

Periodontal and Dentition Status among Psychiatric Patients in Indore: A Descriptive Cross-sectional Study

Sonali Gupta¹, Krishna Kumar Gollahalli Rangappa², Shikha Rani³, Rajendran Ganesh⁴, Pankaj Kukreja⁵, Bhavna Jha Kukreja⁶

ABSTRACT

Aim: To assess and record periodontal and dentition status among psychiatric patients using modified WHO Oral Health Assessment form 1997.

Materials and methods: A descriptive cross-sectional study was conducted at Sri Aurobindo Institute of Medical Sciences and PG Institute, Indore, among the inpatients and outpatients. Ethical approval for the study was obtained from Institutional Review Board of Sri Aurobindo College of Dentistry. Statistical analysis was done using SPSS, IBM version 20.0. Descriptive statistics was used to find the frequencies, mean, and standard deviation of variables considered in the study.

Results: Among all the disorders, schizophrenia subjects had shallow pockets 28 (25.2%) and deep pockets 55 (49.5%). Only 2 (2.6%) study subjects who had major depressive disorder had more than 12 mm loss of attachment (LOA). The highest mean DMFT score was recorded for schizophrenia patients (13.0 ± 7.09).

Conclusion: The results reveal an unmet need of projecting effective planning and implementation strategies toward the improvement of periodontal and dentition status health of the psychiatric patients.

Clinical significance: The study highlights the importance of incorporating dental health education to psychiatric rehabilitation programs.

Keywords: Depression, Oral health, Periodontal diseases, Schizophrenia.

The Journal of Contemporary Dental Practice (2022): 10.5005/jp-journals-10024-3451

INTRODUCTION

Oral health is an integral part of physical health.¹ It is an integral part of general health and essential for the complete well-being of a human being. Oral health can affect the general health in many ways. Directly, strong evidence links poor oral health (severe periodontitis) to chronic lung disorders and diabetes.^{2,3} Indirectly, serious oral diseases impede vital functioning of the body, such as breathing, eating, swallowing, and speaking. Such diseases also undermine self-image and self-esteem, discourage normal social interaction, and lead to chronic stress and depression, as well as incur great financial costs. The burden of disease restricts activities in school, work, and home and often significantly diminishes the quality of life.⁴ Mental illnesses take many forms, such as mood disorders, schizophrenia, anxiety disorders, personality disorders, and eating disorders.⁵ Because of their high prevalence, economic cost, risk of suicide, and loss of quality of life, mood disorders present a serious public health concern. Depression and mania cause significant distress and impairment in social, occupational, educational, or other important areas of functioning.⁶ Bipolar disorder, also called manic-depressive disorder, is an affective disorder in which the patient suffers from alternating, prolonged episodes of extreme elation and depression. The dental manifestations of the manic stage of this disorder include abraded oral mucosa and/or cervical tooth abrasion secondary to the overvigorous use of toothbrushes or dental floss. The dental manifestations of the depressive stage of this disorder are identical to those described in major depression.⁷ Commonly affecting oral health are dental caries and periodontal disease.⁸ The reason for high caries activity in psychiatric patients has been associated with irregular eating and oral hygiene habits in combination with xerostomia. Poor oral health has been reported among various psychiatric populations, such as acute patients in an inner-city psychiatric unit, outpatients, institutionalized and

¹Department of Public Health Dentistry, Rishiraj College of Dental Sciences and Research Centre, Bhopal, Madhya Pradesh, India

²Department of Conservative Dentistry and Endodontics, Dayanand Sagar College of Dental Sciences, Bengaluru, Karnataka, India

³Department of Orthodontics and Dentofacial Orthopedics, Dr BR Ambedkar Institute of Dental Sciences and Hospital, Patna, Bihar, India

⁴Faculty of Dentistry, Al Baha University, Al Aqiq Campus, Saudi Arabia

⁵Department of Biomedical and Dental Sciences, Faculty of Dentistry, Al Baha University, Al Aqiq Campus, Saudi Arabia

⁶Department of Preventive Dental Sciences, College of Dentistry, Gulf Medical University, Ajman, United Arab Emirates

Corresponding Author: Sonali Gupta, Department of Public Health Dentistry, Rishiraj College of Dental Sciences and Research Centre, Bhopal, Madhya Pradesh, India, Phone: +91 9993043736 e-mail: sonalig256@gmail.com

How to cite this article: Gupta S, Rangappa KKG, Rani S, et al. Periodontal and Dentition Status among Psychiatric Patients in Indore: A Descriptive Cross-sectional Study. *J Contemp Dent Pract* 2022;23(12):1260–1266.

Source of support: Nil

Conflict of interest: None

Ethics Approval: The study was obtained from Institutional Review Board of Sri Aurobindo College of Dentistry, Indore, Madhya Pradesh.

psychogeriatric patients, and the homeless mentally ill. Various diagnostic groups, including schizophrenia, bipolar disorder, major depression, and mental retardation, are at risk of developing dental problems.⁹ Dental treatment of psychiatric patients is not an easy task, primarily because they avoid regular visits to dental offices and neglect maintaining adequate oral hygiene. Even more, psychiatric

Table 1: Distribution of study subjects according to level of education

Variable	Disorder								p-value
	Schizophrenia n (%)	Major anxiety n (%)	Major depressive n (%)	Bipolar n (%)	Substance dependence n (%)	Obsessive- compulsive n (%)	Dementia n (%)	Total N (%)	
Professional/ Honors	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	<0.001 $\chi^2 = 56.43$; df = 24
Graduate/ Postgraduate	10 (17.2%)	13 (22.4%)	16 (27.6%)	10 (17.2%)	0 (0.0%)	3 (5.2%)	6 (10.3%)	58 (100%)	
Intermediate	4 (21.1%)	3 (15.8%)	7 (36.8%)	3 (15.8%)	2 (10.5%)	0 (0.0%)	0 (0.0%)	19 (100%)	
High school	19 (30.2%)	13 (20.6%)	14 (22.2%)	7 (11.1%)	7 (11.1%)	2 (3.2%)	1 (1.6%)	63 (100%)	
Middle school	19 (19.4%)	21 (21.4%)	21 (21.4%)	5 (5.1%)	19 (19.4%)	6 (6.1%)	7 (7.1%)	98 (100%)	
Primary school	59 (36.4%)	32 (19.8%)	19 (11.7%)	6 (3.7%)	33 (20.4%)	4 (2.5%)	9 (5.6%)	162 (100%)	
Illiterate	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Total N (%)	111 (27.8%)	82 (20.5%)	77 (19.2%)	31 (7.8%)	61 (15.2%)	15 (3.8%)	23 (5.8%)	400 (100%)	

S, significant ($p < 0.05$), HS, highly significant ($p < 0.001$) Test: χ^2

patients are often incapable to establish true cooperation, scared of dental interventions, and have financial hardship.¹⁰ With this background, the present study was conducted to find out the poor oral health of people with mental illness. The objectives were to assess and record periodontal and dentition status among psychiatric patients.

MATERIALS AND METHODS

Study Design

A descriptive cross-sectional study was conducted in the Department of Psychiatry at Sri Aurobindo Institute of Medical Sciences and Post Graduate Institute, Indore, among the inpatients and outpatients to assess their periodontal and dentition status.

Sample Size and Sampling Strategy

The sample size was calculated using Epi Info software and the formula $n = z^2 \frac{p \times q}{d^2}$. About 400 patients were finally included in the study. Purposive/judgmental sampling was employed to select the study subjects.

Study Tools

For the assessment and recording periodontal and dentition status among psychiatric patients, a modified World Health Organization (WHO) Oral Health Assessment form 1997 was used.

Dentition status and treatment need were assessed for each tooth present in the oral cavity. Crown and root were examined separately. For examination of the crown, score 0 was assigned for sound, whereas score 1 was assigned for decayed tooth. Scores 2 and 3 were assigned for filled with decay and filled with no decay, respectively. For missing, as a result of caries, score 4 was given, and missing for any other reason, score 5 was given. Scores 6 and 7 were assigned for fissure sealant and bridge abutments, respectively. Score 8 was assigned for unerupted tooth, and score 9 for not recorded.

For periodontal status, community periodontal index was recorded. Only index teeth were examined. Score 0 was assigned for healthy condition. Score 1 for the presence of bleeding. Score 2 was assigned for the presence of calculus, score 3 for pocket measuring 4–5 mm, and score 4 for pocket of 6 mm and more.

For recording the demographic data of individual patient, a questionnaire containing demographic details was used.

Inclusion and Exclusion Criteria

Patients diagnosed with mental illness and on medication for at least 1 year, able to respond to the proforma and provide informed written consent, were included in the study. However, patients with brain injury, intellectual disability, aggression tendencies, lack of cooperation, any systemic disorders, or condition contraindicating oral examination were excluded.

Statistical Analysis

Data collected were entered in Microsoft Excel, and analysis was done using Statistical Package for Social Sciences (SPSS, IBM version 20.0). The level of significance was fixed at 5%, and $p \leq 0.05$ was considered statistically significant. Descriptive statistics was used to find the frequencies, mean, and standard deviation of variables considered in the study. Categorical variables were summarized with frequencies and percentages, and continuous variables by mean and standard deviation. For the convenience of comparison, age was categorized into three subgroups. Student's *t*-test and analysis of variance (ANOVA) were employed to compare the mean differences between the groups for different responses.

RESULTS

Out of all the disorders receiving education, none of them were professional/honors and illiterates. Majority of the patients diagnosed with major depressive disorder were graduates or postgraduates 16 (27.6%), while 7 (36.8%) of them were intermediates. Around 19 (30.2%) subjects diagnosed with schizophrenia had high school certificate, while 59 (36.4%) had primary school certificate. Middle school certificate was received by majority of the study subjects, 21 (21.4%) diagnosed with major anxiety and major depressive disorder (Table 1).

Out of all the study subjects, majority of them categorized under schizophrenia disorder, 48 (43.6%) were unskilled workers. Among the professionals, 5 (27.8%) were diagnosed with major anxiety disorder, and 20 (35.1%) were diagnosed with major depressive disorder among the intermediates. Among the study subjects diagnosed with major depressive disorder, around 26 (29.9%) were

Table 2: Distribution of study subjects according to occupation

Variable	Disorder							Total N (%)	p-value
	Schizophrenia n (%)	Major anxiety n (%)	Major Depressive n (%)	Bipolar n (%)	Substance dependence n (%)	Obsessive-compulsive n (%)	Dementia n (%)		
Professional	4 (22.2%)	5 (27.8%)	4 (22.2%)	0 (0.0%)	3 (16.7%)	1 (5.6%)	1 (5.6%)	18 (100%)	<0.001 $\chi^2 = 98.2$ df = 24
Intermediate	10 (17.5%)	12 (21.1%)	20 (35.1%)	8 (14.0%)	2 (3.5%)	1 (1.8%)	4 (7.0%)	57 (100%)	
Skilled nonmanual and skilled manual	16 (18.4%)	14 (16.1%)	26 (29.9%)	11 (12.6%)	9 (10.3%)	7 (8.0%)	4 (4.6%)	87 (100%)	
Partly skilled	33 (25.8%)	21 (16.4%)	12 (9.4%)	10 (7.8%)	39 (30.5%)	1 (0.8%)	12 (9.4%)	128 (100%)	
Unskilled	48 (43.6%)	30 (27.3%)	15 (13.6%)	2 (1.8%)	8 (7.3%)	5 (4.5%)	2 (1.8%)	110 (100%)	
Total N (%)	111 (27.8%)	82 (20.5%)	77 (19.2%)	31 (7.8%)	61 (15.2%)	15 (3.8%)	23 (5.8%)	400 (100%)	

S, significant ($p < 0.05$), HS, highly significant ($p < 0.001$), Test: χ^2

Table 3: Distribution of study subjects according to socio-economic status

Variable	Disorder							Total N (%)	p-value
	Schizophrenia n (%)	Major anxiety n (%)	Major Depressive n (%)	Bipolar n (%)	Substance dependence n (%)	Obsessive-compulsive n (%)	Dementia n (%)		
Upper class	26 (15.2%)	43 (25.1%)	41 (24.0%)	26 (15.2%)	17 (9.9%)	9 (5.3%)	9 (5.3%)	171 (100%)	<0.001 $\chi^2 = 71.34$ df = 24
Upper-middle	32 (30.5%)	19 (18.1%)	17 (16.2%)	2 (1.9%)	23 (21.9%)	2 (1.9%)	10 (9.5%)	105 (100%)	
Middle class	24 (38.7%)	9 (14.5%)	10 (16.1%)	2 (3.2%)	14 (22.6%)	1 (1.6%)	2 (3.2%)	62 (100%)	
Lower-middle	25 (47.2%)	10 (18.9%)	9 (17.0%)	1 (1.9%)	4 (7.5%)	2 (3.8%)	2 (3.8%)	53 (100%)	
Lower class	4 (44.4%)	1 (11.1%)	0 (0.0%)	0 (0.0%)	3 (33.3%)	1 (11.1%)	0 (0.0%)	9 (100%)	
Total N (%)	111 (27.8%)	82 (20.5%)	77 (19.2%)	31 (7.8%)	61 (15.2%)	15 (3.8%)	23 (5.8%)	400 (100%)	

S, significant ($p < 0.05$), HS, highly significant ($p < 0.001$), Test: χ^2

skilled nonmanual and skilled manual workers. Around 39 (30.5%) study subjects diagnosed with substance dependence disorder were engaged in partly skilled occupations (Table 2).

Among all the disorders, the subjects, i.e., 43 (25.1%) diagnosed with major anxiety disorder belonged to upper class. Majority of the patients diagnosed with schizophrenia belonged to upper-middle class 32 (30.5%), middle class 24 (38.7%), lower-middle class 25 (47.2%), and lower class 4 (44.4%) (Table 3).

It was seen that out of all the study subjects, toothbrush was used by majority of the study subjects 68 (61.3%) diagnosed with schizophrenia followed by toothpaste that was used as a material of choice by 68 (82.9%) patients diagnosed with major anxiety disorder. Majority of schizophrenia patients 95 (85.6%) brushed once daily to maintain their oral hygiene status (Table 4).

The highest mean DMFT score was recorded for schizophrenia patients (13.0 ± 7.09), followed by dementia (9.2 ± 3.88). The lowest mean DMFT score was recorded for patients diagnosed with obsessive-compulsive disorder (5.0 ± 3.95) (Table 5) (Figs 1 to 4).

DISCUSSION

The information regarding distribution of the patients with respect to age showed that 29.7% of the subjects were in the age group of less than 30 years and were diagnosed with major depressive disorder. Schizophrenia patients in the age group 31–60 years and 34.3% were diagnosed with substance dependence disorder in the 61 years and above category. A study by Turner and Avison, Graber,

and Hankin et al. concluded that during young adulthood (18 and 29 years), many people have been associated with a greater risk of mental health problems and higher levels of social stress.^{11–13} Unemployment and unrewarding job environments with low-level cognitive demands, minimal skills, and little autonomy have been linked with depression among young adults. Among young men, higher job status is associated with lower levels of depression, whereas for women, physically dangerous jobs are associated with higher levels of depression as described by Wiesner et al. and Zimmerman et al.^{14,15} A study by Horwitz et al. on young married people stated that positive marriage often serves to protect against depression, new financial burdens, and career demands, while a poor adjustment to married life and the birth of children can also lead to negative mental health outcomes, especially among women.¹⁶ Moore et al. stated that maternal depression in particular can have adverse implications for children.¹⁷

In the present study, 23.2% males and 38.4% females were diagnosed with major depressive disorder and schizophrenia, respectively. A study by McGrath et al. and Dube et al. reported that males had greater incidence of schizophrenia than females.^{18–20} Rajkumar et al. reported that urban community in Madras did not show any gender differences.^{19,20} The 1998 World Health report states that “women’s mental health is inextricably linked to their status in society and benefits from equality and suffers from discrimination”.²¹ Similar findings were reported by WHO study on DOSMED that examined individuals with first-onset schizophrenia and found a preponderance of males in the younger age group and



Table 4: Distribution of study subjects according to oral hygiene practices

Variables	Oral hygiene practices								Total N (%)
	Method of cleaning			Material used for cleaning			Frequency of cleaning		
	Toothbrush n (%)	Finger n (%)	Others n (%)	Toothpaste n (%)	Powder n (%)	Others n (%)	Once daily n (%)	More than once daily n (%)	
Schizophrenia	68 (61.3%)	42 (37.8%)	1 (0.9%)	66 (59.5%)	44 (39.6%)	1 (0.9%)	95 (85.6%)	16 (14.4%)	111 (100.0%)
Major anxiety	65 (79.3%)	17 (20.7%)	0 (0.0%)	68 (82.9%)	14 (17.1%)	0 (0.0%)	75 (91.5%)	7 (8.5%)	82 (100.0%)
Major depressive	63 (81.8%)	13 (16.9%)	1 (1.3%)	62 (80.5%)	14 (18.2%)	1 (1.3%)	69 (89.6%)	8 (10.4%)	77 (100.0%)
Bipolar	26 (83.9%)	5 (16.1%)	0 (0.0%)	26 (83.9%)	5 (16.1%)	0 (0.0%)	30 (96.8%)	1 (3.2%)	31 (100.0%)
Substance dependence	19 (31.1%)	42 (68.9%)	0 (0.0%)	19 (31.1%)	42 (68.9%)	0 (0.0%)	58 (95.1%)	3 (4.9%)	61 (100.0%)
Obsessive-compulsive	14 (93.3%)	1 (6.7%)	0 (0.0%)	14 (93.3%)	1 (6.7%)	0 (0.0%)	15 (100.0%)	0 (0.0%)	15 (100.0%)
Dementia	17 (73.9%)	6 (26.1%)	0 (0.0%)	15 (65.2%)	8 (34.8%)	0 (0.0%)	22 (95.7%)	1 (4.3%)	23 (100.0%)
Total N (%)	272 (68.0%)	126 (31.5%)	2 (0.5%)	270 (67.5%)	128 (32.0%)	2 (0.5%)	364 (91.0%)	36 (9.0%)	400 (100.0%)
p-value	<0.001 $\chi^2 = 63.85$ df = 12			<0.001 $\chi^2 = 66.68$ df = 12			<0.001 $\chi^2 = 8.77$ df = 6		

S, significant ($p < 0.05$), HS, highly significant ($p < 0.001$), Test: χ^2

Table 5: Comparison of mean DMFT score among the study subjects with respect to disorders

Disorder	Caries status			
	Decayed (DT) Mean \pm SD	Missing (MT) Mean \pm SD	Filled (FT) Mean \pm SD	DMFT Mean \pm SD
Schizophrenia (n = 111)	9.0 \pm 5.50	3.1 \pm 5.08	1.1 \pm 1.74	13.0 \pm 7.09
Major anxiety (n = 82)	4.5 \pm 2.88	0.5 \pm 1.67	0.7 \pm 1.19	5.6 \pm 3.45
Major depressive (n = 77)	5.4 \pm 4.39	0.7 \pm 1.37	1.31 \pm 2.00	7.35 \pm 4.63
Bipolar (n = 31)	5.6 \pm 3.88	1.9 \pm 3.85	0.5 \pm 1.00	7.9 \pm 5.24
Substance dependence (n = 61)	4.9 \pm 5.96	1.3 \pm 4.26	0.4 \pm 1.06	6.6 \pm 7.39
Obsessive-compulsive (n = 15)	3.6 \pm 2.85	0.4 \pm 0.83	1.0 \pm 1.13	5.0 \pm 3.95
Dementia (n = 23)	6.2 \pm 3.23	1.3 \pm 1.69	1.7 \pm 2.96	9.2 \pm 3.88
p-value	<0.001	<0.001	0.003	<0.001

S, significant ($p < 0.05$), HS, highly significant ($p < 0.001$), Test: Analysis of variance (ANOVA)

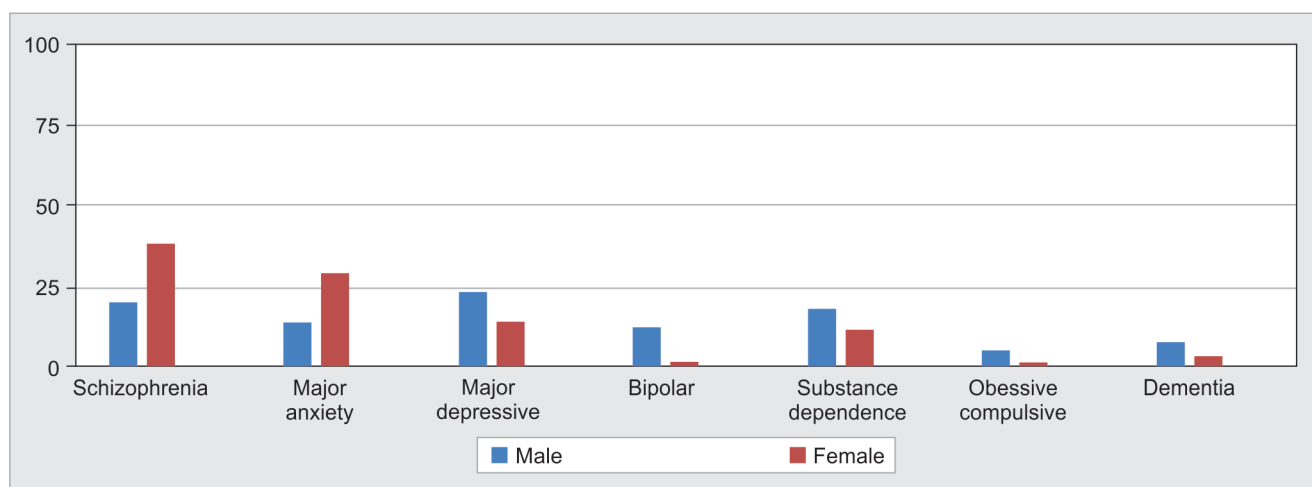


Fig. 1: Distribution of study subjects according to gender

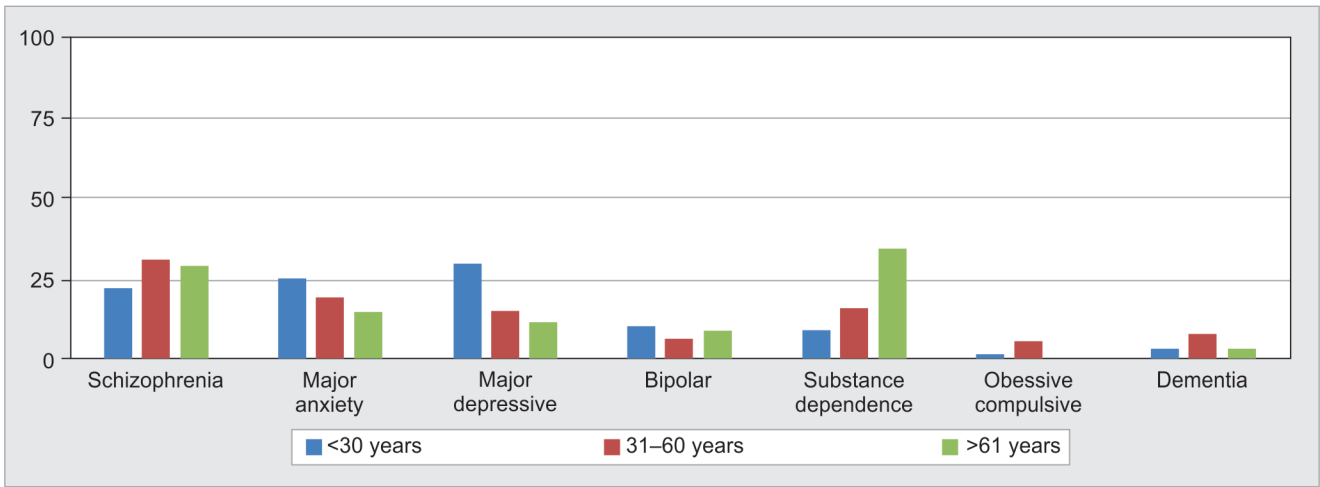


Fig. 2: Distribution of study subjects according to age group

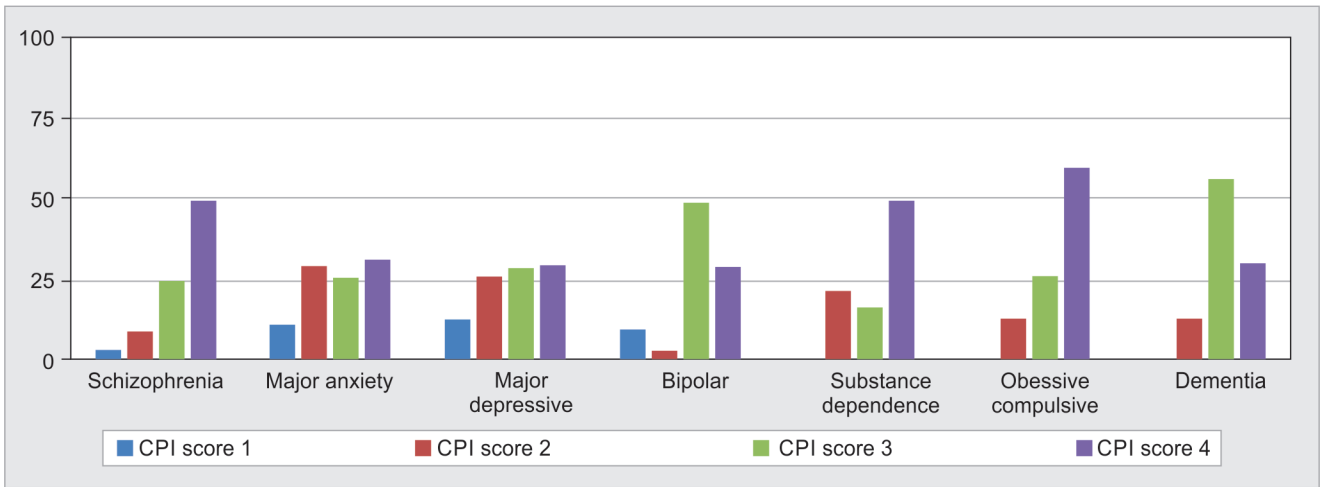


Fig. 3: Distribution of study subjects according to periodontal status

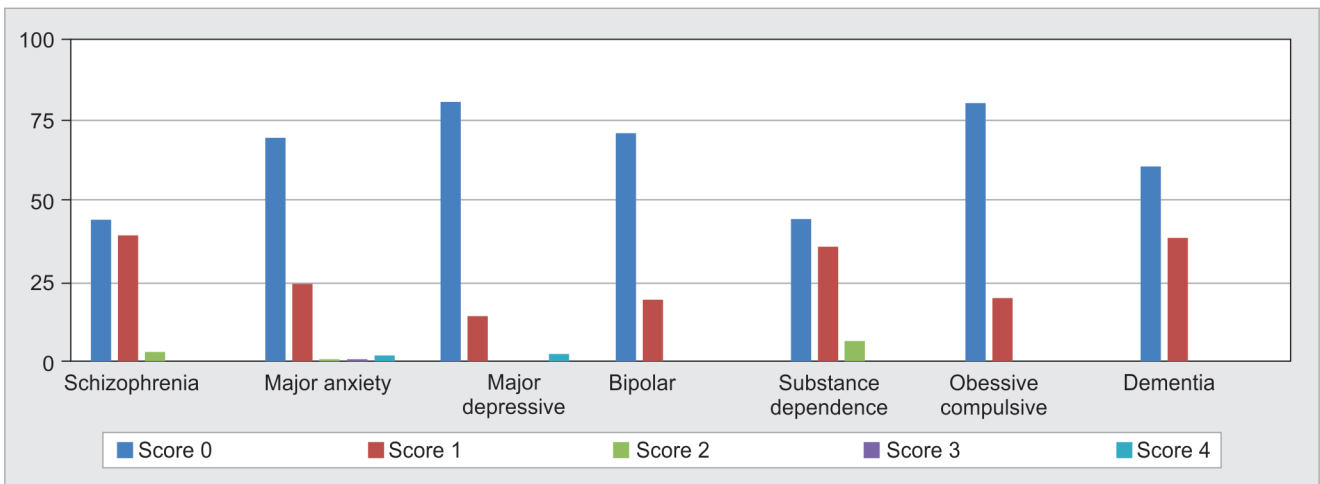


Fig. 4: Distribution of study subjects according to loss of attachment

females in the older age group 45–54 years.²² A study by Gangadhar et al. stated that the higher age at onset in women may be a function of perinatal complications.²³

The assessment of periodontal status showed that 13% had a major depressive disorder with bleeding gums, and 29.3% had major anxiety disorder with calculus. Among all the disorders, schizophrenia subjects 25.2% and 49.5% shallow pockets and deep pockets, respectively. This may be due to the continuous neglect toward personal oral hygiene as the degree of helplessness worsens, and the ability to perform daily activities reduces.

Similar finding was reported by Jain et al.²⁴ A study by Jayakumar et al. reported that male subjects had poor oral hygiene and periodontal status than females.²⁵ Several studies have reported a significant correlation between oral hygiene and periodontal conditions in children with Down's syndrome. However, a high correlation between poor oral hygiene and the development and progression of periodontal disease has been well documented, and the role of poor oral hygiene as a risk factor of periodontal diseases is well established. The most striking feature of the present study was the absence of score 0 in all the study subjects, which was in accordance to Kenkre and Spadigan and Kumar et al.^{26–30} A study in defense set up by Gowda et al. reported a higher prevalence of periodontal disease, particularly score 3 and score 4, due to altered quality and quantity of saliva, oral microbial flora, endocrine dysfunction, and reduced resistance to infection that lead to a higher incidence of periodontal diseases.²⁷ A study by Angelillo et al. on institutionalized psychiatric patients in Italy reported that 64.8% of subjects had score 4, which was in contrast to findings of Vigild et al. study, which reported 11% with score 4.^{28,29}

In the present study, 80.5% with major depressive disorder had 0–3 mm loss of attachment (LOA), and 39.5% of schizophrenia patients had 4–5 mm attachment loss. A study by Albandar et al. reported a greater LOA in psychiatric patients as compared with patients without mental disease.³¹ Kassab and Cohen stated that the increase in attachment loss might be due to gingival recession due to the presence of calculus.³² The factors that can be associated like brushing trauma, abnormal frenula attachment, dental malposition, or aspects like diet, i.e., ingestion of things different from food and in some cases self-injuries, were reported by Lucavechi et al.³³ Studies by Portilla et al. and Luchesse and Checchi reported that 74.1% and 66% patients with mental retardation had values greater than 3 mm of probing depth, respectively.^{34,35}

It was seen that the highest mean DMFT score of 13.0 ± 7.09 and 9.2 ± 3.88 was recorded for schizophrenia and dementia patients, respectively. The lowest mean DMFT score of 5.0 ± 3.95 was recorded in patients with obsessive–compulsive disorder. The present study results were in accordance with findings of Chu et al. and Farhadmollashahi et al.^{36,37} Higher mean DMFT scores of 24.4, 23.8, 19.1, and 17.5 were reported in Jovanovic et al., Zusman et al., Lewis et al., and Ramon et al., respectively.^{38–41} Conversely, Kebede et al., Kumar et al., and Rekha et al. reported lower DMFT indexes compared with the present study.^{42,43}

The psychiatric patients in the present study had poor oral health status, the reason for which may be the reduced focus and inadequate availability of preventive programs and professional services directed for psychiatric population. Awareness regarding oral hygiene maintenance should be provided to this stratum of population, and along with this, nurses and their caretakers should be channelized in order to provide knowledge and help

them improve and maintain their oral hygiene through different educational and preventive programs.

LIMITATIONS

The selection of purposive/judgmental sampling limits the projection of data beyond the sample. Exclusion of patients with inability to cooperate with the study protocol limited participants with the need for immediate care and referral. Despite the attempts made to avoid bias in the present study, there may be probability of bias as the responses of the caregivers while reporting oral health behavior and self-rated oral health were also being considered. Due to the difference between the age groups and mental illness durations, it was difficult to compare the results of the present study with other studies.

CONCLUSION

Based on the results of the present study, it can be concluded that the periodontal and dentition status of the psychiatric patients was poor. On the assessment of periodontal status among all the disorders, schizophrenia subjects had the highest scores of 3 and 4. Whereas patients diagnosed with schizophrenia and dementia had the highest mean DMFT scores. The results reveal an unmet need of projecting effective planning and implementation strategies toward the improvement of periodontal, dentition status, and oral health-related quality of life of the psychiatric patients.

REFERENCES

1. World Health Organization. https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAQQw7AJahcKEwjgrNO2h_H7AhUAAAAAHQAAAAAQBW&url=https%3A%2F%2Fwww.who.int%2Fhealth-topics%2Foral-health&psig=AOvVaw11PNKcvuZxjYQeF11BMbhL&ust=1670830639094697
2. Azarpazhooh A, Leake JL. Systematic review of the association between respiratory diseases and oral health. *J Periodontol* 2006;77(9):1465–1482. DOI: 10.1902/jop.2006.060010.
3. Grossi SG, Genco RJ. Periodontal disease and diabetes mellitus: A two-way relationship. *Ann Periodontol* 1998;3(1):51–61. DOI: 10.1902/annals.1998.3.1.51.
4. Oral health in America: A report of the Surgeon General. *J Calif Dent Assoc* 2000;28(9):685–695. PMID: 11324049.
5. Health Canada. A Report on Mental Illnesses in Canada. Ottawa, Canada; 2002.
6. Royal Commission on Aboriginal Peoples. Choosing Life: Special Report on Suicide Among Aboriginal People, Chapter 3. Ottawa: Canadian Government Publishing; 1995.
7. Friedlander AA, Brill NQ. The dental management of patients with bipolar disorder. *Oral Surg Oral Med Oral Pathol* 1986;61(6):579–581. DOI: 10.1016/0030-4220(86)90097-6.
8. Selwitz RH, Ismail AI, Pitts NB. Dental caries. *Lancet* 2007;369(9555):51–59. DOI: 10.1016/S0140-6736(07)60031-2.
9. Jyoti B, Devi P, Srivastava R, Singh AR. Oral health status and treatment needs of psychiatric inpatients in Ranchi, India. 2012. *J Indian Acad Oral Med Radiol* 2012;24(3):177–181. DOI: 10.5005/jp-journals-10011-1290.
10. Schizophrenia and oral health – Review of literature. *Balkan J Dent Med* 2016;20:15–21. DOI: 10.1515/bjdm-2016-0002.
11. Turner RJ, Avison WR. Status variations in stress exposure: Implications for the interpretation of research on race, socioeconomic status, and gender. *J Health Soc Behav* 2003;44(4):488–505. PMID: 15038145.
12. Graber JA. Internalizing problems during adolescence. In: Lerner RM, Steinberg L (Eds.). *Handbook of Adolescent Psychology*, 2nd edition. Hoboken, NJ: John Wiley and Sons; 2004.

13. Hankin B, Abramson L, Moffitt T, et al. Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *J Abnorm Psychol* 1998;107(1):128–140. DOI: 10.1037//0021-843x.107.1.128.
14. Wiesner M, Windle M, Freeman A. Work stress, substance use, and depression among young adult workers: An examination of main and moderator effect model. *J Occup Health Psychol* 2005;10(2):83–96. DOI: 10.1037/1076-8998.10.2.83.
15. Zimmerman FJ, Christakis DA, Stoep AV. Tinker, tailor, soldier, patient: Work attributes and depression disparities among young adults. *Soc Sci Med* 2004;58(10):1889–1901. DOI: 10.1016/S0277-9536(03)00410-6.
16. Horwitz AV, McLaughlin J, Raskin White H. How the negative and positive aspects of partner relationships affect the mental health of young married people. *J Health Soc Behav* 1998;39(2):124–136. PMID: 9642903.
17. Moore KA, et al. Depression among moms: Prevalence, predictors, and outcomes for children. Research Brief, Publication #2006-1. Washington, DC: Child Trends.
18. Thara R, Kamath S. Women and schizophrenia. *Indian J Psychiatry* 2015;57(Suppl 2):S246–S251. DOI: 10.4103/0019-5545.161487.
19. Rajkumar S, Padmavathi R, Thara R, et al. Incidence of schizophrenia in an urban community in Madras. *Indian J Psychiatry* 1993;35(1):1821. PMID: 21776161.
20. Dube KC, Kumar N. An epidemiological study of schizophrenia. *J Biosoc Sci* 1972;4(2):187–195.
21. World Health Organization. World Health Report. Geneva: World Health Organization; 1998.
22. Varma VK, Wig NN, Phookun HR, et al. First-onset schizophrenia in the community: Relationship of urbanization with onset, early manifestations and typology. *Acta Psychiatr Scand* 1997;96(6): 431–438. DOI: 10.1111/j.1600-0447.1997.tb09944.x.
23. Gangadhar BN, Panner Selvan C, Subbakrishna DK, et al. Age-at-onset and schizophrenia: Reversed gender effect. *Acta Psychiatr Scand* 2002;105:317–319. DOI: 10.1034/j.1600-0447.2002.1153.x.
24. Jain M, Mathur A, Sawla L, et al. Oral health status of mentally disabled subjects in India. *J Oral Sci* 2009;51(3):333–340. DOI: 10.2334/josnusd.51.333.
25. Jayakumar HL, Jyothi D, Mahesh Chandra K, et al. Periodontal health among elderly psychiatric patients in Bangalore city — India. *Pakistan Oral Dent J* 2011;31(1):128–136.
26. Gowda EM, Bhat PS, Swamy MM. Dental health requirements for psychiatric patients. *MJAFI* 2007; 63(4):328–330. DOI: 10.1016/S0377-1237(07)80007-4.
27. Kenkre AM, Spadigan AE. Oral health and treatment needs in institutionalized psychiatric patients in India. *Indian J Dent Res* 2000;11(1):5–11. PMID: 11307250.
28. Angelillo IF, Nobile CG, Pavia M, et al. Dental health and treatment needs in institutionalized psychiatric patients in Italy. *Community Dent Oral Epidemiol* 1995;23(6):360–364. DOI: 10.1111/j.1600-0528.1995.tb00263.x.
29. Vigild M, Brinck JJ, Chirstensen J. Oral health and treatment needs among patients in psychiatric institutions for the elderly. *Community Dent Oral Epidemiol* 1993;21(3):169–171. DOI: 10.1111/j.1600-0528.1993.tb00745.x.
30. Kumar M, Chandu GN, Shafiulla MD. Oral health status and treatment needs in institutionalized psychiatric patients: One year descriptive cross-sectional study. *IJDR* 2006;17(4):171–177. DOI: 10.4103/0970-9290.29868.
31. Albandar JM, Brunelle JA, Kingman A. Destructive periodontal disease in adults 30 years of age and older in the United States, 1988-1994. *J Periodontol* 1999;70(1):13–29. DOI: 10.1902/jop.1999.70.1.13.
32. Kassab MM, Cohen RE. The etiology and prevalence of gingival recession. *J Am Assoc* 2003;134(2):220–225. DOI: 10.14219/jada.archive.2003.0137.
33. Lucavechi T, Barberia E, Maroto M, et al. Self-injurious behavior in a patient with mental retardation: Review of the literature and a case report. *Quintessence Int* 2007;38(7):e393–e398. PMID: 17694202.
34. Portilla MI, Mafla AC, Arteaga JJ. Periodontal status in female psychiatric patients. *Colomb Med* 2009;40(2):167–176.
35. Lucchese C, Checchi L. The oral health status in mentally retarded institutionalized patients. *Minerva Stomatol* 1998;47(10):499–502. PMID: 9866962.
36. Chu K-Y, Yang N-P, Chou P, et al. Factors associated with dental caries among institutionalized residents with schizophrenia in Taiwan: A cross-sectional study. *BMC Public Health* 2010;10:482. DOI: 10.1186/1471-2458-10-482.
37. Farhadmollashahi L, Lashkaripour K, Bakhshani N-M, et al. Dental health status in hospitalized psychiatric patients in Sistan and Baluchestan province, Iran. *Health Scope* 2014;3(4):e21626. DOI: 10.17795/jhealthscope-21626.
38. Jovanović S, Milovanović SD, Gajić I, et al. Oral health status of psychiatric in-patients in Serbia and implications for their dental care. *Croat Med J* 2010;51(5):443–450. DOI: 10.3325/cmj.2010.51.443.
39. Zusman SP, Ponizovsky AM, Dekel D, et al. An assessment of the dental health of chronic institutionalized patients with psychiatric disease in Israel. *Spec Care Dentist* 2010;30(1):18–22. DOI: 10.1111/j.1754-4505.2009.00118.x.
40. Lewis S, Jagger RG, Treasure E. The oral health of psychiatric in-patients in South Wales. *Spec Care Dentist* 2001;21(5):182–186. DOI: 10.1111/j.1754-4505.2001.tb00252.x.
41. Ramon T, Grinshpoon A, Zusman SP, et al. Oral health and treatment needs of institutionalized chronic psychiatric patients in Israel. *Eur Psychiatry* 2003;18(3):101–105. DOI: 10.1016/s0924-9338(03) 00023-3.
42. Kebede B, Kemal T, Abera S. Oral health status of patients with mental disorders in southwest Ethiopia. *PLoS One* 2012;7(6):e39142. DOI: 10.1371/journal.pone.0039142.
43. Rekha R, Hiremath SS, Bharath S. Oral health status and treatments of hospitalized psychiatric patients in Bangalore city: A comparative study. *J Indian Soc Pedod Prev Dent* 2002;20(2):63–67. PMID: 12435019.