Substance Use Disorder (SUD) and oral health diseases. Literature on drug addiction and oral health shows that individuals with SUD experience significant oral health impairment, and specific substances have unique as well as general effects on the oral cavity. Additionally, substance use disorders often co-occur with mental health conditions and when they occur together, they can exacerbate existing impairment that may lead to poorer treatment outcomes. There is a conceivable gap in the literature to examine any relationship between oral health and mental health in individuals with SUD. An investigation of such a relationship will help develop better treatment strategies for individuals with SUD. This pilot study aimed to examine the relationship between oral health and mental health in individuals with Substance Use Disorders (SUD).

Methods: Twenty individuals with SUD from an in-patient drug addiction treatment facility took part in this study. Each participant completed a demographic, substance use, Oral Health Questionnaire (OHQ) and a Depression (DEP) questionnaire. A Pearson correlation analysis was conducted to examine any relationship between mental health and oral health scores.

Results: Of 20 participants, 16 participants reported a history of anxiety or depression and 12 of them were on medication for anxiety or depression. Also, 6 lost all their teeth and 3 lost 10 or more teeth. The Pearson correlational analysis revealed a significant positive correlation between the OHQ scale scores, and the DEP scale scores ($r=0.463$; $p<0.05$).

Conclusions: Based on our results, we propose that community treatment facilities offering drug addiction treatment should consider addressing both oral and mental health problems for their patients using a multidisciplinary treatment approach. This integrated approach could enhance the treatment outcomes in individuals with SUD.

Introduction

Substance use disorder and oral health

Substance abuse disorders are highly prevalent in the United States and have significant adverse effects on individuals' physical health, emotional well-being, and social functioning. Research increasingly indicates a strong correlation between Substance Use Disorder (SUD) and oral health diseases, suggesting a bidirectional relationship between drug addiction and dental health [1-3]. A comprehensive review by Shekarchizadeh and

colleagues [2] revealed that drug addiction is closely associated with various oral health problems, including dental decay, gum diseases, mucosal abnormalities, dry mouth, teeth grinding, tooth erosion, and tooth loss. The authors suggested integrating oral health care, encompassing education, preventive measures, and treatment into the overall care provided to individuals undergoing addiction treatment. Another study by Metsch and colleagues [4] underscored several key findings: Firstly, dental issues rank among the most commonly reported health concerns among individuals with substance use disorders; secondly, drug use independently correlates with increased de-

mand for dental care services; and thirdly, injectable drug use is independently associated with a higher likelihood of unmet dental care needs. The researchers recommended integrating dental services into behavioral health programs as part of the comprehensive approach to addiction treatment.

Consistent with the aforementioned research, Baghaie and colleagues [1] determined that individuals diagnosed with SUD are at a heightened risk of developing periodontal disease and experiencing tooth decay. They concluded a higher prevalence of oral health issues among those with SUD compared to non-drug users. Furthermore, drug users exhibited more instances of tooth decay but fewer dental restorations overall, suggesting limited access to dental care services. Similarly, Reece and colleagues' [5] study showed that individuals affected by SUD exhibited poorer oral health outcomes including increased cavities, greater tooth loss, and higher rates of tooth extraction. These oral health impairments were shown to worsen with age, particularly in environments lacking fluoridation. Additionally, Reece and colleagues noted that individuals with SUD displayed significant oral pathology from a young age, underscoring the early onset and severity of oral health issues within this population.

Research further highlights a significant association between cannabis use and occurrences of xerostomia (dry mouth) as well as an elevated risk of oral malignancies [6]. In addition, studies indicated a dose-response relationship between cannabis consumption and the development of periodontitis among young individuals [3,7]. Moreover, Morio and colleagues [8] emphasized the adverse effects of stimulant drugs, such as amphetamine, methamphetamine, cocaine, and crack cocaine on dental and oral health. Also, apart from advanced dental caries, individuals using amphetamines often experienced accelerated tooth wear due to associated bruxism (teeth grinding).

Titsas and colleagues reported that individuals with opioid use disorder are predisposed to various oral conditions, including dental caries and periodontitis. They often exhibit a high prevalence of extensive dental caries, particularly on cervical and smooth surfaces. According to the authors, this heightened susceptibility to dental caries can be attributed to a complex interplay of multiple factors. The first factor is the dietary habits commonly observed among individuals with opioid use disorder characterized by a reliance on convenience foods high in simple sugars. This particular dietary pattern often stems from general self-neglect and financial difficulties experienced by this population. Another significant factor is the influence of central opioid receptors, such as the kappa (κ) and mu (μ) receptors which directly impact the eating behaviors of opioid users. Modulation of these receptors as a result of chronic opioid use enhances the palatability and rewarding properties of sweet foods thereby contributing to their increased consumption [9].

In summary, the literature on drug addiction and oral health indicates that individuals with SUD commonly face substantial oral health challenges. Different substances exhibit both specific and general effects on oral health, contributing to significant impairment within the oral cavity among those with SUD.

Substance use disorder and mental health

Substance use disorders often coincide with mental health conditions, and when they occur together, they can exacerbate functional impairment, lead to poorer treatment outcomes, increase morbidity and mortality rates, elevate treatment ex-

penses, and heighten the risk of homelessness, incarceration, and suicide compared to when these disorders occur independently. Based on a study by Han and colleagues [10], 325,800 adults aged 18 and older (surveyed during 2008-2014) experienced co-occurring mental illness and substance use disorders. Han and colleagues further noted that among adults with co-occurring disorders, only 9.1 percent received treatment for both mental health and substance use disorders, while 34.5 percent received mental health care exclusively, 3.9 percent received substance use treatment exclusively, and 52.5 percent received neither form of treatment.

According to a review conducted by Kingston and colleagues [11], the repetitive use of drugs as a form of "self-medication" to alleviate diverse psychological symptoms can contribute to the development of substance use disorders. Conversely, Teesson and colleagues [12] highlighted that psychiatric symptoms and illnesses may also arise as a consequence of prolonged substance use. In conclusion, Kingston and colleagues [11] recommend that addiction treatment centers should acknowledge the mental health requirements of their patients.

Therefore, based on the aforementioned research, it is evident that individuals with SUD experience elevated rates of oral health issues, and a higher prevalence of serious mental illnesses compared to the general population.

Existing research gap and the present study

Based on the studies discussed above there appears to be a significant gap in understanding the relationship between oral health and mental health among individuals with SUD. As such, co-occurring oral health and mental health issues can greatly diminish the quality of life for individuals even without SUD. It is conceivable that the presence of these concurrent conditions could substantially impede treatment outcomes for individuals undergoing substance addiction treatment. Unfortunately, many individuals receiving substance addiction treatment do not receive concurrent attention to their mental health needs. Additionally, dental health needs are often not prioritized for these individuals during treatment. Closing this gap and addressing both oral and mental health needs simultaneously could greatly improve the overall well-being and treatment outcomes for individuals with SUD. In this pilot study, we explored the relationship between oral health and mental health among individuals with SUDs undergoing addiction treatment.

Materials and methods

Participants

Twenty-one individuals with SUD from an inpatient drug addiction treatment facility in Newark, New Jersey, took part in this study. Participants were included if they were 18 years or older and who could read and understand English. This study was approved by the Institutional Review Board of Rutgers, The State University of New Jersey (Pro2023001111). All participants provided their consent to take part in the study.

Procedures

The study was advertised in the inpatient drug addiction treatment facility. In response volunteers informed their respective counselors about their willingness to participate. Data were collected in groups of 4/5 individuals. Each participant completed a demographic, substance use, Oral Health Questionnaire (OHQ) [13] and a Depression questionnaire (DEP) [14]. No identifiable information was collected from the participants.

Questionnaires

Demographic and substance use questionnaire consisted of general questions regarding age, gender, race, history of substance use, tobacco use, history of medication for anxiety and/or depression and few general questions regarding oral health status.

Depression Questionnaire (DEP) - Center of Epidemiologic Studies Depression Scale, 10-item version (CES-D-10) [14] The scores for each item range from 0 to 3 where Rarely or none of the time (less than 1 day) = 0; Some or a little of the time (1-2 days) =1; Occasionally or a moderate amount of time (3-4 days) = 2; Most of the time (5-7 days) =3.

Oral Health Questionnaire (OHQ) - 5-item Oral Health Impact Profile [13]. The scores for each item range from 0 to 4 where 0-never, 1- hardly ever, 2-occasionally, 3-fairly often, and 4-very often.

Data analysis

We first computed the OHQ score for each individual by averaging across the five scale items. The same procedure was followed for the DEP score across 10 items. Missing values in the OHQ dataset was imputed using median imputation [13] and using the average imputation for the DEP. SPSS Version 29.0.1.0(171) was used to analyze the correlation between mental health and oral health scores. More specifically, a Pearson’s correlational analysis was performed.

Results

Although we collected data from 21 individuals with SUD, we analyzed data from 20 individuals as one participant did not complete the OHQ. First, we conducted a Shapiro-Wilk analysis to test whether the DEP and OHQ data were normally distributed. Results showed that the depression and oral health data were normally distributed. (p= 0.104 for OHQ and p= 0.769 for DEP). Then, we proceeded with the Pearson’s correlation analysis. Demographic and substance use characteristics of the participants are summarized in Table 1.

Table 1: Demographic, oral and mental health history of individuals who are seeking in-patient treatment for substance use disorders.

Age	40.95 years (Mean) 2.87 years (SD) 3 individuals did not report age
Number of participants	20 (14 males); 2 individuals did not report gender
Race	17 non-Hispanic, 1 Hispanic; 2 did not report
Drug of choice	70% polydrug users; 24% cocaine; 3 did not report
Anxiety/depression history	16 reported a history of anxiety/depression
Number of teeth lost	6 individuals lost all teeth 3 individuals lost 10 or more 6 individuals lost less than 10 teeth 5 individuals did not report
Number of individuals who wore dentures	7 wore dentures

Seventy percent participants were polydrug users (for example, heroin and cocaine, prescription opioid and cocaine) whereas only 4 individuals reported cocaine as their primary drug of choice. For individuals who reported polydrug use, the usage ranged from 6 months to 30 years, and for individuals who reported cocaine as their primary drug of choice, their usage ranged from 7 years to 30 plus years. Smoking history revealed that majority of the participants smoked cigarettes on a daily basis and three participants did not report any history of smoking. Of the smokers, 6 participants smoked for 30-40 years, 9 participants smoked for 10-20 years, and 2 participants smoked for less than 10 years. Sixteen participants reported a history of anxiety or depression and 12 of them were on medication. Regarding dental health, 8 participants had visited the dentist within the last 6 months, 6 within the last year, and 6 within the last 2 years. Six individuals lost all their teeth, 3 individuals lost 10 or more, and 6 individuals lost fewer than 10 teeth, 5 did not report the number of teeth lost. Additionally, 7 out of 18 individuals wear dentures, and 2 individuals did not report their history of using dentures. Table 2 summarizes the mean, median, the highest and the lowest values from the OHQ and the DEP scales.

Table 2: Mental and oral health scores of individuals with substance use disorder.

Oral Health Questionnaire (OHQ) score			
Mean		1.265	
SD		1.0095	
Median		1.239	
Maximum		3.0	
Minimum		0.0	
Depression Questionnaire (DEP) score			
Mean		1.480	
SD		0.4929	
Median		1.450	
Maximum		2.2	
Minimum		0.4	
Correlation Analysis		OHQ	DEP
OHQ	Pearson correlation coefficient (r)	1	0.463
	Significance (2-tailed)		0.04
	N	20	20

The Pearson correlational analysis revealed a significant positive correlation between the OHQ scale scores, and the DEP scale scores (r= 0.463; p <0.05).

Discussion

In this study, we examined the relationship between oral health and mental health among individuals with SUD who were undergoing inpatient treatment. Our results showed that there was a significant positive correlation between the oral health scores and the depression scores. That is, individuals with higher oral health problems also reported higher depression scores.

The individual participant characteristics further supported these results. Such as, 6 individuals reported having lost all their teeth, while 7 relied on dentures for oral functionality, and 12 participants had not visited the dentist in the past 6 months. Also, 16 participants disclosed a history of anxiety or depression

and 12 of them were on medication for anxiety or depression. These participant specific characteristics contribute as additional support to the observed correlation results as the OHQ [13] did not specifically ask for number of teeth lost or dental visits as well as the DEP did not inquire about any history of anxiety/depression or any medication usage.

Since we found that oral health is related to mental health in treatment seeking individuals with addictive disorders, it warrants special attention while these individuals are treated for their addictive disorders. It is imperative that the mental health and dental health specialists, and substance addiction counselors who are involved in these individuals' care should be educated accordingly. We propose that community treatment facilities offering addiction treatment consider adopting a multidisciplinary treatment approach that includes collaboration between mental health and dental health specialists [15]. This integrated approach has the potential to address preventable conditions and enhance overall patient health. Additionally, it could lead to the development of more effective strategies to motivate individuals with SUD to seek treatment and manage their oral and mental health needs effectively. By promoting healing and facilitating better social reintegration post addiction treatment, this integrative treatment approach can significantly improve outcomes for individuals with SUD.

Despite the interesting findings in this pilot project, the results need to be interpreted with caution because of a small sample size. Future larger scale studies are warranted to validate the present findings which will include individuals with addictive disorders from a diverse background. Although the nature of the study was pilot, the significant results shed light on an important relationship between oral and mental health in individuals those who were seeking inpatient treatment for drug addiction.

Declarations

Acknowledgement: We acknowledge Mr. Robert Budsock (President and CEO of Integrity House), Ms. Eman Gibson (Chief Clinical Officer of Integrity House), and the patients at Integrity House residential treatment facility who took part in this study.

Conflict of Interest: The authors have no conflict of interest to declare.

Funding Source: This work was funded by a Rutgers University School of Health Professions' Deans Grant funded in 2023.

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