PERIODONTAL HEALTH AMONG ELDERLY PSYCHIATRIC PATIENTS IN BANGALORE CITY — INDIA

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ABSTRACT

A cross sectional study was carried out on 250 aging psychiatric patients with main objective to assess the periodontal status of these patients in Bangalore City (India). A specially designed proforma was used to collect information on patient’s demographic details and medical history. Psychiatric illness was classified according to International classification of diseases. The periodontal index scores were recorded using CPI on oral health assessment form; ADA type III oral examination was conducted on the patients. The data were collected and statistically analyzed using Chi square and Fisher exact test.

Majority of the study group were affected by Schizophrenia. It was found that 108 males and 85 females cleaned their teeth with tooth brush. Many study subjects had more number of shallow and deep gingival pockets (30% and above in all age groups) indicating the need for professional care and complex periodontal treatment. There were 126 (91.3%) males and 94 (83.9%) females who maintained their oral hygiene on self-help basis whereas 9 (6.5%) males and 11 (9.8%) females needed assistance to brush their teeth.

This study showed that subjects suffering from psychiatric disorders experienced poor oral health, required periodontal care, especially among those with greater physical disability, due to poor neuromuscular co-ordination and prevailing inadequate attention towards oral health.

Key words: Psychiatric patients, periodontal health; Oral hygiene practices, elderly population.

INTRODUCTION

The recent advances in various fields of medical sciences particularly in preventive, diagnostic and therapeutic aspects of disease have lead to increase in life expectancy of elderly population. In India at present elderly population aged 60 years and above is about 5.2% and is increasing day by day.1 Growing old means having to deal with changes in sensory-perceptual, psychomotor and cognitive areas.2 Some changes are due to normal ageing, others being the result of secondary processes. This graying population face many health challenges. One of these is psychiatric morbidity which is manifested as depression, dementia, anxiety and Alzheimer's disease. These psychiatric problems show a tenfold increase in elderly (43.2%) when compared to younger participants (4.66%).3 The teeth and the surrounding structures in the oral cavity need...
considerable professional attention and may constitute an integral part of the overall management of psychiatric condition. Chronic psychiatric patients have been documented in many countries for having poorer oral health than other segments of the population.³

In the course of a lifetime, many individuals experience some kind of psychiatric disturbances that could be due to change in lifestyle and increased demands at workplace. Elderly population with psychiatric disorder are susceptible to many oral diseases as they are prone to develop these specific problems owing to general self-neglect associated with mental illness, fear of treatment, cost of treatment, inability to access dental services and side-effects of medication.⁴ In addition to these factors length of stay has been noted as a contributor to poor oral health among psychiatric patients.

As early as 1890, Talbot recognized that “accretions and debris deposits” were common findings in mentally retarded persons. Oral disease prevalence has in large part been attributed to lack of daily oral hygiene care procedures.⁵ These findings have been attributed to irregular eating habits and inadequate oral hygiene practices along with xerostomia.

Lack of dexterity, diminished physical and mental capacity to perform oral hygiene procedures contribute to this. The specific handicapping of various degrees observed in psychiatric population limits their ability to follow skill based oral care procedures, resulting in poor oral health. Eating and sleeping patterns take precedence over personal and oral hygiene, making them susceptible to many oral diseases. In a well-designed clinical study Powell observed the influence of Intelligent Quotient (IQ) on the oral hygiene status among institutionalized psychiatric population. There was a very significant role of IQ on oral hygiene maintenance, the Oral Hygiene Index (OHI) scores showed 96% variance. It was also hypothesized that environmental factors may have significant influence on oral cleanliness of these individuals.⁶

A study conducted by Mahendru et al on the physical illness of psychiatric patients has shown that neglect of personal care and hygiene coupled with malnutrition due to prolonged and disturbed emotional states were responsible for increased rate of physical illness in chronic psychiatric patients with dementia are noted for progressively poor short term memory resulting in agitation, disorientation and inappropriate behavior. There is an increase in the loss of ability to perform self-care.

Drugs are used mainly to slow down the rate of mental decline, particularly of memory and to address depression, agitation and challenging behavior. An affected person’s need for support increases as the disease progresses leading to close supervision and ultimately dependent nursing care.⁸ The impact of dementia, especially in the later stages, leads to poor oral hygiene and an increase in periodontal disease, incidence of tooth decay (both coronal and cervical) and other oral problems such as candidiasis and maxillofacial injuries due to falls. For patients with less controlled symptoms, poor oral self-care, in conjunction with xerostomia (dry mouth) caused by the antipsychotic medications, which usually have anti-cholinergic side-effects, may lead to higher incidence of caries and periodontal disease.⁹

Mental and behavioral disorders account for 12% of the global burden of the disease. Depression, anxiety and alcohol use are the commonest disorders in a primary care setting, contributing to nearly 20% of the caseload. It is estimated that by 2020, 15% of the disability-adjusted life-years (DALYs) lost would be due to mental and behavioral disorders up from 10% in 1990 and 12% in 2000.¹⁰ Reports have shown that oral health of psychiatric patients is poor and have large unmet treatment needs. This group is often neglected because of ignorance, fear, stigma, misconception and negative attitudes.

Since in India there is lack of quantitative data on periodontal health and treatment needs of these special groups of geriatric patients, present study was undertaken to obtain such data on institutionalized psychiatric patients in Bangalore City. The main objective was to assess oral hygiene practices along with the associated periodontal health status of these patients.

**METHODOLOGY**

India’s total population in 2010 was about 1,150,000,000 (1.15 billion).¹¹ Karnataka is one of the major states of South India. Bengaluru (Bangalore) is the capital city of Karnataka. It is India’s third most populous city and fifth-most dense urban agglomeration.¹² The study population was comprised of psychiatr-
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Initially a list of existing psycho-social rehabilitation centers in Bangalore City was obtained through internet search. Of the 16 recognized psycho-rehabilitation centers functioning in Bangalore City Nine centers were short-listed for the study and approached for the grant of permission. Due to the policy matters of administration four institutes did not grant permission for research to be conducted on their inmates. Only five centers granted permissions and patients of these institutes were considered for the study.

The duration of the study was three months. It was possible to examine only 3 to 5 patients per day due to compromised behavior of the study population. The entire ageing population (≥ 50 years of age) approximately 50 to 120 patients in each institute of all 5 rehabilitation centers, was the target population for this study. They were considered as potential participants of this study as significant attrition in the sample size was expected as many patients could not provide consent due to their mental illness and other reasons. Also this study provided an opportunity for a quick intra-oral examination.

A convenient sample was used. Sample size estimation was based on previous studies, the unfulfilled periodontal need of the ageing psychiatric population above 50 years was 91%, keeping 95% confidence interval and marginal error of 10, sample size was estimated to be 218 and rounded off to 250 in the present study.

Ethical clearance was obtained from the ethical committee of AECS Maaruti College of Dental Science and Research Institute, Bangalore (No: 1508/2008-09). In order to ensure participants safety, permission was obtained from all the administrative heads of the organizations as well as from their consulting psychiatrists. Patients fulfilling the selection criteria were included in the study only after obtaining an informed consent from the guardians/care-givers.

In the proforma demographic details, data regarding oral hygiene practices (Table 1) and periodontal status (CPI index) was recorded. Calibration of investigator (JD) was carried out in the Department of Preventive and Community Dentistry, AECS Maaruti College and Dental Sciences and Research Centre, Bangalore. Twenty five individuals aged above 50 years visiting outpatient department (OPD) were examined. The investigator conducted these examinations for five consecutive days under direct supervision of research guide to get an estimate of diagnostic variability. It was found that the agreement for assessment was 85% which is considered excellent (weighted k- value = 0.82). Three recording assistants (one male and two females) were trained for recording the proforma.

This pilot study assessments were utilized for planning and executing the main study.

All the subjects were examined by the investigator (JD) herself in a clean, uncongested and free from noise, well ventilated room with adequate lighting facility. The patients were seated on an ordinary chair, head rested against a hard surface or when needed it was supported by the assistant for ease of examination. Artificial illumination was provided by the trained assistant who accompanied the examiner throughout the study. The trained assistant for recording was seated close by to the area of examination to ensure that the details of the codes and findings were clearly heard during data recording; and also the entries made could be viewed by the investigator. All recording were once again confirmed by the examiner at the end of the examinations.

The study protocol was discussed with the concerned administrative head and members of the institutions and their consulting psychiatrists who reassured the administration that there would be no harm to the individuals by being a part of this study and also concerns regarding the benefits to the patients and confidentiality of the reports were discussed. A thorough review of each case was done by the investigator using available medical records at the rehabilitation centre. Further clarifications if any, on the psychiatric problem were obtained by discussions with the consulting psychiatrists.

**Inclusion criteria**

- Psychiatric patients aged 50 years and above.
- Psychiatric patients who were not aggressive and co-operative for intra-oral examination.
- Ambulatory psychiatric patients who were not hospitalized.
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Exclusion criteria

- Patients below the age of 50 years.
- Patients who were aggressive and un-cooperative for intra oral examination.
- Hospitalized psychiatric patients.

The intra oral examinations were conducted by a single examiner throughout the study. The examinations were performed using sterile # 5 plain mouth mirror and CPI probe under artificial illumination, ADA type III oral examination was conducted on the patients using mouth mirror, explorer and adequate illumination and no other investigations or interventions were done on the participants. The demographic information (age, gender), medical history (present psychiatric diagnosis according to International Classification of Disease [ICD-10], duration of illness, history of medication) and oral hygiene practices (duration, type, method) were recorded using study proforma. The periodontal index scores were recorded using CPI on oral health assessment form in order to reduce the time of the examination and expected difficulty in examination of the participants only CPI scores were recorded and the Loss of attachment (LOA) component was excluded from the study.

Sterilization of the instruments and materials used for examination was carried out in the Department of Preventive and Community Dentistry using an autoclave. Fifteen sets of diagnostic instruments were packed in sterilization pouches which had biological indicators. These pouches were sterilized in autoclave and then carried to the site of examination in closed stainless steel containers. At the site of the study the sterilized instruments were placed on the rectangular trays during use and used instruments were placed in a separate kidney tray containing 10% korsolex solution.

Statistical Methods

Descriptive statistical analysis was used in the present study. Results on continuous measurements are presented as Mean ± SD (Min-Max) and results on categorical measurement are presented in Number (%). Chi-square/Fisher Exact tests have been used to find the significance of CPI scores on categorical scale between two or more groups. Significance is assessed at 5% level.

RESULTS

Distribution of the study subjects based on demographic characteristics is shown in Fig 1. A total of 250 psychiatric patients in the age group of 50 to 75 years and above formed the study population. (192 (77.2%) participants aged between 50-64 years, 36 (14.4%) were of 65-74 years age group and there were only 21 patients aged 75 years and above.

The distribution of study population based on ICD-10 classification among different age groups in males and females is presented in Fig 2A and 2B. Among males in the age group of 50-64 years majority of them 49 (44.9%) were affected by Schizophrenia followed by affective mood disorders 23 (21.3%). Also elder age groups had more schizophrenics compared to other psychiatric disorders. Almost similar prevalence was noticed among female psychiatric patients. These findings suggest that the psychiatric population in all the present study groups were mainly suffering from schizophrenia followed by affective mood disorder.

The detailed oral hygiene practices followed by psychiatric patients are presented in Fig 3-6. It was found that majority of the males cleaned their teeth with tooth brush, 108 (78.3%) compared to 85 (75.9%) among females. The majority study population used toothpaste and toothpowder and few subjects never used any material to clean their teeth (Fig 4). Toothpaste was used by 109 (78.9%) male subjects compared to 91(81.3%) females.

The frequency of teeth cleaning was recorded to understand regularity in oral hygiene maintenance by the psychiatric patients. The results revealed that a higher percentage (81.3%) of females brushed their teeth once a day compared to male patients (78.0%). There were few subjects who had a habit of brushing occasionally (Fig 5). Among the study participants 126 (91.3%) males and 94 (83.9%) females maintained their oral hygiene on their own whereas 9 (6.5%) males and 11 (9.8%) females needed assistance to brush their teeth. Three (2.2%) males and 7 (6.3%) females could partly maintain their oral hygiene on their
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In the present study all the participants were above 50 years. The prevailing poor periodontal status and periodontal tissues show age-related changes in elderly, their poor oral hygiene, abnormal eating habits and systemic conditions contribute to further periodontal deterioration. The status of periodontal condition when assessed using Community Periodontal Index revealed a significant different between the age groups among males (p= 0.039). The score 1 was predominant among 50-64 years old individuals (22.9%) compared to other 2 groups. Again score 3 and score 4 were also distributed significantly in this age group. The distribution of CPI scores among various groups of females was not significant (p= 0.142). Very few subjects from ≥ 75 years age groups showed higher CPI scores.

The distribution of CPI scores according to dependency to maintain oral hygiene among var-
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IOUS age groups of the study population is shown in Table 1.

**DISCUSSION**

The study was conducted on 250 ambulatory psychiatric subjects. It was observed that male patients were more compared to females. Higher number of male patients could be attributed to various reasons such as under reporting of females specially widows and higher female mortality in different age groups.\(^{13}\) In India, sex ratio of the aged favors males. The present findings are similar to the previous observations made by Angelillo et al.\(^{14}\) and Ramon et al\(^{15}\) had observed more psychiatric male patients compared to females whereas studies by George et al\(^{16}\) and Carter G et al\(^{17}\) showed females were more 51.6% and 75% respectively. Elderly populations aged 75 years and above were very few. Again the life expectancy in India which is around 62 years\(^{18}\) and elderly mor-tality rates must have been the contributing factor for this observation. Even though psychiatric illness showed considerable distribution in both rural and urban population, the specialized institutions are restricted to urban areas. The cost of patient maintenance at rehabilitation centers may be another factor leading to under-reporting of psychiatric illness in elderly population.

**TABLE 1: DISTRIBUTION OF COMMUNITY PERIODONTAL INDEX SCORES (CPI SCORES) ACCORDING TO DEPENDENCY TO MAINTAIN ORAL HYGIENE AMONG STUDY POPULATION**

<table>
<thead>
<tr>
<th>CPI scores</th>
<th>Score 0 N (%)</th>
<th>Score 1 N (%)</th>
<th>Score 2 N (%)</th>
<th>Score 3 N (%)</th>
<th>Score 4 N (%)</th>
<th>X Not recorded N (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-64 yrs</td>
<td>N=193</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>0</td>
<td>38(19.7)</td>
<td>9 (4.7)</td>
<td>61 (31.6)</td>
<td>44 (22.8)</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Assisted</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (31.6%)</td>
<td>5 (2.6)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Both</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>65-74 yrs</td>
<td>N=36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>0</td>
<td>3 (8.3)</td>
<td>0</td>
<td>8 (22.2)</td>
<td>6 (16.7)</td>
<td>10 (27.8)</td>
<td>0</td>
</tr>
<tr>
<td>Assisted</td>
<td>0</td>
<td>2 (5.6)</td>
<td>0</td>
<td>0</td>
<td>2 (5.6)</td>
<td>2 (5.6)</td>
<td>0</td>
</tr>
<tr>
<td>Both</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (5.6)</td>
<td>1 (2.8)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>≥ 75 yrs</td>
<td>N=21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4 (19.0)</td>
<td>4 (19.0)</td>
<td>3 (14.3)</td>
<td>0</td>
</tr>
<tr>
<td>Assisted</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3 (14.3)</td>
<td>0</td>
</tr>
<tr>
<td>Both</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7 (33.4)</td>
<td>0</td>
</tr>
</tbody>
</table>
The study subjects were diagnosed as Schizophrenic (avg 51%) in all the age groups. The next psychiatric condition which was prevalent was affective mood disorder followed by dementia and associated symptoms. These findings are similar to the study on psychiatric patients conducted in Copenhagen by Hede B\textsuperscript{19}. They found that majority (34%) were schizophrenics. Also a study by Angelillo IF et al\textsuperscript{14} observed that 64.98% were schizophrenics and another study in Virginia by George P. Barnes\textsuperscript{16} showed that majority (38%) were diagnosed with schizophrenia and second large proportion were diagnosed to be having affective mood disorder. Schizophrenia is a psychiatric illness characterized by thought disturbances, bizarre behaviors and cognitive impairments that may diminish person’s abilities in areas of social interactions. The onset of the disorder typically occurs between late teens and mid-30.\textsuperscript{20} In India, this is the most common psychiatric disorder among younger age groups, the disease usually is continued towards late age. The changes occur in central nervous system due to aging might also lead to mild to severe symptoms typical of schizophrenia. Schizophrenic behavior needs continuous monitoring by highly skilled professionals. Home care of schizophrenics is very challenging and difficult which makes majority of the schizophrenics hospitalized for effective management.\textsuperscript{20} Only specialists can execute complete care for this population. One of the signs of aging is associated symptoms of dementia. This study revealed several subjects exhibiting signs and symptoms of dementia. 

Majority of the subjects were using toothbrush (77.1%) to clean their teeth. The use of finger with toothpaste or tooth powder was seen in considerable number of individuals (21.6%). The present study findings are similar to that of Mirza et al.\textsuperscript{4} In their study 23 patients reported having a tooth brush and 20 produced it when interviewer asked to show it. Similarly participants of a study on drug abusers in Chennai, India reported that 89% were using toothpaste and 94% used toothbrush for cleaning their teeth.\textsuperscript{21} In contrast, a study by Bhansali et al\textsuperscript{1} on aging psychiatric patients found that 39.2% used toothbrush and toothpaste whereas 52.8% used oral rinse. In the present study all subjects were ambulatory and most of them were suffering from Schizophrenia and associated symptoms which ranged from mild, moderate to severe. No attempt was made to classify them based on their severity of symptoms. Most of the study subjects' behavior was medically controlled except at times when there was episodic attack. It was also noticed that oral hygiene care was inadequate and there was no compulsion on these patients to perform oral hygiene procedures. 

The information collected revealed higher percentage of patients using toothbrush but method of brushing was not assessed. As presented in Fig 5 most of the psychiatric patients were brushing the teeth only once a day. There were 108 (78.2%) males and 91 (81.3%) females brushing once a day. These results are consistent with report by Jovanovic S et al\textsuperscript{22} on oral health status of psychiatric in-patients in Serbia. In her structured interview, the participants response was that they brushed their teeth significantly for shorter duration and less often also, more number of participants used incorrect brushing technique. Hede B\textsuperscript{19} and Tang WK\textsuperscript{23} also reported irregular oral hygiene practices among their study population which was attributed to negative symptoms in schizophrenia and personality disorders. A comparative study conducted in Bangalore, India, reported that 31.6% participants had shown negligence towards tooth brushing. Total absence of oral hygiene maintenance was observed in 9.5% individuals which was attributed to lack of dexterity, physical inability and poor mental capacity to perform oral hygiene procedures. Eating and sleeping patterns take precedence over personal hygiene.\textsuperscript{24} A case control study conducted by Gowda et al\textsuperscript{25} in a defence hospital observed that regular oral hygiene practices were followed by their study group which they attributed to early reporting of psychiatric cases in defence set up and constant supervision by the managing staff. Most of the institutions included in the present study did not give importance to oral health care. No consulting dentists visited these psychiatric populations. The irregular brushing habits are mainly because of their existing illness and poor monitoring by care-takers. Some of the individuals brushed occasionally depending upon their mood variations. Both the sexes had almost similar frequency of tooth brushing habit. The number of caretakers in these institutions was insufficient and due to this reason most of them were not monitoring the oral hygiene procedures of these individuals.

Mental illness may lead to impairment of ability to perform oral hygiene procedures. These patients can
perform their oral hygiene procedure on their own and sometimes need assistance. This study revealed that majority of males (91.3%) and females (83.9%) were self-dependent and only few subjects needed assistance. Most of the individuals studied did not have any kind of physical impairment like total loss of dexterity, poor vision and symptoms of arthritis. They were able to move out and brush their teeth on their own. A study by Vigild et al reported that 48% of dentate residents received assistance from staff in daily oral hygiene as around 29% were either bed ridden or had to use a wheelchair. The oral hygiene of the assisted group was no better than who were not assisted. It has been found in their study that elderly patients were unwilling to allow staff to assist in oral hygiene, reasons elucidated were possibly because that the staff did not know how to help. In this study, method of brushing was not analyzed. When these patients were not interested in cleaning their teeth assistance was provided. The exact reasons for dependency status to maintain oral hygiene needs further studies and elucidation.

The psychiatric population owing to their poor maintenance of oral hygiene is exposed to different clinical manifestations on the periodontal tissues. The community periodontal index was employed to assess periodontal status. Results of this study revealed presence of higher CPI scores (Score 3 and Score 4) among 50-64 years groups in both the sexes. It was almost comparable. The most striking feature was the absence of Score 0 in all study subjects. In a study conducted by Gowda et al on psychiatric patients in a defence setup it was revealed that there existed higher prevalence of periodontal disease particularly score 3 and score 4 and 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. In another study by Kenkre and Spadigam on institutionalized psychiatric patients in India it was found that only 5% of their study population had a score 0. Also a study by Angelillo et al on institutionalized psychiatric patients in Italy observed that 64.8% of subjects had score 4. These studies observed xerostomia caused due to psychiatric medications had a significant impact on oral health, which increases risk of periodontal infections. In contrast a study by Vigild et al revealed that only 11% of them had score 4.

As we have included individuals above 50 years in our study, this is the age at which the periodontal tissues start showing age related changes. The clinical changes observed are bleeding, calculus deposit or evidence of gingival pockets. The psychiatric condition synergistic with age could have acted as major factor on evidence of periodontal involvement. Poor understanding and reasoning capacity limit the ability of psychiatric patient in maintenance of oral hygiene and related aspects. In a study on oral health status of mentally disabled subjects in India by Manish J et al it was observed that male subjects had poorer oral hygiene and periodontal status than their female counterparts. Also a high correlation between poor oral hygiene and development and progression of periodontal disease has been well documented. The role of poor oral hygiene as a risk factor of periodontal disease is well established.

A study by Kumar et al on psychiatric patients in Davangere city observed only 19% of their study population had healthy gingiva and the periodontal condition deteriorated with increasing age, duration of mental illness and among patients who were partially or totally handicapped.

**CONCLUSION**

This study showed that subjects suffering from psychiatric disorders suffer from poor periodontal health, requiring periodontal care, especially among those with greater physical disability, due to increased inability and/or disinterest shown by them. The preventive programs in psychiatric care centers should be tailored to meet the divergent needs of patients with varying diagnoses, prognoses and severities of illness.

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