ORIGINAL RESEARCH

Assessment of Periodontal Status among Psychiatric Inmates Residing in Central Jail, Bhopal, Madhya Pradesh, India: A Cross-sectional Survey

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ABSTRACT

Aim: The aim of the current cross-sectional study was to assess the periodontal status among psychiatric jail patients residing in Central Jail, Bhopal, Madhya Pradesh, India.

Materials and Methods: The study subjects consisted of pre-diagnosed psychiatric patients residing in Central Jail, Bhopal. A matched control consisting of cross-section of the population, i.e. jail inmates residing in the same central jail locality was also examined to compare the psychiatric subjects. The WHO oral health assessment pro forma was used to examine the periodontal status and loss of attachment of the subjects.

Results: The total number of subjects examined was 244, which comprised 122 psychiatric inmates and 122 non-psychiatric inmates. Majority of psychiatric inmates, i.e., 69 (56.6%) were living in the jail for more than 6 years which was followed by 50 (41%) non-psychiatric inmates. A total of 225 (92.2%) inmates were affected with periodontitis which comprised of 95.9% of psychiatric inmates and 88.5% non-psychiatric inmates.

Conclusion: The information presented in this study adds to our understanding of the common oral mucosal lesions occurring in a psychiatric inmate population. Leukoplakia and oral submucous fibrosis were the most common types of oral mucosal lesions found. Efforts to increase patient awareness of the oral effects of tobacco use and to eliminate the habit are needed to improve oral and general health of the prison population.

Keywords: Jail inmates, Periodontal diseases, Periodontal status, Psychiatric illness, Psychiatrics

How to cite this article: Torwane NA, Dayma A, Mishra M, Joshi KR, Khanal LR, Singh VR. Assessment of Periodontal Status among Psychiatric Inmates Residing in Central Jail, Bhopal, Madhya Pradesh, India: A Cross-sectional Survey. Int J Oral Care Res 2018;6(1):S16-22.

Source of support: Nil

Conflicts of interest: None

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INTRODUCTION

Periodontal disease is one of the most prevalent dental diseases affecting the whole adult population throughout the world varying only in degree from mild to severe depending on multiple factors.[1-3]

Impact of periodontitis on an individual's quality of life reflects complex social norms and cultural values and traditions.[4] Personal risk factors such as poor lifestyle and negative psychosocial conditions have been said to play an important role in the etiology of adult periodontitis.[5] Furthermore, it has been implicated as an emerging risk factor for a number of major systemic diseases or conditions, including cardiovascular disease, stroke, and diabetes, as well as for pre-term, low-birth weight infants.[6-8]

There has been a general perception that oral health in India is considered to be the least important.[9] On the other hand, even the most basic oral health education and simple interventions such as pain relief and emergency care for acute infection and trauma are not available to the vast majority of population.[9,10] One of the reasons is a lack of epidemiological data to identify areas needing oral health care. For planning of national or regional oral health promotion programs as well as to prevent and treat oral health problems, baseline data about magnitude of the problem are required.

Dental disease and psychiatric illness are among the most prevalent health problems in the world.[11] Individuals affected with mental illness are one of the neglected special groups in India where special attention is required. There is some evidence that patients suffering from mental illness are more vulnerable to dental neglect and poor oral health.[12,13]

Many patients suffering from long-term psychiatric illness are on medication for long periods. These medications frequently cause gingivitis, periodontitis, and stomatitis.[11]

Furthermore, mental or behavioral disorders are, especially, prevalent among prison populations.[14,16] According to Abram *et al*., 6.4% of male inmates and 12.2% of female inmates were with severe mental disorders.[17,18]

In India, the accessibility to dental facilities for the psychiatric jail inmates is nearly non-existent.

There are many challenges in delivering oral health-services in the prison system, which include provision of service with respect to security procedures; recruitment and retention of dental staff, and declining prison budgets for facilities and equipments. In addition, there is currently no standardized system of assessment and prioritization of the dental needs of prisoners.[19]

There is every possible chance that this neglected group of population may have heavy stress and indulge in alcoholism, gutkha-pan chewing, and other pernicious habits. These factors may cause many oral health-related problems which can make their lives worse.

To the best of our knowledge, there are no data available on the periodontal status of this special community. Hence, the current cross-sectional study was conducted to assess the prevalence of periodontal status among psychiatric inmates residing in central jail and attempts to correlate the various risk factors with the periodontal lesions found.

MATERIALS AND METHODS

Study Design and Setting

A descriptive, cross-sectional survey following the STROBE[20] guidelines was conducted among the psychiatric inmates residing in Central Jail, Bhopal, Madhya Pradesh, India.

Source of Data

The study subjects consisted of pre-diagnosed psychiatric patients residing in Central Jail, Bhopal. A matched control consisting of cross-section of the population, i.e., jail inmates residing in the same central jail locality was also examined to compare the psychiatric inmates.

Eligibility Criteria

All the available pre-diagnosed psychiatric inmates who are approved by psychiatric professional and who are willing to participate in the survey with their consent were considered for the study.

Exclusion Criteria

Subjects with serious mental illness, intellectual disability, and aggressive and uncooperative subjects were excluded from the study due to their limited ability to cooperate.

Similarly, subjects who fail to give consent were also excluded from the study.

Sample Size

A total of 244 subjects comprised of 122 psychiatric inmates and 122 non-psychiatric inmates residing in central jail were included in the study.

Method of Collection of Data

Ethical clearance

Ethical approval for the survey was taken from the ethical committee. Permission to conduct the survey was obtained from the medical incharge of Psychiatric Department of Central Jail, Bhopal.

Survey Schedule

The survey procedure was systematically scheduled and was carried out for 2 weeks.

Details of the Survey

All the psychiatric patients with symptoms of mental disorder and who are approved by the psychiatrist based on criteria specified in the diagnostic and statistical manual of mental disorders, fourth edition were examined for oral mucosal lesions. Before the examination, a written consent from each participant was taken. The cross-section of the eligible subjects residing in central jail was also matched to make valid comparisons.

Assessment of Demographic Details

Before the clinical examination, information on age, sex, education, oral hygiene habits, type of psychiatric disorder, medication used for illness, duration spent in the jail, and tobacco-related habits was obtained from the surveyed subjects.

Clinical Assessment of Periodontal Status

The clinical examination was carried out using the criteria as prescribed by Oral Health Survey: Basic Methods, WHO (1997).[21] The oral examination was made using a mouth mirror and community periodontal index probe on a dental chair in the dental unit of Central Jail, Bhopal, by a single trained and calibrated investigator. The investigator read, understood, and standardized his method of operation so as to minimize error and have reproducible data. A trained recording clerk assisted the examiner in recording procedures. An examination of the oral cavity to record the periodontal status and loss of attachment (LOA) was made on every subject. Mouth mirror and the handle of the periodontal probe were used to retract the tissues.

Table 1: Distribution of inmates according duration in the jail

Duration in the jail (years)	Psychiatric inmates, *n* (%)	Non-psychiatric inmates, *n* (%)	Statistical inference
≥1	13 (10.7)	42 (34.4)	χ^2 value=19.753
2–5	40 (32.8)	30 (24.6)	df=2
≥6	69 (56.6)	50 (41)	*P* value=0.000

Table 2: Distribution of psychiatric inmates according to psychiatric disorder and type of medication

Psychiatric disorder	Psychiatric inmates, *n* (%)
Depression	70 (57.4)
Psychotic disorder	18 (14.8)
Anxiety	15 (12.3)
Bipolar disorder	12 (9.8)
Drug abusers	3 (2.5)
Others psychiatric disorder	4 (3.3)
Type of medication	
Antidepressants	73 (59.8)
Antipsychotics	21 (17.2)
Anxiolytics	22 (18)
Anticonvulsants	3 (2.5)
Others	3 (2.5)

Statistical Analysis

All the obtained data were entered into a personal computer on Microsoft Excel sheet and analyzed using software Statistical Package for Social Science (SPSS; IBM, USA) version 20. Data comparison was done by applying Chi-square test and *t*-test. Similarly, the association of different variables with periodontal status was analyzed using step-wise multiple linear regression analysis. The statistically significant level was fixed at $P \leq 0.05$ with a confidence interval of 95%.

RESULTS

A total of 244 inmates (all males) were equally distributed into two groups, i.e., 122 (50%) psychiatric inmates and 122 (50%) non-psychiatric inmates. The difference was not statistically significant ($P = 0.310$).

Majority of psychiatric inmates, i.e. 69 (56.6%) were living in the jail for more than 6 years which was followed by 50 (41%) non-psychiatric inmates, whereas a highest of 42 (34.4%) non-psychiatric inmates were living in the jail for <1 year compared to 13 (10.7%) psychiatric inmates. The difference was statistically significant (0.000) [Table 1].

Among 122 psychiatric inmates, about 70 (57.4%) inmates had a diagnosis of depression, 18 (14.8%) had psychotic disorders (such as schizophrenia), and 15 (12.3%) had anxiety disorder. 12 (9.8%) bipolar disorder, 3 (2.5%) drug abusers, and remainder 4 (3.3%) had other psychiatric disorders (e.g. dementia and sexual dysfunction). However, the majority of psychiatric inmates, 73 (59.8%), were receiving antidepressants. 21 (17.2%) and 22 (18%) inmates were taking antipsychotics and anxiolytic drugs. Only 3 (2.5%) were taking anticonvulsants and other kind of psychiatric medications [Table 2].

A total of 188 (77%) study inmates which comprised of 107 (87.7%) psychiatrics and 81 (66.4%) non-psychiatrics had a habit of tobacco consumption (smokeless or smoking). The difference in tobacco consumption among inmates was statistically significant ($P = 0.000$) [Figure 1].

It was observed that most of the non-psychiatric inmates, i.e., 95 (77.9%) and 74 (60.7%) have never visited any dentist. The difference in a visit to a dentist among inmates was statistically significant ($P = 0.011$). Similarly, toothbrush was a common oral hygiene aid used by the study participants. The highest number of non-psychiatric inmates, i.e., 101 (82.8%) and 75 (61.5%) psychiatric inmates clean their teeth with a toothbrush, whereas 40 (32.8%) psychiatric inmates followed by 20 (16.4%) non-psychiatric inmates clean their teeth with the finger. The difference was statistically significant ($P = 0.001$) [Table 3].

Almost 11.5% of non-psychiatric inmates and 4.1% of psychiatric inmates were free of periodontal disease, while a total of 225 (92.2%) inmates were affected with periodontitis which comprised of 95.9% of psychiatric inmates and 88.5% of non-psychiatric inmates. The difference was statistically significant ($P = 0.032$) [Figure 2].

Among psychiatric inmates, 4.1%, 1.6%, 64.8%, and 25.4% had healthy periodontal status, bleeding gingiva, calculus deposits, shallow pockets, and deep pockets, respectively. Among non-psychiatric inmates, 11.5%, 13.1%, 56.6%, 16.4%, and 2.5% had healthy periodontal status, bleeding gingiva, calculus deposits, shallow pockets, and deep pockets, respectively. The psychiatric group had greater periodontal pocket formation when compared to their counterparts. The difference was statistically significant ($P = 0.001$).

Furthermore, among psychiatric inmates, 18.9% had LOA of 4–5 mm, 14.8% had LOA of 6–8 mm, 6.6% had LOA of 9–11 mm, and 5.7% had LOA of 12 mm and more. Among non-psychiatric inmates, 16.4% had LOA of 4–5 mm, 9% had LOA of 6–8 mm, 2.5% had LOA of 9–11 mm, and none of them had LOA of 12 mm and more. The difference was statistically significant ($P = 0.006$) [Table 4].

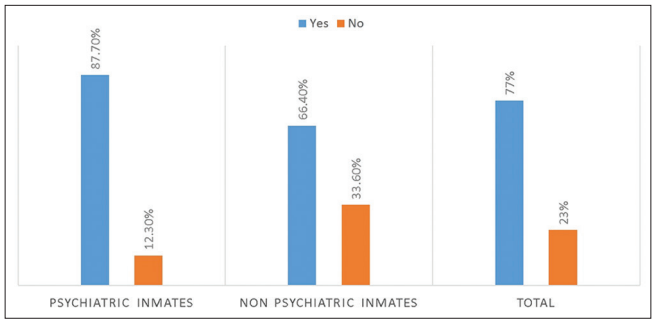

Figure 1: Distribution of inmates according to tobacco-related habits and frequency of tobacco use

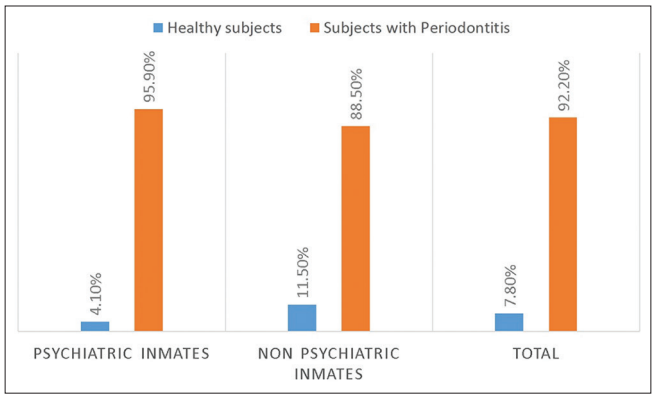

Figure 2: Prevalence of periodontitis among inmates

The mean number of healthy (1.93) and bleeding sextants (0.67) was highest among non-psychiatric inmates, while mean number of sextants for calculus (3.49), shallow pockets (0.34), and deep pockets (0.06) was highest among psychiatric inmates. However, a highest mean of 5.02 for LOA 0–3 mm was recorded among non-psychiatric inmates, while highest mean of 0.48 for LOA of 4–5 mm, 0.30 for LOA of 6–8 mm, 0.21 for LOA 9–11 mm, and 0.08 for LOA 12 mm and more was recorded among psychiatric inmates [Table 5].

DISCUSSION

Very few studies have been carried out on the periodontal status of prisoners across the globe. In the present study, a very first of its kind, pioneering attempt has been made to assess the prevalence of periodontal status among psychiatric jail inmates residing in Central Jail, Bhopal, Madhya Pradesh, India. The oral examination was conducted using the WHO oral health assessment pro forma 1997.

The present study had two limitations: First, all the inmates recruited were male subjects. The second was lack of literature on the subject at both country and international levels for comparison and discussion purposes.

Table 3: Frequency of dental visits and brushing habits among inmates

Response	Psychiatric inmates, *n* (%)	Non-psychiatric inmates, *n* (%)	Statistical inference
Visit to dentist in the past year			
Once	13 (10.7)	16 (13.1)	
Twice	7 (5.7)	16 (13.1)	
Three times	3 (2.5)	6 (4.9)	
More than three times	4 (3.3)	5 (4.1)	
Not visited	95 (77.9)	79 (64.7)	
Cleaning of teeth with			
Tooth brush	75 (61.5)	101 (82.8)	χ^2 value=15.841
Finger	40 (32.8)	20 (16.4)	df=3
Chew stick/neem stick	5 (4.1)	0	*P* value=0.001
Others	2 (1.6)	1 (0.8)	

Table 4: Distribution of periodontal status and loss of attachment among inmates

Periodontal status						
Subjects	**Healthy**	**Bleeding**	**Calculus**	**Shallow pocket**	**Deep pocket**	**Statistical inference**
Psychiatric inmates	5 (4.1)	2 (1.6)	79 (64.8)	31 (25.4)	5 (4.1)	
Non psychiatric inmates	14 (11.5)	16 (13.1)	69 (56.6)	20 (16.4)	3 (2.5)	
Loss of attachment						
Subjects (mm)	0–3	4–5	6–8	9–11	>12	Statistical inference
Psychiatric inmates	66 (54.1)	23 (18.9)	18 (14.8)	8 (6.6)	7 (5.7)	χ^2 value = 14.315
Non-psychiatric inmates	88 (72.1)	20 (16.4)	11 (9)	3 (2.5)	0	df = 4
						P value = 0.006

Table 5: Distribution of mean number of sextants affected by periodontal disease and loss of attachment among inmates

Periodontal status					
Subjects	**Healthy**	**Bleeding**	**Calculus**	**Shallow pocket**	**Deep pocket**
Psychiatric inmates	1.62±1.80	0.15±0.59	3.49±1.93	0.34±0.69	0.06±0.34
Non-psychiatric inmates	1.93±2.13	0.67±1.15	2.79±2.05	0.28±0.68	0.02±0.15
t-value	−1.199	−1.460	2.760	0.746	0.952
P value	0.232	0.000	0.006	0.456	0.342
Loss of attachment					
Subjects	0–3	4–5	6–8	9–11	>12
Psychiatric inmates (mm)	4.58±1.88	0.48±0.86	0.30±0.61	0.21±0.78	0.08±0.37
Non-psychiatric inmates	5.02±1.78	0.48±1.00	0.16±0.46	0.03±0.22	0.00±0.00
t-value	−1.88	0.00	2.00	2.44	2.40
P value	0.061	1.000	0.046	0.015	0.017

Nevertheless, a sincere attempt has been made to compare our data with studies conducted among psychiatric patients and general population.

A total of 244 inmates distributed into two groups, i.e., 122 (50%) psychiatric inmates and 122 (50%) non-psychiatric inmates were recruited in the study. Majority of psychiatric inmates, i.e., 56.6% were living in the jail for more than 6 years, while a highest of non-psychiatric inmates (34.4%) were living in the jail for <1 year. This indicates that factors such as extremely stressful living conditions present in jail, feeling of loneliness, and derived and solitary life of an individual may alter the psychological behavior of an individual.

Among psychiatric inmates, about 57.4% of inmates had a diagnosis of depression (affective mood disorder). The other psychiatric conditions prevalent were psychotic disorder such as schizophrenia (14.8%), followed by anxiety disorder (9.8%) and bipolar disorder (2.5%). These findings are similar to the study on psychiatric patients conducted in Virginia by Barnes *et al*.[22] which showed that majority (38%) were diagnosed with affective mood disorder and second large proportion was diagnosed to be having schizophrenia. According to the severity of symptoms, the psychotic disorders are generally ranged from mild, moderate, to severe. In our study, no attempt was made to classify them based on their severity of symptoms.

The majority of psychiatric inmates, 59.8%, were receiving antidepressants, followed by 17.2% antipsychotics and 18% anxiolytic drugs. These findings are similar to a study conducted by Kebede *et al*.[23] where 65.8% of patients were receiving antidepressants and 17.5% antipsychotics.

The psychiatric population owing to their poor maintenance of oral hygiene is exposed to different clinical manifestations on the periodontal tissues. The prevalence of periodontitis in the present study was found to be 92.2% which is similar to studies conducted by George[24] and Uma and Hiremath[25] The frequency and severity of periodontal disease was greater, i.e., 95.9% in psychiatric inmates than in controls; in fact, all the psychiatric inmates had some form of periodontal disease. These findings are in accordance with other studies conducted among institutionalized psychiatric patients.[26,27]

The psychiatric patients with healthy gingiva were only 4.1% as compared to 11.5% in study group. Calculus and shallow pockets were the priority problems in psychiatric group, i.e. 64.8% and 25.4% as compared to 56.6% and 16.4% in non-psychiatric group. Other problems of psychiatric group were bleeding (1.6%) and deep pockets (4.1%). The findings of Rekha *et al*.[28] are confirmatory with the findings of our study. Furthermore, similar observations were recorded in a study conducted by Gowda[29] on psychiatric patients in a defense setup where there was a higher prevalence of periodontal disease, particularly, calculus and shallow pockets. It was due to altered quality and quantity of saliva, altered oral microbial flora, endocrine dysfunction, and reduced resistance to infection among the patients which lead to higher incidence of periodontal diseases. Similarly, in a study conducted by Monteiro da Silva *et al*.,[30] psychological factors were found to be a significant predictor for plaque accumulation, and this finding is consistent with our results since abundant plaque accumulation (score 3) was significantly higher among the study group; in addition, tooth brushing was more neglected among the psychotic patients compared with the non-psychotics.

Among study participants, the destruction of periodontal ligament disease characterized by LOA was 18.9% among psychiatric inmates and 16.4% among non-psychiatric inmates. These findings are much lower compared to a study conducted by Kenkre and Spadigam on institutionalized psychiatric patients in India where only 5% of their study population had a score 0 (LOA 0–3 mm).[31] Furthermore, a study by Angelillo *et al*.[32] on institutionalized psychiatric patients in Italy observed a score of 4 (LOA more than 12 mm) among 64.8% of subjects. These studies observed xerostomia caused due to

psychiatric medications which had a significant impact on oral health, which increases the risk of periodontal infections.

One of the most common side effects of psychiatric medication is a dry mouth (xerostomia) caused by reduced salivary flow.[32-34] This has a significant impact on oral health, increasing the risk of dental caries, periodontal disease, and oral infections.[33] In the present study, we observed that the subjective sensation of dry mouth was the chief complaint among most of the psychiatric inmates. Our psychiatric subjects were on the long-term use of antidepressants, antipsychotic medications, oral and long-acting injection preparations, and mood stabilizers. This could be a major contributing factor behind their poor periodontal health which should be assessed in detail.

The findings of the current study underscore the importance of providing dental services in the prison settings since it seems doubtful whether most prisoners with these problems would receive dental care.

Further comparative studies with a larger sample size and with addition of more number of similar institutionalized settings are recommended to focus on a broader assessment of oral health status of psychiatric inmates and correlate it with possible associating factors.

CONCLUSION

The subjects of this cross-sectional study were psychiatric inmates, most of them were well controlled and more cooperative, and yet it was still found that they had a worse oral health than that of controls. The incarceration period is vital in educating this disadvantaged group about proper oral hygiene practices and to promote oral health. Similarly, when psychiatric patients are prescribed for antidepressants, the effect of the treatment should be taken into consideration and psychiatric patients could be referred to dental clinic for preventive measures. We found several predictors of poor oral health among these inmates, which may be useful for designing social and dental interventions to improve the oral health of this vulnerable population.

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