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Paper Accepted*

ISSN Online 2406-0895

Original Article / Оригинални рад

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Oral Health of Prosthetic Rehabilitated Patients with Schizophrenia

Орално здравље протетски рехабилитованих пацијената са схизофренијом

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Received: November 09, 2020

Revised: December 29, 2020

Accepted: January 05, 2021

Online First: January 13, 2021

DOI: <https://doi.org/10.2298/SARH201109002S>

***Accepted papers** are articles in press that have gone through due peer review process and have been accepted for publication by the Editorial Board of the *Serbian Archives of Medicine*. They have not yet been copy-edited and/or formatted in the publication house style, and the text may be changed before the final publication.

Although accepted papers do not yet have all the accompanying bibliographic details available, they can already be cited using the year of online publication and the DOI, as follows: the author's last name and initial of the first name, article title, journal title, online first publication month and year, and the DOI; e.g.: Petrović P, Jovanović J. The title of the article. *Srp Arh Celok Lek*. Online First, February 2017.

When the final article is assigned to volumes/issues of the journal, the Article in Press version will be removed and the final version will appear in the associated published volumes/issues of the journal. The date the article was made available online first will be carried over.

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Орално здравље протетски рехабилитованих пацијената са шизофренијом

SUMMARY

Introduction/Objective Factors such as nature of psychiatric disorder, length of hospitalization and oral-side effects of psychotropic medications may considerably contribute to high prevalence of oral diseases among people with schizophrenia, and a consequent need for prosthetic rehabilitation.

The aim of this study was to ascertain the oral health level of prosthetic rehabilitated patients with schizophrenia and to consider their needs for future improvement of prosthetic rehabilitation.

Methods The study group comprised 52 patients with schizophrenia, hospitalized at the Clinic for Mental Disorders "Dr Laza Lazarevic" Belgrade. The control group comprised 52 patients with no psychiatric medical history, treated at the School of Dental Medicine, University in Belgrade. The oral health indices (DMFT index, CPITN and OHI-S), socio-demographic characteristics, smoking habits, oral hygiene habits and previous dental visits were registered in both groups, as well as medical characteristics of the primary disease in the study group patients.

Results Fifty percent of the study group patients had partial mobile dentures, while almost 30% had fixed dentures, in opposite to the control group patients who prevalently had fixed dentures. In both groups of patients, a statistical significance was observed between partial mobile and fixed dentures wearers, in terms of DMFT index, carious teeth, CPI modified and OHI-S. Similarly, a statistically significant difference between groups was observed concerning fixed dentures in terms of carious teeth, filled teeth, CPI modified and OHI-S.

Conclusion Multidisciplinary approach is needed for complete oral and prosthetic rehabilitation of this group of psychiatric patients.

Keywords: prosthetic; schizophrenia; oral health

САЖЕТАК

Увод/Циљ Фактори као што су природа психијатријског поремећаја, дужина хоспитализације и орални нежељени ефекти психотропних лекова могу знатно допринети повећаној преваленцији оралних болести код особа са шизофренијом и последичној потреби за протетском рехабилитацијом. Циљ овог истраживања био је да се установи ниво оралног здравља протетски рехабилитованих пацијената са шизофренијом, те размотре могућности и потребе за унапређењем њихове протетске рехабилитације у будућности.

Метод Студијску групу чинило је 52 пацијента са шизофренијом, хоспитализованих на Клиници за психијатријске болести „Др Лаза Лазаревић“. Контролну групу чинило је 52 пацијента, без историје менталних поремећаја, а који су лечени на Стоматолошком факултету Универзитета у Београду. Индекси оралног здравља (КЕП индекс, ЦПИ модификовани и ОХИ-С), социодемографске карактеристике, пушење, навике у одржавању оралне хигијене и претходне посете стоматологу регистроване су у обе групе испитаника, као и медицинске карактеристике примарне болести код пацијената студијске групе.

Резултати Педесет процената испитаника студијске групе имало је парцијалне мобилне протезе, док је готово 30% њих имало фиксне протетске радове, за разлику од контролне групе испитаника који су претежно (76,9%) имали фиксне протетске радове. У обе групе испитаника, уочена је статистичка значајност међу носиоцима парцијалних мобилних и фиксних протетских радова, у смислу КЕП индекса, броја каријесних зуба, ЦПИ модификованог и ОХИ-С. Слично томе, уочена је статистички значајна разлика између носилаца фиксних протетских радова у студијској и контролној групи у погледу броја каријесних зуба, рестаурисаних зуба, ЦПИ модификованог и ОХИ-С.

Закључак Мултидисциплинарни приступ је потребан за потпуну оралну и протетску рехабилитацију ове групе психијатријских пацијената.

Кључне речи: протетика; шизофренија; орално здравље

INTRODUCTION

Physical health of patients with schizophrenia seems to receive much attention over recent years because this group of psychiatric patients has been significantly increasing, and

they are less likely to receive the level of physical-based care and rehabilitation they need [1]. Also, studies indicate that positive and negative symptoms of schizophrenia are correlated with poor quality of life [2, 3]. In addition, the chronicity of the schizophrenia has been attributed to the undesirable consequences that potentially devastate oral health [4].

Oral health is an integral part of general health. Dental caries that constitute a significant public health problem worldwide is a common chronic infectious transmissible disease [5]. Apart from poor oral hygiene and diet (in particular, sugar-rich food), many other factors have always been associated with it [5]. Similar to that, periodontitis is microbe-induced inflammatory and multifactorial oral disease, characterized by inflammation of periodontium and loose of periodontal attachment apparatus [6]. In addition, these changes can lead to serious consequences such as tooth loss and lower quality of life [7].

Many studies have shown that people with schizophrenia are at increased risk of poor oral health [8–12]. Factors such as nature of psychiatric disorder, length of hospitalization and oral-side effects of psychotropic medications may considerably contribute to high prevalence of oral diseases among this group of psychiatric patients, and a consequent need for prosthetic rehabilitation [8]. However, dental treatment of people with schizophrenia is not an easy task, primarily because they avoid regular visits to dental offices due their financial situation and a neglected maintaining adequate oral hygiene [8]. Poor oral hygiene and dental neglect in this group of psychiatric patients seems to lead to pain and infection processes, negatively impacting not only physical health, but also quality of life, social functioning and self-esteem [9].

According to the evidences that persons with schizophrenia have higher number of dental carious and missing teeth than general population, with severe form of periodontitis, poor oral hygiene and that some of them already have some kind of prosthetic appliances [8–12], the aim of this study was to access the oral health of prosthetic rehabilitated patients with

schizophrenia and to consider options of their needs for future improve prosthetic rehabilitation.

METHODS

Study Population

This cross-sectional study was conducted at the Clinic for Mental Disorders “Dr Laza Lazarević” Belgrade (for the study group patients) and at the School of Dental Medicine, University in Belgrade (for the control group of patients), in full accordance with the World Medical Association Declaration of Helsinki. Also, the approval from the Ethics Committees in both medical institutions was received. All participants or their legal guardians (for the study group patients) were informed through a special brochure (concerning the type of the research, data collection procedure, and other aspects of the study), and they signed the informed consent form before participating in any part of the study.

The study group comprised 52 patients with schizophrenia (18 males and 34 females, aged 25 to 67 years; mean age 47.56 ± 10.59 years), hospitalized at the Clinic for Mental Disorders “Dr Laza Lazarevic” Belgrade. The inclusion criteria for entering the study group were that the patients were older than 18 years at the time of the study, diagnosed with schizophrenia in accordance to the 10th Revision of the International Classification of Diseases (ICD-10) minimum two years prior to the study and that they have some kind of oral prosthetic rehabilitation at the time of hospitalization. The exclusion criteria for the study group patients were the primary diagnosis of another mental disorder, hospitalized patients diagnosed with schizophrenia in the period shorter than two years from the time of the survey, patients who were not prosthetic rehabilitated before the study, the simultaneous presence of severe somatic illnesses or severe disability, and inability to communicate or the refusal to cooperate.

The control group comprised 52 patients (19 males and 33 females, aged 19 to 71 years; mean age 49.10 ± 10.99 years), treated at the School of Dental Medicine, University in Belgrade. They were matched to the study group by number, gender and roughly by age. The inclusion criteria for entering the study were patients older than 18 years at the time of the study, with no medical history in terms of mental disorders, and also that they already had some kind of prosthetic rehabilitation. The exclusion criteria were the diagnosis of any psychiatric or somatic illness and the use of drugs that can cause oral changes (antibiotics, antifungals, blood pressure medication, corticosteroids, diabetes medication, etc.) [13].

A questionnaire for both groups of patients was designed in order to record the socio-demographic characteristics (gender, age, educational level, marital status and residence), smoking habits, oral hygiene habits and previous dental visits. The data about schizophrenia in the study group were taken from the medical records and included the duration of schizophrenia, number of previous hospitalizations and current psychotropic medication.

Clinical Examination

All patients were subjected to the thorough dental clinical examination in accordance with the criteria recommended by the World Health Organization [14]. The dental clinical examinations were carried out by two trained and calibrated examiners at the Clinic for Mental Disorders "Dr Laza Lazarevic" in Belgrade, Serbia, and the Faculty of Dental Medicine, University of Belgrade, Serbia, in order to assess the Decayed, Missing and Filled Teeth Index (DMFT index) [14], Community Periodontal Index (CPI) modified [14] and Oral Hygiene Index - Simplified (OHI-S) [15]. In terms of DMFT index, the examinations were performed in the daylight, using plan mouth mirror [14]. In addition, clearly visible lesions with cavities on tooth surfaces were registered as caries, teeth with only a change in transparency, but with intact surface and without cavitation were registered as being healthy

[14]. In terms of CPI modified, the clinical measurements were performed by using the periodontal CPI probe graded in mm on the sextants, scoring on the scale from 0 to 4. In each sextant, all teeth were examined and only the highest value for each sextant was scored and recorded [14]. OHI-S was composed of two components, the Debris Index and the Calculus Index. These indexes represented the amount of debris or calculus found on the preselected surfaces of index teeth [15].

Statistical Analysis

All collected data were organized and evaluated using the dedicated software (SPSS 17.0 Inc, Chicago, IL, USA) and were analyzed by the descriptive statistical parameters and regression models. 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 the percentages. The methods for testing the difference of numerical data (DMFT index, CPI modified and OHI-S) were represented by the Mann-Whitney test. For testing the data of different categories (socio-demographic characteristics, smoking habits, oral hygiene habits and previous dental visits), the Person's χ^2 -test was used. The level of significance was set at $p \leq 0.05$.

RESULTS

Types of prosthetic appliances in both groups of patients are shown in Figure 1. Fifty percent of the study group patients had partial mobile dentures, while almost 30% had fixed dentures (crowns and/or bridges), in opposite to the control group patients who prevalently (76.9%) had fixed dentures - Figure 1.

The distribution of socio-demographic characteristics of both groups is shown in Table 1. The statistically significant differences between the groups were observed for education,

marital status and residence status (Table 1). The educational level of patients with schizophrenia was lower than that of the control group patients. Furthermore, the percentage of employees among the study group patients was significantly lower than in the control group (Table 1). Also, most of study group patients lived with their parents, in opposite to the control group patients, who had in most percent their own property (Table 1).

In the study group, schizophrenia lasted 17.79 ± 9.59 years (range 2 to 45 years), and the average number of hospitalizations was 9.54 ± 5.15 (range 1 to 25 hospitalizations) - table 2. The patients with schizophrenia were treated with an average of 4.18 ± 1.07 psychotropic medications (range 2 to 7) - Table 2. Also, average number of antipsychotics per patient was 1.56 ± 0.57 (range 1 to 3), and in most cases patients were also treated with mood stabilizers, anxiolytics and antiparkinsonics (Table 2).

Most of the study group patients were smokers, brushing their teeth on daily level, without using oral hygiene aids, in opposite to the control group patients who were in about 50% smokers, brushing their teeth on daily level and using oral hygiene aids in more than 60% (Table 3). In terms of previous dental visits, patients with schizophrenia in most cases visited dentist more than once a year, mostly because of tooth restauration and the pain (Table 3). Patients of the control group visited dentist in a period less than 6 months, mostly because control exam and tooth restauration (Table 3).

In both groups of patients, a statistical significance was observed among partial mobile denture wearers, in terms of DMFT index, number of carious teeth, CPI modified and OHI-S (Table 4). Study group patients had the significantly higher values of DMFT index, number of carious teeth, CPI modified and OHI-S, than the control group patients (Table 4).

Similarly, a statistically significant difference between groups was observed concerning fixed dentures (crowns and/or bridges) in terms of number of carious teeth, number of filled teeth, CPI modified and OHI-S (Table 4).

The impact of independent variables (socio-demographic characteristics, characteristics of primary disease, smoking habits, oral hygiene habits and previous dental visits) on oral health indices (DMFT index, CPI modified and OHI-S) was examined by the linear regression model (Table 5). In terms of DMFT index, the univariate regression model showed that age, educational level and the use of oral hygiene aids had a significant impact on value of this oral health index (Table 5). However, the multivariate regression model showed that only age of patients had a significant impact on DMFT index value of the study group patients (Table 5). Similarly, univariate regression analysis showed a statistical significance of the CPI modified and OHI-S among the study group patients in terms of gender, number of previous hospitalizations and the use of oral hygiene aids for CPI modified, and tooth brushing technique and oral hygiene aids for OHI-S. In terms of CPI modified, multivariate regression model showed that all three independent variables had a significant impact on the value of this oral parameter. In terms of OHI-S, multivariate regression model showed that only tooth brushing technique have a significant impact on the value of this index (Table 5).

DISCUSSION

The average values of the DMFT index, CPI modified and OHI-S among patients with schizophrenia who had prosthetic appliances were significantly higher than that of the control group patients, which is in accordance with previous studies [8, 9, 10, 16, 17, 18].

In terms of socio-demographic characteristics of patients with schizophrenia, this study show that they had lower educational level and they were mostly unemployed, unmarried, and lived with their parents, which lead to financial deficit. It is known that patients with schizophrenia have problems with financial competence, leading to deficit in several cognitive functions that have an important role in maintaining an independent social life [19].

In the study group patients, schizophrenia lasted in average 17.79 ± 9.59 years, with the large number of hospitalizations per patient (over 10 in average), which points to the fact that patients were hospitalized for a proportionally long time period, as shown in other studies as well [8, 18]. Also, they were predominantly treated with antipsychotics: typical or first-generation, and atypical or second-generation. Although both groups of antipsychotics block dopamine receptors, atypical ones differ from the typical since they have a more secure profile of neurological side effect and they are less likely to cause extrapyramidal symptoms, such as Parkinsonism expressed by muscle rigidity and involuntary and intentional tremors [20]. These deficiencies of first-generation antipsychotics have a negative effect on fine motor movements and, consequently, on the patient's ability to efficiently brush their teeth and perform oral hygiene activities [21]. Also, both types of antipsychotics can cause tardive dyskinesia, but atypical antipsychotics, compared to typical ones, are less likely to do so [21]. Tardive dyskinesia is a parafunctional activity of mastication and tongue musculature that can have a negative effect on the teeth and occlusion [21]. Also, both generations of antipsychotics have anticholinergic side effects, including xerostomia or "dry mouth" [22]. As saliva plays a major role in the prevention of dental caries, xerostomia is a significant risk factor for the appearance of dental caries [22]. Moreover, patients with dry mouth often drink a carbonated drink, which increases the risk of caries occurrence even more [22].

Based on linear regression models and statistically significant independent variables (age for DMFT index; gender, number of previous hospitalizations and oral hygiene aids for CPI modified; and tooth brushing technique and oral hygiene aids for OHI-S), it seems that schizophrenia indirectly affect oral health of patients with this mental disorder, by reducing their motivation and awareness of the importance of oral health.

In the present study, half of study group patients had partial mobile dentures, while almost 30% of them had fixed dentures (crowns and/or bridges). Choi K et al. [23] suggest

that dental prosthetic treatment of patients with schizophrenia would seem reasonable with shortened dental bridge, after restauration of four occluding pairs of premolars which provide sufficient occlusal stability and masticatory function. Also, they suggest that older patients, patients with lower education and duration of schizophrenia more than 10 years should be rehabilitated with removable prosthetic appliances [24]. Fixed dentures (crowns and/or bridges) are the first choice for replacing missing teeth in partially edentulous patients [23]. On the other side, advanced rehabilitation treatments such as dental implants placement in patients with schizophrenia are insufficiently described in the scientific literature. Dental implants, rather than removable prosthesis, may be favorable for aesthetical outcomes in patients with schizophrenia treated under combined surgical and prosthetic rehabilitation planning. This planning should include the fact that general anesthesia in patients with schizophrenia should be limited [23]. Implant placement in local anesthesia should generally be preferred for people with mental disorders, including a previous consultation with psychiatric specialists on conducting the best patient management [24], and it is known that patients with schizophrenia needed complex and extensive dental extractions [25].

Limitation of this study is relatively low number of study group patients. But it is rare to find already prosthetic rehabilitated patients with schizophrenia having in mind their low socio-economical characteristics. Also, all of them were patients of the Clinic for Mental Disorders “Dr Laza Lazarevic” in Belgrade. Thus, it can be assumed that situation may be much worse in other psychiatric institutions in Serbia, concerning the oral health of this group of psychiatric patients.

CONCLUSION

The population of patients with schizophrenia is experiencing, broadly speaking, the same oral health problems and the same barriers in accessing adequate oral care as the

mentally healthy population. There is a complex interrelation between socio-demographic characteristics, schizophrenia, psychotropic medication and oral health. The high costs of dental treatments constitute the main barrier in complete prosthetic rehabilitation of this group of psychiatric patients.

Conflict of interest: None declared.

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REFERENCES

1. Moore S, Shiers D, Daly B, Mitchell AJ, Gaughran F. Promoting physical health of people with schizophrenia by reducing disparities in medical and dental care: Clinical overview. *Acta Psychiatr Scand* 2015; 1-3 (PMID:25958971; DOI: 10.1111/acps.12431)
2. Cernovsky Z. Quality of life in persons with schizophrenia. *Ment Illn* 2017; 9(1):7052 (PMID: 28435648; DOI: 10.4081/mi.2017.7052)
3. Žarković Palijan T, Kovačević D, Vlastelica M, Dadić-Hero E, Sarilar M. Quality of life of persons suffering from schizophrenia, psoriasis and physical disabilities. *Psychiatr Danub* 2017; 29(1):60-65 (PMID:28291975; DOI: 10.24869/psyd.2017.60)
4. Swati G, Pratibha P.K, Gupta R. Necessity of oral health intervention in schizophrenia patients - a review. *Nepal J Epidemiol* 2016; 6(4):605-612 (PMID: 28804672; DOI: 10.3126/nje.v6i4.17254)
5. Ghimire N. Oral health - An integral part of general health. *J Mass Communicat Journalism* 2013; 3:4 (DOI: 10.4172/2165-7912.1000e138)
6. Pizzorno J.E, Murray M.T, Joiner-Bay H. *The Clinician's Handbook of Natural Medicine - 3rd Edition*. Elsevier Ltd. 2016 (ISBN: 9780702055133)
7. Buset S.L, Walter C, Friedmann A, Weiger R, Borgnakke W.S, Zitzmann N.U. Are periodontal diseases really silent? A systematic review of their effect on quality of life. *J Clin Periodontol* 2016; 43: 333-344 (PMID: 26810308; DOI: 10.1111/jcpe.12517)
8. Đorđević V, Đukić Dejanović S, Janković Lj, Todorović Lj. Schizophrenia and oral health - review of literature. *Balk J Dent Med* 2016; 20:15-21 (DOI: 10.1515/bjdm-2016-0002)
9. Kisely S. No mental health without oral health. *Canadian Journal of Psychiatry* 2016; 61(5): 277-282 (PMID: 27254802, DOI:10.1177/0706743716632523)
10. Đorđević V, Jovanović M, Miličić B, Stefanović V, Đukić Dejanović S. Prevalence of dental caries in hospitalized patients with schizophrenia. *Vojnosanit Preg* 2016; 73(12):1102-1108 (PMID: 29341566; DOI: 10.2298/vsp150917111d)
11. Denis F, Milleret G, Wallenhorst T, Carpentier M, Rude N, Trojak B. Oral health in schizophrenia patients: A French multicenter cross-sectional study. *La Presse Médicale* 2019; 48(2):89-99 (DOI: 10.1016/j.lpm.2018.06.018)
12. Cockburn N, Pradhan A, Taing W, Kisely S, Ford P.J. Oral health impacts of medications used to treat mental illness. *Journal of Affective Disorders* 2017; 223:184-193 (PMID: 28759866; DOI: 10.1016/j.jad.2017.07.037)
13. Critchlow D. Part 3: Impact of systematic conditions and medications on oral health. *Br J Community Nurs*. 2017; 22(4): 181-190 (PMID:28414538; DOI: 10.12968/bjcn.2017.22.4.181)
14. World Health Organization. *Oral health surveys: basic methods - 5th edition*. World Health Organization 2013 (ISBN: 978 92 4 154864 9)
15. Greene J.G, Vermillion J.R. The Simplified Oral Hygiene Index. *The Journal of American Dental Association* 1964; 68(1): 7-13 (DOI: 10.14219/jada.archive.1964.0034)
16. Hu F.K, Chou Y.H, Wen Y.H, Hsieh K.P, Tsai J.H, Yang P, et al. Antipsychotic medications and dental caries in newly diagnosed schizophrenia: A nationwide cohort study. *Psychiatry Res* 2016; 245:45-50 (PMID: 27526316; DOI: 10.1016/j.psychres.2016.07.047)
17. Yang M, Chen P, He M.X, Lu M, Wang H.M, Soares J.C, et al. Poor oral health in patients with schizophrenia: A systematic review and meta-analysis. *Schizophr Res* 2018; 201:3-9 (PMID: 29759350; DOI: 10.1016/j.schres.2018.04.031)
18. Gupta S, Pratibha R, Gupta R. Necessity of oral health intervention in schizophrenia patients - A review. *Nepal J Epidemiol* 2016; 6(4):605-612 (PMID: 28804672; DOI: 10.3126/nje.v6i4.17254)
19. Niekawa N, Sakuraba Y, Uto H, Kumazawa Y, Matsuda M. Relationship between financial competence and cognitive function in patients with schizophrenia. *Psychiatry Clin Neurosci* 2007; 61(5):455-61 (PMID: 17875022; DOI: 10.1111/j.1440-1819.2007.01693.x)
20. Fratto G, Manzon L. Use of psychotropic drugs and associated dental diseases, *Int J Psychiatry Med*. 2014; 48(3):185-97 (PMID: 25492713; DOI: 10.2190/PM.48.3.d.)
21. Kisely S, Baghaie H, Lalloo R, Siskind D, Johnson N.W. A systematic review and metaanalysis of the association between poor oral health and severe mental illness. *Psychosom Med*. 2015; 77(1):83-92 (PMID: 25526527; DOI: 10.1097/PSY.0000000000000135)
22. Okamoto A, Miyachi H, Tanaka K, Chikazu D, Miyaoka H. Relationship between xerostomia and psychotropic drugs in patients with schizophrenia: evaluation using an oral moisture meter. *J Clin Pharm Ther*. 2016;41(6):684-688 (PMID: 27663579; DOI: 10.1111/jcpt.12449)
23. Choi Y.S, Kim H, Rhee S.H, Ryoo S.H, Karm M.H, Seo K.S, et al. Multiple implant therapy with multiple inductions of general anesthesia in non-compliant patients with schizophrenia: A case report. *J Dent Anesth Pain Med*. 2019; 19(4):239-244 (PMID: 31501783; DOI: 10.17245/jdpm.2019.19.4.239)

24. Castellanos-Cosano L, Corcuera-Flores J.R, Mesa-Cabrera M, Cabrera-Domínguez J, Torres-Lagares D, Machuca-Portillo G. Dental implants placement in paranoid squizofrenic patient with obsessive-compulsive disorder: A case report. *J Clin Exp Dent.* 2017; 9(11):e1371-e1374. (PMID: 29302292; DOI:10.4317/jced.54356)
25. Denis F, Goueslard K, Siu-Paredes F, Amador G, Rusch E, Bartaud V, Quantin C. Oral health treatment habits of people with schizophrenia in France: A retrospective cohort study. *PLoS ONE* 2020; 15(3):e0229946 (PMID: 32150582; DOI: 10.1371/journal.pone.0229946)

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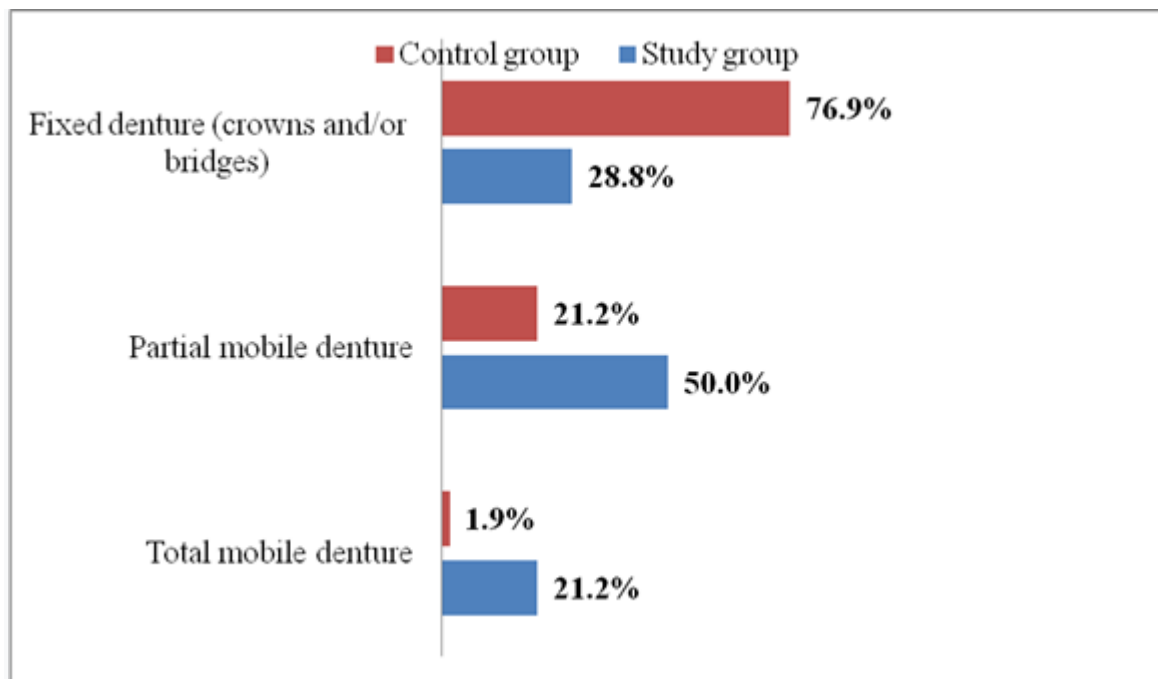


Figure 1. Types of prosthetic dentures in study and control group

Table 1. Socio-demographic characteristics of study and control group

| Socio-demographic variables | Obtained values | | Significance ^a (<i>p</i>) |
|----------------------------------|-------------------|---------------------|---|
| | Study group n (%) | Control group n (%) | |
| Education: | | | |
| without school/elementary school | 7 (13.5) | 2 (3.8) | 0.001* |
| junior high school | 31 (59.6) | 16 (30.8) | |
| high school | 5 (9.6) | 11 (21.2) | |
| college | 9 (17.3) | 23 (44.2) | |
| Employment: | | | |
| unemployed | 30 (57.7) | 25 (48.1) | 0.056 |
| employed | 5 (9.6) | 14 (26.9) | |
| invalid retirement | 7 (13.5) | 2 (3.8) | |
| age or survivor retirement | 10 (19.2) | 11 (21.2) | |
| Marital status: | | | |
| married | 6 (11.5) | 19 (36.5) | 0.000* |
| divorced/separated | 5 (9.6) | 13 (25) | |
| unmarried/alone | 40 (76.9) | 17 (32.7) | |
| widow | 1 (1.9) | 3 (5.8) | |
| Residence: | | | |
| own property | 18 (34.6) | 26 (50) | 0.005* |
| parents' property | 25 (48.1) | 13 (25) | |
| rent or other | 9 (17.3) | 13 (25) | |

*statistically significant; ^aPearson's χ^2 test

Table 2. Medical characteristics of study group

| Medical characteristics | Obtained values n (%) |
|--|---------------------------|
| Duration of schizophrenia <i>per patient</i> (in years): [(X ± SD; med (min–max))] | 17.79 ± 9.59; 16.5 (2–45) |
| Number of previous hospitalizations <i>per patient</i>: [(X ± SD; med (min–max))] | 9.54 ± 5.15; 8.5 (1–25) |
| Number of psychotropic medications <i>per patient</i>: [(X ± SD; med (min–max))] | 4.18 ± 1.07; 4 (2–7) |
| Number of antipsychotics <i>per patient</i>: [(X ± SD; med (min–max))] | 1.56 ± 0.57; 2 (1–3) |
| Mood stabilizers: | |
| no | 11 (21.2) |
| yes | 41 (78.8) |
| Hypnotics: | |
| no | 34 (65.4) |
| yes | 18 (34.6) |
| Anxolytics: | |
| no | 7 (13.5) |
| yes | 45 (86.5) |
| Antidepressants: | |
| no | 48 (92.3) |
| yes | 4 (7.7) |
| Antiparkinsonics: | |
| no | 22 (42.3) |
| yes | 30 (57.7) |

X – mean value; SD – standard deviation

Table 3. Smoking habits, oral hygiene habits and previous dental visits between study and control group

| Smoking habits, oral hygiene habits and previous dental visits | Obtained values | | Significance ^a (p) |
|--|----------------------|----------------------|-------------------------------|
| | Study group n (%) | Study group n (%) | |
| Smoking habits: | | | |
| no | 13 (25) | 24 (46.2) | 0.000* |
| yes | 39 (75) | 28 (53.8) | |
| Frequency of brushing teeth: | | | |
| no | 18 (34.6) | 0 (0) | 0.000* |
| occasionally | 6 (11.5) | 0 (0) | |
| yes | 28 (53.8) | 52 (100) | |
| Tooth brushing technique: | | | |
| correct | 14 (26.9) | 25 (48.1) | 0.000* |
| incorrect | 38 (73.1) | 27 (51.9) | |
| Oral hygiene aids: | | | |
| no | 21 (61.8) | 10 (19.2) | 0.026* |
| occasionally | 13 (38.2) | 34 (65.4) | |
| yes | 0 (0.0) | 8 (15.4) | |
| Last dental visit: | | | |
| less than six months | 11 (21.2) | 23 (44.2) | 0.000* |
| six months till one year | 9 (17.3) | 14 (26.9) | |
| more than one year | 32 (61.5) | 15 (28.8) | |
| Reason of last dental visit: | | | |
| control exam | 3 (5.8) | 17 (32.7) | 0.000* |
| tooth restauration | 15 (28.8) | 19 (36.5) | |
| pain | 13 (25) | 0 (0) | |
| prosthetic rehabilitation | 3 (5.8) | 1 (1.9) | |
| oral soft tissue problems | 18 (54.5) | 15 (28.8) | |
| | | | |

*statistically significant; ^aPearson's χ^2 test

Table 4. Oral health indices of study and control group

| Dentures | Study group X ± SD; Med (min–max) | Control group X ± SD; Med (min–max) | Significance ^a (p) |
|--|--------------------------------------|--|----------------------------------|
| Partial mobile denture: | | | |
| DMFT index | 20.96 ± 4.70; 22 (8–28) | 15.18 ± 3.03; 16 (10–20) | 0.000* |
| Cariou teeth | 6.31 ± 4.00; 6 (0–13) | 0.55 ± 1.21; 0 (0–4) | 0.000* |
| Missing teeth | 11.42 ± 6.44; 10 (6–23) | 10.81 ± 5.10; 11 (5–19) | 0.781 |
| Filled teeth | 3.23 ± 3.50; 1.5 (0–11) | 3.81 ± 3.57; 4 (0–10) | 0.612 |
| CPI-modified | 2.35 ± 0.85; 2 (1–4) | 1.00 ± 0.45; 1 (0–2) | 0.000* |
| OHI-S | 2.23 ± 0.82; 2 (0–3) | 0.36 ± 0.50; 0 (0–1) | 0.000* |
| Fixed denture (crowns and/or bridges) | | | |
| DMFT index | 14.87 ± 6.52; 15 (5–28) | 12.78 ± 5.08; 12.5 (4–24) | 0.293 |
| Cariou teeth | 6.80 ± 5.29; 5 (2–20) | 1.70 ± 2.05; 1 (0–8) | 0.000* |
| Missing teeth | 3.87 ± 2.55; 3 (2–10) | 2.90 ± 2.55; 3 (1–10) | 0.407 |
| Filled teeth | 4.20 ± 4.04; 4 (0–12) | 8.18 ± 4.08; 7 (2–19) | 0.004* |
| CPI-modified | 1.87 ± 6.40; 2 (1–3) | 0.85 ± 0.92; 1 (0–3) | 0.000* |
| OHI-S | 1.67 ± 0.72; 2 (0–3) | 0.45 ± 0.55; 0 (0–2) | 0.000* |

X – mean value; SD – standard deviation;

*statistically significant; ^aMann–Whitney test

Table 5. The values of oral parametar indices among study group examined by the linear regression models

| Parameters | DMFT index | | | | CPI modified | | | | OHI-S | | | |
|-------------------------------------|---------------------------------------|----------|---|----------|---------------------------------------|----------|---|----------|---------------------------------------|----------|---|----------|
| | Univariate linear regression analysis | | Multivariate linear regression analysis | | Univariate linear regression analysis | | Multivariate linear regression analysis | | Univariate linear regression analysis | | Multivariate linear regression analysis | |
| | #B (95%CI) | <i>p</i> | #B (95%CI) | <i>p</i> | #B (95%CI) | <i>p</i> | #B (95%CI) | <i>p</i> | #B (95%CI) | <i>p</i> | #B (95%CI) | <i>p</i> |
| Gender | -0.131 | 0.947 | - | - | -0.677 | 0.008* | -0.734 | 0.004* | 0.071 | 0.788 | - | - |
| Age | 0.300 | 0.000* | 0.360 | 0.001* | 0.019 | 0.152 | - | - | 0.020 | 0.104 | - | - |
| Education | -2.834 | 0.004* | -1.416 | 0.160 | -0.158 | 0.270 | - | - | -0.188 | 0.165 | - | - |
| Employment | 0.847 | 0.267 | - | - | -0.034 | 0.764 | - | - | 0.022 | 0.841 | - | - |
| Marital status | -1.472 | 0.271 | - | - | -0.118 | 0.556 | - | - | -0.275 | 0.139 | - | - |
| Residence | -0.481 | 0.657 | - | - | 0.036 | 0.817 | - | - | 0.243 | 0.109 | - | - |
| Duration of schizophrenia | 0.126 | 0.195 | - | - | 4.281 | 0.998 | - | - | 0.021 | 0.109 | - | - |
| Number of previous hospitalizations | 0.162 | 0.341 | - | - | 0.054 | 0.044* | 0.058 | 0.022* | 0.017 | 0.498 | - | - |
| Number of psychotropic medications | 0.147 | 0.846 | - | - | 0.181 | 0.134 | - | - | -0.025 | 0.836 | - | - |
| Number of antipsychotics | 0.946 | 0.564 | - | - | 0.369 | 0.083 | - | - | -0.137 | 0.525 | - | - |
| Mood stabilizers | -3.042 | 0.180 | - | - | -0.483 | 0.149 | - | - | -0.286 | 0.403 | - | - |
| Hypnotics | 2.595 | 0.182 | - | - | 0.500 | 0.058 | - | - | 0.249 | 0.355 | - | - |
| Anxyolitics | -4.813 | 0.074 | - | - | -0.175 | 0.721 | - | - | -0.776 | 0.069 | - | - |
| Antidepressants | 3.042 | 0.384 | - | - | -0.179 | 0.762 | - | - | -0.049 | 0.935 | - | - |
| Antiparkinsonics | 0.570 | 0.763 | - | - | 0.191 | 0.460 | - | - | 0.176 | 0.493 | - | - |
| Smoking habits | -0.612 | 0.578 | - | - | -0.247 | 0.094 | - | - | 0.008 | 0.953 | - | - |
| Frequency of brushing teeth | -1.019 | 0.313 | - | - | -0.125 | 0.383 | - | - | -0.049 | 0.731 | - | - |
| Tooth brushing technique | 3.293 | 0.113 | - | - | 0.447 | 0.083 | - | - | 0.728 | 0.006* | 0.750 | 0.008* |
| Oral hygiene aids | 6.524 | 0.004* | 2.781 | 0.191 | 0.804 | 0.008* | 0.775 | 0.003* | 0.785 | 0.007* | 0.505 | 0.062 |
| Last dental visit | 0.768 | 0.303 | - | - | -0.004 | 0.965 | - | - | 0.164 | 0.092 | - | - |
| Reason of last dental visit | 0.451 | 0.546 | - | - | 0.013 | 0.900 | - | - | 0.084 | 0.393 | - | - |

#B (95%)-unstandardized coefficient B (95% confidence interval); *p*-significance;

*statistically significant