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RESEARCH ARTICLE

IMPACT OF IMPRISONMENT ON ORAL HEALTH INCLUDING DENTITION AND PERIODONTAL STATUS: A CROSS-SECTIONAL SURVEY

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ABSTRACT

Aim of this cross sectional survey was to evaluate the dentition and periodontal status of the prison inmates.
Material and method WHO format of 1997 was used to extract data for the dentition status and periodontal status using WHO criteria of oral health survey.
Results A total of 1274 inmates was included in the study from two prisons of Ambala district. Highest score of 2 for CPI was found among 64.8% of subjects indicating poor periodontal health required immediate attention. Tobacco related habits were also found to be common among prisoners as it was found in 59.9% of the subjects. Dentition status showed the number of sound teeth per person was 26.38 while number of decayed teeth per person was 2.32. Mean number of Teeth filled with and without decay were 0.07 and 0.13 in number, respectively. Mean number of teeth missing due to caries was 0.83 while teeth missing due to other reasons were 1.38.
Conclusion Access to oral health care is important to every individual to maintain oral health and this factor implies on prisoner community. Simpler way of preventing disease is to increase awareness among prisoners community about oral health.

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INTRODUCTION

Oral health means more than good teeth; it is gateway to general health. Oral health is essential for wellbeing as it is required to maintain quality of life (Petersen, 2003). This wider meaning of oral health does not diminish the relevance of the two globally leading oral afflictions - dental caries and periodontal diseases which is effecting population across the globe (Patro *et al*., 2008). Poor oral health conditions such as these have a profound impact on health and thereby effects general quality of life (Slade, 1997).

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The increase in dental caries in many developing countries, the prevalence of periodontal diseases whleading to pain, infection, and impaired masticatory functions are causing an increasing burden of oral disease on the individual level, community level and national level (WHO, 1988). And this increasing burden of oral disease in developing countries is due to least access to oral health care delivery system. Different communities and populations have their own obstacles, which may be related to cultural, socioeconomic, political which enable them to buy a good oral health care or access. Each population group needs different approach for health care delivery system and one of the strategies in public health is to identify unique population groups, study their health problems and explore methods for health care and provide them best possible approach in order to satisfy their unmet need (Digra *et al*., 2016).

Prisoners forms a special group of population as they are different from other people in context of their "freedom of movement", liberty of buying heath care at their own will and moreover other factors are also associated with their life like adversely affect mental health include overcrowding, dirty and depressing environment, poor food, inadequate health care, aggression (which may take many form such as physical, verbal, racial or sexual), lack of purposeful activity, the availability of illicit drug and either enforced solitude or lack of privacy and time for quite relaxation all which leads to poor heath which also effects oral health (Heidari *et al*., 2007; Singh *et al*., 2012). Historically, dental caries and periodontal diseases are considered the two most important global oral disease of the humanity and Studies conducted on prisoners clearly indicated that gingival and periodontal problems were much higher compared to the general population (Slade, 1997; Singh *et al*., 2012; Osborn *et al*., 2003). All these factor lead us to undertake this cross-section survey among prison inmates Ambala district Haryana to find out dentition and periodontal status, so that compassion can be done with the other prison population and conclusion can be drawn about the differences of oral health in different prison populations.

MATERIALS AND METHODS

The cross sectional survey was done to assess the Dentition status and periodontal status of the prison inmates of Ambala district (Haryana) India. The ethical clearance for the present study was obtained from the ethical committee of Swami Devi Dyal hospital and Dental College, Barwala, Panchkula and Permission to examine the prison inmates was obtained from Director General of Prisons (DGP), Panchkula, Haryana state (Annexure) and Superintendents (SP) of the concern jail. The survey was systematically schedule and was spread over a period of 7 months from March 2014 to September 2014 as jail authorities permitted 2 days in a week for camp in the jail premises. A detailed weekly and monthly schedule was prepared well in advance by informing and obtaining consent from jail authorities. On an average 25 subjects were examined each day. The total sample calculated was 1039 and it was according to 80% power, 95% confidence interval and 3% allowable error. All those prisoners who are willing to participate were included in the survey except for hardcore prisoners those were not allow out of their cell more than one hour per day. Information regarding demographic details was collected and data on dentition and periodontal status and treatment needs was recorded on a WHO format (1997). Along with it, additional data was also extracted from the prisoner regarding tobacco related habit. The data were analyzed using SPSS package version 17. Chi square analysis was applied to find the significance of two or more variables. Student-T test (Unpaired) and ANOVA (Analysis of Variance) were used to find the significance of the cross tabulation of a variable with the mean of another variable and P value was stated to be statistically significant when equal to or lower than 0.05.

RESULTS

A total of 1274 subjects were examined with mean age 35.26 years and standard deviation of 12.29 years. Table 1 showing the distribution of subjects based on gender, educational qualification and occupation prior to imprisonment with percentages.

Table 1. Distribution of the subjects according to gender, education and occupation

Gender		
	Frequency	Percent (%)
Males	1159	90.9
Females	115	9.1
Education		
Illiterate	333	26.13
Primary school	156	12.24
Middle school	234	18.36
High school	262	20.7
Intermediate	162	12.8
Degree	100	7.9
Postgraduate	27	2.1
Occupation		
Unemployed	170	13.34
Unskilled	36	2.82
Semi Skilled	77	6.04
Skilled worker	231	18.1
Clerical, Shopkeeper, Former	383	30.06
Semi-Professional	196	15.38
Professional	181	14.2
Total	1274	100.0

Table 2 Distribution of subjects according to Tobacco habits

Habit	Frequency		Percent (%)
	Male	Female	
No	420	96	40.50
Yes	739	19	59.49
Type			
Smoking tobacco	561	14	45.13
Chewing tobacco	102	4	8.32
Both	76	1	6.04

Table 3. Distribution of subjects according to CPI

	Frequency	Percent
Healthy	95	7.4
Bleeding	56	4.4
Calculus	825	64.8
Pockets 4-5 mm	208	16.3
Pockets ≥ 6mm	59	4.7
Excluded	31	2.4
Total	1274	100.0

Out of total population, 115(9.07%) were females and 1159(91.97%) were males**.** Most of subjects (27.6) falling in the age group of 35 – 45 and least for the age group ≥ 75 (0.7%). Gender wise male subjects (28.12%) were more in 35-44 age group and for female subjects (24.3%) in the age group of 25-34**.** While considering the educational status, 26% were illiterate followed by 20.6% passed in high school, 10% of the study subjects had graduation (7.2%) while 2.8% had post graduation. Results also revealed that the higher number of study subjects examined in the prison belonged to class V category according to kappuswami scale that is clerical, shopkeeper, former partly (30.05%) and 14.2% of the subjects belong to class 1 category which is unemployed.

Table 3a. Distribution of subjects according to Gender with Maximum CPI score

Gender	N	Maximum CPI- Score					Total
		Healthy	Bleeding	Calculus	Pockets 4-5 mm	Pockets >=6mm	
Male	1159	87 (7.69)	21 (1.88)	736 (65.07)	234 (20.68)	53 (4.68)	1131
Female	115	8 (7.1)	4 (3.6)	70 (62.5)	24 (21.4)	6 (5.4)	112
Total	1274	95 (7.64)	25 (2.01)	806 (64.84)	258 (20.75)	59 (4.74)	1243

N = Number of subjects; p = 0.52 (statistically not significant

Table 3b. Distribution of subjects according to Tobacco habits with Maximum CPI score

Habit	N	Healthy	Bleeding				Total
No	516	55 (10.0)	13 (2.6)	312 (60.4)	97(18.9)	23 (4.4)	500
Smoking	575	33 (5.73)	9 (1.56)	355 (61.8)	138 (24)	26 (4.52)	561
Chewing	106	7 (6.7)	2 (1.9)	75 (70.8)	17 (16.03)	4 (3.8)	105
Both	77	0 (0)	1 (1.3)	64 (83.1)	6 (7.8)	6 (7.8)	77
Total	1274	95 (7.0)	25 (1.8)	806 (63.2)	258 (18.9)	59 (4.3)	1243

N = Number of Subjects; Values in parenthesis ( ) denote percentages;
p <0.001* (Statistically significant);

Table 4. Showing Dentition status (Crown & Root status along with Treatment needs)

	Minimum	Maximum	Sum	Mean	S.D.
CROWN STATUS					
Sound	0	32	33605	26.38	5.449
Decayed	0	19	2956	2.32	2.475
Filled with decay	0	4	83	0.07	.304
Filled without decay	0	7	172	0.13	.566
Missing due to caries	0	32	1060	0.83	2.134
Missing due to other reason	0	32	1759	1.38	4.609
Trauma	0	9	145	0.11	.479
Bridge abutment	0	5	13	0.01	.189
Unerupted	0	8	962	0.76	1.213
ROOT STATUS					
Sound	0	32	32705	25.7	5.554
Decayed	0	7	60	0.05	.418
Filled with decay	0	2	2	0.00	.054
Filled without decay	0	2	2	0.00	.054
Root obscured due to calculus	0	28	1122	0.88	2.380
TREATMENT NEEDED					
No treatment	0	32	29708	25.81	6.118
One surface filling	0	21	1866	1.46	2.118
Two surface filling	0	7	397	0.31	.682
Crown	0	3	27	0.02	.186
Coronoplasty	0	11	53	0.04	.448
Pulp therapy	0	6	539	.042	.767
Extraction	0	17	1229	0.96	1.883

S.D. = Standard Deviation

Table 2 Shows the distribution of subjects according to tobacco habits. Out of 1274 subjects, 59.49 % (758) had tobacco habit. 45.13 % (575) of the subjects were habitual of smoking tobacco only, 8.32 % (106) of the subjects were habitual of chewing tobacco only whereas 6.04 % (77) of the subjects were used to both smoking as well as chewing tobacco Table 3 Shows the distribution of CPI score Among dentulous population, only 7.4 % of the subjects were found to have completely healthy periodontal tissues and were classified in a CPI value of 0. The highest number of individuals (64.8 %) was classified as CPI score of 2 (calculus), whereas 21% had at least one sextant with a CPI score of 3 or 4 (shallow or deep pockets). Table 3a Shows the comparison of Gender with Maximum CPI score. Score 2 (calculus) was found in 65.07 % of males and in 64.8 % of females. Scores in other CPI categories were higher in females than males.

The association of gender with periodontal status was not statistically significant (p = .52). Table 3b Shows comparison of Tobacco habits with Maximum CPI score. Maximum subjects habitual of both smoking and chewing tobacco (7.8 %) had pockets ≥ 6 mm deep while maximum subjects habitual of smoking tobacco (24 %) had pockets 4-5 mm deep. Subjects using tobacco had lower bleeding score than those who didn't use it. The association of tobacco habit was statistically significant (p = .0001) with maximum CPI score. Table 4 Explains the Dentition status (Crown & Root) along with Treatment needs and Showing Percentage of teeth according to the dentition status. Number of sound teeth per person was 26.38 while number of decayed teeth per person was 2.32. Mean number of Teeth filled with and without decay were 0.07 and 0.13 in number, respectively. Mean number of teeth missing due to caries was 0.83 while teeth missing due to other

reasons were 1.38. There were 60 decayed roots and only 4 filled roots, 2 with decay and 2 without decay. Mean number of teeth in need of one and two surface filling was 1.46 and 0.31, respectively. Around one (0.96) tooth per person was in need of extraction. In other words, 3.01 % of the total teeth or 3.32 % of the teeth examined, needed extraction.

DISCUSSION

The present cross-sectional survey was design to assess the dentition status and periodontal status of the prison inmates of the Ambala district, Haryana. A total of 1274 subjects from two different prisons were enrolled in this survey with mean age of the study subjects was 35.26 years, which is similar to other studies Dhanker *et al*. (2013) Heidari *et al*. (2007) and Osborn *et al*. (2003), Male to female ratio (10.08:1) was also found to be similar to other study (Heng and Morse, 2002). In this present study education level varied amongst the prisoners. Total subjects having graduation degree were only 10%. The level of education of the study subjects was similar to study reported by Dhanker *et al*. (2013) Nobile, (2007) High percentage of subjects with less education in prison could be because such people will have less opportunity for jobs and resort to illegal activities and land up in jail. Overall literacy rate was similar to that reported by Sajid *et al*. (2006) A high number of inmates (30.06) were falling in the category of clerical, shopkeeper and former followed by semiprofessional and least was the unskilled which is similar to other study done by Salive *et al*. (1989).

Tobacco related habits among prisoner were found lesser than that found in other studies done by Cropsey, (2006) Along with smoking tobacco, quite of large number of subjects were habitual of chewing tobacco. Hence, the overall use of tobacco was found to be similar to the study done by Cropsey 2006 Subjects in our study had the highest CPI score as 2 (calculus). This was similar to that reported by other studies although the percentage of subjects in this category was quite low in other studies done by Osborn *et al*. (2003) and Nobile *et al.* (2007) than our study. Khamrco, (1999) reported a higher percentage of subjects with score 2 as their highest CPI score as compared to our study. Subjects with score 1 were distinctively lesser in our study than other studies done by Osborn *et al*. (2003) and Uma SR and Hiremith (2011). Subjects with shallow or deep pockets were higher than that reported by Khamrco, (1999) but lower than that reported by Petersen *et al*. (2005) Maximum score of 2 (Formation of calculus) may be attributed to various factors like negligence of oral health, improper brushing techniques and unavailability of oral hygiene aids.

In this present study Number of sound teeth per person was 26.38 while number of decayed teeth per person was 2.32. Mean number of Teeth filled with and without decay were 0.07 and 0.13 in number, respectively. Mean number of teeth missing due to caries was 0.83 while teeth missing due to other reasons were 1.38. There were 60 decayed roots and only 4 filled roots, 2 with decay and 2 without decay. Mean number of teeth in need of one and two surface filling was 1.46 and 0.31, respectively. Around one (0.96) tooth per person was in need of extraction. In other words, 3.01 % of the total teeth or 3.32 % of the teeth examined, needed extraction.

There was higher number of teeth missing due to other reasons as compared to teeth missing due to caries. This can be because of several reasons including periodontal disease; traumatic injuries resulted by assaults etc. Teeth missing due to caries were higher in subjects of higher age. This may be attributed to least access to the dental services like general population and poor oral health knowledge. The number of decayed teeth per person was lower than most of the studies done by Hurlen *et al*. (1984) Cunningham, *et al*. (1985) and Lunn *et al*. while other studies done Jones *et al* (2014) and Nobile *et al*. (2006) found a similar number. The mean number of filled teeth was found to be quite low as compared to other studies done by Cunningham *et al* (1985), Jones, (2002) and Wyatt, (2002). The mean number of teeth missing due to caries was lower than various studies done by Cunningham *et al*. and Lunn *et al*. 2003 while teeth missing due to other reasons were lower than National oral health survey – Haryana.

Conclusion

Higher rate of dental disease among prisoners population is not a unique fact about the two globally leading oral afflictions - dental caries and periodontal diseases. Access to oral health care is main obstacle for maintaining the oral health but poor oral health knowledge, attitude and practice could be one of the reason along with freedom of movement and choice to avail the treatment at their will. Preventive strategies should be opted in the prison with regular check on oral health education and continuous re-enforcement for the same. Both the major disease of the oral cavity are preventive in nature and can be tackle by simple measures of preventive policies. Such preventive policies will not only reduce the disease burden on the prisoner community but also unwanted pchyological trauma and economical loss through subsidies treatment.

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