

# Oral Health Status and Oral Health Related Quality of Life Among Prisoners in Central Prison of Nellore District - A Cross Sectional Study

Dr. Desu Ravali Durga<sup>1</sup>, Dr. R V S Krishna Kumar<sup>2</sup>, Dr. G Srinivasulu<sup>3</sup>,  
Dr. P. Symon Prasanth<sup>4</sup>

<sup>1,2</sup>Department of Public Health Dentistry,  
Narayana Dental College and Hospital, Dr. YSR University of Health Sciences, Nellore, India

Corresponding Author: Dr. Desu Ravali Durga

DOI: <https://doi.org/10.52403/ijrr.20230334>

## ABSTRACT

**INTRODUCTION:** Prisoners are unique population with many oral health problems. Prisoners are psychologically, socially, morally and economically affected group, which makes them to neglect their oral health. Oral Health Impact Profile (OHIP-14) was the most widely used instrument to assess the Oral health-related quality of life (OHRQoL) in an individual. Few studies have observed that oral hygiene status of the prisoners is poor and there is a higher prevalence of dental caries and periodontal diseases.

**AIM & OBJECTIVE:** The aim was to evaluate the dental caries status, periodontal status, and the OHRQoL among prisoners of Nellore District. In addition, it is an attempt to find the effect of dental caries and periodontal disease on OHRQoL.

**MATERIALS AND METHODS:** A cross sectional study was conducted to assess dental caries, periodontal health status, and oral health-related quality of life (OHRQoL) in prisoners of Nellore district. The Oral Health Impact Profile -14 questionnaires was given to the participants followed by Oral health status was assessed using the WHO Oral Health Assessment Form (2013).

**RESULTS:** A total of 115 prisoners were included in the study. The prevalence of dental caries was 53.1% with mean DMFT of  $2.6 \pm 3.5$ . Pockets measuring 4-5mm was observed among 10.4% and >6 mm was observed among 21.7% of prisoners. LOA was seen among 27.8% of prisoners. A significant correlation was found

between OHIP-14 with Dental caries and periodontal diseases.

**CONCLUSION:** This study concluded that periodontal health and dentition status was poor among prisoners due to lack of accessibility to dental care and dental health education.

**Keywords:** Oral health, oral health-related quality of life (OHRQoL), prison inmates, dental caries, periodontal disease, loss of attachment.

## INTRODUCTION

Oral health is considered as an essential part of general health and they are linked together; indicating that no one can have one without having the other. Various factors such as socioeconomic status, education, income are responsible for maintaining good oral health.<sup>[1]</sup> Each group of population requires a different health care approach, by identifying and studying their health problems.<sup>[2]</sup> Many oral health surveys have targeted children, adolescents, and adults from the normal population.<sup>[3]</sup> Among these groups, Prisoners are unique population with many oral health problems.<sup>[4]</sup> Prisoners are psychologically, socially, morally and economically affected group, which makes them to neglect their oral health.<sup>[5-7]</sup> Plan of providing dental health services in prison, stood as a challenging part as the dental instruments used while screening and treatment are

sharp in nature, which makes difficult task for jail authorities to provide safety of dentist against prisoners.<sup>[8-10]</sup>

Oral health-related quality of life (OHRQoL) is as an individual's assessment of how the functional factors, psychological factors, social factors, and experience of pain/discomfort in relation to orofacial concerns affects his or her well-being. Oral Health Impact Profile (OHIP-14) was the most widely used instrument. The responses are scored on a five-point Likert scale, from never to very often.<sup>[2]</sup> Few studies carried out in other parts of the world, in a prison setup, have observed that the oral hygiene status of the prisoners is poor compared to the general population and there is a higher prevalence of dental caries and periodontal diseases.<sup>[8,11-13]</sup> There are few studies done in India with regard to the oral health related quality of life, dental caries and periodontal health status among the prisoners, and hence, the information regarding the dental and periodontal status of prisoners is scant. As the information is sparse, the present study was conducted to evaluate the dental caries status, periodontal status, and the OHRQoL in the prison inmate population of Central prison of Nellore, Andhra Pradesh, India. In addition, an attempt has been taken to observe the effect of dental caries and periodontal disease on OHRQoL.

## **MATERIALS & METHODS**

### **ETHICAL CLEARANCE**

Approval for the study was obtained from the Institutional Ethical Committee, Narayana Dental College and Hospital, Nellore. An informed consent was taken from all the participants in the study. The necessary permission was obtained from the jail authorities to conduct the study.

### **STUDY DESIGN**

A descriptive cross-sectional study was conducted at central prison in Nellore district to assess dental caries levels, periodontal health status, and oral health-related quality of life (OHRQoL) among prisoners. The study was performed in the

Dental wing of the hospital of the Central prison. Only those who were available on the day of study and who gave informed consent were included. The study was conducted for a period of 3 months from February-April 2022.

A total of 115 participants were enrolled and OHRQoL of prisoners was assessed using the pre-validated OHIP-14 questionnaire which was back translated from English to local language Telugu by two persons who were experts in both English and Telugu. The Telugu version was then back translated into English. The both versions were compared to verify that the questions were properly translated. Then the OHIP-14 questionnaire was personally distributed among prisoners for data collection. Assistance was given to those who needed help in understanding the questions. The majority of participants reported that questions were simple to understand, and it took 5-10 minutes to fill the questionnaire.

After completion of questionnaire, clinical examination was carried out by single examiner. The prisoners were asked to sit comfortably on a chair in a well-ventilated room and clinical examination was carried out under natural light with a mouth mirror and a Community Periodontal Index and Treatment Needs-E probe. Recordings for dental caries and periodontal status were done using decayed missing and filled teeth index (DMFT), community periodontal index (CPI) and Loss of attachment (LOA) by using WHO oral health assessment form 2013.<sup>[14]</sup> General information about the age, gender and years of imprisonment was recorded as well. The intra-examiner reliability was checked using test and retest method, which yielded good intra-examiner agreement (kappa value 0.85).

### **VALIDITY AND RELIABILITY OF THE QUESTIONNAIRE:**

In the present study, a pre-validated OHIP-14 questionnaire was used as a study tool.<sup>[2]</sup> The OHIP-14 questionnaire was pilot tested among 10 prisoners to assess the reliability

and the results obtained by test - retest (Cronbach's Alpha) was 0.87 which showed a high agreement. These 10 prisoners were not included into the main study.

**INCLUSION CRITERIA:** All the prisoners who gave informed consent and who were willing to participate were included in the study.

**EXCLUSION CRITERIA:**

1. Uncooperative prisoners
2. Prisoners who were systemically unhealthy
3. Prisoners who don't give any informed consent were excluded from the study.

**DATA COLLECTION**

A total of 115 prisoners were participated in the study. A pre validated OHIP-14 questionnaire which consists of 14 questions was used to measure the OHRQoL among prisoners by assessing the 7 domains: Functional limitation; Physical discomfort; Psychological discomfort; Physical disability; Psychological disability; Social disability and Handicap. The responses are scored on a five-point Likert scale ranging from never (0), hardly ever (1), occasionally (2), fairly often (3), and very often (4) and calculated by adding responses to all 14 questions, with scores ranging from 0-56. The higher the OHIP-14 score indicates the poorer OHRQoL. Further assessment of dental caries and periodontal status was done using decayed missing and filled teeth index (DMFT), community periodontal index (CPI) and Loss of attachment (LOA) by using WHO oral health assessment form 2013. In present study, periodontal pockets of 4-5 mm considered as shallow pockets and 6mm or more considered as deep pockets, where both were defined as periodontal disease.

**STATISTICAL ANALYSIS**

The data was collected, compiled and entered into Microsoft excel 2013, Statistical analysis was performed using Statistical package for social sciences

(SPSS Inc., Chicago, IL, Version 25 for Windows) and descriptive statistics such as mean, proportions and Standard deviations were prepared. Spearman's correlation was done to assess the relation between OHIP-14 with Age, Duration of imprisonment, DMFT and Periodontal diseases.

**RESULT**

In this study, a total of 115 prisoners were completed the given OHIP-14 questionnaire and underwent clinical examination. Overall, response rate was about 100% and received questionnaires and clinical examination results were used in the analysis. The overall prevalence of dental caries was 53.1% among the prisoners.

**Figure 1** shows the distribution of subjects according to their age. Among 115 prisoners the age group distribution was as follows: <25 years of age: 10.4%, 25-34 years of age: 25.2%, 35-44 years of age: 36.5%, 45-54 years of age: 18.3%, and >54 years of age: 9.6%.

**Table 1** shows the distribution of study subjects according to duration of imprisonment. About 27 (23.4%) of prisoners were serving their term of 1-2 years, 21(18.3%) of them were serving their term of 3-4 years, 37(32.2%) of them were serving their term of 5-6 years and 30(26.1%) of them were serving their term of >6 years.

**Table 2** shows the distribution of study subjects according to caries prevalence and treatment needs. The mean DMFT was  $2.6 \pm 3.5$  among all groups. The mean DMFT was higher among > 54 year age group with  $4.6 \pm 7.1$  and lower among 25-34 year age group with  $1.7 \pm 2.2$ . The mean decayed teeth was higher among <25 year age group with  $1.7 \pm 2.8$ , mean missing teeth was higher among >54 year age group with  $4.4 \pm 7.21$  and mean filled teeth was higher among 35-44 year age group which was  $0.26 \pm 0.8$  respectively. Presence of at least one decayed tooth and one missing tooth was high among 35-44 year age group which was 24(39.3%) and 19(38.8%). At least one

tooth requires treatment due to dental caries was higher in the age group 35-44 year age group which was 22(40%).

**Table 3** shows the distribution of study subjects according to periodontal status and Loss of attachment. It was found that only 34(29.5%) of prisoners had healthy periodontium and 81(70.4%) were presented with bleeding gums. Shallow pockets of 4-5 mm were observed among 10.4% of total prisoners and found higher among 35-44 year age group with 58.3%. Deep Pockets of >6 mm was observed among 7.8% of total inmates and found higher among >54 year age group with 36%. Loss of Attachment (LOA) was found to be higher in the age groups of 35-44 years and >54 year age group which was 35.2 & 31.2% respectively.

**Table 4** shows the distribution of responses for the OHIP-14 questionnaire among prisoners. The higher mean of 1.65±0.84

was seen for the question - Have you had painful aching in your mouth, followed by 1.44±0.98 for question - Have you found it uncomfortable to eat any foods because of problems with your teeth or mouth. The lower mean of 0.20±0.56 was seen in question - Have you felt that your sense of taste has worsened because of problems with your teeth or mouth and followed by 0.21±0.60 for question - Have you felt that life in general was less satisfying because of problems with your teeth or mouth.

**Table 5** shows the correlation between OHIP-14 with age, duration of imprisonment, DMFT & periodontal diseases. It shows a statistically significant relation between OHIP-14 with age (p value-0.02), DMFT (p value-0.01) and periodontal diseases (p value-<0.001) respectively. A negative correlation was found between OHIP-14 and duration of imprisonment (p value-0.91).

Figure 1: Age details of study participants

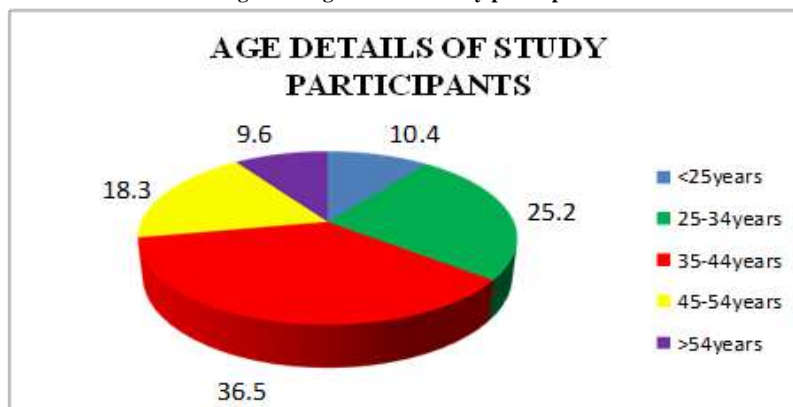


Table 1: Distribution of study subjects according to duration of imprisonment

| Years of imprisonment | Total (%) |
|-----------------------|-----------|
| 1-2 years             | 27(23.4)  |
| 3-4 years             | 21(18.26) |
| 5-6 years             | 37(32.17) |
| >6 years              | 30(26.1)  |

Table 2: Caries prevalence and treatment needs in the prisoners

| DENTAL HEALTH INDICATORS              | <25 YEARS |          | 25-34 YEARS |          | 35-44 YEARS |          | 45-54 YEARS |          | >54 YEARS |           |
|---------------------------------------|-----------|----------|-------------|----------|-------------|----------|-------------|----------|-----------|-----------|
|                                       | N(%)      | MEAN ±SD | N(%)        | MEAN ±SD | N(%)        | MEAN ±SD | N(%)        | MEAN ±SD | N(%)      | MEAN ±SD  |
| DMFT                                  |           | 2.0±3.3  |             | 1.7±2.2  |             | 2.71±1.4 |             | 2.8±3.5  |           | 4.6±7.11  |
| DT                                    |           | 1.7±2.8  |             | 1.03±1.7 |             | 1.21±1.4 |             | 1.04±1.2 |           | 0.27±0.64 |
| MT                                    |           | 0.25±0.6 |             | 0.62±1.4 |             | 1.23±2.2 |             | 1.8±3.5  |           | 4.4±7.21  |
| FT                                    |           | 0.8±0.3  |             | 0.10±0.6 |             | 0.26±0.8 |             | 0.14±0.5 |           | 0.0±0     |
| ATLEAST ONE DECAYED TOOTH             | 5(8.2)    |          | 17(27.9)    |          | 24(39.3)    |          | 13(21.3)    |          | 2(3.3)    |           |
| ATLEAST ONE MISSING TOOTH             | 2(4.1)    |          | 8(16.3)     |          | 19(38.8)    |          | 11(24.4)    |          | 9(18.4)   |           |
| ATLEAST ONE TOOTH REQUIRING TREATMENT | 4(7.3)    |          | 15(27.3)    |          | 22(40)      |          | 12(21.8)    |          | 2(3.6)    |           |

**Table 3: Distribution of study subjects according to periodontal status and LOA**

| AGE GROUPS   | HEALTHY n(%) | BLEEDING n(%) | PERIODONTAL POCKETS 4-5mm(shallow) n(%) | PERIODONTAL POCKETS 6mm (deep) n(%) | LOSS OF ATTACHMENT n(%) |
|--------------|--------------|---------------|---|-------------------------------------|-------------------------|
| <25YEARS     | 8(23.5)      | 4(4.9)        | 0(0)                                    | 0(0)                                | 0(0)                    |
| 25-34 YEARS  | 16(47.1)     | 13(16)        | 1(8.3)                                  | 3(10.3)                             | 4(12.5)                 |
| 35-44 YEARS  | 8(23.5)      | 34(42)        | 7(58.3)                                 | 6(24)                               | 10(35.2)                |
| 45-54 YEARS  | 2(5.9)       | 19(23.5)      | 2(16.7)                                 | 7(28)                               | 8(25)                   |
| >54YEARS     | 0(0)         | 11(13.6)      | 2(16.7)                                 | 9(36)                               | 10(31.2)                |
| <b>TOTAL</b> | 34(100)      | 81(100)       | 12(100)                                 | 25(100)                             | 32(100)                 |

**Table 4: Distribution of responses for the OHIP-14**

| OHIP-14QUESTIONS   | NEVER n (%) | HARDLY EVER n (%) | OCCASIONALLY n (%) | FAIRLY OFTEN n (%) | VERY OFTEN n (%) | Mean±S.D  |
|--|-------------|-------------------|--------------------|--------------------|------------------|-----------|
| 1. Have you had trouble pronouncing any words because of problems with your teeth or mouth?              | 109(94.8)   | 4 (3.5)           | 1(0.9)             | 0                  | 1(0.9)           | 0.86±0.45 |
| 2. Have you felt that your sense of taste has worsened because of problems with your teeth or mouth?     | 97 (84.3)   | 14 (12.2)         | 3 (2.6)            | 0                  | 1( 0.9)          | 0.20±0.56 |
| 3. Have you had painful aching in your mouth?  | 8 (7.0)     | 42 (36.5)         | 49 (42.6)          | 14 (12.2)          | 2( 1.7)          | 1.65±0.84 |
| 4. Have you found it uncomfortable to eat any foods because of problems with your teeth or mouth?        | 24 (20.9)   | 32 (27.8)         | 44 (38.3)          | 14 (12.2)          | 1( 0.9)          | 1.44±0.98 |
| 5. Have you been self-conscious because of your teeth or mouth?  | 47 (40.9)   | 49 (42.6)         | 14 (12.2)          | 3 (2.6)            | 2 (1.7)          | 0.81±0.87 |
| 6. Has been your diet been unsatisfactory because of problems with your teeth or mouth?                  | 58( 50.4)   | 38( 33.0)         | 14 (12.2)          | 3 (2.6)            | 2 (1.7)          | 0.72±0.90 |
| 7. Have you felt tense because of problems with your teeth or mouth?                                     | 62 (53.9)   | 39 (33.9)         | 9 (7.8)            | 3 (2.6)            | 2( 1.7)          | 0.64±0.87 |
| 8. Have you had to interrupt meals because of problems with your teeth or mouth?                         | 58( 50.4)   | 38( 33.0)         | 13 (11.3)          | 4 (3.5)            | 2 (1.7)          | 0.73±0.92 |
| 9. Have you found it difficult to relax because of problems with your teeth or mouth?                    | 75 (65.2)   | 30 (26.1)         | 5 (4.3)            | 4 (3.5)            | 1( 0.9)          | 0.48±0.80 |
| 10. Have you been a bit embarrassed because of problems with your teeth or mouth?                        | 100( 87.0)  | 9 (7.8)           | 1 (0.9)            | 3( 2.6)            | 2 (1.7)          | 0.24±0.75 |
| 11. Have you been a bit irritable with other people because of problems with your teeth or mouth?        | 92( 80.0)   | 17 (14.8)         | 3 (2.6)            | 2 (1.7)            | 1 (0.9)          | 0.28±0.68 |
| 12. Have you had difficulty doing your jobs because of problems with your teeth or mouth?                | 82 (71.3)   | 22 (19.1)         | 7 (6.1)            | 2 (1.7)            | 2 (1.7)          | 0.43±0.82 |
| 13. Have you felt that life in general was less satisfying because of problems with your teeth or mouth? | 99( 86.1)   | 9 (7.8)           | 5 (4.3)            | 2 (1.7)            | 0                | 0.21±0.60 |
| 14. Have you been totally unable to function because of problems with your teeth or mouth?               | 80( 69.6)   | 22 (19.1)         | 9( 7.8)            | 3 (2.6)            | 1 (0.9)          | 0.46±0.81 |

**Table 5: Correlation between OHIP-14 with age, duration, DMFT & periodontal diseases**

|                | AGE               | DURATION  | DMFT              | PERIODONTAL DISEASES   |
|----------------|-------------------|-----------|-------------------|------------------------|
| <b>OHIP-14</b> | r = 0.217         | r = -0.06 | r = 0.230         | r = 0.319              |
|                | <b>p = 0.02 *</b> | p = 0.91  | <b>p = 0.01 *</b> | <b>p = &lt;0.001 *</b> |

Spearman's correlation; p <0.05(significant)

## DISCUSSION

The prisoners are the special group of population with various general and oral health problems. So there is a need to assess the dental status, periodontal status and OHRQoL in prisoners. The results of the present study has provided an opportunity to analyze the dental caries and periodontal status among prisoners in Nellore central prison and to provide special need of dental care among them. To the best of our

knowledge, there have been very few studies that assess the OHRQoL among prisoners in Nellore, India.

In the present study, the prevalence of dental caries was 53.1% which was higher than 44.5% according to National Oral Health Survey and Fluoride Mapping for general population.<sup>[15]</sup> The similar findings were reported by Sharma A et al.<sup>[16]</sup> But the prevalence of current study was much lesser as compared to 64.9% which was reported

by Rinki Hans et al,<sup>[9]</sup> 66% reported by Muni kumar et al,<sup>[10]</sup> 67.6% reported by Vittal Das Shetty et al,<sup>[5]</sup> 71.8% reported by Shailee Fotedar et al,<sup>[2]</sup> 78.7% reported by Dhankar K and Ingle et al<sup>[6]</sup> & Anup N et al,<sup>[17]</sup> 92.5% by Veera Reddy et al<sup>[18]</sup> and 98% reported by Nobile Carmelo et al.<sup>[12]</sup> The high prevalence of dental caries might be due to increased number of untreated dental caries in prisoners when compared to the general population.

The mean DMFT of present study was 2.6, which was similar to a study done by Uma SR et al<sup>[7]</sup> where it was 2.8. The mean DMFT was marked lower in present study when compared to 3.26 by Renuka G et al,<sup>[19]</sup> 3.4 by Muni kumar et al,<sup>[10]</sup> 4.47 by Shailee Fotedar et al,<sup>[2]</sup> 4.79 by Dhankar K and Ingle et al<sup>[6]</sup> & Anup N et al,<sup>[17]</sup> 5.26 by Veera Reddy et al,<sup>[18]</sup> 5.2 by Vishwanath et al,<sup>[20]</sup> 5.3 by Neha Agarwal et al,<sup>[21]</sup> 5.40 by Acharya Balkrishna et al,<sup>[22]</sup> 9.8 by Nobile Carmelo et al,<sup>[12]</sup> 16.8 by Raija Vainionpaa et al<sup>[23]</sup> and 19.72 by Alessandro Leite et al<sup>[11]</sup>. This high mean of DMFT indicates unmet needs of dental treatments and lack of awareness on oral health among prisoners as they should depend on jail authorities for their needs.

Periodontal assessment performed using CPI among prisoners revealed that the deep pocket (6 mm or more) was observed among 21.7% which was similar with the findings of Vittal Das et al,<sup>[5]</sup> Anup N et al,<sup>[17]</sup> Dhankar et al,<sup>[6]</sup> Neha Agarwal et al<sup>[21]</sup>. The current findings were high when compared to study conducted by Narayana Roa et al,<sup>[1]</sup> Nobile Carmelo et al,<sup>[12]</sup> Colman et al<sup>[24]</sup>. The prevalence of deep pockets was increased with increasing age which is similar to the study done by Vittal Das et al<sup>[5]</sup> and Manjunath Dayakar et al<sup>[4]</sup>. The high prevalence of periodontal diseases among prisoners indicates poor oral hygiene habits, use of tobacco, poor nutrition, systemic diseases and faulty oral habits.

In the present study, 27.8% of prisoners had LOA which was similar with the findings of Manjunath Dayakar et al<sup>[4]</sup> and which was found lesser when compared with the

studies conducted by Narayana Roa et al,<sup>[1]</sup> Anup N et al,<sup>[17]</sup> Dhankar et al<sup>[6]</sup> and Shailendra et al.<sup>[25]</sup>

The mean OHIP-14 score of the present study was 9.15 which were found lesser when compared to 14.97 by Shailee Fotedar et al<sup>[2]</sup> and 15.61 by Ruth Freeman et al<sup>[26]</sup> and was found high when compared to general population which was 8.8 by Jain M et al<sup>[27]</sup> and 7.5 by Acharya S et al<sup>[28]</sup>. The variation in occurrence of negative impacts was due to availability of both preventive and curative treatments for general population, while among prisoners the treatments are only relief oriented.

#### LIMITATIONS:

- Some of the limitations of this study were its cross-sectional in nature which limits the ability to establish the time order of the risk factor and complication in this situation whether dental caries are consequence of imprisonment.
- A longitudinal study would be more appropriate to establish the actual association between the disease and time, based on multi-centre approach at different prisons as the study was done at single prison.
- The other limitation was the sampling method, as only those who agreed to participate were included in the study.

#### STRENGTH OF THE STUDY:

- Most of the previous studies have compared the Dental caries, periodontal status among prisoners but only a few studies conducted to assess the Oral health related quality of life among prisoners.

#### CONCLUSION

This study conducted in central jail has clearly indicates that the dental and periodontal diseases were more prevalent in prisoners than in general population, which indicates less treatment experience and lack of oral health awareness among prisoners. A significant relation was found between

OHRQoL with dental caries and periodontal diseases among prisoners. It creates an urgency to pay attention towards the risk group by providing preventive and curative treatment to improve oral health among prisoners of Nellore district.

This study indicates need for providing oral health educational programmes to educate jail staff and prisoners on proper oral hygiene practices. The requirement of a dental unit could be made mandatory in the jail set-up so that the basic dental treatment can be provided to the prisoners.

### **Declaration by Authors**

**Ethical Approval:** Approved

**Acknowledgement:** I would like to thank the prison authorities and to all the prisoners for their great support during the study

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

### **REFERENCES**

1. Vinnakota NR, Bommireddy VS, Pachava S, Ravoori S, Talluri D, Sanikommu S. Assessment of periodontal health among jail inmates of Guntur city Andhra Pradesh: A cross-sectional study. *Journal of Dr. NTR University of Health Sciences*. 2016 Jul 1;5(3):200.
2. Fotedar S, Chauhan A, Bhardwaj V, Manchanda K, Fotedar V. Association between oral health status and oral health-related quality of life among the prison inmate population of kanda model jail, Shimla, Himachal Pradesh, India. *Indian Journal of Public Health*. 2016 Apr 1;60(2):150.
3. George B, John J, Saravanan S, Arumugham IM, Johny MK. Dental caries status of inmates in central prison, Chennai, Tamil Nadu, India. *Journal of natural science, biology, and medicine*. 2015 Aug;6(Suppl 1):S110.
4. Dayakar MM, Shivprasad D, Pai PG. Assessment of periodontal health status among prison inmates: A cross-sectional survey. *Journal of Indian Society of Periodontology*. 2014 Jan;18(1):74.
5. Shetty VD, Garcha V. Dental caries experience and periodontal status of the female inmates in Yerwada prison, Pune, Maharashtra. *Journal of Indian Association of Public Health Dentistry*. 2011 Nov 1;9(18):865.
6. Dhanker K, Ingle NA, Kaur N, Gupta R. Oral Health Status and Treatment Needs of Inmates in District Jail of Mathura City--A Cross Sectional Study. *Journal of Oral Health & Community Dentistry*. 2013 Jan 1;7(1).
7. Uma SR, Hiremath SS. Oral health care for inmates of central prison, Bangalore-An institutionalized approach. *Journal of Indian Association of Public Health Dentistry*. 2011 Jul 1;9(5):297.
8. Osborn M, Butler T, Barnard PD. Oral health status of prison inmates in New South Wales, Australia. *Aust Dent J* 2003;48:34-8.
9. Hans R, Thomas S, Dagli RJ, Solanki J, Arora G. Prevalence of dental caries among prisoners of central jail, jodhpur city, Rajasthan, India. *World Journal of Dentistry*. 2014 Apr;5(2):92-7.
10. Sode MK, Fareed N, Shanthi M, Sudhir KM. Oral health status and treatment needs amongst prison inmates of Nellore District in Andhra Pradesh. *Journal of Indian Association of Public Health Dentistry*. 2011 Jan 1;9(18):1.
11. Leite Cavalcanti A, Araujo Rodrigues IS, de Melo Silveira IT, Sarmiento de Oliveira TB, de Almeida Pinto MS, Cabral Xavier AF, Dias de Castro R, Nascimento Padilha WW. Dental caries experience and use of dental services among Brazilian prisoners. *International journal of environmental research and public health*. 2014 Dec;11(12):12118-28.
12. Nobile CG, Fortunato L, Pavia M, Angelillo IF. Oral health status of male prisoners in Italy. *International dental journal*. 2007 Feb 1;57(1):27-35.
13. Dhanker K, Ingle NA, Kaur N, Gupta R. Oral Health Status and Treatment Needs of Inmates in District Jail of Mathura City--A Cross Sectional Study. *Journal of Oral Health & Community Dentistry*. 2013 Jan 1;7(1).
14. World Health Organization. Oral health surveys: basic methods. World Health Organization; 2013.
15. National Oral Health Survey and Fluoride Mapping. India: DCI Publication; 2002-2003. p. 89-92.

16. Sharma A, Parkar S, Gaur A, Bagri B. Impact of incarceration on nutritional status and oral health among male inmates of central jail of Jaipur city, India. *Revista Espanola de Sanidad Penitenciaria*. 2020 Sep;22(3):96.
17. Anup N, Biswas G, Vishnani P, Tambi S, Acharaya S, Kumawat H. Oral health status and treatment needs of inmates in district jail of Jaipur city-A cross sectional study. *J Nurs Health Sci*. 2014;3:22-31.
18. Reddy V, Kondareddy CV, Siddanna S, Manjunath M. A survey on oral health status and treatment needs of life-imprisoned inmates in central jails of Karnataka, India. *International Dental Journal*. 2012 Feb 1;62(1):27-32.
19. Nagarale RG, Nagarale G, Shetty PJ, Prasad KV. Oral health status and treatment needs of prisoners of Dharwad, India. *Int J Dent Health Sci*. 2014;1(6):849-60.
20. Hiremath VP, Rao N. Assessing the Oral Health Status and Treatments Needs of the Male Inmates in the Central Prisons of Karnataka State. A Descriptive Study. *Journal of Indian Association of Public Health Dentistry*. 2011 Jul 1;9(5):425.
21. Agrawal N, Gupta ND, Garg AK, Tiwari RK, Bey A. A survey on oral health status and treatment needs of prison inmates of Aligarh district in Uttar pradesh, India. *EJ Dent*. 2014;4(2):585-91.
22. Balkrishna A, Singh K, Sharma A, Parkar SM, Oberoi G. Oral health among prisoners of District Jail, Haridwar, Uttarakhand, India-A cross-sectional study. *Revista Española de Sanidad Penitenciaria*. 2022 May;24(2):41.
23. Vainionpää R, Peltokangas A, Leinonen J, Pesonen P, Laitala ML, Anttonen V. Oral health and oral health-related habits of Finnish prisoners. *BDJ open*. 2017 Mar 3;3(1):1-5.
24. McGrath C. Oral health behind bars: A study of oral disease and its impact on the life quality of an older prison population. *Gerodontology*. 2002 Dec;19(2):109-14.
25. Chaturvedi SS, Bagde H. Periodontal diseases and oral hygiene practices among a group of drug addicted prisoners. *TMU Journal of Dent*. 2015;2(2):44-4.
26. Freeman R, Richards D. Factors associated with accessing prison dental services in Scotland: A cross-sectional study. *Dentistry Journal*. 2019 Feb 1;7(1):12.
27. Jain M, Kaira LS, Sikka G, Singh SK, Gupta A, Sharma R, Sawla L, Mathur A. How do age and tooth loss affect oral health impacts and quality of life? A study comparing two state samples of gujarat and rajasthan. *Journal of Dentistry (Tehran, Iran)*. 2012;9(2):135.
28. Acharya S. Oral health-related quality of life and its associated factors in an Indian adult population. *Oral health & preventive dentistry*. 2008 Jun 1;6(3).
29. Prison Health. Available from: <http://www.prisons.tn.nic.in/history.htm>. [Last accessed on 2022 sep 12].

How to cite this article: Desu Ravali Durga, R V S Krishna Kumar, G Srinivasulu et.al. Oral health status and oral health related quality of life among prisoners in central prison of Nellore district – a cross sectional study. *International Journal of Research and Review*. 2023; 10(3): 296-303.  
DOI: <https://doi.org/10.52403/ijrr.20230334>

\*\*\*\*\*