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Assessment Of Oral Health Status Among Sugar Factory Workers Of Barwani District M.P

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ABSTRACT

Inroduction: Occupational environments have a profound impact on both general and oral health. Exposure to sugar and its byproducts might influence oral health of the sugar factory workers. Hence the aim of the study is to assess the oral health status of the sugar factories workers of Barwani district M.P.

Methodology: A cross-sectional study was conducted in four private sugar factories located in the Barwani district. Using multistage random sampling, a total of 200 sugar factory workers. Out of 200 study participants, 140 frontline and 60 administrative workers were selected for participation. The oral health status of the workers was assessed using the WHO Oral Health Assessment Form (2013). Data analysis was performed using SPSS version 21. Descriptive statistics, including mean, standard deviation, and proportions, were calculated for each clinical parameter. For intergroup comparisons, Student's T-test and Chi-square analysis were employed

Result: The mean DMFT (Decayed, Missing, and Filled Teeth) score for production line workers was 1.02 $\pm$1.3, while administrative workers had a significantly lower mean score of 0.63$\pm$1.35 and the difference was found to be statistically significant (p = 0.001). The periodontal condition of the study participants was also compromised, with approximately 40% exhibiting bleeding gums, whereas around 20% had periodontal pockets

Conclusion: The present study revealed that oral health of sugar factory workers is compromised which primarily due to the exposure of sugar dust. This further indicates a need to educate the factory workers about the oral hygiene habits and oral hygiene maintenance.

1. INTRODUCTION

Oral health is an essential aspect of overall well-being, reflecting a combination of physiological, psychological, and social factors that are crucial for maintaining a high quality of life. Dental caries, a multifactorial and infectious disease, remains one of the most prevalent oral health problems globally. It is unique to humans and has reached alarming levels of occurrence across both developed and developing countries. According to the National Oral Health Survey (2002–2003) conducted by the Dental Council of India, the prevalence of dental caries in the Indian population was found to be approximately 85% among the surveyed population, emphasizing its ubiquitous nature in civilized societies.[1] Dental caries is a major contributor to irreversible tooth destruction and, if not treated promptly, may progress to complications such as pulpitis, severe dental pain, and chronic infections.[2,3] Similar to dental caries, other oral diseases such as gingivitis and various forms of periodontal disease have been present in human populations since ancient times. Periodontal diseases are among the most common dental problems affecting individuals globally.[4] The progression of periodontal diseases has been shown to be influenced by multiple factors, including age, educational status, occupational environment, and socioeconomic conditions.[5,6] Among these, the occupational environment plays a significant role in determining both general and oral health. Occupational hazards are defined as risks associated with specific job roles or workplace environments, often involving exposure to harmful materials, substances, or processes that predispose individuals to various injuries and diseases.[7].[10 11]

Sugar factory workers are particularly vulnerable to various oral health problems due to their unique occupational environment. Continuous exposure to airborne sugar dust and particles significantly increases the risk of dental caries The factory setting, often characterized by high temperatures and dehydration, can reduce salivary flow, further compromising

the mouth's natural ability to cleanse itself and neutralize acids. Moreover, the accumulation of plaque and bacterial biofilm due to poor oral hygiene and sugar exposure can result in gingivitis and, if left untreated, progress to periodontitis. These problems are often compounded by limited access to dental care and low awareness of proper oral hygiene.

India, as one of the largest sugar-producing nations in the world, plays a significant role in the global sugar economy. The country has a long history of sugarcane cultivation and sugar production, with sugarcane occupying approximately 5 million hectares—about 2.57% of India's gross cropped area—and providing livelihood to over 7 million farmers and associated workers across more than 550 sugar mills.[12] Sugar is a staple of the Indian diet, and the domestic demand is estimated at around 27 million tons per year. While Uttar Pradesh is the leading state in sugarcane production, Madhya Pradesh (MP) ranks 11th in terms of sugar output.[13] In Madhya Pradesh, Barwani district is a significant contributor to the sugar industry, housing numerous sugar factories across its western and central regions. Despite the potential oral health implications associated with occupational exposure in this industry, there is a notable lack of data on the dental health of sugar mill workers in this region.

Hence, the present study was undertaken to assess the oral health status of sugar factory workers in Barwani district, Madhya Pradesh**.** The study aims to address this gap and contribute to the growing body of literature on occupational oral health, with an emphasis on disease prevention and workplace interventions.

2. MATERIAL AND METHOD

STUDY DESIGN

The present study is a descriptive cross-sectional study conducted among workers employed at four different sugar factories located in the Barwani district of Madhya Pradesh, India. The study was carried out over a period of three months, from March 2024 to May 2024.

SAMPLING

Madhya Pradesh, one of the largest states in India, is geographically divided into four major zones: North, South, East, and West. For the purpose of this study, Western Madhya Pradesh was selected as the sampling frame, owing to its high concentration of sugar factories, which makes it a significant cluster for occupational oral health assessment in the sugar industry. To ensure broad and representative coverage, Western Madhya Pradesh was further subdivided arbitrarily into four zones—North, South, East, and West—based on geographical orientation within the western region. This subdivision facilitated systematic selection and distribution of study participants across the sampling frame.A multistage random sampling technique was employed to recruit participants. In the first stage, four sugar factories were randomly selected from the defined zones within Western Madhya Pradesh. In the second stage, a total of 200 sugar factory workers were selected from these factories, adhering strictly to pre-defined inclusion and exclusion criteria. The sample comprised 140 production line workers, who are directly involved in manufacturing processes and are more likely to be exposed to occupational hazards, and 60 administrative staff, who typically work in office settings with minimal exposure to industrial dust and chemicals. This stratified approach ensured diversity in occupational roles, allowing for comparative analysis between workers exposed to different workplace environments. The sampling methodology was designed to reduce selection bias and enhance the generalizability of the study findings within the region.

SAMPLE SIZE CALCULATION

Formula used- $$N= \frac{(r+1)(Z\alpha/2 + Z1-\beta)^2 \sigma^2}{rd^2}$$

Where,

Standard deviation (σ) = 3.6

Minimum detectable difference (d) = 1.01

Confidence level = 95% ⇒ Zα/2=1.96Z_{\alpha/2} = 1.96Zα/2=1.96

Power = 80% ⇒ Z1−β=0.84Z_{1-\beta} = 0.84Z1−β=0.84

$$N = \frac{2 \cdot 7.84 \cdot 12.96}{1.0201} = \frac{203.2128}{1.0201} \approx 199.19$$

So, Total sample size for the study is 200 participants

INCLUSION CRITERIA

1.Worker in the age group of 18 to 60 years

2.Front line worker (production worker)

3.Administrative worker

4.Workers who gave consent for the study

5. Has a minimum of one year of experience

EXCLUSION CRITERIA

1.Workers suffering from any systemic disease

2.Workers who are on contract basis

3.Edentulous patient

ETHICAL CLEARANCE AND INFORMED CONSENT

Prior to the commencement of the study, the research protocol was thoroughly reviewed and approved by the Institutional Ethical Committee of the Sri Aurobindo college of Medical science, Indore.( ) Ensuring adherence to ethical principles and guidelines outlined in the Declaration of Helsinki for research involving human subjects In addition, formal permission was obtained from the management authorities of each participating sugar factory in the Barwani district, Madhya Pradesh. The purpose, objectives, and procedures of the study were clearly communicated to all relevant stakeholders before data collection began. All selected participants were briefed in detail about the nature and scope of the study, including potential benefits and the voluntary nature of their involvement. Each participant was provided with an information sheet outlining the study details, and any questions or concerns were addressed prior to enrollment. Written informed consent was then obtained from each participant, confirming their voluntary participation and understanding of the research process. Confidentiality and anonymity of the participants were strictly maintained throughout the study. The data collected was used solely for research purposes and was stored securely to prevent unauthorized access.

3. DATA COLLECTION

CLINICAL EXAMINATION

A single calibrated examiner conducted the oral examinations for all study participants to ensure consistency and eliminate inter-examiner variability. Each clinical examination, including the recording of data, took approximately 10 to 15 minutes per participant. On average, 20 to 25 sugar factory workers were examined per day, depending on availability and cooperation of the participants.

A total of 200 sugar factory workers were examined during the study period. This sample included 140 production line workers, who were directly involved in industrial operations, and 60 administrative staff, who primarily performed office-based duties. The clinical assessment was conducted in sequence under available natural daylight, ensuring a standardized environment across all examination settings.

The oral examinations followed the Type III clinical examination protocol as recommended by the World Health Organization (WHO), which involves inspection using a mouth mirror, dental explorer, and adequate illumination. This method is widely accepted for community-based oral health surveys and provides reliable data for large population groups.

Oral health status was assessed using the WHO Oral Health Assessment Form (2013 version). The clinical evaluation included the following key indices:

- Dentition Status and Treatment Needs
- Community Periodontal Index (CPI)
- Loss of Attachment (LOA)
- Prosthetic Status and Prosthetic Needs

These indices collectively provided a comprehensive overview of each subject’s dental and periodontal condition, prosthetic requirements, and the overall treatment needs of the population.

Participants who were found to have acute dental pain or other urgent dental conditions during the examination were referred

to nearby dental clinics or hospitals for emergency dental treatment, ensuring ethical responsibility and participant well-being.

4. STUDY TOOL

DATA COLLECTION TOOL

A structured proforma was developed specifically for the purpose of collecting comprehensive information from each study participant. The proforma was designed to be simple, clear, and effective in capturing both sociodemographic and clinical data, and was divided into two main sections.

The first section of the proforma was dedicated to gathering demographic and personal information. This included details such as the participant's name, age, gender, educational qualification, occupational role (production or administrative), and socioeconomic status. Additionally, this section assessed oral hygiene practices, covering variables such as:Type of cleaning method used ,Frequency of cleaning, Material used for cleaning Technique or method of cleaning, Presence of adverse oral habits, Dietary history. These variables were recorded to evaluate potential risk factors associated with poor oral health outcomes in the occupational setting.

The second section of the proforma incorporated the standardized WHO Oral Health Assessment Form 2013, which was used to systematically record the clinical oral health status of each participant. The form includes essential indices such as Dentition Status and Treatment Needs, Community Periodontal Index (CPI), Loss of Attachment (LOA), Prosthetic Status and Prosthetic Needs

This structured format enabled consistent data collection and facilitated subsequent analysis of the correlation between oral health status and various demographic, occupational, and behavioral factors

TRAINING AND CALIBRATION

Prior to the commencement of the field study, comprehensive training and calibration of the principal investigator were conducted to ensure consistency, accuracy, and reliability in clinical data collection. The training was organized under the guidance of an experienced faculty member from the Department of Public Health Dentistry, Sri Aurobindo College of Dentistry, Indore.

The training program involved practical sessions using 15 individuals presenting with varying degrees of oral disease conditions, selected specifically to cover the full spectrum of diagnostic categories defined in the WHO Oral Health Assessment Form 2013. This exercise helped to standardize the interpretation, understanding, and application of the diagnostic criteria and coding system prescribed by WHO. The training lasted for a period of three consecutive days, during which the investigator practiced the examination techniques and discussed clinical findings with the trainer for alignment and clarity.

To further ensure diagnostic reliability, intra-examiner calibration was conducted one week after the training. The investigator re-examined a subset of previously assessed individuals to determine the consistency of clinical findings over time. The Kappa statistic, used to measure intra-examiner agreement, was found to be 0.82, indicating substantial agreement and a high level of diagnostic reproducibility.

In addition, a recording assistant was trained specifically to support the data recording process during fieldwork. The examiner provided detailed instructions regarding the terminology, coding procedures, and structure of the assessment form. The assistant was also trained to identify potential recording errors or omissions and to communicate any discrepancies to the examiner during examinations.

Efforts were made to ensure the same recording assistant accompanied the examiner during all field visits, thereby minimizing variability and maintaining consistency throughout the data collection phase.

PIOLT STUDY

A pilot study was carried out to check the feasibility and practicability of procedure of data collection before commencement of the main study. Pilot study was conducted among 30 peoples sugar factory workers. The pilot study samples were not included in the main study.

STATISTICAL ANALYSIS

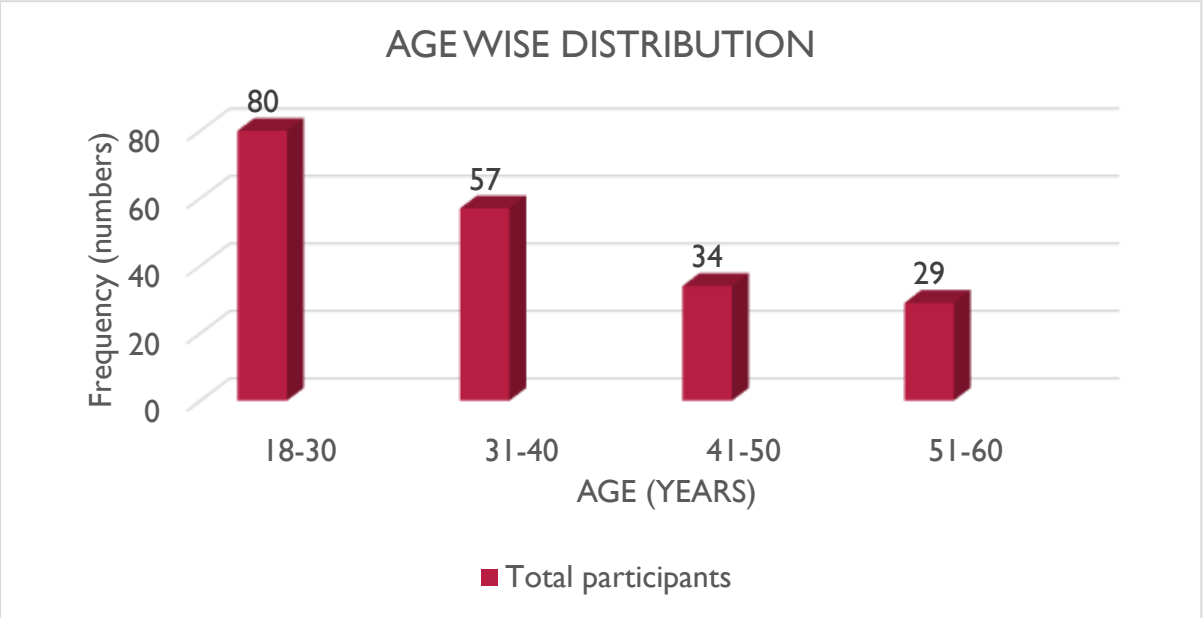
All the collected data was entered in the Microsoft Word Excel Sheet 2007 version and processed using the SPSS 16 Version. Mean, Standard Deviation and proportions (% of subjects affected) were calculated for each clinical parameter. The student t-test and Chi-square analysis was done to analyze difference in the clinical parameters between the production line workers and administrative staff of sugar mill. The level of significance was fixed at 5%.

5. RESULT

Table 1- Demographic details of frontline workers and administrative workers

CATEGORY	***SUB-CATEGORY***	***FRONTLINE WORKER***	***ADMINISTRATIVE WORKER***	***TOTAL***
AGE (YEARS)		Front Line Worker (n = 140)	Administrative Worker (n = 60)	Total (n = 200)
	18–30	60 (42%)	20 (33%)	80 (40%)
	31–40	39 (27%)	18 (30%)	57 (28.5%)
	41–50	24 (17%)	10 (16%)	34 (17%)
	51–60	17 (12%)	12 (20%)	29 (14.5%)
GENDER	FEMALE	12 (8.5%)	6 (10%)	18 (9%)
	MALE	130 (92%)	52 (86%)	182 (91%)
SOCIO-ECONOMIC STATUS	*UPPER*	0	0	0
	UPPER MIDDLE	0	0	0
	LOWER MIDDLE	36(25%)	15(25%)	51(25.5%)
	UPPER LOWER	46(32.8%)	20(33%)	66(33%)
	LOWER	58(41.4%)	25(41.6%)	83(41.5%)
WORKING EXPERIENCE	*1-5years*	38(27.1%)	10(16.6%)	48(24%)
	6-10years	29(20.7%)	22(36.6%)	51(25%)
	11-15years	45(32.1%)	14(23.3%)	59(29.5%)

	>15 years	28(20%)	14(23.3%)	42(21%)

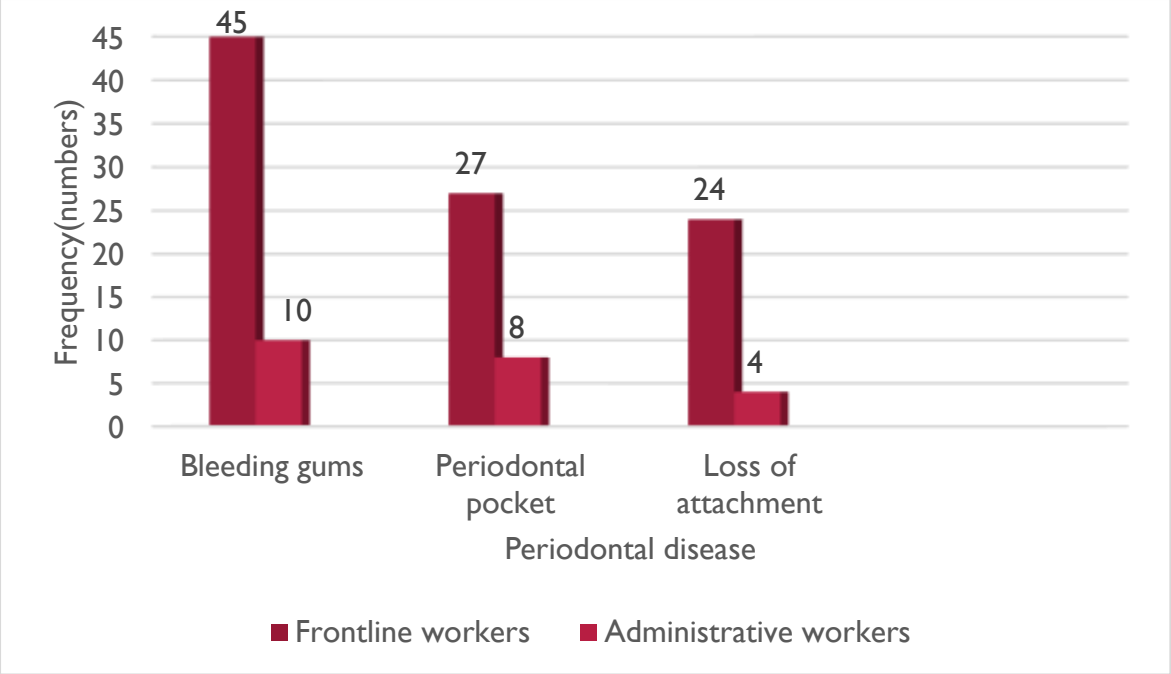


Graph 1: Distribution of study participants based on age

Table 1 presents the demographic profile of the study population, which comprised 200 sugar factory workers, including 140 production line workers and 60 administrative staff. The majority of participants were aged (**graph-1)** between 18–30 years ,total 80 out of with 60 (42%) frontline workers and 20 (33%) administrative staff in this age group. Regarding gender distribution, the workforce was predominantly male, with 182 males (91%) and only 18 females (9%). In terms of socioeconomic status, most participants belonged to Class IV (upper-lower class). When categorized by work experience, 59(29.5%) workers had been employed for 11–15 years, while 42(21%) workers had more than 15 years of service.

Table 2: Comparison of variables between front line worker and administrative workers

	FRONTLINE WORKER	***ADMINISTRATIVE WORKER***	***TOTAL***	***p-value***
BLEEDING	45(32%)	10(16%)	55(24%)	X^2 =0.024 P<0.05 (s)
POCKET	27(19%)	8(13%)	35(17.5%)	X^2=1.03 P>0.05 (ns)
LOA	24(8%)	4(6%)	28(8.5%)	X^2 =0.04 P<0.05 (s)



Graph 2: Distribution of study participants based on periodontal Disease.

Table 2 and graph 2 presents a comparison of periodontal health indicators between frontline and administrative workers, including bleeding on probing, presence of periodontal pockets, and loss of attachment. A total of 45 frontline workers and 10 administrative staff exhibited bleeding on probing, which was found to be statistically significant ($p < 0.05$). In terms of periodontal pockets, 27 frontline workers and 8 administrative workers were affected. Additionally, loss of attachment was observed in 28 frontline workers compared to 4 administrative staff, also showing a significant difference ($p < 0.05$). These findings indicate a higher prevalence of periodontal issues among frontline workers.

Table 3: Mean and percentage dental caries of frontline workers and administrative workers

	FRONTLINE WORKER ***(N=140)*** ***%***	***ADMINISTRATIVE WORKER*** ***(N=60)*** ***%***	***TOTAL*** ***(N=200)*** ***%***	***P Value***
MEAN DMFT	1.02 ±1.3 59	0.63±1.35 38	1.73±1.23 48.5	P<0.05 (S)

$p \leq 0.05$ – Significant, CI = 95 % *Statistical test- chi-square test*

Table 3 presents the comparison of mean dental caries experience, measured using the DMFT index, between frontline and administrative workers. The mean DMFT score among frontline workers was 1.02 ± 1.3, whereas among administrative workers, it was 0.63 ± 1.35. The difference in mean DMFT scores between the two groups was found to be highly significant ($p < 0.05$), indicating a greater caries experience among frontline workers**.**

shows the prevalence of dental caries among both categories of sugar factory workers. The prevalence among frontline workers was found to be 59%, while 38% of administrative workers were affected. The overall prevalence of dental caries among the study population was 48.5%, and this difference between the two groups was statistically significant ($p < 0.05$), indicating a higher burden of dental caries among frontline workers.

Table 4: Mean dental caries on the basis of working experience

DURATION OF EMPLOYMENT	*DMFT (Mean± Sd)*	*p-value*
1-5years	0.49±1.26	0.533 (ns)
6-10years	0.59±1.55	
11-15years	0.76±1.38	
>15 years	0.95±1.61	

Table 4 presents the mean dental caries experience, as measured by the DMFT index, in relation to the duration of work experience among sugar factory workers. The findings indicate a progressive increase in mean DMFT scores with longer years of service. Workers with 1–5 years of experience had a mean DMFT of 0.49 ± 1.26, while those with 6–10 years of experience showed a slightly higher mean DMFT of 0.59 ± 1.55. The mean DMFT further increased to 0.76 ± 1.38 among workers with 11–15 years of experience, and reached 0.95 ± 1.61 in those with more than 15 years of service. This trend suggests a positive correlation between work duration and dental caries experience, indicating that prolonged exposure to occupational and lifestyle factors associated with the work environment may contribute to increased caries risk over time.

6. DISCUSSION

Occupation has a relationship on health and well-being and there are diverse aspects on the effect of occupation on health[14]. Occupation can affect health through direct impacts, such as physical job conditions, psychosocial job characteristics and stress, and social support. Occupation may also affect health through indirect mechanisms via income, health insurance, prestige, and authority that are related to occupation. Occupational factors like workplace environment, rules and regulations affecting health habits and influence of coworkers might also have significant impact on general as well as oral health[14,15] Hence, it is essential to analyse the influence of occupation on health. Same holds true for Sugar Industry in our country. India was the first to begin with the production of sugar following the process of pressing sugarcane to extract juice and boil it to get crystals. Jobs in Indian Sugar Industry have created ample employment opportunities in rural India. Today the Indian Sugar Industry has absorbed about 5 lakh rural people. The working environment in the sugar mills of our country creates a unique environment which might have tremendous influence on the general and oral health of production line and administrative workers[16]**.** Hence, the present study was conducted to assess the oral health status of the production line workers of sugar mill and compare with that of the administrative staff.

The observed dental caries prevalence of 59% among frontline workers and 38% among administrative staff aligns with several studies highlighting the occupational risk factors associated with production environments in sugar industries. **Anaise JZ. Et al. (1978)[17]** also found higher caries rates among confectionery factory workers compared to their non-production counterparts, suggesting that occupational exposure to sugar contributes significantly to oral disease burden. Supporting this, **Khatun et al. (2019)[18]** observed a caries prevalence of 84% among factory workers in Narayangonj, Bangladesh, with poor oral hygiene and high sugar intake as contributing factors. However, contrasting evidence was found by **Reddy et al. (2020)[19]**, who noted a higher caries prevalence among administrative staff (74.9%) than production workers (62.5%) in a steel factory setting. Despite some variation, the overall trend supports the notion that sugar factory production workers are at increased risk of dental caries due to their occupational environment, highlighting the need for targeted oral health interventions in this group.

In the present study majority (41%) of sugar factory workers belong to lower socio-economic classes which is aligns with studies conducted in similar industrial settings. For instance, a study **Shivappa K et al. (2019)[20]** in Bidar district, Karnataka, found that women workers in sugar industries were predominantly from lower economically backgrounds, facing irregular employment and low wages due to the seasonal nature of the work . Similarly, research conducted in the Northern Corridor of Cebu, Philippines, **Ostia GM et al. (2024)[21]** highlighted that sugar industry workers often experience income instability and limited access to basic welfare facilities, reflecting their low SES. Contrastingly, A study assessing periodontal status among sugar factory workers **S. Sankethguddad S. et al.(2020)[22]** in Karad taluka, India, found that while many workers

were from lower socio-economic backgrounds, there was a significant representation from middle and upper-middle classes as well . This indicates that while lower SES is prevalent, sugar factory employment also attracts individuals from diverse economic backgrounds, possibly due to varying job roles and opportunities within the industry.

In the present study, the mean DMFT score of frontline workers was found to be 1.02 ± 1.3, while that of administrative workers was 0.63 ± 1.35. These findings are in alignment with a study conducted by **Puja C.Y. et al. (2019)[23]** in Davangere district, Karnataka, India, and **Singh K. et al.(2015)[24]**Both studies indicate that the mean DMFT score is higher among frontline (or production line) workers compared to administrative staff. Where as present study mean DMFT is contrary to the findings of **Z. Tohidast akrad et al.(2006)[25]** which is 12.59 ± 6.5.

In the present study, the mean DMFT score among individuals with more than 20 years of employment was found to be 0.95 ± 1.61, while those with less than one year of employment had a mean DMFT score of 0.49 ± 1.26. These findings are consistent with the results of a study conducted by **Puja C.Y. et al. (2019)[23],** in which the mean DMFT score was reported as 4.17 ± 3.04 for individuals employed for over 20 years, and 2.82 ± 2.05 for those employed for less than one year. Both studies suggest a positive association between the duration of employment and the DMFT score, indicating that longer duration of employment may be linked to increased dental caries experience, possibly due to cumulative exposure to occupational and lifestyle-related risk factors.

In the present study, 24% of the participants were found to have bleeding gums, which is notably lower than the prevalence reported in previous studies. This finding is contrary to the results of **Singh K. et al. (2015)[24]** and **Vidhya G. et al. (2019)[26],** who observed a higher proportion of participants exhibiting gingival bleeding, suggesting possible variations in oral hygiene practices, occupational exposure, or access to dental care among different study populations.

Regarding the loss of attachment (LOA), 8.5% of the participants in the current study exhibited clinical signs of attachment loss. This result aligns closely with the findings of **Vidhya G. et al. (2019)[26]**in a similar population in Madurai, indicating comparable periodontal health status. However, it contrasts significantly with the findings of **Singh K. et al. (2015)[25]** who reported a much higher prevalence of LOA at 40%, and **Sankethguddad S. et al.(2020)[22]** who documented an even greater prevalence of 70.8%. These discrepancies may be attributed to differences in study settings, occupational environments, oral health awareness, and the duration of exposure to risk factors.

Additionally, periodontal pockets were detected in approximately 17.5% of the participants in the current study. This prevalence is in agreement with the observations made by **Vidhya G. et al. (2019)[26]**, reinforcing the consistency of periodontal conditions across similar demographic groups. However, it contrasts sharply with the findings of **Sankethguddad S. et al.(2020)[22]**, where a significantly higher prevalence of periodontal pockets was reported. The variation could be due to differences in oral health interventions, preventive measures implemented at the workplace, or overall oral hygiene behaviors among the populations studied.

Limitations,

The cross-sectional design of this study limits the ability to establish a causal relationship between occupational exposure to sugar dust and the development of oral diseases. Consequently, future longitudinal studies are recommended to assess the long-term effects of sugar dust exposure on oral health

7. CONCLUSION

The findings of the present study indicate that the oral health status of sugar mill factory workers is significantly compromised. This deterioration can largely be attributed to two primary factors: continuous exposure to sugar dust during working hours and a general lack of awareness regarding the importance of maintaining good oral hygiene. These observations highlight a pressing need for comprehensive oral health education among mill workers, emphasizing the adoption of proper oral hygiene practices and routine dental care.

To address this issue effectively, it is strongly recommended that regular dental check-ups be promoted as part of workplace health initiatives. Moreover, collaborative efforts involving factory management, government health departments, and dental institutions are essential. Such partnerships can facilitate the organization of periodic dental screening and treatment camps within or near factory premises. Establishing dedicated dental clinics within the factory premises would serve as a long-term solution, ensuring accessible and timely dental care for workers. These interventions can play a crucial role in improving the overall oral health and well-being of sugar mill workers.

1. Dental Council of India**.** National Oral Health Survey and Fluoride Mapping 2002–2003. New Delhi: Dental Council of India; 2004.
2. Kidd EAM, Fejerskov O. What constitutes dental caries? Histopathology of carious enamel and dentin related to the action of cariogenic biofilms. *J Dent Res*. 2004;83(Spec No C):C35–C38.
3. Loesche WJ. Role of *Streptococcus mutans* in human dental decay. *Microbiol Rev*. 1986;50(4):353–380.
4. Petersen PE, Ogawa H. The global burden of periodontal disease: towards integration with chronic disease prevention

and control. *Periodontol 2000*. 2012;60(1):15–39.

5. Albandar JM. Global risk factors and risk indicators for periodontal diseases. *Periodontol 2000*. 2002;29(1):177–206.
6. Shaju JP, Zade RM, Das M. Prevalence of periodontitis in the Indian population: A literature review. *J Indian Soc Periodontol*. 2011;15(1):29–34.
7. Leigh JP, Miller TR. Occupational illnesses within two national data sets. *Int J Occup Environ Health*. 1998;4(2):99–113.
8. Boffetta P, Soutar A, Cherrie JW, et al. Occupational exposure to dust and risk of cancer. *Lancet*. 1995;345(8943):1061–1062.
9. Gupta SK, Saxena S, Pant MC. Occupational exposure to arsenic: impact on oral health. *J Occup Health*. 2005;47(6):489–493.
10. Greim H, Snyder R, eds. *Toxicology and Risk Assessment: A Comprehensive Introduction*. 1st ed. Wiley-VCH; 2008.
11. Chikte UME, Patel N, Girdler-Brown B. Occupational exposure and oral health: A review of sugar industry workers. *Int Dent J*. 2018;68(3):145–152.
12. Indian Sugar Mills Association (ISMA). *Sugar Industry Overview 2021*. Available from: https://www.indiansugar.com
13. Ministry of Agriculture & Farmers Welfare, Government of India. *Sugarcane Production Statistics 2022*. Available from: https://agricoop.nic.in
14. Krantz G, Ostergren P. Double exposure: The combined impact of domestic responsibilities and jobstrain on common symptoms in employed Swedish women. Eur J Public Health. 2001;11:413-19.
15. Gueorguieva R, Sindelar JL, Falba TA, Fletcher M, Keenan P, Wu R, Gallo WT. The Impact of Occupation on Self-Rated Health: Cross-Sectional and Longitudinal Evidence from the Health and Retirement Survey. J Gerontol B Psychol Sci Soc Sci. 2009;64B(1):118–24
16. http://shodhganga.inflibnet.ac.in/bitstream/10603/23490/6/06_chapter%20i. pdf. [Accessed on 22nd Dec.2014]

REFERENCES

[1] Anaise JZ. Prevalence of dental caries among workers in the sweets industry in Israel. *Community Dent Oral Epidemiol*. 1978;6(6):286-289.

[2] Khatun M, Rahman MM, Sen Gupta PK, et al. Food Habit and Dental Caries among the Workers in a Selected Factory in Narayangonj. *Bangladesh J Health Allied Sci*. 2019

[3] Reddy KV, Reddy PP, Reddy KK, et al. Oral Health Status and Oral Health-Related Quality of Life among Steel Factory Workers of Visakhapatnam-A Cross-Sectional Study. *J Clin Diagn Res*. 2020;14(1):ZC01-ZC05.

[4] Shivappa K. Socio-economic Conditions of Women Workers in Sugar Industries of Bidar District, Research Review International Journal of Multidisciplinary. 2019 Jul;4(7)

[5] Ostia, G. M., Gimena, J. A. F., Biore, C., Llamedo, E. E., Sayson, Y. C., & Anoos, J. M. M. (2024). Socioeconomic Status of Workers in the Sugar Industry and Their Plight: The Case of the Northern Corridor, Cebu, Philippines. *Asian Journal of Managerial Science*, *13*(2), 15–30.

[6] Sankethguddad S, Abbayya K, Suragimath G, Kamala KA, Sujith SG. An epidemiological study to assess periodontal status among sugar factory workers of Karad taluka using community periodontal index. J Family Med Prim Care 2020;9:3480-6.

[7] Puja CY, Reddy V, Ramesh M, et al. Oral health status of workers in sugar industry: A cross-sectional study. *J Indian Soc Periodontol*. 2019;23(2):165-170. doi: 10.4103/jisp.jisp_406_18

[8] .Singh k., Pandita V.et al. Is Oral Health of the Sugar Mill Workers Being Compromised? Journal of Clinical and Diagnostic Research. 2015 Jun, Vol-9(6): ZC07-ZC10

[9] Z Tohidast akrad, JM Beitollahi,AA Khajetorab. DMFT (Decayed, Missing, Filled, Teeth) Oral Health Index in Sweets and Cable Industry Workers, Iranian J Publ Health, 2006, Vol. 35, No. 2, pp.64-68

[10] Vidhya G., Muthu Karuppaiah R. , Bharath Kumar Garla, Umesh K., M. Taranath , and Palanivel Pandian. Oral Health Status and Treatment Needs of Soft Drink Factory Workers of Madurai City: A Cross-sectional Study. Journal of Advanced Oral Research 10(1) 30–33, 2019