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Dental Caries, Periodontal Health Status, and Oral Hygiene Related Habits of Women Behind Bars in Central Jail Karachi, Sindh, Pakistan

Hina Shah, Imran Khan, Sibghat Ullah Khan, Jai Kershan, Sanaa Ahmed, Sumbal Ayaz

ABSTRACT

Objective: To assess the frequency of dental caries and periodontal health status among incarcerated women in Karachi facility, Sindh, Pakistan.

Study design and Setting: A cross-sectional study was conducted between December 2021 to February 2022 at the department of Department of Community, Sindh Institute of Oral Health Sciences.

Methodology: All female inmates between the ages of 18-65 years, serving various jail terms including those sentenced for life, prisoners condemned to death and awaiting trial were included in the study. Women younger than 18 years or older than 65 years and those who refused to give consent to participate were excluded. For each participant, dental caries and periodontal status examination were performed. Dental caries were scored using DMFT index.

Results: A total of 131 incarcerated women were examined with a mean age 34.73 ± 9.94 years. The mean DMFT score was 4.76 ± 4.46. Older age was significantly associated with dental caries ($p<0.0001$). Participants who had diabetes had significantly increased caries as indicated by their high DMFT score ($p=0.045$). The participants who claimed to brush their teeth twice a day had significantly lower DMFT scores ($p<0.0001$).

Conclusion: The study brings light to the poor oral care and the need to address oral health facilities for disadvantaged incarcerated groups. It emphasizes the need to regularly conduct dental checkups for diagnosis and treatment among the vulnerable population.

Keywords: CPI index, dental caries, DMFT, oral health, periodontitis.

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INTRODUCTION:

In Pakistan, periodontal diseases and dental caries are highly prevalent.[1] Caries varies between very low in rural areas to moderate in some urban communities. The prevalence varies between 4 – 30% with prevalence being higher in urban areas than rural areas.[2]

While most oral health surveys conducted have consistently focused primarily on children, adolescents and adults from the general population, few have been conducted on disadvantaged groups. Worldwide there are disparities in the oral health of those from poor families compared with their counterparts of higher status and for disadvantaged groups with special health care needs.[3]

Among the disadvantaged groups the health of prisoners is particularly of interest because of the increasing number of inmates and unhealthy environment.[4] Prisoners are more vulnerable to a wide range of health problems including alcohol and drug abuse, infectious diseases, chronic diseases, psychosocial and psychiatric problems.[5] One area that is currently under-researched is the oral health status of individuals in the prison environment. Prisoners are a vulnerable and socially deprived group requiring attention as they are often neglected with little or no access to health

care.[6-8] Oral health is also linked to the quality of life indicating that the prisoners are at disadvantage in comparison to population at large.

Evidence indicates that women make up a tiny percentage of the overall population in prison; however, they have been recognized to be less educated, marginalized, and liable to the prevailing criminal justice system. In terms of legislation and debate on prisoner rights, their gender-specific issues and concerns are frequently disregarded or neglected. According to the official figures issued by the Ministry of Human Rights in 2020, female prisoners are up to 1,121 out of 73,242 in Pakistan, or 1.5 percent of the total population in prison. Punjab has the most female inmates (727), accompanied by Sindh (205) and KPK (166). A total of 24 female medical staff are on board to cater to the health and nutritional requirements of these female prisoners. Sindh has seven medical officers, out of a total of 24.[8] When compared to the female inmates to whom they must cater, these figures appear to be insufficient.

Periodontitis and dental caries are the commonest two problems causing tooth loss across the globe. These studies have shown that the common oral health problems affecting the normal population are to be seen in prisoners.[6,7]. Maintaining hygiene and oral health in prison is a challenge itself. Our objective is to find out the oral and nutritional health and oral health-related behaviors among the women prisoners at the Central Jail facility, Sindh, Pakistan.

Pakistan is a developing country. There is usually low priority, corruption and negligence in government institutions in fulfilling their responsibilities. Since prisoners are generally unprivileged and hated individuals, not considered for the equal human rights as with the rest of the citizens, it is very important to know the dental health and nutritional status of prisoners beside their social and mental wellbeing during their stay in prison. Women are already a vulnerable group and are at an increased risk of having compromised mental and dental health and nutritional deficiency. Depression, aggression and isolation are common mental health related issue in these women. Taking care of these issues will be helpful in making women in prisons useful citizens of the society when they are released. Till date only one study is present related to the oral health of the imprisoned persons providing limited data of male prisoners.[2] Though several explored the health that is the mental and physical wellbeing of these prisoners. The present study was conducted to assess the frequency of dental caries and periodontal health status among incarcerated women in Karachi facility, Sindh, Pakistan.

METHODOLOGY:

A cross-sectional study was conducted between December 2021 to February 2022 at the department of Community, Sindh Institute of Oral Health Sciences and Women Prison Karachi. The study was started after approval from the Institutional Review Board of JSMU (JSMU/IRB/2021/-579) and permission from the prison facility.

By employing non-probability convenience sampling technique participants were recruited in the study. For sample size, Select Statistics was used. Prevalence of dental caries was reported to be 47% among women in Pakistan. Keeping 47%,as the sample proportion, and a population of women incarcerated in Sindh prisons as 205, the margin of error as 5%, and a confidence level of 95%, a sample size of 134 was calculated. [8-9]

All female inmates between the ages of 18-65 years, serving various jail terms including those sentenced for life, prisoners condemned to death and awaiting trial were included in the study. Women younger than 18 years or older than 65 years and those who refused to give consent to participate were excluded.

Data was collected using structured questionnaires and oral examination. The data on socio demographics age, duration of incarceration, frequency of teeth brushing, material used for teeth brushing and educational level, marital status, number of children, husband occupation, nutritional/dietary habits, etc were recorded in a predefined structured questionnaire.

For each participant, oral examination was done. The dental caries and periodontal status examination were also performed under direct sunlight while wearing proper personal protective equipment (PPE), using a mouth mirror, explorer and CPITN probe. Dental caries were scored using DMFT index. All findings were properly documented. Community Periodontal Index (CPI) was used for periodontal health assessment. The examination was conducted by a single dentist with over five years of experience who remained blinded to the study objective - to reduce the chance of bias.

All data was entered and analyzed using Statistical Package for the Social Sciences version 26. All quantitative variables were presented as mean and standard deviation including age, DMFT Scores, duration of substance abuse, frequency of food intake, etc., while all categorical variables (severity of caries, socioeconomic status, etc.) were presented as frequency and percentages. Association of categorical sociodemographic variables and dental hygiene habits with DMFT Score and severity of periodontal disease were explored using chi-square test and for counts < 5, Fisher-Freeman-Halton test was used. A p-value of < 0.05 was set as cut off value for significance.

The participants were assured about the maintenance of their anonymity and confidentiality throughout the period of the study. The participants were allowed to leave the interview at any time they felt uncomfortable. No personal identifiers such as full name, address, or home number, were collected or documented. The data always remained accessible to the principal author and the co-authors.

RESULTS

A total of 131 incarcerated women were examined for oral health status with a response rate of 98.4%. The mean age of prisoners was 34.73 ± 9.94 years at the time of data collection while it was 28.46 ± 11.46 years at the time of incarceration. The mean DMFT score was 4.76 ± 4.46 with a very small percentage of women having DMFT however, 21 (16%) of women had hypertension. The majority of the prisoners had no formal education. Table 1 illustrates the oral hygiene habits among incarcerated women and the frequency of dental caries among women prisoners.

In total 362 decayed, 252, and 10 filled teeth were reported in the study population. We found that only 35 (26.7%) of women have had caries while about 71.7% women had at least one decayed tooth, 63 (48.1%) had at least one missing tooth, and 7 (5.3%) had at least one filled tooth (Table 2). Only 37 (28.2%) women had healthy gums.

The study showed that about 76 (58%) participants had a DMFT score between 0-5, 42 (32.1%) had a score between 6-10, and 13 (9.9%) score above 11. Older age was significantly associated with dental caries ($p<0.0001$). Furthermore, it was found that participants who had diabetes had significantly increased caries as indicated by their high DMFT score ($p=0.045$). Furthermore, the association between oral hygiene habits and dental caries were assessed; the participants who claimed to brush their teeth twice a day had significantly lower DMFT scores while those who claimed to not brush their teeth at all, had considerably higher DMFT scores ($p<0.0001$). Of those 21 participants who had hypertension, 61.9% had a DMFT score between 6-10 in contrast to only 26.4% participants who did not have hypertension ($p=0.005$). See Table 3 for detailed analysis.

DISCUSSION

We evaluated the oral hygiene status of female inmates at Central Jail, Pakistan. In this study, 72% women were suffering from some degree of periodontitis Women with more severe periodontitis scored significantly higher on DMFT criteria. Severity of periodontal disease was significantly associated with lack of formal education and medical comorbidity such as diabetes mellitus type 2 and hypertension. Furthermore, in our study, the majority of the women had dental caries. In fact only a small number of women i.e. one-fourth of them did not have any dental caries. About seven women out of 10 had at least one decayed tooth, and one half of the women had at least one missing tooth, while only a handful had at least one filled tooth highlighting the burden of dental caries in this cohort.

Incarcerated population remains a disadvantaged group of the community. It is difficult to work with them and often they remain inaccessible. This explains why there is little published literature to acknowledge their health needs.[10] Where dental health has remained a neglected and less touched health sector for all populations, similar is true for incarcerated individuals too. To the best of our knowledge, this is among the first few pieces of evidence on the oral health of Pakistani female inmates. Hence, this study remains robust in highlighting a barely touched community health issue.

Literature from other low-to-middle-income countries is not vastly different from our results. A study from Nigerian inmates reported that 67% had decayed / missing due to caries teeth. CPI of 1 or more was reported in 95% of their sample.[11] However, their population comprised only 2.6% females, as compared to our female exclusive sample. Comparatively, in our study, almost three-fourth (73%) had dental caries along with at least one tooth decay (71%) with

Table 1. Oral Hygiene Habits of Study Participants

History of Diabetes Mellitus	10 (7.6)
History of Hypertension	21 (16)
History of Cardiovascular Disease	10 (7.6)
History of Psychiatric Disease (Depression/anxiety, etc.)	27 (20.6)
Habits	
Frequency of Brushing Teeth	
I do not brush my teeth	34 (26)
Once daily	71 (54.2)
Twice Daily	26 (19.8)
What material do you use for brushing teeth?	
Toothpaste	72 (55)
Only toothbrush	25 (19)
The duration of brushing teeth	
Upto 2 minutes	88 (67.2)
> 2 minutes	9 (6.9)
Tongue cleaning	18 (13.7)
Use of Dental Floss	Nil
Use of Mouthwash	5 (3.8)

Table 2: Prevalence of Dental Caries and Severity of Periodontitis among Incarcerated Participants

Dental Caries	Frequency
Prisoners with Caries	35 (26.7)
Prisoners without Caries	96 (73.3)
At Least one decayed tooth	94 (71.7)
At Least one missing tooth	63 (48.1)
At Least one filled tooth	7 (5.3)
Severity of Periodontitis	
Healthy	37 (28.2)
Bleeding	29 (22.1)
Calculus	50 (38.2)
4-5 mm Pocket Depth	14 (10.7)
6 mm or more Pocket Depth	1 (0.8)

Table 3: Association between sociodemographic features of participants and dental caries

	DMFT Score			
Characteristics	0-5	6-10	11-31	P-value
Age				
35 years and younger	58 (81.7%)	10 (14.1%)	3 (4.2%)	<0.0001
36 years and older	18 (30%)	32 (53.3%)	10 (16.7%)	
Ethnicity				
Sindhi	13 (54.2%)	8 (33.3%)	3 (12.5%)	0.612
Punjabi	19 (52.8%)	14 (38.9%)	3 (8.3%)	
Baloch	6 (37.5%)	7 (43.8%)	3 (18..8%)	
Pashtun	8 (72.7%)	3 (27.3%)	Nil	
Urdu	22 (64.7%)	9 (26.5%)	3 (8.8%)	
Other	8 (80%)	1 (10%)	1 (10%)	
Education				
No formal education	39 (48%)	29 (36.3%)	12 (15%)	0.076
Primary to Secondary	20 (69%)	9 (31%)	Nil	
Matric or higher	17 (77.2%)	4 (22.2%)	1 (5.6%)	
Residence (Prior to incarceration)				
Urban	61 (60.4%)	29 (28.7%)	11 (10.9%)	0.338
Rural	15 (50%)	13 (43.3%)	2 (6.7%)	
History of Diabetes Mellitus				
Yes	3 (30%)	7 (70%)	Nil	0.045
No	73 (60.3%)	35 (28.9%)	13 (10.7%)	
History of Hypertension				
Yes	6 (28.6%)	13 (61.9%)	2 (9.5%)	0.005
No	70 (63.6%)	29 (26.4%)	11 (10%)	
History of Cardiovascular Disease				
Yes	3 (30%)	6 (60%)	1 (10%)	0.125
No	73 (60.3%)	36 (29.8%)	12 (9.9%)	
History of Psychiatric Disease (Depression/anxiety, etc.)				
Yes	12 (44.4%)	13 (48.1%)	2 (7.4%)	0.156
No	64 (61.5%)	29 (27.9%)	11 (10.6%)	
Frequency of Brushing Teeth				
I do not brush my teeth	11 (32.4%)	14 (41.2%)	9 (26.5%)	<0.0001
Once daily	43 (60.6%)	24 (33.8%)	4 (5.6%)	
Twice Daily	22 (84.6%)	4 (15.4%)	Nil	
What material do you use for brushing teeth?				
I do not brush my teeth	11 (32.4%)	14 (41.2%)	9 (26.5%)	<0.0001
Only toothbrush	14 (53.8%)	10 (38.5%)	2 (7.7%)	
Toothpaste	51 (71.8%)	18 (25.4%)	2 (2.8%)	
The duration of brushing teeth				
1 minute	31 (53.4%)	24 (41.4%)	3 (5.2%)	.004
2 minutes	27 (90%)	2 (6.7%)	1 (3.3%)	
> 2 minutes	7 (77.8%)	2 (22.2%)	Nil	
Tongue cleaning				
Yes	18 (100%)	Nil	Nil	<0.0001
No	58 (51.3%)	42 (37.2%)	13 (11.5%)	

48% having missing teeth and 5% having filled teeth. In an Indian study, 54.2% of female inmates had decayed teeth, 37.1% had missing teeth, and 2.9% filled teeth.[12] A Sudanese study reported their results separately for males and females. They utilized CPI-treatment needs criteria and reported that as compared to 0% males, 14% females scored 0 indicating healthy gingiva. Most of their female population (47%) scored 1. As compared to 4% of male prisoners; 12% of their female prisoners scored 4 - periodontal pocket > 5.5mm. Overall their female prisoners were worse oral health and the gender based differences were statistically significant.[13] This depicts how even within a disadvantaged group, women face further vulnerability. In our study, 12% of women had a periodontal pocket of 4mm or deeper. There are quite a few studies on the incarcerated population from India. A recent systematic review published in 2017 included 13 studies which assessed the oral health of the incarcerated population from January 2010 till May 2016.[10] They reported a range of DMFT scores 2.7-5.7 in at least 60 to 90 percent of the prison population. In our study, the range of the DMFT score was 4.76 (4.46), with 58% scoring low (0-5) and 10% scoring the highest (>11). The mean DMFT score of female inmates is reported to be 8.7.[14] Further 60-90% of their population reported poor periodontal status which is comparable to 72% reported in our study. The mean DMFT in female inmates aged above 35 years was 13.64 which is in line with our study. One cross-sectional was conducted with prisoners in Pakistan. A 98% frequency of caries was reported, 88% required restorations, and 67% required extraction. It was alarming that 12% were suffering from premalignant lesions.[15] Results from high-income countries like South Africa are also not very different. Their mean DMFT score was 9.8 and most individuals were classified as CPI score. The mean DMFT in elderly patients was 11.31.[16]

In our study, older age was significantly associated with dental caries which is also seen in the general population as well as in the incarcerated population.[17-18] Sharma et al., revealed that periodontal status significantly associated with age ($p<0.05$).[18] In our study, inmates with diabetes mellitus and those who were obese were also associated with higher DMFT score. In another study by Soares GH et al., it was found that 84% imprisoned women had untreated dental caries. Furthermore, the study also revealed that the highest DMFT scores of 19.9 ± 5.04 and 22.4 ± 7.23 were found in women aged between 45 to 54 years and 55 to 60 years, respectively.[19]

To sum it up, the current evidence highlights the burden of dental caries and periodontal disease among incarcerated women. Therefore, it is essential to include the dental health indicators in the assessment of the prison system in order to enhance the wellbeing of women in prisons. [20]

CONCLUSION:

The results of this study bring light to the poor oral care and the need to address oral health facilities for disadvantaged incarcerated groups. It emphasizes the need to regularly conduct dental checkups for diagnosis and treatment but also to introduce preventive measures and awareness on the importance of maintaining oral hygiene among this isolated population to government organizations and NGOS involved in the providing facilities and services to these women.

Authors Contribution:
Hina Shah: Conceptualized the study, acquisition, collection, statistical analysis & interpretation of data, manuscript writing
Imran Khan: Contributed to the oral examination, study design, data collection, reviewed the manuscript
Sibghat Ullah Khan: Contributed to the questionnaire design and interpretation of data
Jai Kershan: Contributed to the questionnaire design, reviewed and approved the manuscript
Sanaa Ahmed: Contributed in data collection, statistical analysis, an edited the manuscript
Sumbal Ayaz: Contributed to the oral examination, collection and interpretation of data

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