



Oral Health Inequalities among Female Prisoners in Pakistan: Risk Factors, and Access to Dental Care

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Abstract

Prisoners in general exhibit unsatisfactory oral conditions, especially regarding the large number of missing teeth and untreated caries. The purpose of the study was to determine the oral health of women in prison. A sample of 108 women prisoners was included with a convenient sample from the Kot Lakh Pat Jail in Lahore. Data was collected regarding oral health practices, characteristics of oral health, and oral health-related quality of life. Data was coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0. Categorical variables were summarized into frequencies and percentages. Chi-square and Pearson tests were used to check the demographic variables and dental condition. The P-value of (<0.05) was considered statistically significant. Most of the female prisoners 59.1% were cleaning their teeth once a day in the morning; a statistically significant relationship was noted between the level of education and oral hygiene practice ($p=0.001$). The majority of 61.1%, had good teeth, while 11.1% were with missing teeth due to carries, 25.9% had the complaint of tooth sensitivity. Out of 108 inmates, 53 (49%) needed preventive treatment due to dental caries and tooth sensitivity, while 12 (11.1%) needed restoration of decayed teeth. Based on this research, we have concluded that oral health among inmates was not ideal. The major concern was dental caries and tooth sensitivity indicates the need to improve oral health by taking preventive measures.

Keywords: Female prisoners; Oral health; dental care; jails in Pakistan; Inmates.

1. Introduction

Oral health is defined by the World Health Organization as a state of being free from pain, cancer, sore infection, gum or periodontal disease, tooth loss, and tooth decay [1]. The oral health of female prisoners is significantly neglected. Most convicted females use smoking tobacco, alcohol, and drugs that contribute to oral mucosa disease and dental caries [2-3]. There is a positive relationship between untreated dental problems and other systemic health conditions including cardiovascular disease, diabetes, osteoarthritis, low birthweight [4-5]. Dental problems

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are also often associated with lifestyle behaviors, socioeconomic disparities, and lack of access to oral health services. Quality of life and well-being are directly affected by oral health care [6-7]. Therefore, the lack of dental services within jail centers overstresses even more the serious condition of oral health [8]. Oral health care related behavior of female prisoners is an essential component of the inclusive well-being of the incarcerated population. Oral health issues such as periodontitis, dental caries, and oral cancer affect a large population and increase the overall health burden of an underserved section of society [9].

There are a greater number of decayed and missing teeth when compared to the non-custodial population. Females in prison experience more difficulties while trying to approach dental services even when they have a toothache [10]. Endogenous organisms in the mouth of humans colonize the exposed surfaces of the dentition and form a natural microbial biofilm called dental plaque [11]. It is colorless sticky at first, however, when tartar is formed, it changes to pale yellow or brown, which contributes to the progress of gingival inflammation and promotes oral diseases [12-13]. Overtime if plaque is not removed, minerals from saliva, fruits, and food create an environment that promotes bacterial growth deposits into the plaque, making it harder, and form teeth, tartar or dental calculus, which may lead to cavities, gingivitis, and bad breath [14].

Women are considered a minority among all prisoner communities, and their oral health needs are often neglected. The oral health needs are clear from expert opinion, research and experience from all over the world. The health care support to incarcerated women fails to meet their needs [15]. Oral health requirements for female prisoners should be assessed at reception. It provides an opportunity for the healthcare professional to access each prisoner as they may not access healthcare during their stay in prison [16-17]. It helps improve the quality of life related to symptom management, continuity of treatment, and reduced hospital admissions [18-19].

This attempt is made to assess oral health care-related behavior of female prisoners in Kot Lakh pat jail Lahore Pakistan to enterprise further preventive, curative, and rehabilitative oral health care intensifying program in the women wing of Kot Lakh pat jail Lahore.

2. Material and Methods

This cross-sectional, descriptive study was conducted at the University of Health Sciences with the collaboration of Kot Lakh Pat Jail, Lahore.

After approval of the Research Ethical Committee of the University of Health Sciences and administrative permission of the Inspector, General Prisoner for selected jail data was obtained. 108 female offenders were selected after meeting the eligibility criteria; participants who were residing in jail for more than six months were included.

2.1 Exclusion Criteria

Confined for more than once. The inmates failed to complete the interview. The convenient sampling technique was followed.

2.2 Data Collection Tools and Procedures

Data was collected by administering a well-structured questionnaire, which included oral health practices, oral health characteristics, and oral health-related quality of life. The questionnaire was pretested in ten female prisoners for the pilot study to verify reliability and validity. Intra-oral examination to determine the status of oral health was done with the help of female dentist Dr. Rabia Anjum, Department of oral pathology at the University of Health Sciences Lahore. Before oral examination, precautionary measures were taken; a surgical mask and non-disposable gloves were used for self-safety, sterilized wooden tongue depressors were used for each individual for patient safety.

2.3 Statistical Data Analysis

All collected information was entered into the computer and analysis was done through the Statistical Package for the Social sciences (SPSS) version 20 to summarize the results, descriptive statistics along with chi-square tests were performed to analyze the categorical data. Values < 0.05 were considered statistically significant.

3. Results

Table 1 shows the study population's (N=108) oral hygiene and eating habits in detail. A large number of the female prisoners said they brushed their teeth regularly (89.9%, n=97). In terms of how often they did it, 60.2% (n=65) of the participants brushed their teeth once a day in the morning, and 33.3% (n=36) did it twice a day. About how long they cleaned, 50.9% (n=55) said they brushed for 2–3 minutes, and 11.1% (n=12) said they brushed for more than 5 minutes. However, a surprising 38.0% (n=41) said they brushed for less than 2 minutes. A lot of people used toothpaste; 70.4% (n=76) said they "always" used it. However, only 10.2% (n=11) of the group said they "always" cleaned their teeth after eating or drinking sweets.

Preventive professional care and clinical symptoms revealed a substantial disparity in the maintenance of oral health. A staggering 91.7% (n=99) of the participants did not go to the dentist for regular cleanings every six months, and 23.1% (n=25) said they had dental pain or discomfort in the 12 months before the study. We also looked at people's eating and drinking habits, which have a big effect on their oral health. Twenty-three percent (n=25) of the participants ate vegetables every day, but most (63.9%, n=69) said they "rarely" drank milk or its parts. People drank a lot of water; 23.1% (n=25) always met the daily requirement of 10 cups or more, and 37.0% (n=40) often did.

The study additionally investigated the correlation between the educational background of female prisoners and their oral hygiene practices employing the chi-square test. Table 2 shows that there was a statistically significant link between the level of education and some important hygiene variables.

There was a strong link between how often people cleaned their teeth and how much education they had ($P = .005$). All participants possessing a "Metric" or "Graduation" level of education indicated regular dental hygiene practices, whereas the 11 participants who did not maintain such practices were categorized within the "Illiterate" (n=6) or "Primary" (n=5) education groups. The frequency of brushing also had a very strong link to education ($P = .000$). For example, brushing twice a day was most common among people with a "Primary" education (24.0%, n=26). Only people who were "Illiterate" or "Primary" brushed twice a week.

The length of time spent cleaning teeth also changed a lot based on how much education someone had ($P = .001$). People with more education tended to follow the recommended times more closely. For example, all six people in the "Graduation" group (5.5%, n=6) brushed up for the 2 to 3 minutes period. On the other hand, most of the people who brushed for less than 2 minutes had a "Metric" education level (25.0%, n=27). Those who brushed for more than 5 minutes were split evenly between the "Illiterate" and "Primary" groups.

Table 1. Oral Health Practices in Female Prisoners of Lahore Pakistan

| Variables | Responses (N=108) | |
|--|--------------------------|----------|
| Cleaning teeth regularly? | Yes | 97(89.9) |
| | No | 11(10.2) |
| How often do you clean your teeth? | Morning | 65(60.2) |
| | Twice a day | 36(33.3) |
| | Twice a week | 7(6.5) |
| Cleaning duration? | <2 minutes | 41(38.0) |
| | 2-3 minutes | 55(50.9) |
| | >5 minutes | 12(11.1) |
| Visiting dentist for cleaning every 6 months? | Yes | 9(8.3) |
| | No | 99(91.7) |
| During the past 12 months, have your teeth or mouth caused any pain or discomfort? | Yes | 25(23.1) |
| | No | 83(77.1) |
| Do you use toothpaste to clean your teeth? | Always | 76(70.4) |
| | Often | 12(11.1) |
| | Sometimes | 14(13.0) |
| | Rarely | 4(3.7) |
| | Never | 2(1.9) |
| Cleaning teeth after eating food or sweets? | Always | 11(10.2) |
| | Often | 17(15.7) |
| | Sometimes | 52(48.1) |
| | Rarely | 18(16.7) |
| | Never | 10(9.3) |
| Do you eat vegetables daily (raw or cooked)? | Always | 25(23.1) |
| | Often | 38(35.2) |
| | Sometimes | 23(21.3) |
| | Rarely | 21(19.4) |
| | Never | 1(.9) |
| Do you drink milk and it constitute daily? | Always | 1(.9) |
| | Often | 6(5.6) |
| | Sometimes | 16(14.8) |
| | Rarely | 69(63.9) |
| | Never | 16(14.8) |
| Do you drink enough water (10 cups& more)? | Always | 25(23.1) |
| | Often | 40(37.0) |
| | Sometimes | 22(20.4) |
| | Rarely | 16(14.8) |
| | Never | 5(4.6) |

Table 2. Association between Level of Education and Oral Hygiene Practices

| Level of education and oral hygiene practice | | | | | | |
|--|------------|----------|--------|------------|----------|---------|
| Variable | Illiterate | Primary | Metric | Graduation | Total | P value |
| Cleaning teeth regularly | | | | | | |
| Yes | 16(14.8) | 33(30.5) | 42(38) | 6(5.5) | 97(89.1) | .005 |
| No | 6(5.5) | 5(4.6) | 0 | 0 | 11(10.1) | |
| How often do you brush your teeth? | | | | | | |
| Moring | 12(11.1) | 11(10.1) | 36(33) | 6(5.5) | 65(60.1) | .000 |
| Twice a day | 4(3.7) | 26(24.0) | 6(5.5) | 0 | 36(33.3) | |
| Twice a week | 6(5.5) | 1(0.9) | 0 | 0 | 7(6.48) | |
| Cleaning duration | | | | | | |
| <2 | 12(11.1) | 2(1.8) | 27(25) | 0 | 41(38.6) | .001 |
| 2-3Mints | 4(3.7) | 30(28.7) | 15(14) | 6(5.5) | 55(51.9) | |
| >5 | 6(5.5) | 6(5.5) | 0 | 0 | 12(11.1) | |

Figure 1 shows how the participants rated their own oral health overall. The majority of the study population, 41.7% (n=45), reported their oral health as *Good*. Next, 26.9% (n=29) of the people said their oral health was *Fine*. A substantial segment of the cohort, 20.4% (n=22), indicated *Poor* oral health, whereas a mere minority of 11.1% (n=12) assessed their oral health status as *Excellent*.

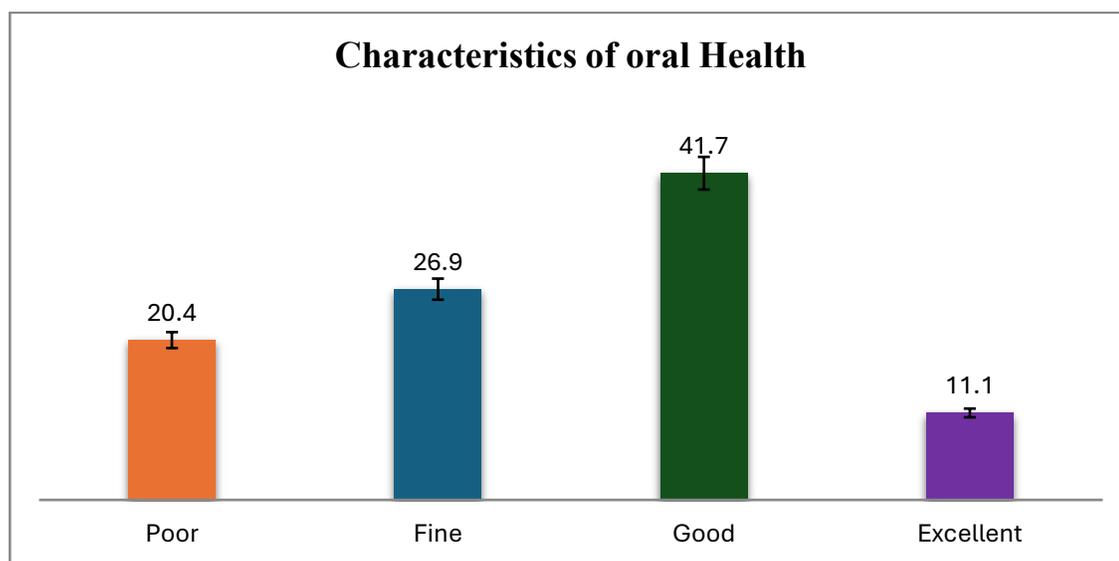


Figure 1. Characteristics of Oral Health of Female Prisoners in Pakistan

The chi-square test was used to look at the link between education level and oral hygiene behaviors as shown in Figure 2. It showed that all measured variables were significantly linked (Table 2). The frequency of tooth brushing was significantly correlated with education level (P = .005), with all participants in the "Metric" and "Graduation" categories reporting regular cleaning, in contrast to those in the "Illiterate" and "Primary" groups, who represented

all cases of irregular cleaning. The frequency of brushing was also very important. Most people (60.1%, n=65) brushed their teeth in the morning, but those with only a primary education (24.0%, n=26) were the most likely to brush their teeth twice a day. On the other hand, only "Illiterate" (5.5%) and "Primary" (0.9%) education levels had the habit of brushing only twice a week. Also, the length of time spent cleaning was strongly linked to education (P = .001), with all "Graduation" level participants following the 2 to 3 minutes rule. On the other hand, most of the people who brushed for less than 2 minutes had a "Metric" level of education (25%, n=27).

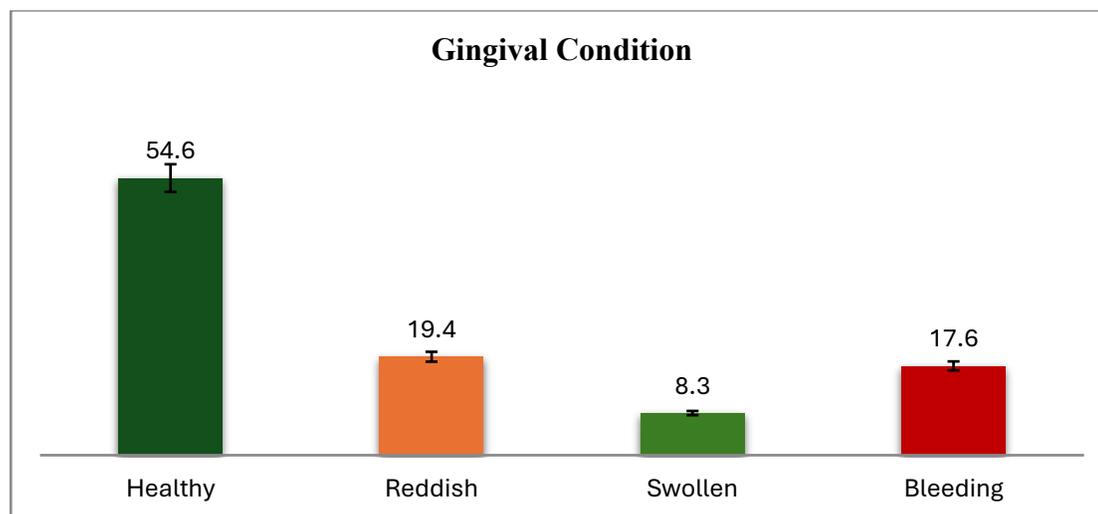


Figure 2. Gingival condition of Female Prisoners in Lahore Pakistan

A significant association was seen between demographic variable and gingival condition. Participants belong to age group 21 to 30 years having healthy gingival condition as compared to age group greater 40 years of old. Same as length of stay in prison and education level have significant effect on oral health as summarized in Table 3.

Table 3. Relationship between Demographic Variable and Gingival Condition

| Variables | Healthy | Reddish | Swollen | Bleeding | Total | P value |
|-------------------------------|---------|---------|---------|----------|-------|---------|
| ≤ 20 years | 3 | | | | 3 | .03 |
| 21 – 30 years | 28 | 4 | 2 | 4 | 38 | |
| 31 – 40 years | 20 | 7 | 3 | 6 | 36 | |
| > 40 years | 8 | 10 | 4 | 9 | 31 | |
| Duration of admission: | | | | | | |
| 6 months - 1 year | 32 | 2 | 1 | 3 | 38 | 0.04 |
| 1 - 2 years | 12 | 8 | 3 | 4 | 27 | |
| 2- 3 years | 9 | 5 | 2 | 5 | 21 | |
| > 3 years | 6 | 6 | 3 | 7 | 22 | |
| Educational level | | | | | | |
| Illiterate | 18 | 9 | 5 | 7 | 39 | .557 |
| Primary | 14 | 6 | 2 | 8 | 30 | |
| Secondary | 21 | 4 | 2 | 3 | 30 | |
| Graduation | 6 | 2 | | 1 | 9 | |

The clinical examination of the participants' dental status (N=108) indicated that although most of the samples had healthy teeth (61.1%, n=66), a notable segment of the population displayed indications of dental disease as shown in Table 4. Dental caries was the most common problem, affecting 22.2% (n=24) of the female prisoners. Additionally, 11.1% (n=12) of the participants were missing teeth because of cavities or other reasons, and only a small number, 5.5% (n=6), had fillings in their teeth.

Table 4. Dentition Status of Female Prisoners

| Dentition status | N=108 |
|--|----------|
| Sound | 66(61.1) |
| Carries | 24(22.2) |
| Missing due to carries or other reason | 12(11.1) |
| Teeth with filling | 6(5.5) |

Table 5 shows how common dental caries and the state of restoration are among female prisoners. A clinical examination showed that 22.2% (n=24) of the participants had active dental caries and 61.1% (n=66) did not. 88.8% of the participants had all of their teeth, but 11.1% had lost one or more teeth because of caries or other reasons. Restorative care was very low; 94.4% of the participants did not have any fillings, and only 5.5% (n=4) of the total cohort had one or more teeth with a filling.

Table 5. Dental Caries Experience among Female Prisoners

| Variables | Prisoners Response (N) | Percentage (%) |
|---|------------------------|----------------|
| Dental caries | | |
| Yes | 24 | 22.2 |
| No | 66 | 61.1 |
| Missing teeth due to caries or other reasons | | |
| Non | 96 | 88.8 |
| One | 1 | 0.9 |
| Two | 2 | 1.8 |
| Three | 4 | 3.7 |
| > Three | 5 | 4.6 |
| Teeth with filling | | |
| None | 104 | 94.4 |
| One | 2 | 1.8 |
| Two | 2 | 1.8 |
| Three | 1 | 0.9 |
| > Three | 1 | 0.9 |

Table 6 shows that other dental problems were also recorded, in addition to caries and gingival health. The most common problem reported was tooth staining, which affected 30.5% of the people who took part. Tooth sensitivity was the second most common problem, affecting 25.9% of the people who took part. Other problems that were noticed were gaps between teeth (17.5%), attrition (5.5%), and fluorosis (2.7%).

Table 6. Other Dental Issues in Female Prisoners

| Variable | N=108 |
|-----------------|----------|
| Sensitivity | 28(25.9) |
| Staining | 33(30.5) |
| Space b/w teeth | 19(17.5) |
| Attrition | 6(5.5) |
| Fluorosis | 3(2.7) |

The effect of oral health on the participants' quality of life showed that they had to deal with a lot of functional and mental problems. Functionally, 9.2% of participants found it uncomfortable to bite or chew foods, and 11.1% experienced painful aching in their mouths as summarized in Table 7. There were also psychological and social effects. For example, 4.6% of inmates said they were irritable with others, 3.7% said they avoided smiling, and 2.7% said they were embarrassed about how they looked because of dental problems. Also, 5.5% said that dental issues made it hard for them to sleep or say words correctly.

Table 7. Oral Health-Related Quality of Life

| Variables | Yes | No |
|--|----------|------------|
| Have you found it uncomfortable to bit or chew foods because of problems with your teeth or mouth? | 10(9.2) | 98 (90.7) |
| Have you felt that your sense of taste has worsened due to problems with your teeth or mouth? | 4(3.7) | 104(96.2) |
| Have you had painful aching in your mouth? | 12(11.1) | 96 (88.8) |
| Have you had trouble pronouncing words because of problems with your teeth or mouth? | 6(5.5) | 102(94.4) |
| Have you felt that your general health has worsened due to problems with your teeth, mouth, or dentures? | 8(7.4) | 100(92.5) |
| Have you felt embarrassed that your appearance has been affected because of problems with your teeth, mouth? | 3(2.7) | 105(97.2) |
| Have you felt tense due to problems with your teeth or mouth? | 4(3.7) | 104 (96.2) |
| Has your sleep been interrupted because of problems with your teeth, mouth, or dentures? | 6(5.5) | 102 (94.4) |
| Have you avoided smiling because of problems with your teeth and mouth? | 4(3.7) | 104 (96.2) |
| Have you been a bit irritable with other people due to problems with your teeth or mouth? | 5(4.6) | 103 (95.3) |

4. Discussion

Oral health practices of female inmates were good in contrast to international studies. In response to a question about oral hygiene practices, 97(89.9%) were cleaning regularly, while 11(10.2%) were cleaning but not on a regular basis. Our research was backed by the article [20] where around 90 % of participants used to clean teeth regularly. In contrast to our results, the study concluded that the practice of tooth brushing was rarely observed in prisoners [19].

Different oral hygiene measures are practiced worldwide. The use of toothbrushes and toothpaste is a common approach, while natural oral hygiene is also utilized in different regions of the world [22]. In the present study (70.2%) of female prisoners were using toothbrush and paste on daily basis, 12% did not use them often. In the related international literature, 90% of the participants used a toothbrush with toothpaste to clean teeth [23]. In contrast to our study, [24-26] concluded in their studies that the majority of the inmates used water and fingers alone for cleaning teeth that could not help in the prevention of dental carries significantly. Female prisoners had poor oral hygiene practices because of unavailability of appropriate materials, so 64% females used water with a finger only to maintain oral hygiene [27].

A significant number of female prisoners, 99 (91.7%) did not visit any dentist on a regular basis. They visited only when they had pain, which is in accordance with the study conducted in [28] those female prisoners reported a longer time since their last visit. Mishra and Sharma also reported similar findings, where female prisoners used to visit a dentist only for consultation with a complaint of pain [27]. Digra et al. also supported the current study findings that (62.2%) female prisoners never visited any dentist before imprisonment while 38.6% of prisoners had their last visit five years ago [29].

Availability of raw vegetables, milk, or dairy as cardioprotective products and sources of calcium and polypeptides was largely compromised, hence cooked vegetables were provided to them. As reported by the female prisoners, they were not consuming desserts, sweets frequently. In the current study, 59(54.6%) females were with healthy gingiva and gums while the other was presented with reddish and swollen gingiva. In contrast to our results [30], we observed the opposite that most female inmates had swollen gums and mucosal lesions.

Females had a better interest in oral hygiene behavior and perceived their own health to be better than males. It can be thought that due to the unavailability of chocolates, sweets, and beverages, female prisoners have better oral health.

It was observed that oral health status was significantly good in the age group ranging from 20 to 30 years compared to female prisoners older than 40 years. In addition, the length of the sentence and quality of dental health was also linked as dental health progressively deteriorates as time span increases in prison. The findings were consistent with previous studies that dental health decreases with the progress of age and length of stay in incarceration [31-32]. Dental caries, missing teeth, and teeth with filling were observed more frequently in the female age greater than 40 years. Literacy rate also has an important impact on oral health like gingival conditions and oral health practices.

During dental examination, 66 (61.1%) participants were free of dental caries, 24 (22.2%) had dental caries and 12(11.1) were with missing teeth due to caries or other reasons. The results of the current study are consistent [20], where 10 (9.2%) female prisoners had dental carries. In contrast to our findings [33], stated that about 71.8% of female prisoners were with dental carries, missing and teeth filling compared to male offenders. Another study [23] opposed our results, where the occurrence of untreated dental caries was 84% that makes the quality of life associated with dental pain. The findings of another study in [34] are also in contrast to our results, where female prisoners have a high rate (70%) of dental caries that causes worse oral health outcomes. Approximately, one-third of the prisoners who had dental carries need curative treatment.

Female prisoners have poor oral health-related behavior due to their oral health-related quality of life including uncomfortable biting, chewing, aching while eating and tension. A comprehensive dental check-up upon entering

prison is necessary. In the current study, 10(9.2%) participants complained about uncomfortable feelings during food chewing and 12(11.3%) had experienced a toothache. Findings are supported based on research in [35], who observed that the maximum number of missing teeth had a significant impact on the quality of life. Half of the prisoners reported that their dental health affects quality of life [36]. Female offenders with greater frequency reported dental problems, such as dental pain, that affected daily activities and needed restorative treatment.

5. Conclusion

In addition to other health facilities, oral health among prisoners is not ideal. The high prevalence of dental carries and tooth sensitivity indicates the need to improve oral health by taking preventive measures. It requires special attention from government and voluntary organizations to provide facilitation of oral health care services to inmates to improve their overall health status. The oral health status of prison inmates can be improved by developing comprehensive and systematic preventive programs. Poor oral health of inmates may be affecting them physically and psychologically and their reformation, rehabilitation, and integration back into society may be compromised.

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Data Availability Statement

Not applicable.

Conflicts of Interest

The author declares no conflicts of interest.

Ethical Approval and Consent to Participate

Not applicable.

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