Original Article

To Assess the Oral Health Status and Treatment Need of Prisoners in Central Jail, Patna, Bihar, India

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Abstract

Introduction: Prisoners make a special group of population as they are different from other people in the context of their "freedom of movement." The prisoner's area psychologically, socially, morally, and economically affects the group, which leads them to neglect their general as well as oral health. This study was carried out to assess the oral health status and treatment needs of prisoners in the Central Jail, Patna, Bihar. **Materials and Methods:** The present cross-sectional study was conducted among 400 prisoners of the Central Jail, Patna, Bihar, using a convenience sampling method. The data collection was carried out with the help of a self-prepared questionnaire, and the clinical assessment of oral health was done using the World Health Organization Oral Health Assessment form (2013). The data were analyzed statistically using the Statistical Package for Social Science version 20.0 Software. Statistical significance level was fixed at $P < 0.05$. **Results:** The mean age of subjects was 30.89 ± 5.4. Male subjects were 68% and female subjects were 32%. Maximum were from 175 (43.8%) lower socioeconomic class. 28.5% had an adverse habit of consuming smoking and alcohol. The maximum duration of imprisonment was 3–6 years (50.75). The decayed, missing, and filled teeth score was 4.35 ± 1.59. 4–5 mm pocket depth was present in 36%. 35% of subjects had leukoplakia, 38.5% had ulceration, 6.8% had acute necrotizing ulcerative gingivitis, 5.3% had candidiasis, and 9% had abscess. Significant association ($P < 0.05$) was found between dentition and periodontal status with duration of imprisonment. **Conclusion:** From the present study, it was concluded that there was a prevalence of dental caries, oral mucosal lesions, suboptimal periodontal health, and varying degrees of dental fluorosis. The quality and quantity of dental healthcare provided to and received by prisoners are significantly below acceptable standards. It necessitates urgent attention to these at-risk groups, particularly with the factors contributing to their inadequate oral health status.

Keywords: Adverse habits, Dentition status, Oral health, Periodontal health, Prisoners

Introduction

Health, as defined by the World Health Organization, is a state of complete physical, mental, and social well-being – not merely the absence of disease or infirmity.[1] Among the many determinants of health, oral health plays a significant role. It encompasses the ability to speak, smile, smell, taste, chew, and convey emotions without discomfort or disease of the craniofacial complex.[2] Despite its importance, oral health often receives inadequate attention, particularly in conditions that are not life-threatening, such as dental caries and periodontal disease, which are the most prevalent global oral health issues.

Oral health significantly affects quality of life. Over 90% of systemic diseases present oral manifestations, with established links between oral diseases and systemic diseases.[3] While developed nations have integrated oral healthcare into general health systems, developing countries allocate minimal resources to this domain.[4] Yet, most oral diseases are preventable with basic hygiene practices and lifestyle modifications, including early detection of premalignant oral lesions.

Oral health disparities mirror broader social and economic inequalities. Socioeconomic status, education, income, race, and geography are pivotal factors influencing access to and quality of oral healthcare.[5] High costs remain a major barrier, especially in underserved populations.

India, with a population exceeding 1.4 billion, ranks fourth globally in incarceration numbers, with over 573,000 inmates

Access this article online

Website: www.jrad.co.in

DOI: https://doi.org/10.53064/jrad.2024.16.5.716

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Received: Jun. 09, 2025; **Accepted:** Jul. 26, 2025; **Published:** Aug. 05, 2025

How to cite this article: Kumar N, Batra M, Gijwani D, Gandral AR, Popli H, Jain M. To Assess the Oral Health Status and Treatment Need of Prisoners in Central Jail, Patna, Bihar, India. J Res Adv Dent 2025;16(5):1-6.

as of 2024.[6] Bihar alone had 47 prisons recorded by the Ministry of Home Affairs up to 2022.[7] Prisoners constitute a distinct and vulnerable group due to restricted freedom, prior social exclusion, low education, unstable employment, and poor access to healthcare.[8] Their psychosocial environment, marked by stress, violence, substance abuse, and mental health issues, exacerbates neglect of general and oral health.[9] Suboptimal infrastructure further deteriorates their health status, particularly oral health.[10]

Indian prisons are frequently overcrowded and stressful, with disproportionate representation of marginalized communities.[11] Factors such as poverty, migration, and political policies have contributed to rising incarceration rates in recent decades.[12] Many inmates enter prisons with pre-existing poor oral health, often requiring emergency care. Substance misuse – especially tobacco and alcohol – worsens oral health, increasing the risk of decay, periodontal disease, and oral cancers.[13] Prisoners generally lack routine dental care and oral hygiene practices. Their health neglect is compounded by limited awareness and systemic inattention to oral healthcare needs.[10] Growing evidence links poor oral health with systemic diseases such as cardiovascular and inflammatory conditions, reinforcing the need for targeted oral health assessments and interventions.

Although studies from other Indian prisons have documented poor oral health and high prevalence of dental diseases[14-17] no such data exists for the Central Jail in Patna, Bihar. Therefore, this study was undertaken to assess the oral health status and treatment needs of prisoners in Central Jail, Patna, Bihar.

Material and Methods

The present cross-sectional research was conducted among prisoners of Central Jail, Patna, Bihar, to assess the oral health status and treatment needs of prisoners during 1 year. Ethical clearance was taken from Surendera Dental College and Research Institute, Sri Ganganagar, and the Ethical Clearance Certificate was obtained (SDCRI/IEC/23/58). Prior permission was taken from the superintendent of Central Jail, Patna, to conduct a study among prison inmates.

A purposive sampling technique was used. The sample size was determined based on the prevalence reported in a previous study by Durga *et a*l.,[18] which investigated the frequency of prisoners with at least one decayed tooth in the Central Jail of Nellore, and found a prevalence of 53.04%.

The sample size was calculated using the formula: $n = z^2pq/d^2$.

Where n = sample size
P = prevalence of dental caries 53.04%
q = free of dental caries (100-p [66%]) = 46.96%
d = allowable error (0.5)
z = point on normal deviation (1.96)

On calculation "n" was equal to 383, which was rounded off to 400.

Inclusion criteria

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

Exclusion criteria

1. The subjects who did not give their consent for oral examination were excluded
2. Subjects with serious mental illness, intellectual disability, and aggressive and uncooperative subjects were excluded from the study due to their limited ability to cooperate
3. Also, patients having <2 teeth present in each sextant on examination were excluded.

The data were obtained through face-to-face interviews using a self-prepared questionnaire, which includes questions regarding sociodemographic factors using the BG Prasad scale socioeconomic status scale 2024.[19] The self-prepared questionnaire included information on: socio-demographic about total family members, family education level, average monthly income before imprisonment and occupation, and the individual's gender, age, any adverse habit (smokeless tobacco, smoking tobacco and alcohol) with duration or frequency, frequency of brushing, Duration of imprisonment and any dental care received during imprisonment. For clinical Examination, the WHO pro forma for adults (2013)[20] was used to evaluate the oral health status among 400 subjects.

The "statistical investigation was carried out using the statistical package for social science (SPSS) (SPSS Version 25; Chicago Inc., USA)." A number of statistical tests were performed on the data to determine the statistical significance of the comparisons. Mean values were used to compare quantitative variables, and proportions were utilized to compare qualitative aspects. A significant threshold of $P < 0.05$ was established.

Results

Table 1 shows demographic data for subjects. It was found that the mean age of subjects was 30.89 ± 5.4. Maximum subjects were in the age group of 25–34 years (29%). Male subjects were 68% and female subjects were 32%. The maximum subjects follow the Hindu religion (60.3%). Most of the subjects were illiterate (58.5%). Most of the subjects were worker (44.5%), and 175 (43.8%) were from lower class. On the basis of duration of imprisonment, it was found that 2.5% had 1–3 years, 50.7% had 3–6 years, 14% had 6–10 years, and 6.8% had >10 years.

Table 2 shows the distribution of subjects according to their oral health practices. The most common methods used for cleaning teeth were neemstick (37.5%), material used was tooth powder (51%). The common method of brushing was horizontal (56.8%), and the frequency of brushing was once a day (64.3%).

Table 3 shows the distribution of subjects according to their adverse habits. 7.8% had a habit of smoking, 17.8% had habit

Table 1: Demographic data of prisoners

Variable	Category	Frequency (%)
Age (years)	18–24	17 (4.3)
	25–34	116 (29.0)
	35–44	80 (20.0)
	45–54	103 (25.8)
	>54	84 (21.0)
	Mean±SD	30.89±5.4
Gender	Male	271 (68.0)
	Female	129 (32.0)
Religion	Hindu	241 (60.3)
	Muslim	91 (22.8)
	Sikh	26 (6.5)
	Christian	11 (2.8)
	Other	31 (7.8)
Education	Illiterate	234 (58.5)
	Primary	75 (8.8)
	Secondary	47 (11.8)
	Higher secondary	22 (5.5)
	Graduate	22 (5.5)
Occupation	Daily wage worker	178 (44.5)
	Commercial operator/professional	98 (24.50)
	Artisan/clerk	39 (9.8)
	Farmer	35 (8.8)
	Unemployed	50 (12.5)
	Other	0
SES	Upper class	15 (3.8)
	Upper middle class	38 (9.5)
	Middle class	69 (17.3)
	Lower middle class	103 (25.8)
	Lower class	175 (43.8)
Duration of imprisonment (years)	1–3	114 (28.5)
	3–6	203 (50.7)
	6–10	56 (14)
	>10	27 (6.8)

SD: Standard deviation, SES: Socioeconomic Status

of alcohol, 11.5% had habit of chewing tobacco, 28.5% had smoking and alcohol, 7.8% had alcohol and chewing, 7.8% had smoking had chewing tobacco, and 19% had habit of smoking with chewing tobacco and alcohol.

Table 4 shows the distribution of subjects according to their oral health status. Mean decayed, missing, and filled teeth (DMFT) score of subjects, and it was found that decayed score was 2.25 ± 1.02, missed score was 1.53 ± 1.25, filled score was 0.56 ± 0.73, and DMFT score was 4.35 ± 1.59. Gingival bleeding was absent in 30.3% and present in 69.8% of subjects. Pocket was absent in 30.3%, 4–5 mm was present in 36% and 6 mm or more was present in 33.8%. 0–3 mm was present in 30.3%, 4–5 mm in 18.5%, 6–8 mm in 28.5%, 9–11 mm in 18.5% and 12 mm or more in 4.3%. 5.5% of subjects had no abnormal condition, 35% had leukoplakia, 38.5% had ulceration, 6.8% had ANUG, 5.3% had candidiasis, and 9% had abscess. No prosthesis was needed in 75.5% subjects, a partial was needed in 12.5% and a complete was needed in 12%.

Table 2: Distribution of subjects according to their oral health practices

Oral health practices	Frequency (%)
Method used for cleaning teeth	
Toothbrush	120 (30)
Finger	110 (27.5)
Neemstick	150 (37.5)
Nil	20 (5)
Material used for cleaning teeth	
Toothpaste	57 (14.2)
Toothpowder	204 (51)
Other	89 (22.3)
Nil	50 (12.5)
Method of brushing	
Horizontal	227 (56.8)
Vertical	148 (37)
Nil	25 (6.3)
Frequency of brushing	
Once a day	257 (64.3)
Twice a day	70 (17.5)
Nil	73 (18.3)

Table 3: Distribution of subjects according to their adverse habits

Adverse habits	Frequency (%)
Only smoking	31 (7.8)
Only alcohol	71 (17.8)
Only chewing	46 (11.5)
Smoking+Alcohol	114 (28.5)
Alcohol+Chewing	31 (7.8)
Smoking+Chewing	31 (7.8)
Smoking+Chewing+Alcohol	76 (19)

Tables 5 and 6 show a comparison of dentition and periodontal status among subjects in relation to the duration of imprisonment, and it was found that duration of imprisonment was statistically significant with missed, filled, and DMFT score with $P < 0.001$.

Discussion

The prison population is a unique and challenging one with many problems, including poor health. Dental diseases can reach epidemic proportions in prison settings. Enhancing dental health can positively impact overall health, although inmates, as a socially marginalized and isolated community, receive insufficient attention from both the government and the profession about their oral health, despite their entitlement to equal health rights. Numerous obstacles arise in the provision of services within the prison system, particularly concerning security protocols, as well as the recruitment and retention of dental personnel amidst high demand and attractive compensation in private practice. There is presently no standardized assessment system.[10,21]

Table 4: Distribution of subjects according to their oral health status

Parameter	Category	Frequency (%)
Dentition status (mean±SD)	Decayed teeth	2.25±1.02
	Missing teeth	1.53±1.25
	Filled teeth	0.56±0.73
	Total DMFT score	4.35±1.59
Gingival bleeding	Absent	121 (30.3)
	Present	279 (69.8)
Periodontal pocket depth	Absent	121 (30.3)
	4–5 mm	144 (36.0)
	≥4 mm	135 (33.8)
Loss of attachment (mm)	0–3	121 (30.3)
	4–5	74 (18.5)
	6–8	114 (28.5)
	9–11	74 (18.5)
	≥4	17 (4.3)
Oral mucosal lesions	No abnormal condition	22 (5.5)
	Leukoplakia	140 (35.0)
	Ulceration	154 (38.5)
	ANUG	27 (6.8)
	Candidiasis	21 (5.3)
	Abscess	36 (9.0)
Prosthetic needs	No prosthesis required	302 (75.5)
	Partial prosthesis required	50 (12.5)
	Complete prosthesis required	48 (12.0)

ANUG: Acute necrotizing ulcerative gingivitis, DMFT: Decayed, missing, and filled teeth, SD: Standard deviation

Table 5: Comparison of dentition status among subjects in relation to duration of imprisonment

Duration	Decayed	Missed	Filled	DMFT
Duration of imprisonment (years)				
1–3	2.4±1.0	1.0±0.9	1.0±0.7	4.4±1.4
3–6	2.1±0.9	1.5±1.1	0.47±0.7	4.2±1.6
6–10	2.3±1.2	2.6±1.5	0.1±0.3	5.0±1.2
>10	2.2±1.0	0.81±0.39	0.22±0.4	3.2±1.6
F	1.548	29.449	30.748	8.786
P	0.202	0.000**	0.000**	0.000**

DMFT: Decayed, missing, and filled teeth

In the present study, the mean age of prisoners was found to be 30.89 years. Maximum prisoners were in the age group of 25–34 years, and least were in the age group of 18–24 years. Our study had similarity with a research conducted by Digra *et al*.,[22] Dhanker *et al*.[23] and Heidari *et al*.[8] where the mean age of the prisoners was found to be 35.26 years, with minimum subject age was 18 years, whereas the maximum was 88 years. This is because the average age of doing crime in these areas was between mid-20s and mid-30s.

In our study, there were more number of male prisoners as compared to female prisoners. Results resembled other research conducted by Heng and Douglas,[10] Mack *et al*.,[24] and Avon.[25] Most research was conducted solely on male prisoners, whereas just one study was identified that focused exclusively on female detainees.

In the present study, prisoners classified on the basis of socioeconomic status were lower class, lower middle class, middle class, upper middle class, and upper class, among which the maximum were from the lower class and lest were from the upper class. The study conducted by Haq *et al*.[26] Their study revealed that most prisoners belong to low-income countries. Addressing barriers to dental access and awareness is imperative. Highlighting the need for tailored outreach to less-educated individuals and emphasizing basic oral hygiene practices, as well as promoting dental visits.[26]

In the present study, maximum prisoners had been sentenced for 3–6 years of imprisonment, followed by 1–3 years, 6–10 years, and >10 years. Study conducted by Dhanker *et al*.[23] 374 (43%) of the 870 prisoners had served <3 years, 283 (32.5%) 3–6 years, 184 (21.1%) 6–10 years, and 29 (3.3%) more than 10 years. Study conducted by Kumar *et al*.[27] found that out of the 532 prisoners, 229 (43%) had been incarcerated for a maximum of 3 years, 158 (29.7%) for 3–6 years, and 145 (27.3%) for 6–10 years.

In our study, most of the prisoners use neemstick and toothpowder in horizontal direction for once day for cleaning teeth. The current findings contrast with those of Osborn *et al*., which reported, respectively.[28] The results of the present study closely resemble those published by Gaiao *et al*.,[29] indicating that fewer than half of the study population utilizes a toothbrush as a cleaning instrument. The stated brushing habits are attributable to the lack of oral hygiene supplies provided by jail authorities, who exhibit no concern for the prisoners' dental health.[29]

According to adverse habits, it was found that most of the prisoners had a habit of consuming alcohol and smoking from the past 5 to 10 years with a frequency of at least 2–5 times a day. Our findings regarding smoking behaviors were consistent with research done on male prisoners by Dahyia and Croucher.[30] According to Christina *et al*.,[31] female prisoners smoked at a significantly higher rate (81%) than male prisoners (71%). This could be the outcome of cultural variations in India. A higher prevalence of smoked tobacco products (cigarettes) among both sexes has been found in certain studies.[32,33] Higher percentages of prisoners using alcohol and illegal drugs have been documented in some studies.[34] Peer pressure, boredom, stress relief, or a mix of these factors could be the cause of this. For apparent reasons, the current study did not assess the usage of illegal drugs. Although illegal drug usage is prohibited in Indian jails, there have been multiple instances where <1% of prisoners have obtained these substances.[34]

In the present study, the mean DMFT score was 4.35, and mean decay score was 2.25, the missed score was 1.53, and the filled score was 0.56, which was very low. The association of DMFT with duration of imprisonment was found to be

Table 6: Comparison of periodontal status among subjects in relation to duration of imprisonment

Duration	1–3 years	3–6 years	6–10 years	>10 years	χ^2	*P*
Gingival bleeding						
Absent	40 (33.1)	75 (62)	6 (5)	0	27.417	0.000**
Present	74 (26.5)	128 (45.9)	50 (17.9)	27 (9.7)		
Pocket						
4–5 mm	39 (27.1)	76 (52.8)	24 (16.7)	5 (3.5)	47.55	0.000**
6 mm or more	35 (25.9)	52 (38.5)	26 (19.3)	22 (16.3)		
Absent	40 (33.1)	75 (62)	6 (5)	0		
Loss of attachment (mm)						
0–3	40 (33.1)	75 (62)	6 (5)	0	82.306	0.000**
4–5	21 (28.4)	31 (41.9)	16 (21.6)	6 (8.1)		
6–8	21 (18.4)	66 (57.9)	22 (19.3)	5 (4.4)		
9–11	21 (28.4)	31 (41.9)	6 (8.1)	16 (21.6)		
12 or more	11 (64.7)	0	6 (35.3)	0		

statistically significant in our study ($P < 0.05$). In contrast to the current study, Nobile *et al*.[35] reported a mean DMFT score of 9.8. The findings of the current study also differ from those of prior research by Salive *et al*.[36] that reported a high DMFT score. In contrast to the current study, a study by Naidoo *et al*.[37] revealed a mean DMFT of 15.45, which was extremely high. Badner and Margolin[38] achieved a mean DMFT of 9.9 in their investigation. A mean DMFT of 22.5 was reported by McGrath.[20] The mean DMFT of 5.22 was reported by Hiremath.[19] This was almost consistent with the findings of the current investigation. Because dental caries is a multifactorial disease influenced by a variety of factors, including lifestyle choices, dietary habits, a lack of oral hygiene practices, and cultural issues before entering the penitentiary, it is prevalent in the current population.

About 70% of prisoners had a pocket depth of 4–5 mm and 6 mm or more. Maximum prisoners had a loss of attachment of 0–3 mm followed by 6–8 mm, 4–5 mm, and 9–11 mm. There was a significant ($P < 0.05$) correlation between loss of attachment, pocket depth, with duration of imprisonment. According to a study by McGrath[20] 12.27% and 6.13% of individuals, respectively, had CPI ratings of three and four. In a research by Corbet *et al*.[39] in southern China, participants had their periodontal health examined; <1% of them had calculus free, healthy periodontal conditions.

The most common type of mucosal lesion found in our study was ulceration, leukoplakia, abscess, ANUG, and candidiasis. Study conducted by Reddy *et al*.[40] found that the prisoners of the central jails in Dharwad, Gulbarga, and Belgaum had a significant frequency of OSMF. The high prevalence of tobacco use may be the cause of this. Young prisoners also had a comparatively high incidence. This illustrates how common tobacco chewing is. In line with research by Pedraza *et al*.[42] on changes in the oral mucosa of prisoners in Mexico, ulcers (mucocutaneous lesions) were more frequently discovered among older inmates. This study believed that the pressures of loneliness and restricted mobility were the primary causes of an increased propensity to smoke during spare time. Therefore, as the time of incarceration increases, the prevalence of oral mucosal ulcers may also increase.[41]

Conclusion

The quality and quantity of dental healthcare provided to and received by prisoners are significantly below acceptable standards. The usage of tobacco and alcohol, and the duration of imprisonment, serve as an aid to poor oral health. It necessitates urgent attention to these at-risk groups, particularly with the factors contributing to their inadequate oral health status. This study emphasizes the need for special attention from the government and voluntary organizations to meet the oral health needs of this special group. Preventive efforts to enhance dental care and provide dental health education are essential to ensure optimal oral health among prisoners. It is essential to identify and comprehend the specific barriers to care for each group.

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