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ORIGINAL ARTICLE

Assessment of Dental Prosthetic Status and Needs Among Prisoners of Haryana, India

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Abstract This cross-sectional study was planned to evaluate the prosthetic status and treatment needs using WHO (1997) format among prisoners of Haryana state, India. 1,393 subjects with age range of 35.26 ± 12.29 years were examined. Of the study subjects, 11 (0.8 %) were completely while 606 (43.5 %) were partially edentulous. Of these 617 subjects, 305 (49.4 %) were edentulous only in posterior region. Dental caries accounted for loss of teeth in 325 (52.7 %) subjects. 44 (7.1 %) subjects were wearing some prosthesis. Regarding dental arch wise prosthetic need, 335 (54.3 %) subjects needed prosthesis in maxillary arch while 482 (78.1 %) needed prosthesis in mandibular arch. With advancing age there was an increase in the number of complete dental prosthesis required. There was no statistically significant difference between length of imprisonment and prosthetic need, except for need of a combination of prosthesis. Only one-fourth of the prisons had a dentist. The prisoners were taken to a hospital outside the prison in case of health needs. Prosthetic needs of prisoners were high. The lack of dental infrastructure in prisons makes the provision for multi-visit conservative dental treatments very difficult leading to higher tooth mortality. People who migrate back and forth across the prisons and communities represent a public health opportunity that should be addressed.

Keywords Prosthetic status · Missing teeth · Prison · Edentulous · Prosthetic need

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Introduction

Although reports, mainly, from developed countries indicate that tooth loss has declined over the past two or three decades, edentulousness remains a problem of considerable magnitude. Tooth loss remains a significant deterrent to oral health and also adversely affects the dietary intake and nutritional status of individuals compromising their general health [1]. Tooth loss was listed as the second most frequent cause of disability amongst the elderly after cataract [2]. The major reason for tooth loss has been mentioned to be periodontal disease by some [3] while dental caries [1, 4–6] by others. Apart from oral diseases various non disease indicators such as socio-demographic factors, dental attitudes and dental utilization behaviours have shown to be associated with tooth mortality. Tooth loss is therefore considered as an outcome of a complex interaction between disease and non-disease entities [1, 7].

Prisoners carry a much greater burden of illness than other members of the society. They harbour diseases that are determined both by the environment out of which they come and by the prison in which they live. The lack of

concern, facilities and expertise further deteriorates their health [8, 9]. Health care systems in Indian prisons are built on the model of "access by demand" and triage for a level of care felt appropriate by people other than the patient him/herself. It is difficult to expect oral health to be a priority in such settings and extraction of teeth can become a thing of common parlance while these teeth can be easily restored and saved.

Prosthodontic rehabilitation has the ability to reduce and in many respects eliminate the deficits attributable to lost teeth [1]. Epidemiological data on health and its related issues are very important in order to plan for future health care provision [2]. There are few published studies on the oral health of the prisoners [9–11] and none regarding prisoners in Haryana. Haryana is one of the 29 states of India consisting of 21 districts. This study is an attempt to determine the dental prosthetic status as well as needs of prisoners of Haryana state, India.

Materials and Methods

A cross-sectional survey regarding prosthetic status and treatment needs was conducted. The study was conducted after obtaining permission from Director General of Prisons (DGP), Haryana state, and clearance from the institutional ethical committee. This study was part of a larger study regarding oral health status and treatment needs, conducted between September 2007 and June 2008. The pilot study was conducted at District jail, Kurukshetra on 98 subjects to assess the feasibility.

Study population consisted of prisoners of all the 19 prisons of Haryana. The inclusion criterion for the study was being for a minimum 6 months period in the prison irrespective of being a convict or an under trial or any other previous history of imprisonment. Access to the prison records was prohibited hence the random allocation of the subjects for the study was left to the prison authorities. In each prison, one police official was assigned to randomly pick the prisoners from each cell and ask them for their wish to participate. A total number of 1,393 subjects were examined and the data collected.

The age range of the study subjects was 18–88 years. Subjects were interviewed regarding information on demographic and health details. Occupation was categorized based on the UK Registrar General's classification [12] which is widely accepted also in India and education was classified based on Kuppuswamy's Scale [13]. Of the WHO Oral Health Survey [14], data regarding prosthetic status and needs along with reasons for missing teeth is presented here. Neither the need for removable or fixed prosthesis nor the subjects' opinion was taken regarding the prosthetic needs. The subjects were examined using mouth mirrors and Community Periodontal Index (CPI) probe under adequate illumination. A single examiner (VB) conducted the examinations in all the prisons.

The data were recorded with the help of a recorder who was also part of the team. The data were analyzed with SPSS version 13.0 using χ^2 test at a significance level of $p < 0.05$.

Results

In the present study, 1,393 subjects were examined. The subjects mean age was 35.26 ± 12.29 years. 27.5 % (383) subjects were illiterate while 34.7 % (483) subjects belonged to class IV (partly skilled) occupation prior to imprisonment. Only 481 (34.5 %) subjects had visited a dentist for their dental treatment ever in their life. Of the study subjects, 11 (0.8 %) were completely while 606 (43.5 %) were partially edentulous. Of these 606 subjects, 56 (9.2 %) were edentulous only in anterior region, 305 (50.3 %) only in posterior region whereas 256 (42.2 %) in both anterior as well as posterior region (Table 1).

Regarding missing teeth, dental caries accounted for loss of teeth in 325 (52.7 %) subjects, other reasons accounted for tooth loss in 213 (34.5 %) subjects whereas 79 (12.8 %) subjects had lost teeth because of a combination of both the reasons (Table 2).

The mean tooth loss was 0.83 ± 2.13 due to dental caries while 1.38 ± 4.61 due to other reasons.

Inmates who had stayed in prison for more than 5 years had 2.98 ± 5.56 mean number of missing teeth as compared to 1.95 ± 4.32 in those since less than 1 year imprisonment but this relation was not statistically significant.

Table 1 Status of edentulousness

Edentulousness	Number of subjects
Complete	11 (0.8 %)
Partial	606 (43.5 %)
Total subjects	1,393 (100 %)
Only anterior	56 (9.2 %)
Only posterior	305 (50.3 %)
Both anterior and posterior	256 (42.2 %)
Total partially edentulous	606 (100 %)

Table 2 Reasons for missing teeth

Reason for tooth loss	Number of subjects
Dental caries	325 (52.7 %)
Other reason	213 (34.5 %)
Combination of caries and other reason	79 (12.8 %)

50 (8.1 %) subjects were wearing some prosthesis; 32 (5.2 %) in maxillary arch and 18 (2.9 %) in mandibular arch (Table 3). Regarding dental arch wise prosthetic need, 335 (54.3 %) subjects needed prosthesis in maxillary arch while 482 (78.1 %) needed prosthesis in mandibular arch (Table 4). With advancing age there was an increase in the number of complete dental prosthesis required. A statistically highly significant difference was obtained between age and type of prosthesis required by the subjects ($p < 0.01$, χ^2) (Table 5). There was no statistically significant difference between length of imprisonment and prosthetic need, except for need of a combination of prosthesis (Table 6). Only one-fourth of the prisons had a full time/part time dentist. The prisoners were taken to a government hospital in case of health needs.

Discussion

There are a limited number of studies conducted in prison set-ups, especially in India [8].

The demographic findings of the subjects suggest them to be from poor socio economic background. A very high number of subjects were partially edentulous. The mean tooth loss was higher while the number of edentulous subjects possessing prosthesis was low as compared to the general population of Haryana [15]. This is because correctional health services are organized as "sick call", a system of request for care of health problem and triage to the appropriate level of care [16]. The lack of dental infrastructure in prisons makes the provision for multi-visit conservative dental treatments very difficult. Providing dental health services to prisoners, outside the prison walls, presents a number of challenges with security concerns vying with the need to provide effective oral health care to inmates [10]. Hence, single visit treatments like extractions become the treatment of choice when the subjects are referred to a hospital outside the prison premises. This was similar to that reported by Lin et al. [17] and Luan et al. [18], in rural China where extractions, in absence of adequate dental infrastructure, had rendered a large number of subjects edentulous. As dental caries and periodontal diseases are largely preventable diseases, the restorative therapeutic approach which often fails to address the fundamental bacterial nature of dental diseases and usually lead to a repeat restorative cycle should be overtaken by a primarily preventive approach along with an additional benefit of a lower cost [19].

Contrarily, high tooth loss in this population could be because of the poor awareness or low paying capacity of the subjects which might have led many of them edentulous even before admitting to the prisons. Majority of the subjects were edentulous in posterior region which shall negatively affect the functional capability of the dentition. Similar to several reports [1, 17, 20] dental caries was reported to be the causative agent for the loss of teeth in majority of the subjects which is contrary to that reported by Kumar et al. [21]. The prosthesis present as well as their need was higher in upper arch as compared to lower this finding is similar to that reported by Reddy et al. [22] If dentists take a less interventionist approach, checking as well as treating dental diseases with preventive and strictly tooth-preserving methods, dental treatment can result in healthy mouth. This can be an important step for developing countries that are seeking to integrate dental care into their health care system [19].

Subjects with imprisonment more than 5 years had higher number of missing teeth as compared to subjects with imprisonment less than 1 year. However, the relation of length of imprisonment with missing teeth was not significant. The relation of prosthetic needs with length of imprisonment was also not statistically significant. Hence increase in the period of imprisonment has not been found to be resulting in greater tooth loss. There was a higher need for prosthesis in mandibular arch while a higher number of subjects possessed prosthesis in maxillary arch. The reasons for this preference for the restoration of maxillary arch as opposed to mandibular arch need to be explored.

The health of the prisoners is an important part of the nation's health. People who migrate back and forth across the "border" between prisons and communities represent a public health opportunity that can be addressed if and when there is a safety net that serves these citizens while they are

Table 3 Showing existing prosthetic status

Prosthesis present	*N*	Maxillary arch	Mandibular arch
Bridge	5	2	3
Partial denture	36	27	12
Complete denture	3	3	3
Subjects possessing prosthesis	50 (8.1 %)	32 (5.2 %)	18 (2.9 %)

Percentages based on edentulous subjects (617)

Table 4 Showing prosthetic needs

Prosthesis needed	Maxillary arch	Mandibular arch
One unit prosthesis	130 (21.1 %)	205 (33.2 %)
Multi unit prosthesis	43 (7.0 %)	48 (7.8 %)
A combination of one and/or multi unit prosthesis	126 (20.4 %)	189 (30.6 %)
Full prosthesis	36 (5.8 %)	40 (6.5 %)
Total subjects needing prosthesis	335 (54.3 %)	482 (78.1 %)

Percentages based on edentulous subjects (617)

Table 5 Showing comparison of age with prosthetic needs

Age (years)	Need one unit prosthesis*	Need multi unit prosthesis*	Need a combination*	Need complete prosthesis*
≤24 ($n = 279$)	25 (9.0 %)	2 (0.7 %)	10 (3.6 %)	0 (0 %)
25–34 ($n = 465$)	109 (23.4 %)	25 (5.4 %)	56 (12.0 %)	1 (0.2 %)
35–44 ($n = 351$)	101 (28.8 %)	24 (6.8 %)	63 (18.0 %)	6 (1.7 %)
45–54 ($n = 172$)	38 (22.1 %)	18 (10.5 %)	63 (36.6 %)	14 (8.1 %)
55–64 ($n = 85$)	29 (34.1 %)	14 (16.5 %)	42 (49.4 %)	11 (12.9 %)
>=65 ($n = 41$)	4 (1.0 %)	5 (1.2 %)	14 (34.2 %)	15 (36.6 %)
Total ($n = 1393$)	306 (22.0 %)	88 (6.3 %)	248 (17.8 %)	47 (3.4 %)

n number of subjects

* $p < 0.01$

Table 6 Showing comparison of length of imprisonment with prosthetic needs

Length of imprisonment	Need one unit	Need multi unit	Need a combination*	Need full prosthesis
0.5–1 year (447)	93 (20.8 %)	23 (5.2 %)	83 (18.6 %)	12 (2.7 %)
>1–2 years (287)	61 (21.3 %)	21 (7.3 %)	41 (14.3 %)	11 (3.8 %)
>2–5 years (397)	86 (21.7 %)	22 (5.5 %)	58 (14.9 %)	12 (3.0 %)
>5 years (262)	66 (25.2 %)	22 (8.4 %)	66 (25.2 %)	12 (4.6 %)

n number of subjects

* $p < 0.05$

detained and when they return to their communities. To help people be all that they can be, we must pay attention to their entire well-being. In the present study sampling was more of convenient nature (because of the constraints applied) and comprised of the prison inmates who were allocated by the prison authorities. Further studies are needed, utilizing permissions from higher authorities to access the prison records, hence using a more random allocation of the subjects to the study.

In the present study we have assessed the presence of dental manpower in the prisons. Very few prisons had a dentist. The study did not assess the presence and the adequacy of the resources and the tools required for dental care delivery. In case the prisons with a dentist posted do not possess an adequately functional dental set-up, over-enthusiastic recommendation of posting dentists in prisons lacking them would be of no use. Hence we first need to assess the presence and the adequacy of dental set ups in prisons through further studies.

The lack of dental infrastructure in prisons makes the provision for multi-visit conservative dental treatments very difficult leading to higher tooth mortality.

Conclusion

This study explores the prosthodontic status and needs of the subjects residing in prisons. The prosthetic needs of the prisoners were found to be high. Because oral health is inextricably linked to overall health, as well as to self-esteem, we have a responsibility to ensure that oral health services are available and accessible as part of our health care delivery systems both within and outside prison walls [11]. There is a need to learn lessons from developed countries where dental care in prisons is easily available.

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