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## Research Article

### A CROSS-SECTIONAL STUDY ON THE PERIODONTAL HEALTH STATUS OF JAIL INMATES OF VISAKHAPATNAM CITY ANDHRA PRADESH

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#### ABSTRACT

**Background and objectives:** Prisoners are a social group likely to have psychological problems which may cause them to ignore their oral hygiene. This study was conducted with the objective of evaluating the periodontal health status of prisoners and to correlate the same with possible contributing factors.

**Materials and methods:** The study was conducted in the Central prison, Visakhapatnam. The test group consisted of 180 male prisoners whose oral and mental status was assessed by a structured questionnaire which included data on occupation prior to entering prison, occupation in prison, education level, duration of stay in prison, type of imprisonment, frequency of meeting their family, provision for maintaining oral hygiene in prison, previous dental history, family history, diet, personal habits and their oral hygiene practices. The control group consisted of 180 male individuals attending the outpatient clinic, Dept of Oral Medicine & Radiology, GITAM Dental College & Hospital Visakhapatnam. Oral hygiene and periodontal status was assessed using clinical parameters like oral hygiene index simplified, community periodontal index and sulcus bleeding index.

**Results:** The oral hygiene index and community periodontal index were found to be significantly higher in the prison group ( $p < 0.05$ ). On the contrary, the sulcus bleeding index was found to be slightly lower in the prison group in comparison to the control group ( $p > 0.05$ ). Based on the duration of stay in prison, individuals who have been imprisoned for longer duration had poor clinical attachment level and oral hygiene.

**Conclusion:** Within the limits of this study, it can be concluded that prisoners have compromised general, oral and periodontal health compared to the general population. They exhibited poor oral health, which may be due to their lifestyle, psychological stress and inappropriate access to health care.

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#### INTRODUCTION

Prison is an environment with special difficulty in the maintenance of health. At the individual level, prison takes away autonomy and may inhibit or damage self-esteem. Prison populations mainly comprise individuals from those sections of society with high levels of poor health and social exclusion

(Heidari *et al*, 2008). Prisoners tend to have poorer physical, mental and social health than the general population and their lifestyles are more likely to put them at risk of ill health. Many prisoners have had little or no regular contact with health services before entering prison. On entering prison, individuals lose out on the environment conducive to health (family and social support, information and healthy surrounding) and the

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prison environment also poses a threat to mental well-being, especially personal security (Jurgens *et al*, 2007).

These individuals, under psychological stress, tend to adopt behavioral changes like neglect of their oral hygiene, smoking and clenching or grinding of teeth (Jurgens *et al*, 2007).

In 1969 Ringsdorf and Cheraskin discovered that mental stress could influence life-style and dental hygiene habits. This influence was not only the decrease of the frequency as well as the quality of the dental hygiene but also the increase of tobacco use and alcohol consumption, changes in food habits leading to a diminution of the general health (Reners and Breex, 2007). This was also recently confirmed by Sateesh et al. Linden et al. also have reported on the positive relationship between stress and the progression of periodontitis.

### Aims and Objectives

The aim of this study was to correlate a positive relation between stress and periodontal health status of prisoners in India. The objective of this study was to evaluate the periodontal health status of prisoners and to correlate the same with possible contributing factors.

## MATERIALS AND METHODS

### Study design

The present study was conducted at Central Prison, Visakhapatnam district, Andhra Pradesh. The study was approved by the Deputy Inspector General of Central Prisons, Rajahmundry and the ethical committee of GITAM Dental College & Hospital, Visakhapatnam.

The study included 360 subjects. These subjects were included under two groups:

**Group I (Test group):** This group included 180 male individuals who were imprisoned in Central Prison, Visakhapatnam dist, Andhra Pradesh. The mean age of these individuals was  $37.19 \pm 10.71$  years. This group was further subdivided into four groups based on the duration of stay in prison.

- Group Ia: Included individuals who were in prison for the past 1 to 3 years.
- Group Ib: Included individuals who were in prison for the past 3 to 6 years.
- Group Ic: Included individuals who were in prison for the past 6 to 9 years.
- Group Id: Included individuals who were in prison for more than 9 years.

### Group II (Control group)

This group included 180 male individuals who attended Out Patient ward, Dept of Oral Medicine & Radiology, GITAM Dental College & Hospital Visakhapatnam. The mean age of these individuals was  $35.23 \pm 12.70$  years. Informed consent was taken from all individuals.

All participants completed a structured interview before undergoing an oral examination. Different questionnaires were employed for the test group (prisoners) and the control group. Questionnaire for the prisoners included data on occupation prior to entering prison, occupation in the prison, educational level, duration of stay in the prison, type of imprisonment (simple / rigorous), frequency of meeting their family, provision for maintaining oral hygiene in the prison, previous dental history, history of medication, family history, diet,

personal habits like smoking, alcohol and their oral hygiene practices.

Questionnaire for the control group included data on occupation, educational level, past dental history, history of medication, family history, diet, personal habits and oral hygiene practices.

### Clinical parameters measured were:

Oral hygiene index simplified (OHI-S) (Silness and Loe,1964) Community periodontal index (CPI) which included both community periodontal index (CPI) and clinical attachment loss (CAL) (Pischon *et al*, 2008)

Sulcus bleeding index (SBI) (Loe and Silness, 1963)

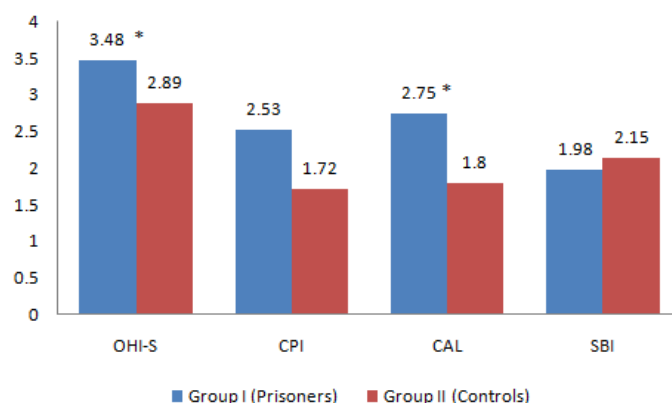
All the parameters were measured by a single examiner and the stress level was assessed using the questionnaire.

### Statistical Analysis

Fisher test (F Test) and ANOVA test were used for statistical analysis of periodontal parameters between test group and control group. Independent student t test was used to assess correlation between smokers and non-smokers for clinical attachment loss and community periodontal index p value less than 0.05 was considered significant in this study.

## RESULTS

Oral hygiene index simplified (OHI-S): When compared to group II, group I had a significantly higher scores of OHI-S ( $p < 0.05$ ). (Figure 1)



**Figure 1** Comparison of Oral hygiene Index simplified (OHI-S), Community Periodontal Index (CPI & CAL) and Sulcus Bleeding Index (SBI) among Groups \* $p < 0.05$

Community periodontal index (CPI and CAL): When compared to group II, group I had a higher scores of CPI and CAL ( $p < 0.05$ ). Furthermore CPI did not differ significantly between group I and group II ( $p > 0.05$ ) (Figure 1).

Sulcus bleeding index (SBI): On the contrary, the sulcus bleeding index was found to be slightly lower in the group I when compared to group II (Figure 1).

Based on the duration of stay in the prison, among the four groups described, periodontal parameters (CPI, CAL) were found to be worse in Group Id, and oral hygiene index was found to be worse in the Group Ic. However the differences were not found to be statistically significant among the groups ( $p > 0.05$ ) (Figure 2)

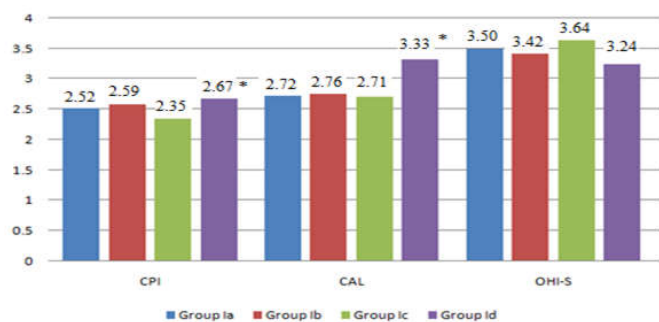


Figure 2 Comparison of Community Periodontal Index (CPI & CAL) and Oral hygiene Index simplified (OHI-S) within the prison group \*p<0.05

The initial interview of the prisoners showed that most of them were smokers. To assess the influence of smoking on these individuals, all the periodontal parameters were evaluated among smokers and non-smokers in the prison. The results depicted that community periodontal index (CPI) was significantly higher in the smokers in comparison to non-smokers (p<0.05). In the smokers' category, clinical attachment loss (CAL) was found to be higher than the community periodontal index (CPI) (Figure 3).

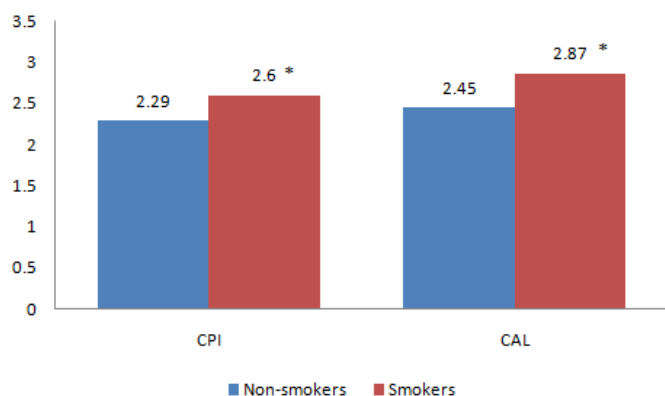


Figure 3 Comparison of Community Periodontal Index (CPI & CAL) among smokers and non-smokers in the prison group \*p<0.05

## DISCUSSION

Despite an awareness of the predisposing factors for chronic periodontitis, the understanding of the differences in the prevalence of periodontal disease in different niches in the oral cavity and in different groups of people, remains little understood. Prisoners constitute a special category of individuals in whom the periodontal status may be different from other individuals and this suggests that they may be in need of periodontal treatment (Gupta *et al*, 2006).

In the current study, prisoners were having significantly poor oral hygiene compared to control subjects. Most of the subjects in the prison group were found to have periodontitis with significant CPI and CAL values (p<0.05). This finding may be attributed to psychological stress invariably associated with imprisonment. Psychosocial stress which is a significant risk indicator for periodontal disease has a direct effect on the hypothalamic - pituitary – adrenal cortex axis (Gupta *et al*, 2011). It is hypothesized that prolonged activation of this axis releases cortisol and neurotransmitters, which results in an immunosuppression that increases the potential for destruction

by periodontal pathogens (Carranza, 2006; Linda *et al*, 2002). This could also probably be attributed to risk factors like improper maintenance of oral health, imbalanced diet, xerostomia and smoking. Other factors such as sugar based medication, fear and anxiety could also contribute to advanced periodontal involvement (Jurgens *et al*, 2007).

In contrast, sulcus bleeding index (SBI) was found to be lower in prisoners when compared to control subjects. The reason for this may be the presence of larger number of smokers in the prison group. Smoking exerts strong, chronic, and dose dependent suppressive effect on gingival bleeding. Thus, smoking is found to be a confounding factor in the study (Thomas and Jean, 2004).

Based on the duration of stay in the prison, Group Id (> 9 years) prisoners showed significantly worse periodontal status. This effect might be due to the cumulative effect of psychological stress, personal negligence, habits, improper maintenance, long time inaccessibility to treatment etc. which could result in poor periodontal status (Zukri and Hassim, 2010). Furthermore, the impact of stress on periodontium may not merely be related to its presence or absence but related to the type and duration of stress and how an individual copes with it.

In this study, smokers amongst prisoners had significantly higher clinical attachment loss (CAL) as compared to non-smokers (p < 0.05) and as compared to control subjects. Smoking has its effect on attachment loss and difference in patterns of bone loss (Socransky and Haffajee, 2001).

## CONCLUSION

The oral health of the prison population in the Central Prison, Visakhapatnam dist, Andhra Pradesh was more compromised when compared with that of general population. Psychological stress and unhealthy behaviors such as tobacco smoking, diets high in sugar content, improper oral hygiene were common. The high turnover of prisoners and high demand for emergency care makes the delivery of preventive and routine dental care difficult. As oral health is inextricably linked to overall health as well as to self-esteem, prison services and dental professionals should take the lead in the provision of oral and periodontal care to prisoners (Henrie Allan, 2005).

The following suggestions can be made based on the present study:

Dental screening should be integrated with medical screening in order to identify prisoners who require referral to specialist dental services.

Prison establishments should introduce oral health education programs, along with an emphasis on the effects of smoking and unhealthy eating in relation to oral health.

Stress reduction protocol should be incorporated for prisoners by means of psychological counselors in the prison.

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