Oral Health Status and Treatment Needs of Inmates in District Jail of Mathura City – A Cross Sectional Study

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ABSTRACT
OBJECTIVES: To assess the oral health status and treatment needs of inmates of District Jail Mathura.
MATERIALS AND METHODS: A cross sectional study was carried out on the inmates (N=870) in the district jail of Mathura. Proforma related to general demographic information was filled by the examiner and the subjects were clinically examined using WHO 1997 “Oral Health Assessment Form
RESULTS: This study revealed that 92.5% of the inmates were male. 53.8% never visited the dentist & 87% never received any type of dental care during imprisonment. Prevalence of pro-mucosal lesion was 59.8%. Inmates had poor periodontal conditions and 79% inmates had dental caries with mean DMFT of 4.79.
CONCLUSION: Periodontal disease, mucosal lesions and dental caries are major public health problem among the inmates, which require special attention and efforts from government and other organizations to meet their treatment needs.

Keywords: Oral health status, Treatment needs, Jail, Inmates, Prosthesis

Health is a fundamental right of every individual and oral health is an integral part of general health. Various factors are responsible for maintenance of good oral health. Socio-economic status, occupation, education are playing major role in maintenance of good oral health. Access is one of the main barriers of health care delivery system which we want to overcome by primary health care. (1)

Each population group needs different approach for health care. One of the strategies in public health is to identify unique population groups, study their health problems and explore methods for health care. Prisoners make a special group of population as they are different from other people in context of their “freedom of movement”. (2)

The majority of prisoners are those who come from a context already shaped by social exclusion. Among other things, they are likely to be members of an ethnic minority, have limited education and a history of instability, unemployment or underemployment, substandard diet and housing conditions and inferior medical access. (2)
The prison population is a unique and challenging one with many health problems, including poor oral health. The prisoners in jail have a different life style; routine dental care and daily oral hygiene are not in their regular component of life style. Now there is a growing recognition that there is a direct link between oral health and lifestyle related diseases such as heart disease, arthritis etc. This lack of attention in maintaining oral hygiene is reflected in their overall health status. An assessment of their oral health is required, as there is a need to be more attentive to oral health promotion of these prisoners as they will be returning to the general community. (4)

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Many prisoners enter prison with poor oral health requiring emergency treatment. This may be due to limited knowledge about good oral health practices. Substance misuse contributes to high levels of tooth decay and gum disease. Excessive alcohol consumption, particularly spirits, and tobacco use increase the prevalence and severity of periodontal disease and are by far the greatest risk factors for oral cancer. (5)

The present study is a cross-sectional study conducted to assess the Oral Health Status and Treatment needs of Inmates of District Jail, Mathura.

**SOURCE OF DATA**
Data was collected through a survey which included clinical examination and a questionnaire.

**Study group**
Those persons, who were sentenced (inmates), were included in the study group.

**Information about study group**
A total of 870 convicts of the jail aged 18-85 years were examined. Both male and female inmates were included in the study (Male = 805, Female = 65).

**Inclusion criteria**
· All the inmates who were willing to give the consent were included in the study.
· Inmates who were imprisoned for more than 1 year were included.

**Exclusion criteria**
The subjects who did not give their consent for oral examination were excluded.

**Sampling methodology**
Purposive sampling (6) – Purposively selecting the individuals for the study. The group of individuals who were actually available for the investigations (All the inmates).

**Pilot study**
Pilot study was carried before starting the main study to check feasibility of proforma. The data of the pilot study was not included in the main study and the necessary modifications were made in the final proforma.

**Training of recording assistant**
The examiner was assisted by a recording assistant who was trained to write codes clearly. The instructions were given to the assistant about how to record the data on the assessment form and other entries correctly.

**Training and Calibration of the examiner:**
Before the starting of the survey, the guide calibrated the investigator regarding the WHO criteria for diagnosing the oral disease. The mean Kappa co-efficient values for intra-examiner reliability with respect to Kappa co-efficient of all the indices used in the WHO Oral Health Assessment format was 0.80.

**Details of clinical examination**
Armamentarium used included PMT sets, WHO Probe, Disposable Gloves and Mouth Masks, Concentrated Sterilizing Solution, Kidney trays, Recording forms and Pen Torch.

**Examination area**
The investigator himself carried out the clinical examination throughout the study. The inmates were examined in the hospital of jail. Each subject was made to sit on a chair with examiner standing behind or in front of the chair and the examination was carried out using natural light. All the data was recorded by the recording assistant. The recording assistant was seated in front of the examiner, so that the codes being recorded were seen by the examiner.

**Clinical examination**
The clinical examination of all the subjects was done by the examiner himself and the data was recorded based on WHO standard criteria.

**WHO Oral Health Assessment Form, 1997** (7) was used to collect data from each
subject. These forms have been designed to facilitate examination of all age groups for the assessment of prevalence of oral disease and treatment needs. Standard codes were used for all sections of the form with each code assigned to an oral condition. The codes range from 0 to 9.

Clinical assessment
In order to ensure that all conditions were detected and diagnosed, the clinical examination followed the order of the assessment form.

Referral
Those subjects who were suffering from pain or infection and who needed immediate attention or routine treatment were referred to civil hospital Mathura and those who required specialty treatment were referred to S.N. Medical College, Agra.

Statistical Analysis
The statistical procedure was carried out in 2 steps.
- Data compilation and presentation
- Statistical analysis

Data compilation and presentation
The data obtained was compiled systematically, transformed from a pre-coded pro-forma to a computer and a master table was prepared. The total data was distributed meaningfully and presented as individual tables along with graphs.

Statistical analysis
Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ±SD (Min-Max) and results on categorical measurements are presented in Numbers (%). Significance is assessed at 5% level of significance. (p < 0.05). Chi square and ANOVA tests were used.

Statistical Software
The statistical software namely SPSS 17.0 was used for analysis of the data and Microsoft excel was used to generate results.

Results
A cross sectional descriptive survey was conducted to assess the oral health status and treatment needs of inmates of District Jail, Mathura city, Uttar Pradesh, India. A total of 870 inmates were examined. The data was collected during the month of August to October 2012.

Distribution of study inmates according to gender
A total of 870 inmates were examined. Out of which 805 (92.5 %) were males and 65 (7.5 %) were females.

Distribution of study inmates according to age groups
The minimum subject age was 18 years while the maximum was 85 years. Majority of the study population i.e. 318(36.6%) belonged to 25 – 34 year and 203 (23.3%) belonged to 35 – 44years age group, with the remaining of 187(21.5%), 100(11.5%), 46(5.3%) and 16 (1.8%) belonging to the 18 – 24 years, 45 – 54 years, 55 – 64 years and 65 and above age groups respectively. Distribution of study population according to literacy status

The education level varied among the inmates with majority of them were illiterate 196 (22.5 %), inmates who studied till primary school were 177 (20.3%), who studied till high school were 168 (19.3%), those who studied till middle school were 160 (18.4%) and 130 (14.9%) were intermediates. On the other hand 3(0.3%) were professionals, 36 (4.1%) were graduates and post graduates.

Distribution of study inmates according to occupation
While questioning, it was found that majority of inmates examined belonged to farmer, shop owner group 226(26.0%), followed by unemployed 161(18.5%), unskilled worker 160(18.4%), Semi skilled workers 159 (18.3%), skilled workers 134 (15.4%). A total of 25(2.9%) and 5(0.6%) inmates were semi-professionals and professionals.

Distribution of study population according to Duration of Imprisonment
Out of 870 inmates, 374 (43%) were in prison for less than 3 years, 283 (32.5%) for 3 – 6 years, 184 (21.1%) for 6 – 10 years and 29 (3.3%) for more than 10 years.

Distribution of study population based on frequency of dental visits
It was found that 468 (53.8%) of the inmates had never visited dentist in their lifetime and 402 (46.2%) of them had made past dental visits for dental treatments and their problems.

Distribution of study population based on past dental care received
In total inmates, 399 (45.9%) received dental care in their life, whereas 471 (54.1%) never received any kind of treatment.

Distribution of the study population based on Oral Hygiene Aids Used
Majority of the study inmates used finger with toothpaste or powder i.e. 373 (42.9 %), 302 (34.7%) used toothbrush with toothpaste/powder and 157 (18%) used neem stick/ datoon to clean their teeth, whereas 38 (4.4%) inmates did not use any aid to clean their teeth.

Prevalence of TMJ Disorders
Out of 870 inmates, 554 (63.7 %) inmates were suffering with problems regarding Temporo - mandibular joint disorder. (Table 1)

Out of 870 inmates, 342(39.4%) reported clicking sound at TMJ, 102(11.7%) reported tenderness at TMJ while opening the mouth and 110(12.6%) inmates were not able to open their mouth more than 30 mm. Whereas 316 (36.3%) were free from TMJ problem. (Table 1)

Prevalence of Oral Mucosal Lesions
The overall prevalence of Oro-mucosal lesions was 520(59.8%), 350(40.2%) of the inmates had no abnormal condition fol-

ORAL HEALTH STATUS AND TREATMENT NEEDS OF INMATES IN DISTRICT JAIL OF MATHURA CITY – A CROSS SECTIONAL STUDY
lowed by 271(31.1%) with Leukoplakia, 156(17.9%) with ulceration, 31(3.6%) with lichen planus, 35(4.0%) with candidiasis, 25(2.9%) with acute necrotizing gingivitis, whereas 2(0.2%) were having abscess. (Table 2)

Prevalence of Dental Fluorosis among study population (Dean’s Fluorosis Index)
Among all the inmates (n=870) examined, none was free from dental fluorosis. Mild fluorosis among 510 (58.6%) and moderate fluorosis were present among 242 (27.8%) inmates followed by very mild fluorosis among 69 (7.9%) and severe fluorosis among 37 (4.3%) inmates.

Periodontal Status (CPI) of the study population according to Duration of Imprisonment
It was found that 222 (59.3%) inmates who had been imprisoned for 1 to 3 years had calculus, 93 (24.8%) had shallow pockets, 42 (11.2%) had deep pockets and 13 (3.4%) were having bleeding on probing.

It was observed that, among the inmates imprisoned for 3 - 6 years, only 3 (1.06%) inmates had bleeding on probing with majority having calculus 131 (46.2%), shallow pockets among 82 (28.9%) and 65 (22.9%) inmates were having deep pockets.

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A significant difference in CPI scores (p < 0.05) were observed among the inmates with respect to period of imprisonment (Table 3).

Distribution of loss of attachment scores according to Duration of Imprisonment
Inmates 27 (7.2%), 53 (14.1%), 106 (28.3%) imprisoned for period for 1-3years showed the loss of attachment of 9-12mm, 6-8mm and 4-5mm respectively.

Inmates 26 (9.1%), 50 (17.6%), 103 (36.3%) imprisoned for 3 – 6 years showed loss of attachment of 9-12mm, 6-8mm and 4-5mm respectively.

Around 184 inmates which were imprisoned for 6-10years, among them only 4 (2.1%) showed loss of attachment of more than 12mm, 20 (10.8%), 45 (24.4%) inmates showed loss of attachment of 9-12mm, 6-8mm respectively.

Only 2 (6.8%) inmates which were imprisoned for more than 10years showed loss of attachment of 9-12mm, 10 (34.4%), 15 (51.7%) inmates showed loss of attachment of 6-8mm, 4-5mm respectively.

There was highly statistically significant differences in loss of attachment scores between the inmates imprisoned for different period of imprisonment (p = 0.000) (Table 3).

Prevalence of dental caries among the study population
Out of 870 inmates, 185 (21.3%) inmates were free from dental caries. Six hundred and ninety five (78.7%) inmates exhibited shallow pockets, deep pockets respectively.

In the inmates imprisoned for 6 – 10 years, 76 (41.3%) showed the presence of calculus deposits, followed by 55 (28.8%), 50 (27.1%) inmates exhibiting shallow pockets, deep pockets respectively.

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ferring from dental caries. Inmates 156(17.9%), 150(17.2%), 135(15.5%), 89(10.2%), 48(5.5%) were having caries in their 3, 4, 2, 5, and 6 teeth respectively. (Table 4).

Prevalence of dental caries according to Period of Imprisonment
Two hundred and eighty one (75.2%) inmates imprisoned for 1-3 years were suffering from caries, followed by 232(82%), 135(15.5%), 89(10.2%), 48(5.5%) were having caries in their 3, 4, 2, 5, and 6 teeth respectively. (Figure 1).

Prevalence of teeth with trauma among the study population
Out of 870 inmates, 215(24.7%) inmates were having broken teeth because of trauma. One hundred six (12.2%) inmates were having 1 traumatic tooth, 95(10.9%) inmates were having 2 teeth broken. Eleven (1.3%), one (0.1%) and two (0.2%) inmates were having 3, 4, 5 traumatic teeth.

Distribution of study population according to Prosthetic Need
In maxillary arch 147(16.9%) inmates needed one unit prosthesis, 127(14.6%) inmates were in need of multi unit prosthesis, 96(11%) needed combination of one and /or multi unit prosthesis, and 15(1.7%) needed full prosthesis. In mandibular arch, the prosthetic need of the inmates were 128(14.7%) for one unit prosthesis, 113(13%) for multi unit prosthesis, 149(17.1%) for combination of one and /or multi unit prosthesis, and 14(1.6%) had need for full prosthesis (Figure 2).

Distribution of study population according to need for Immediate Care
A total of 286 (32.9%) inmates were having life threatening conditions, and needed immediate attention and referral (Figure 3).

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<thead>
<tr>
<th>Table 3: Periodontal status (CPI) of the Study Population According to Duration of Imprisonment</th>
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<tr>
<td><strong>CPI score</strong></td>
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<tr>
<td>0= healthy</td>
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<td>1=calculus</td>
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<td>2=4-5mm pocket</td>
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<td>3=excluded</td>
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<td><strong>Total</strong></td>
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<th>Table 4: Prevalence of Dental Caries Among the Study Population</th>
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<td><strong>Number of teeth affected by caries</strong></td>
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<td><strong>Total</strong></td>
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Distribution of study population according to treatment needs

Out of 870 inmates, 413 (47.5%) and 476 (54.7%) inmates need one surface and two surface restoration of decayed tooth. Whereas 256 (29.4%), 355 (40.8%), 460 (52.9%) inmates need pulp care, extraction, and prosthetic replacement respectively (Figure 4).

DISCUSSION

The prison population is a unique and challenging one with many problems, including poor health. Dental diseases can reach epidemic proportions in the prison settings.

The heterogeneity of population was studied and methods of assessment precluded simple generalization, but the pattern appeared to be that the oral health status of inmates was poor.

Demographic Details

Majority of the inmates were illiterate 196 (22.5%) and were unemployed or farmers. These findings were in contrast to prison inmates of Central Prison Bangalore by Dr. Uma SR et al. 2011 (8) where majority of prison inmates 764 (58.4%) had achieved more than secondary education. Findings reported regarding education status of Remand Prisoners in Brixton, London (2) and on Institutionalized Older People in North-East Brazil (9) were similar to the present study.

Oral Hygiene Practices

The jail authorities do not provide oral cleaning materials to the inmates, therefore large proportion of 373 (42.9%) of the inmates used finger and tooth paste/powder and 302 (34.7%) used tooth brush and toothpaste/toothpowder for cleaning their teeth in this study. This shows that they are least concerned about their oral health. The present findings are not similar to the study conducted by Nobile CGA et al (10) which stated that 96% of the population in their study used tooth brush and tooth paste. M. Osborn et al in 2003 (11) observed that 86% of the subjects brushed their teeth using tooth brush and tooth paste. Present study results are quite similar to results reported by Luciene Ribeiro Gaiao et al, 2009 (9) where only 53% study population uses toothbrush as a cleaning aid. This pattern of brushing habit reported is due to study being conducted among older population where most of the study samples were edentulous.

Past dental visits and care

402 (46.2%) inmates in our study had visited the dentist out of which 399 (45.9%) had received care. Study findings were in accordance with the studies conducted by Nobile CGA et al. 2007 (10) (39.15%), Bansal V et al. 2010 (12) (36.8%), Osborn M et al. 2003 (11) (62%). A study conducted by Jones et al. 2002 (13) among Scottish prisons, also revealed the same result i.e. 58.5% prisoners visited the dental surgeon. The reason for the visit in our study may be because of frequent treatment camps being organized in the hospital within the jail premises.

Oral Mucosal Lesions

The prevalence of oral-mucosal lesions has
variation among the inmates. The overall prevalence of oral-mucosal lesions among the inmates of our study was 59.8%. The results of the present study are high compared to the study conducted by Uma SR and Hiremath SS [2011] (8) in Karnataka in India. The prevalence of oral-mucosal lesion was 12% in that study. In our study, the most common mucosal lesions were leukoplakia (31.1%). This result is higher comparable to study conducted by Veera Reddy [2012] (14) in which the prevalence of leukoplakia was 1.1%. This might be because of excessive use of tobacco in the Mathura jail, to overcome the stress.

In our study, the prevalence of white lesions were leukoplakia (31.1%) and lichen planus (3.6%), it was in accordance with the study conducted by Uma Uma SR and Hiremath SS [2011]. (8) Oro-mucosal conditions and diseases may be caused by local diseases, systemic diseases, drug related reactions or life style factors such as consumption of tobacco, betel chew or alcohol [Harris CK, 2004], (15) also other factors trauma, affects of medication and oral and denture hygiene [Jainkittivong A, 2002] (16) also play a role in the causation.

Periodontal Status (CPI):

It was observed that none of the inmates in the study population had healthy periodontal condition. This was in accordance with the findings by McGrath C.[2002] (17) and James H Clare [2002]. (18) Whereas, Nobile CGA et al [2007] (10) found that 10.5% of the study sample had healthy sextants in a study conducted at Italy.

It was observed that 49.8% of the study sample had a CPI score of 2, which was not in agreement with the results obtained by Barnes GP et al [1987] (19) who found that 32% of the study subjects had a CPI score of 2. In other study done by McGrath [200] (17) among the prisoners in Hong Kong detection centre; periodontal health of prisoner’s was assessed. The majority, 25.5% had a highest CPI score of two. Formation of calculus may be attributed to various factors like negligence of oral health, improper brushing techniques and unavailability of oral hygiene aids [Uma SR, Hiremath SS, 2011]. (8)

Approximately 27.4% and 19.5% of inmates had a CPI score of 3 and 4 respectively with gingival pockets 4-5mm and > 6mm. These findings were not in accordance with the study done by McGrath [2002] (17) who found that CPI scores of three and four were recorded for 12.27% and 6.13% subjects respectively. In a study conducted by Cobert et al [2001], (20) in Southern China, subjects underwent periodontal examination; few (<1%) had healthy periodontal conditions in the absence of calculus. Most subjects in all age groups scored either calculus (61%) or shallow pockets (34%), and only a small proportion were recorded as having deep pockets (5%). In a study conducted on institutionalized elderly in Hong Kong by Lo et al [2004]. (21) The percentage of subjects with CPI scores were 1% (CPI-0), 2% (CPI-1), 41% (CPI-2), 37% (CPI-3) and 20% (CPI-4) respectively.
This may be attributed to a lack of oral health maintenance and also the various types of stressors experienced by the inmates. It proves the fact that these inmates need thorough oral hygiene care by the dental professionals along with good dental health education to improve the existing situation.

Loss of Attachment
In the present study 38.2% of the study population had a loss of attachment score of 0 (0-3 mm), and 32.9% of the inmates had a score of 4-5 mm, loss of attachment i.e. code 1. Our study results are not similar to a study conducted by Thakare V et al [2010] (22) among institutionalized individuals where she demonstrated that 11.53% of the study subjects had a score of 0 and 64.42% scored 1 in loss of attachment.

The probable reason for poor periodontal health might be associated with oral hygiene practices among the prison inmates and the education attainment among the prison inmates was poor. Majority of prisoners were not educated.

Caries Prevalence
Dental caries experience was measured as the number of decayed, missing or filled permanent teeth (DMFT) using the WHO Dentition Status and Treatment Need.

The prevalence of dental caries in our study was 78.7% with the mean DMFT of 4.79. Noble CGA et al [2007] (25) observed a mean DMFT score of 9.8 and the caries prevalence of 91.2% which is not in accordance with the results of the present study. This prevalence of dental caries in the present population is due to the fact that dental caries is a multi-factorial disease influenced by many factors including lifestyle factors, type of diet, lack of oral hygiene measures and cultural factors before coming to the jail. Inmates depend on prison authorities to arrange dental care. The high prevalence due to the fact that untreated dental decay is greater in prison population [Lars Moller et al, 2007]. (28) The high prevalence may be attributed to the low utilization of preventive and therapeutic dental services and inadequate dental personnel for the prison inmates.

Treatment Need
In the present study 44.3% inmates needed prosthesis in the maxillary arch and 46.4% inmates needed prosthesis in mandibular arch which was not in contrast to study done by Uma SR and Hiremath SS [2011]. (8) Among the inmates it was observed that 14.6% in maxillary and 13% in mandibular arch need more than one tooth replacement, while 1.7% and 1.6% required complete denture in maxillary and mandibular arch respectively. This can be due to high incidence of caries and periodontal disease. With increasing age, attitudes towards oral health and their care seeking behaviors and the limited options of treatment modalities [Smith, J. M, 1980]. (29)

In our study 78.7% inmates required restorations, 29.4% required pulp care whereas 40.8% inmates needed extraction of grossly decayed teeth. In results reported by Scottish prison’s Dental Health Survey by Jones et al [2002], (30) where 31% inmate’s needs restorative care and 28.8% required endodontic treatments and in another study conducted by Heidari et al [2007] (2) in HMP Brixton, London reported very high need for restorative care among prisoners was reported. These findings were found to be in accordance to the present study.

In the present study, it was found that 286(32.9%) inmates were suffering from life threatening conditions like leukoplakia etc and required referral to the hospital having dental settings as they required urgent treatment.

Prisoners have significantly greater oral health needs than the general population. Many prisoners are unemployed before being sentenced and come from communities with a high level of social exploitation. The demand for prison dental services has continued to increase in last few decades, especially because the numbers of inmates have increased and hence, there is the need to be more responsive to their clinical needs.

The normative needs should be converted into a demand for dental care which involves rising the perceived need. To lead a good quality of general health it is necessary to have good oral health which is contributory to the general health of the individual. It is necessary to improve the health of the inmates since they are available during the incarcerated period as stated by T Marshall [2001]. (31)

LIMITATIONS OF THE STUDY
- The major limitation of the study was its cross sectional nature, which limited our ability to relate the time pattern with the risk factors and their complications.
- More refined and informational results could be obtained if the present study inference would be compared with non prisoner population, questioned and examined by the same codes and criteria.

CONCLUSION
Providing access to appropriate dental care for the underserved segments of the population is a complex problem that will not be solved easily. Preventive measures to improve dental care and provision of dental health education are very much necessary to ensure optimum oral health among the inmates. It is imperative that the specific barriers to care for each group are identified and understood.

The results of the current study indicate
that the inmates of Mathura Jail had high prevalence of dental caries, oral mucosal lesions, poor periodontal status and varying degrees of dental fluorosis. It creates an alarming need to focus on these risk groups with special emphasis on the factors which are contributing to the poor oral health status.

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REFERENCES