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Prevalence of periodontitis among young adults with mental disorders

Преваленција пародонтитиса код младих одраслих особа са менталним поремећајима

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SUMMARY

Introduction/Objective Previous investigations pointed to a notable frequency of periodontitis appearance in persons with mental disorders, but almost none of them were addressed to the periodontitis among young adults with mental disorders as a target group, which can have high public health significance. Therefore, the aim of this investigation was to estimate the prevalence of periodontitis among young adults suffering mental disorders and to determine probable risk factors for their overall periodontal health.

Methods The investigation included two groups of patients, each group having 81 participants-the study group (young adults with mental disorders) and the control group (mentally healthy young adults). The study instruments included a questionnaire (age, gender, psychoactive substances use, and maintaining oral hygiene) and CPI for both groups, and the data concerning primary disease of mentally deceased patients (diagnostic category, mental disorder duration, number of hospitalizations, and psychotropic medications).

Results In terms of psychoactive substances use and maintaining oral hygiene, statistically significant differences were observed between groups in all independent variables. Young adults with mental disorders shown a high prevalence of periodontitis compared to the mentally healthy young adults. Also, gender, smoking habits and the use of antipsychotics exhibited as possible risk factors contributing current periodontal health of young mentally deceased patients.

Conclusion This study indicates the need for more consideration for periodontal health among people with mental disorders and determination of potential models for its improvement.

Keyword: periodontitis; prevalence; young adults; mental disorders

САЖЕТАК

Увод/циљ Претходно спроведене студије показале су високу преваленцију пародонтитиса код особа са менталним поремећајима, али скоро ниједна од њих није била усмерена на пародонтитис младих одраслих особа са менталним поремећајима као циљном групом, што може имати велики јавно-здравствени значај. Стога, циљ овог истраживања је био да се одреди преваленција пародонтитиса код младих одраслих особа са менталним поремећајима, као и да се одреде могући фактори ризика повезани са њиховим тренутним стањем пародонталног здравља.

Методе Истраживање је обухватило две групе испитаника са по 81 пацијентом у свакој групи - студијску групу (младе одрасле особе са менталним поремећајима) и контролну групу (ментално здраве младе одрасле особе). Инструменти коришћени у истраживању су били упитник (старост, пол, употреба психоактивних супстанци и одржавање оралне хигијене) и ЦПИ за обе групе, као и подаци о примарној болести испитаника студијске групе (дијагностичка категорија, трајање менталног поремећаја, број хоспитализација и психотропни лекови).

Резултати У погледу коришћења психоактивних супстанци и одржавања оралне хигијене, уочене су статистички значајне разлике у свим независним варијаблама између испитаника. Младе одрасле особе са менталним поремећајима показују високу преваленцију пародонтитиса, у поређењу са ментало здравим младим одраслим особама. Такође, пол, пушачке навике и коришћење анти-психотика су се показали као могући фактори ризика који доприносе постојећем стању пародонталног здравља младих одраслих особа са менталним поремећајима.

Закључак Ово истраживање указује на потребу за даљим истраживањима пародонталног здравља особа са менталним поремећима, као и смернице за могуће моделе његовог унапређења.

Кључне речи: пародонтитис; преваленција; младе одрасле особе; ментални поремећаји

INTRODUCTION

Periodontitis is a microbe-induced oral disease, characterized by inflammation of periodontal tissues, which may provoke tooth loss and significantly lower quality of life [1, 2]. Although immunological processes are crucial for initiation and progression of periodontitis, previous studies have shown that they are influenced by several risk factors, such as smoking habit, alcohol beverage consumption, poor oral hygiene, use of different medications on daily basis, hormonal changes, as well as stress and psychic factors [3, 4]. However, periodontitis can be preventable and treatable if appropriate and timely management is undertaken, especially for modifiable risk factors [3].

Young adulthood is a specific developmental period of human life, which occurs between the ages of 18 and 25 years [4]. This period of life comes after adolescence and it is very important because of a significant increase of depression, anxiety, self-harming traits, and eating disorders, including first episodes of more severe mental disorders, such as psychosis and personality disorders [5]. It is assumed that almost 75% of adults with a diagnosed mental health problem will manifest first symptoms of altered mental health by the age of 24 [5]. Therefore, altered mental health represents a prominent burden for this age group and should represent a priority for health improvement [5]. In addition, a numerous modifiable risk factors, such as psychoactive substance use (alcohol beverage consumption, smoking, cannabis consumption, etc.), starts during this period of life [6, 7].

Previous studies have shown a high prevalence of two most common oral diseases in population of people with mental disorders - dental caries and periodontitis [8, 9, 10]; however, almost none of them were addressed to periodontitis among young adults with mental disorders as a target group, which can have high public health significance. Therefore, the aim of this investigation was to estimate the prevalence of periodontitis among young adults with mental disorders and to determine possible risk factors for their overall periodontal health.

METHODS

This observational, epidemiological, and cross-sectional study was conducted at the Clinic for Mental Disorders "Dr. Laza Lazarević" Belgrade and Community Health Center "Vračar" in Belgrade. It was adjusted to the statement "Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)", designed to improve quality of observational studies [11], and conducted according to Declaration of Helsinki [12]. The study received an approval from the Ethics Committee of the Clinic for Mental Disorders "Dr. Laza Lazarević" (No. 2878) and an approval from the director of Community Health Center "Vračar" (No. 02/900). Before participation in the investigation, all the participants signed the informed consent form before participating in any part of the study.

Two groups of patients were created, both comprising 81 randomly selected young adults. The study group comprised young adults with mental disorders (46 males and 35 females, mean age 21.8 ± 3.6 years), hospitalized at the Clinic for Mental Disorders "Dr. Laza Lazarević" Belgrade ("bias-coin" randomization). The inclusion criteria for entering the study were: patients' age between 18 and 25 years old, suffering from mental disorder according to the 10th Revision of the International Classification of Diseases (ICD-10) diagnosed at least two years prior to the investigation. The exclusion criteria were: the patients younger than 18 or older than 25 years, diagnosed with mental disorders in a period shorter than two years prior to the investigation, simultaneous presence of severe somatic illnesses or severe disability, and inability/refuse to cooperate. The control group, also, comprised 81 randomly chosen young adults, age and gender matched with study group of patients (42 males and 39 females, mean age 22.8 ± 2.6 years). They were suffering from dental caries, without any mental or somatic disorders or conditions. These patients were recruited from patients visiting Community Health Center "Vračar" in Belgrade for caries treatment. The control group of patients did not use any medication that could affect oral or mental health [13].

A special type of questionnaire was designed for both groups in order to note socio-demographic data (gender and age), oral health habits (maintaining oral hygiene, tooth brushing technique) and psychoactive substances use (smoking habits and consuming alcohol beverages). The data about mental disorder of the study group patients were taken from the medical records and included the type of mental disorder (according to the ICD-10), duration of medical disorder, number of hospitalizations and current psychotropic medication. All patients were subjected to the thorough dental clinical examination according to the World Health Organization (WHO) criteria [14]. The clinical examinations were carried out by two trained examiners at the Clinic for Mental Disorders "Dr. Laza Lazarević" and the Health Center "Vračar" in Belgrade, Serbia. The examiners were calibrated twice, by assessing the Community Periodontal Index (CPI) [14], before and during the study, with a degree of agreement being ± 1 mm of 94%. The clinical measurements were performed by using the periodontal probe graded in mm (WHO-621 Trinity probe) on the sextants, scoring on the scale from 0 to 4. All the teeth were examined in each sextant, and only the highest value for each sextant was noted.

All collected data were organized and evaluated using the dedicated software (SPSS 21.0 Inc., Chicago, IL, USA) and were analyzed by the descriptive statistical parameters, methods for testing the hypothesis and regression models (uni- and multivariate linear regression analysis). The descriptive statistical methods were represented by the measures of central tendency (mean and median), measure of variability (standard deviation and variation interval) and were expressed in percentages. The methods for testing the difference of numerical data were represented by the Kruskal-Wallis test and Mann-Whitney test. For testing the data of different categories (gender, smoking habits, drinking alcohol beverages, maintaining of oral hygiene, tooth brushing technique etc.), the χ^2-test was used. The level of significance was set at $p \leq 0.05$.

RESULTS

The use of psychoactive substances and oral hygiene habits among both groups of patients are presented in table 1. A statistical significant difference between groups was observed in terms of all independent variables (Table 1). Most of the study group patients were smokers (72.8%), alcohol beverages consumers (66.7%), with maintaining oral hygiene several times per month or once a day (55.6%) and with incorrect technique of tooth brushing (76.0%). On the contrary, most of the control group patients were non-smokers (80.0%), non-users of alcohol beverages (82.7%), with maintaining oral hygiene twice a day or more times per day and with correct technique of tooth brushing (Table 1).

Concerning mental disorders, most of the study group patients were diagnosed to be F_{20}-F_{29} or schizophrenia, schizotypal and delusional disorder, and F_{30}-F_{39} or mood/affective disorders (Table 2). Mean value of duration of mental disorders among the study group patients was approximately 6 years, and they were treated with several psychotropic medications, mostly antipsychotics, anxiolytics and mood stabilizers (Table 2).

Statistically significant differences between groups were also observed in terms of mean value of CPI (Table 3). The study group patients had more than twice times higher mean value of this periodontal index (1.6 ± 0.7) than the control group patients (0.7 ± 0.5). The patients in the study group had gingival bleeding more often (30.1%) than the control group patients, who had healthy PDL more frequently (48.0%). Moreover, the periodontal pockets where detected 21.9% in the study group patients, while only 4.0% of the control group patients had this pathological finding (Table 3).

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had healthy PDL more frequently (48.0%). Moreover, the periodontal pockets where detected 21.9% in the study group patients, while only 4.0% of the control group patients had this pathological finding (Table 3).

Analyzing the values of the CPI in relation to the psychoactive substances use and oral hygiene habits in both groups, a statistically significant difference in the study group patients was observed in terms of smoking habits, maintaining oral hygiene and tooth brushing technique (Table 4). The highest values of the CPI were registered among smokers, those who brushed their teeth several times per month or once a day and those who use an incorrect technique of tooth brushing. Similarly, in the control group of patients, a statistically significant difference in the CPI values was observed in terms of maintaining oral hygiene and tooth brushing technique (Table 4). In addition, mentally healthy patients who brushed their teeth several times per month or once a day and those who used an incorrect technique of tooth brushing had highest values of the CPI.

In terms of psychotropic medications of the study group patients, statistically significant differences in the values of the CPI among the study group patients were observed in terms of using antipsychotics and anticholinergics (Table 5). The highest values of the CPI were observed among those who use antipsychotics and those who use anticholinergics.

The impact of psychoactive substances using, oral health habits, and characteristics of the primary disease, the CPI values among the study group patients were examined by the linear regression model (Table 6). In univariate regression model, statistical significant factors in terms of the CPI value among the study group patients were gender, smoking habits, drinking of alcohol beverages, maintaining of oral hygiene, tooth brushing technique, the use of antipsychotics and anticholinergics (Table 6). However, multivariate regression model showed that only gender, smoking habits and the use of antipsychotics were statistical significant factors that contributed to the value of the CPI among the study group patients.

DISCUSSION

The main objective of the current investigation was to estimate the prevalence of periodontitis among young adults with mental disorders. In addition, this study also defined the possible risk factors that may contribute to the current periodontal health among this group of people with mental disorders. The principal finding of this study was a high prevalence of periodontitis among young adults with mental disorder compared to the mentally healthy young adults. Also, this study showed that the gender, smoking habits and the use of antipsychotics are possible risk factors that may contribute to the current periodontal health of young adults with mental disorders.

According to the current study, most of patients of the study group were smokers (72.8%) and alcohol beverages consumers (66.7%) which are known to be risk factors for xerostomia and salivary gland hypofunction [15,16]. Smoking is recognized as the most relevant risk factor for periodontitis, because it evokes different responses in oral microcirculation, highlighting the importance of many toxic substances beside nicotine [17]. In addition, study from 2019 reveals that smoking in a period of late adolescence is relevant risk factor for periodontitis in young adulthood [18]. On the other hand, chronic alcohol consumption may increase the severity of periodontitis due to lower local inflammatory response and higher level of alveolar bone resorption [19]. Also, in our study mostly of the study group patients were diagnosed as schizophrenia schizotypal and delusional disorder (51.9%), with mean value of duration of mental disorder per patient 5.8 ± 3.6 years and mean value of psychotropic medications per patient 4.2 ± 1.7 (mostly antipsychotics, anxiolytics and mood stabilizers). Hu KH et al. concluded that younger persons with newly diagnosed schizophrenia, female gender and exposure to the antipsychotics were independent risk factors for periodontitis [20]. In addition, hypo-salivation as an adverse effect of first generation of antipsychotics was associated with an increased risk for periodontitis [20]. Skallevold et al. in their review from 2023 conclude

that the mutual relationship of oral health and mental disorders, among others, dysregulates microbiome, translocated bacteria, and systemic inflammation [21].

The periodontal index used in this study was the CPI, recommended by the WHO [14]. According to the studies based on critical review of periodontal indices, the CPI represents a modification of former CPITN (Community Periodontal Index and Treatment Needs),which is one of the most common used diagnostic tools in epidemiological types of studies [22,23]. Modification is done by eliminating "treatment needs" and including loss of attachment (LOA) category, which avoid the false scoring of pseudo periodontal pockets [22,23]. The mean value of the CPI in current study was more than twice higher in the study group of patients compared to the control group (1.6±0.7 vs. 0.7±0.5), with 21.9% of them with registered periodontal pockets (15.2% of shallow periodontal pockets and 5.7% of deep periodontal pockets). Additionally, only 20.0% of young adults with mental disorders had a healthy PDL. The most common finding among young adults with mental disorders was a gingival bleeding (30.1%), in contrast to the healthy PDL, which was observed in almost 50% of mentally healthy young adults. These findings are in correlation with previous studies [10,23]. Meta-analysis of the association between periodontitis and severe mental illnesses (SMI) from 2022 shows that severity of mental disorder is associated with an increased prevalence of periodontitis compared to general population [10]. According to these findings, Amedari et al. showed that outpatients with mental disorders in most cases had gingival bleeding [23]. An average of almost three teeth in each outpatient with mental disorder was associated with gingival bleeding compared to the average of less than one tooth in the control group [23]. Gingival bleeding is considered a symptom of gingival inflammatory process, and it, if untreated, can progress to periodontitis [24]. The main reason for gingival bleeding is the absence of oral hygiene habits and/or inadequate tooth brushing technique [25]. This can explain our results in terms of high values of the CPI among young adults with mental disorders who doesn't maintain oral hygiene

and those who maintain oral hygiene but with inadequate tooth brushing technique. In addition, 23.5% of the study group patients didn't maintain oral hygiene at all. Also, 76.0% of the study group patients demonstrated inadequate tooth brushing technique. It is known that absence of maintain oral hygiene and inadequate oral health technique are associated with an increased level of periodontitis, mostly because of higher accumulation of dental plaque [26].

This study reveals that the gender, age, current smoking habit and the use of antipsychotics are possible predictors for periodontitis among young adults with mental disorders. In addition, a higher values of the CPI were registered among young males compared to females, smokers compared to the non-smokers and those who have antipsychotics in their daily therapy compared to the patients who don't use antipsychotics. This is similar to the results of other studies. Coelho et al. in their cross-sectional study based on association of periodontitis with common mental disorder show that the occurrence of periodontitis among people with common mental disorder is approximately 50% higher compared to those of persons without common mental disorder, with statistical significance after adjustment of age, gender, family income, current smoking status, alcohol beverage consumption and cardiovascular disorder [8]. Similarly, Kisely concluded that there were interactions between periodontal health and mental disorders, comprising several biological, behavioral, and psychosocial factors [27].

CONCLUSION

This investigation reveals a high prevalence of periodontitis among young adults with mental disorder and that the gender, smoking habits and the use of antipsychotics exhibited as possible risk factors that may contribute to the current periodontal health of this subgroup of young people. Also, this study indicates the need for more consideration for periodontal health

among people with mental disorders and determination of potential models for its improvement.

Conflict of interest: None declared.

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Table 1. The use of psychoactive substances and oral hygiene habits among the investigated groups

Independent variables	Obtained values		p (χ^2 test / Man–Whitney test)
	Study group n (%)	Control group n (%)	
Smoking habits			
yes	59 (72.8)	15 (20.0)	
no	22 (27.2)	66 (80.0)	0.000*
Drinking alcoholic beverages			
yes	54 (66.7)	8 (17.3)	
no	27 (33.3)	73 (82.7)	0.000*
Maintaining oral hygiene			
no	19 (23.5)	0 (0.0)	
yes, several times per month or once a day	45 (55.6)	7 (8.6)	0.000*
yes, twice a day or more times per day	17 (20.9)	74 (91.4)	
Demonstrating tooth brushing technique			
correct	18 (24.0)	65 (80.2)	0.000*
incorrect	63 (76.0)	16 (19.8)	

n (%) – number (percentage); p – significance; * – statistically significant

Table 2. Medical data of the study group patients

Independent variables	Obtained values Study group
Diagnostic category (ICD-10), n (%)	
F20–F29	42 (51.9)
F30–F39	18 (22.2)
F40–F49	2 (2.5)
F50–F59	3 (3.7)
F60–F69	3 (3.7)
F70–F79	1 (1.2)
F90–F98	12 (14.8)
Duration of mental disorder per patient	
X ± SD; Med (min–max)	5.8 ± 3.6; 5 (0–9)
Psychotropic medication per patient	
X ± SD; Med (min–max)	4.2 ± 1.7; 3 (1–5)
Antipsychotics, n (%)	78 (96.3)
Antidepressants, n (%)	21 (25.9)
Anxiolytics, n (%)	63 (77.8)
Hypnotics, n (%)	41 (50.6)
Mood stabilizers, n (%)	57 (70.3)
Anticholinergics, n (%)	9 (11.1)

n (%) – number (percentage); X – mean value; SD – standard deviation; Med – median

Table 3. Community Periodontal Index values of both groups of patients

Groups	Obtained values					
	$X \pm SD$; Med (min–max)	Community Periodontal Index codes, n (%)				
		0	1	2	3	4
Study group	1.6 ± 0.7; 1.5 (0–4)	15 (20)	23 (30.1)	21 (28)	11 (15.2)	5 (6.7)
Control group	0.7 ± 0.5; 1 (0–3)	36 (48)	24 (32)	12 (16)	3 (4)	0 (0)
p (χ^2 test / Man–Whitney test)	0.000*	0.000*				

X – mean value; SD – standard deviation; Med – median; p – significance; * – statistically significant

Table 4. Community Periodontal Index values among both groups of patients in terms of using psychoactive substances and oral hygiene habits

Independents variables	Obtained values of Community Periodontal Index			
	Study group		Control group	
	X ± SD	p (Kruskal–Wallis / Man–Whitney test)	X ± SD	p (Man–Whitney test)
Smoking habits				
yes	2.05 ± 0.23		0.72 ± 0.85	
no	1.15± 1.38	0.001*	0.93 ± 0.96	0.414
Drinking of alcoholic beverages:				
yes	1.45 ± 1.06		0.79 ± 0.89	
no	1.66 ± 1.24	0.512	0.62 ± 0.77	0.570
Maintaining oral hygiene:		0.003*		
no	2.14 ± 0.08	(1:2) 0.731	n/a	
yes, several times per month or once a day	1.78 ± 1.26	(2:3)0.045*	1.28 ± 0.19	0.000*
yes, twice a day or more times per day	1.12 ± 0.49	(1:3) 0.002*	0.12 ± 0.09	
Demonstrating tooth brushing technique:				
correct	1.17 ± 1.56		0.26 ± 0.41	
incorrect	2.01 ± 0.41	0.012*	1.13 ± 0.83	0.000*

X – mean value; SD – standard deviation; p – significance; * – statistically significant

Table 5. Community Periodontal Index values among the study group patients, in terms of psychotropic medications

Independent variables	Obtained values of Community Periodontal Index	
	X ± SD	p (Mann–Whitney test)
Antipsychotics		
no	1.07 ± 1.14	0.001*
yes	2.12 ± 0.76	
Antidepressants		
no	1.67 ± 1.39	0.536
yes	1.56 ± 1.61	
Anxiolytics		
no	1.40 ± 1.23	0.058
yes	1.82 ± 1.01	
Hypnotics		
no	1.75 ± 0.97	0.729
yes	1.61 ± 0.79	
Mood stabilizers		
no	1.58 ± 1.32	0.067
yes	1.81 ± 1.02	
Anticholinergics		
no	1.15 ± 1.78	0.043*
yes	2.21 ± 0.46	

X – mean value; SD – standard deviation; p – significance; * – statistically significant

Table 6. Community Periodontal Index among the study group patients examined by linear regression model

Independent variables	Univariate linear regression analysis		Multivariate linear regression analysis	
	#B (95%CI)	p	#B (95%CI)	p
Gender	0.222	0.004*	0.519	0.032*
Age	-0.011	0.721	/	/
Smoking habits	0.518	0.004*	0.098	0.016*
Drinking of alcohol beverages	0.410	0.026*	-0.098	0.314
Maintaining of oral hygiene	-0.108	0.018*	0.116	0.315
Tooth brushing technique	0.160	0.032*	0.346	0.455
Diagnostic category	0.006	0.150	n/a	n/a
Duration of mental disorder	0.164	0.139	n/a	n/a
Psychotropic medication	-0.049	0.768	n/a	n/a
Antipsychotics	0.138	0.002*	1.024	0.021*
Antidepressants	0.188	0.490	n/a	n/a
Anxiolytics	-0.490	0.098	n/a	n/a
Hypnotics	0.233	0.399	n/a	n/a
Mood stabilizers	0.064	0.822	n/a	n/a
Anticholinergics	-0.243	0.050*	-0.449	0.421

p – significance; #B – unstandardized Coefficient B; * – statistically significant