ORIGINAL ARTICLE

Correlation between dental caries with quality of life in people with substance use disorder (SUD) at the lido rehabilitation center: a cross-sectional study

Chrisanty Anastasia Parorrongan[1]
Tiarma Talenta Theresia[2*]
Marie Louisa[3]
Nadira Zahrani Effendi[1]
Anzany Tania Dwi Putri[4]
Resthie Rachmanta Putri[5]

[1]Undergraduate student, Faculty of Dentistry, Universitas Trisakti, Jakarta, Indonesia
[2]Department of Preventive and Dental Public Health, Faculty of Dentistry, Universitas Trisakti, Jakarta, Indonesia
[3]Department of Periodontology, Faculty of Dentistry, Universitas Trisakti, Jakarta, Indonesia
[4]Lido Rehabilitation Center, National Narcotics Board, Republic of Indonesia, Indonesia
[5]Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden

* Correspondence:
tiarma@trisakti.ac.id

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ABSTRACT

Introduction: Drug abuse is one of the concerning problems in Indonesia. It negatively impacts oral health, such as caries, xerostomia, periodontal disease, and tooth loss. Among these, dental caries is reported to be the leading cause of a reduction in quality of life. Although most oral health issues are not life-threatening, they significantly impact an individual's quality of life by extending periods of pain and discomfort. This study aims to analyze the correlation between dental caries and quality of life in individuals with substance use disorder (SUD) at the Lido Rehabilitation Center. **Methods**: This cross-sectional study was conducted at the Lido Rehabilitation Center, West Java, in August 2024. 101 SUD patients at the center were assessed through questionnaires and oral examinations. Dental caries served as the independent variable, while the quality of life (QoL), measured using the WHOQOL-BREF questionnaire across four domains (physical, psychological, social relationships, and environment), was the dependent variable. Data analysis using Spearman rank correlation to determine the correlation between QoL in the dental and non-dental caries groups and unpaired T-test to evaluate QoL scores in each domain for both dental and non-dental caries groups. **Results**: Significant differences were observed in the mean quality of life scores for the physical domain between the caries group (60,5 ± 13,78) and the non-caries group (65 ± 3,46), as well as for the social domain between the caries group (55,59 ± 19,29) and the non-caries group (58,33 ± 23,86). No significant correlation was found between quality of life scores and Dental caries values. **Conclusion**: No correlation was found between dental caries and quality of life scores. Differences in QoL were observed between the dental and non-dental caries groups, but these differences were insignificant. Dental caries were higher among SUD patients compared to those without caries.

KEYWORDS

Quality of life, caries, drug abusers, drugs.

INTRODUCTION

Drug abuse is one of the concerning problems in Indonesia. According to a survey by the Indonesian National Narcotics Agency, the prevalence rate of drug abuse in 2023 was 2.20%, equating 4,244,622 individuals aged 15-64 years who have used drugs.[1] Drugs can cause addiction and physical disorders such as lung disease, stroke, and heart disease.[2–4] Moreover, drug abuse has negative impacts on oral health, causing xerostomia, caries, periodontal disease, and tooth loss.[5–7]

Dental caries is a common dental health problem.[8] According to the Indonesia Health Survey (2023), the prevalence of dental caries in Indonesia is 82.8%.[9] Drugs have the side effect of reducing the rate of salivary flow and buffer capacity.[10] Reduced saliva volume accompanied by changes in saliva composition results in impaired saliva function. Salivary buffers that do not function properly will reduce the buffer's ability to neutralize acids formed during fermentation. Reduced saliva secretion also results in adhesion and accumulation of food debris and increased plaque accumulation, resulting in caries.[11]

One study reported that 72% of substance abusers suffer from an excessively dry mouth (xerostomia), which can increase the risk of caries.[12] A study conducted by Salsabila et al. among prisoners who use methamphetamine in the Penitentiary Jember Regency showed that the prevalence of caries in methamphetamine users was 89.66% and the average DMF-T was 7.21, which is considered very high.[13] These results align with findings by Pasiga et al., who assessed the DMFT status of drug abusers at BNN Baddoka, Makassar. The study revealed that drug users had a DMFT score of 7.1, indicating a very high level of dental caries.[5]

Among oral health outcomes, dental caries is reported to be the main cause of reduced quality of life.[14] Although most oral health issues are not life-threatening, they significantly impact an individual's quality of life by prolonging periods of pain and discomfort. Caries contributes to a range of complications, including functional impairments, aesthetic concerns, and difficulties with nutrition, as well as psychological distress, leading to long-term suffering.[15]

Quality of life (QoL) is a multidimensional concept reflecting an individual's general well-being in relation to their values, environment, and the cultural and social context in which they live.[16] The World Health Organization (WHO) has developed a quality of life instrument called the WHOQOL-BREF, comprising 26 items and four domains of quality of life: physical, psychological, social relationships, and environment.[15]

A study by Marques et al. showed that the low quality of life among psychoactive substance users is associated with high DMFT scores, low income, and the use of cocaine or crack, with individuals having DMFT > 13 being 2.25 times more likely to experience a lower quality of life compared to those with DMFT ≤ 13.[17] Similarly, a study by Almaas concluded that individuals without caries had a better quality of life compared to those with caries.[18]

Therefore, by understanding the impact of caries on quality of life and the high rate of drug use, which increases the risk of caries, this study was conducted to analyze the correlation between dental caries and quality of life in drug users at the Lido Rehabilitation Center.

METHODS

The cross-sectional study was conducted at the Lido Rehabilitation Center, Bogor, West Java, in August 2024. Participants consisted of 101 SUD patients undergoing treatment at the rehabilitation center. Participants were selected using purposive sampling based on the predefined inclusion and exclusion criteria. The inclusion criteria were patients in the adaptation phase of rehabilitation at BNN Lido, while the exclusion criteria were patients in the detoxification phase.

Data were collected using questionnaires and oral examinations. Patients who agreed signed the informed consent and completed the WHOQOL-BREF Questionnaire. Dental caries examinations were conducted by two calibrated dentists from The Faculty of Dentistry, Trisakti University, using the World Oral Health (WHO) dental caries diagnosis guidelines. The examinations were conducted using dental mirrors, probes, and headlamps. All instruments were disinfected with an antiseptic solution after each use. The result of the caries examination, based on the WHO index, yielded the deft or DMFT score. Socio-demographic data were obtained from the Lido Rehabilitation Center.

In this study, the independent variable was dental caries, and the dependent variable was quality of life, measured using WHOQOL-BREF Questionnaire. The questionnaire consists of 26 questions covering four domains: physical, psychological, social relationships and environmental. The scoring assessment was conducted by summing the responses from the 26 questions according to the weight of each response category and then dividing the total by four, corresponding to the number of domains. Higher scores indicate a better quality of life.

Data were entered and analyzed using the Statistical Package for Social Science. Descriptive analysis for categorical variables was presented as proportions, while numerical variables were presented as means and standard deviations. Data normality was assessed by histogram inspection. Quality of life outcomes were described using means, standard deviations, and medians.

Bivariate analysis was used to assess whether there was a difference in quality of life between the caries and non-caries groups, using the independent t-test for normally distributed quality of life domains or the Mann-Whitney U test for non-normally distributed quality of life domains. Bivariate analysis was also performed to assess the correlation of DMFT scores and each quality of life domain score using the Spearman correlation test. The correlation coefficient (r) ranged from 0 (no correlation) to 1 (perfect correlation). Correlation was considered weak if r ranged from 0.1 to 0.3, moderate if r ranged from 0.4 to 0.6, or strong if r ranged from 0.7 to 0.9.

RESULTS

A total of 101 participants were included in this study. The demographic characteristics of the participants are presented in Table 1. The mean age of respondents was 31.5 years, and most of the study population was male (94.1%, n=95). More than half of the respondents had a senior high school education background (n=52).

In terms of employment, 33.7% of respondents identified as unemployed (n=34). The majority of study subjects used methamphetamine (n=90), followed by marijuana (n=17). Most subjects used a single drug (63.4%) and were in the moderate category on the drug use scale (69.3%). Several respondents had comorbidities, with hepatitis C being the most prevalent (n=6).

Table 1. Demographic Information

Characteristics	n (%)/Mean (SD)
Age (years)	31,5 (7,7)
Gender	
Male	95 (94,1)
Female	6 (5,9)
Education	
No education	1 (1)
Elementary School	8 (7,9)
Junior High School	14 (13,9)
Senior High School	52 (51,5)
Vocational High School	13 (12,9)
Diploma	2 (2)
Bachelor's Degree	9 (8,9)
Master's Degree	2 (2)
Occupation	
Unemployed	34 (33,7)
Artist	1 (1)
Laborer	12 (11,9)
Lecturer	1 (1)
Teacher	1 (1)
Housewife	1 (1)
Bike driver	1 (1)
Merchant	1 (1)
Employee	2 (2)
Private Sector	13 (12,9)
Student	1 (1)
Farmer/Fisherman/Breeder	1 (1)
Police	9 (8,9)
Security	1 (1)
Driver	8 (7,9)
Military	1 (1)
Entrepreneur	13 (12,9)
Types of Narcotic	
Cannabis/Marijuana	17 (16,8)
Opiate	1 (1)
Methamphetamine	90 (89,1)
MDMA/Ecstasy	6 (5,9)
BZD/Benzodiazepine	14 (13,9)
NPS	3 (3)
Opiate Analgesics	14 (13,9)
Combination	
Single	64 (63,4)
2 Combination	29 (28,7)
3 Combination	7 (6,9)
4 Combination	1 (1)
Scale of Narcotic	
Mild	12 (11,9)
Moderate	70 (69,3)
Severe	19 (18,8)
Infectious disease	
HIV	3 (3)
Hepatitis B	2 (2)
Hepatitis C	6 (5,9)
Tuberculosis	4 (4)

Table 2. Distribution of Research Subjects Based on Caries Diagnosis and DMFT

Diagnose	n (%)/median (p25 – p75)[a]
Caries	
Yes	98 (97)
No	3 (3)
DMFT	9 (4-14)

[a]Numeric variables with non-normal distribution are presented as median (p25 – p75)

The distribution of caries diagnosis is shown in Table 2. The majority of research subjects were diagnosed with caries (97%) with a median DMFT value of 9,42. 50% of participants had DMFT values ranging between 4 and 14 (Table 2)

Table 3. Relationship Between Quality of Life and Caries Diagnosis in Research Subjects

Domain	Caries (mean ± SD) n=98	No Caries (mean ± SD) n=3	p[a]	DMFT (r)	p[b]
Physical	60,5 ± 13,78	65 ± 3,46	0,417	-0,036	0,72
Psychological	56,11 ± 15,93	50 ± 19	0,511	0,051	0,615
Social relationship	55,59 ± 19,29	58,33 ± 23,86	0,715	-0,024	0,813
Environment	25,01 ± 4,94	25 ± 3	0,997	-0,05	0,62
Total score of all domains	197,21 ± 44,28	198,33 ± 44,74	0,966	0,003	0,972

[a]Unpaired T-test or Mann-Whitney U; [b]Spearman correlation test; *p<0,05

Table 3 shows a comparison of general quality of life (based on physical, psychological, social relationship, and environment domains) between subjects diagnosed with caries and those without. Respondents with no caries had better mean scores in the physical domain (65 ± 3,46) than respondents with caries (60,5 ± 13,78), although this difference was not statistically significant (p=0,417). Similarly, for the social correlation domain, respondents without caries (58,33 ± 23,86) had higher mean scores than those with caries (55,59 ± 19,29). No significant correlation was found between quality of life scores and Dental caries values.

DISCUSSION

Table 1 shows that the average age of respondents was 31.5 years, which falls within the productive age range (15–64 years) as defined by the World Health Organization (WHO). Research by Pidada et al. found that 98% of drug abusers were in the productive age group.[19] Similarly, Putri et al. found that drug use was predominantly observed among individuals in the productive age group, with social factors such as peer pressure, partner influence, and curiosity about the effects of these substances being the primary reasons for initiation.[20] The World Drug Report confirmed that, in 2016, 5.6% of the global population aged 15-64 years used drugs.[21]

The highest prevalence of drug abuse was observed among individuals with a high school education background. This finding is consistent with Pidada et al., which highlights that teenagers are particularly vulnerable due to their social, physiological, and psychological transitions, as well as a heightened curiosity toward new experiences.[19]

Regarding the respondents' occupations, unemployed individuals (n=34) represented the largest group, followed by private employees (n=13), self-employed individuals (n=13), laborers (n=12), and police (n=9). This result aligns with the study by Hastiana et al. conducted at Class IIB Sidrap prison, which found 41.7% of drug abusers were unemployed.[22] Unemployment increases psychological stress and elevates the risk of drug use. During periods of economic recession, providing psychological support to individuals who lose their jobs and are vulnerable to substance abuse becomes important.[23]

The socio-demographic data reveal the most widely abused drug was methamphetamine (n=90), followed by marijuana (n=17), BZD, and opiate analgesics (n=14). This is in line with Rosida et al., who reported that methamphetamine was the most frequently abused narcotic, accounting for 90.36% of cases.[24,25] Methamphetamine is widely used by addicts because it is easy to produce, easier to obtain, and more affordable than other narcotics.[26] Methamphetamine, which is a powerful stimulant, is often abused as a

performance-enhancing drug in sports to improve physical performance. In addition, the anti-sleep effect of methamphetamine also encourages some individuals to consume it to increase work enthusiasm, as it can reduce fatigue and increase physical activity.[26,27]

Methamphetamine can stimulate inhibitory alpha-2 receptors in salivary gland vascularization, resulting in reduced salivary flow and xerostomia, which increases the risk of caries.[5,28,29] Methamphetamine consumption can cause bruxism, xerostomia, dental erosion, and severe caries; a condition often referred to as "meth mouth."[30] Individuals with meth mouth typically exhibit blackened, stained, or rotting teeth, even among young or short-term users.[31] The acidic nature of methamphetamine, combined with its high sugar content and meth-induced low saliva production, provides an ideal environment for the adhesion, colonization, and biofilm formation by cariogenic oral bacteria such as S.mutans. This process accelerates the demineralization of enamel, thereby weakening the teeth and making them highly susceptible to cavities.[32] These findings are consistent with the results presented in Table 2, which show that the number of drug abusers with dental caries is higher than those without caries. Research by Pasiga et al. reported that the average DMFT value for users was 7.13 ± 1.64, whereas the non-user group had a DMFT of only 2.93 ± 2.84.[5] Furthermore, 50 respondents in this study were found to have root caries, corroborating the findings of Mukherjee et al., who reported that 78% of drug users had root caries affecting three or more teeth.[33]

Table 3 illustrates the differences in quality of life across each domain between the caries group and the non-caries group. The non-caries group demonstrated higher scores in physical and social domains, indicating a better quality of life compared to the caries group. This is in line with research by Almaas, which found that people without caries had higher WHOQOL-BREF scores across all domains, and Marques et al., who found that high DMFT scores among psychoactive substance users were associated with low quality of life.[17,18] However, the caries group in this study had higher scores in the psychological domain. This discrepancy may be attributed to the subjective nature of the questionnaire, which can introduce bias in individual perceptions and interpretations. Moreover, while the non-caries group had a slightly higher total scores (198,33 ± 44,74) compared to the caries group (197,21 ± 44,28), this difference was not statistically significant. This may be related to the short-term study design, which could have limited the ability to observe more differences between the groups.

A limitation of this study is its cross-sectional design, which makes it impossible to determine whether caries occurred first and influenced quality of life or vice versa (temporal ambiguity). Consequently, the findings only demonstrate an association rather than a causal relationship.

CONCLUSION

The number of SUD patients with dental caries was higher than the number of SUD patients without caries. Although there were differences in quality of life (QoL) between the caries and non-caries groups, these differences were not statistically different. This study highlights the need for health facilities to develop educational programs addressing the effects of drug use on dental caries and quality of life. In addition, it is recommended to maximize dental treatment programs in rehabilitation centers, particularly for caries, considering that nearly all drug users in this study had caries-related issues.

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