

## Original Research Article

**PREVALENCE OF DENTAL CARIES AND ORAL HYGIENE STATUS OF BISCUIT FACTORY WORKERS IN MADURAI CITY****<sup>1</sup>Prabu D, <sup>2</sup>Sindhu R, <sup>3</sup>Raj Mohan M, <sup>2</sup>Bharathwaj V V, <sup>4</sup>Savitha S**<sup>1</sup>Master of Dental Surgery, Professor and Head, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India<sup>2</sup>Master of Dental Surgery, Senior lecturer, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India<sup>3</sup>Master of Dental Surgery, Reader, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India<sup>4</sup>Postgraduate student (Master of Dental Surgery), Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India**Received: 09-01-2022 / Revised: 27-01-2022 / Accepted: 11-02-2022****Corresponding author: Dr. Prabu D****Conflict of interest: Nil****Abstract****Aim:** To assess the oral hygiene status and prevalence of dental caries among the biscuit factory workers in Madurai city.**Materials and Methods:** This cross-sectional study was conducted among 100 biscuit factory workers of whom 56 were males and 44 were females between the age group of 19-50 years. Their oral hygiene status was assessed by using oral hygiene index simplified (John C Greene and Jack R Vermillion), dental caries was assessed using DMFT index (Henry Klein and Carol E Palmer) and sugar consumption was assessed using sweet score.**Results:** The study population composed of 56 males and 44 females. The present study showed that there was mean sweet score of <5 in 0% of subjects (excellent zone), mean score of 10 in 2% of subjects (good zone) and mean score of >15 in 98% of subjects (watch out zone). Mean oral hygiene status was found to be 2.83 which can be interpreted as poor score, mean DMFT was 5.06.**Conclusion:** The results show that dental caries is highly prevalent among biscuit factory workers and it increases with sugar consumption. This is due to widespread neglect of oral hygiene and direct exposure to sugar dust.**Keywords:** Dental caries, Oral hygiene status, Sugar consumption, biscuit factory workers**I. Introduction**

Dental caries has been recognized as a main occupational disease in personnel working in bakeries and confectionery industries. In 1886, Hesse suggested that flour dust/ sugar dust is the main cause for prevalence of caries in workers of bakeries and confectionary

industries. In 1901 Kunnert concluded that sugar dust alone was the cause of the high prevalence of caries in bakers [1,2].

Diet is defined as the type and amount of food eaten daily by an individual. Diet refers to the local action of the foods on tissues and

encompasses the composition of the food, its consistency, pattern and frequency of food as it is eaten regardless of its fate and exerts local /direct effect upon dentition. Nutrition that get through the diet deals with those parts or elements of food that are absorbed through the intestinal tract and enter into metabolic process of the body in the formation and replacement of tissues.

Nutrition exerts systemic effects upon the dentition via the pulpal blood supply and the saliva. L-Ascorbic acid deficiency, Vitamin D deficiency leads to deficient dentin and hypoplastic enamel formation that results in extensive dental caries. This high occurrence of caries is due to their low standard of living, excessive consumption of sugar along with poor personal oral hygiene and increased exposure to cariogenic conditions [3, 4]. The lack of awareness creates a major cause for the increased prevalence of dental caries. Consumption of sugar is considered to be one of the most important cause for dental caries especially sucrose [5].

A better dental health status among these workers may probably be obtained by avoidance of dental health hazards at work place like reduction of sugar dust in environment and preventing consumption of sugar among workers during working hours which can be of great help.

Oral hygiene status is sought to be one of the most necessary aspects to maintain good health since earlier natural products like Neem sticks were used to maintain good teeth. With the advancement of technology in the modern era, products like toothpaste, mouthwashes, dental floss, and teeth whiteners have been introduced. Among these toothpaste is the most common home care products used to maintain oral hygiene [6].

Improvement in dental health can be achieved by dental care programs with an

emphasis on prevention made available to individuals under routine care [7]. These industrial workers constitute a well-defined and easily accessible population group and therefore provide several practical advantages for conducting epidemiological studies [8,9]. Efforts should be directed to carry out dental health programs to meet the treatment needs of this population group and thereby enhancing their oral health.

#### **Materials and Methods:**

The cross-sectional study was conducted among production line workers of Jayaram biscuit factory in Madurai. The research was done on various age groups- 19-30 years, 31-40 years and 41-50 years. Out of the 150 workers working in the factory, 100 were selected for the study by simple random sampling method. Out of the total 100 samples, 56 of them were males and 44 were females.

Ethical clearance was obtained from the ethical committee of Department of Preventive Dentistry and Oral Epidemiology. Prior permission has been taken from the concerned authority of the factory. The workers who came to work on that day only were included in the study. The study includes workers who were working in the factory for minimum of six months. The study was done in the month of May and June 2011. Diet chart has been taken from the samples, oral hygiene status was recorded by using OHI-S as put forth by John C Greene and Jack R Vermillion [10] and dental caries experience by using DMFT index as put forth by Henry Klein and Carol E Palmer [11].

The instruments used for OHI-S and DMFT were mouth mirror and shepherds crook explorer no.23. Partially erupted teeth, supernumerary teeth, third molars, missing teeth due to trauma and other reasons rather than caries were not included in the study.

The examination was done by using sterile instruments and it is disinfected after every use. The data collection was done by the examiner who was trained by the higher

authorities. The data was entered in Microsoft - excel and statistical analysis was done using SPSS version 18.

### Results:

Table 1 shows the sample population comprises of 100 samples. Out of the total 100 samples, 41 of them were between the

age group of 19-30 years, 44 were between the age group of 31-40 years and 15 were between the age group of 41-50 years.

**Table 1: Distribution of sample based on age**

Age group	Frequency
19-30	41
31-40	44
41-50	15
Total	100

Table 2 shows in the sample population the number of male samples was 56 and the number of female samples was 44.

**Table 2: Distribution of gender**

Sex	Frequency
Male	56
Female	44
Total	100

Table 3 denotes in the study population none of them were under good category, only 17 of them were under fair category and 83 of them were under poor category. It shows that majority of them had poor oral hygiene status.

**Table 3: Oral HYGIENE Status Based on OHI score**

OHI-S Score	Frequency
Fair	17
Poor	83
Total	100

Table 4 indicates only 2 subjects of the sample population were under good category and the remaining come under the watch out zone. It shows that there was increased sugar consumption among biscuit factory workers.

**Table 4: Category of sugar consumption in sample based on sweet score**

Sweet Score	Frequency
Good	2
Watch out	98
Total	100

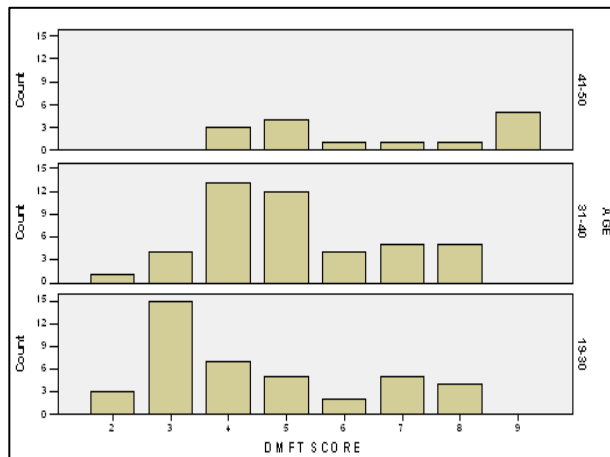
Table 5 shows the mean of DMFT, OHI-S and SWEET SCORE. It shows that there was increased caries incidence, poor oral hygiene status, and increased sugar consumption among biscuit factory workers.

**Table 5: Mean Value of Dmft, Ohi and Sweet Scores**

**Descriptive Statistics**

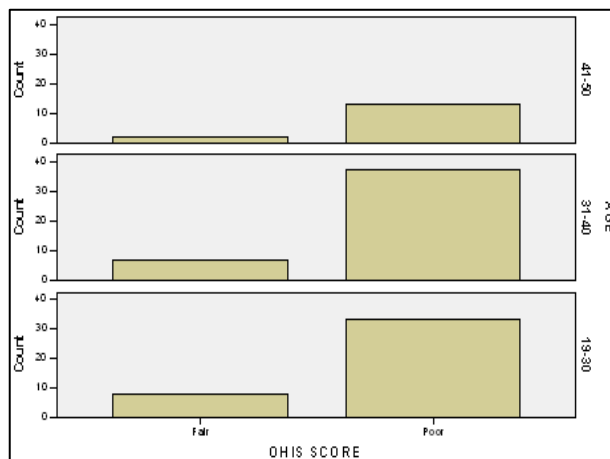
	Mean	Std. Deviation	N
AGE	1.74	.705	100
DMFT SCORE	5.06	1.895	100
OHIS SCORE	2.83	.378	100
Sweet SCORE	2.98	.141	100

Figure 1 depicts that the DMFT score increases with age. The score nine was seen only in subjects between age group of 41-50 years and score two and three were not seen in that age group. There was slight increase in DMFT score from the age group of 19-30 to 31-40 years.



**Figure 1: Dmft Score in Correlation with Age**

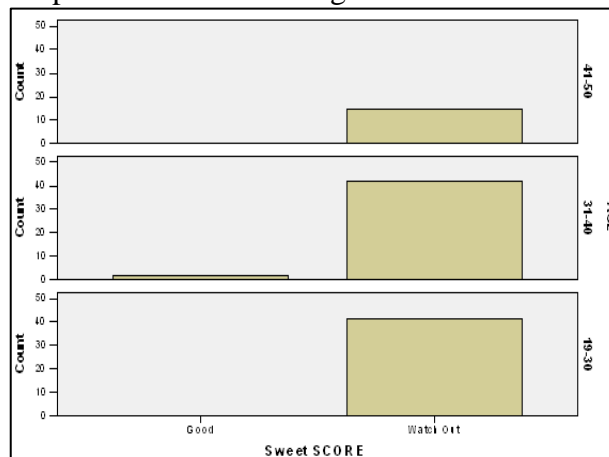
Figure 2 depicts that the oral hygiene status was poor with increase in age. None of the samples in the study population had good oral hygiene status. The number of samples with fair oral hygiene status decreases with age and majority of them had poor oral hygiene status in the age group of 41-50 years.



**Figure 2: Distribution of Ohi Scores in Age Groups**

Figure 3 depicts that the majority of the biscuit factory workers were under watch out zone and

the amount of sugar consumption increases with age.



**Figure 3: Sweet Scores Distributed In Age**

### Discussion:

The concept of ‘bakers caries’ has been based on the results of some earlier studies which concluded that dental caries of typical appearance and location on flat surfaces of teeth can exist in confectionery workers and that the caries experience of the confectionery workers was higher than in the normal population. Kai Massalin’s study suggests that dietary behavior and the nature of between meal snacks seem to be the most significant dental risk exposure in the confectionery industry [12]. The type of products manufactured by the workers and the fact that the workers were allowed to consume these products during work hours constitute potential hazards to the dental health of these workers. This result was in accordance with our study.

Tohidast. Z et al had done a study on sweets and cable industry workers using DMFT and OHI-S. That study says that missing teeth were highest and filled teeth were lowest among sweet industry workers [13]. In our study also it was shown that decayed and missing teeth were more in number when compared with filled teeth among biscuit factory workers because of neglect of oral health care.

Dileep C. L., Basavaraj. P, Jayaprakash..K, Bhuvan Deep Gupta had done a study on dental caries experience and oral hygiene status of biscuit factory workers in Kanpur, using DMFT, DMFS and OHI-S. The results given by them coincides with our results that DMFT score increases with age and none of the sweet industry workers had good oral hygiene status[14].

Poul Erik Peterson's study on dental health among workers at Danish chocolate factory found that subjects in the age group of 19-39 years had gingivitis and older individuals had pocket formation of depth 5mm and about two third of the population had bad or poor oral hygiene status[15]. This leads to increased caries incidence, therefore confectionery workers have to be considered as a high risk group.

Joseph Z Anaise’s study on prevalence of dental caries among workers in sweet industries in Israel showed that DMFT score increases with age which was also shown in our study [7].The results given by Kal E Massalin’s study on Dental caries risk in relation to dietary habits and dental services in two industrial population states that caries experience was found to be high in both

confectionery and bakery workers. Similar dietary behaviors were found in both populations and it was the most important factor affecting caries occurrence and susceptibility [16]. The results show that biscuit factory workers had higher risk to dental caries than the normal population. This should be considered as an occupational hazard and should be tackled accordingly. It shows the need for simple, effective prophylactic measures and oral health care education program in this branch of industry [12].

The study by Cheung C, Tong M, Lum C on effectiveness of an oral health care education program delivered by elderly ambassadors showed that an oral health care program delivered by trained elderly peers can improve oral hygiene status among a population. This provides a model of practice for promoting population-based oral health care [17]. Therefore oral health care programs can be conducted to improve the oral hygiene status of biscuit factory workers.

### Conclusion:

The results indicate that there is increased caries incidence among biscuit factory workers due to exposure to sugar dust for longer duration of time, poor living conditions and neglect of oral hygiene. Improvement in dental health of the study population can be achieved by conducting dental care programs, providing dental treatment facilities at subsidized rate to these workers, reduction of sugar dust in the environment, raising the level of knowledge about dental health among these workers. In addition further work is required to determine whether the effects of the programs are sustained or whether a reinforcement program is required.

### References:

1. Massalin K et al. Oral health of workers in modern Finnish Confectionery

Industry. Community Dent Oral Epidemiol. 1990; 18: 126-130.

2. Bernard, Sarnat G & Issac Schour. Oral manifestation of occupational origin. J Am Med Assoc. 1942; 120: 1197-1206.

3. Joseph Z Anaise. Prevalent of dental caries among workers in sweet industry in Israel. Community Dent Oral Epidemiol. 1978; 6:286-289.

4. Yabao R. N. et al. Prevalence of dental caries and sugar consumption among 6-12 year old school children in Philippines. Eur J Clin Nutr. 2005; 59:1429-1438.

5. Neethu Rappai, M. Vishali, D. Prabu, Sunayana Manipal, Rajmohan, Bharatwaj V.V. Association of Prevalence and Severity of Dental Caries with Consumption of Food and Beverage Across Age and Gender among 6-12 Years Old Children in Chennai, Tamilnadu. Indian J Public Health Res Dev. 2021; 12: 2.

6. Dinesh, Sindhu R, Prashanthi M R, Rajmohan M, Bharathwaj V V, Dinesh Dhamodhar, Shreelakshmi S, Prabu D. Contemporary Perception Of Oral Hygiene Among Adults Using Pea-Sized Blob And A Glut Of Toothpaste In Chennai, India- A Cross-Sectional Study. Nat. Volatiles&Essent.Oils. 2021; 8(5):2593 -2600.

7. Schou L. Oral health promotion at worksites. Int Dent J. 1989; 39: 122-128.

8. Dharmashree S, Chandu GN, Pushpanjali K, Jayashree SH, Shaftulla M. Periodontal status of industrial workers in Davangere City, Kamataka- A Descriptive 20 Sectional Study. Journal of Indian Association of Public Health Dentistry. 2006 Jan 1; 4(7):20.

9. Hyun Duck Kim & Chester. W. Douglas. Association between occupational health behaviour and occupational dental erosion. J Public

- Health Dent. 2003; 63:244-249.
10. John C Greene & Jack R Vermillion. Oral Hygiene Index Simplified. J Am Dent Assoc.1964; 64:7-13.
  11. Klein H, Palmer CE, Knutson JW. Studies on dental caries:I. Dental status and dental needs of elementary school children. Public Health Reports (1896-1970). 1938 May; 13:751-65.
  12. Kai Masalin et al. Work related behavioral and dental risk factors among confectionery workers. Scand J Work Environ Health. 1992; 18:388-392.
  13. Tohidast Z et al. DMFT, oral health index in sweet and cable industry workers. Iran. Public health. 2006; 35(2):64-68.
  14. Dileep CL, Basavaraj P, Jayaprakash K, Gupta BD. Dental caries experience and oral hygiene status of biscuit factory workers in Kanpur city. Journal of Indian Association of Public Health Dentistry. 2007 Jan 1; 5(9):54.
  15. Poul Erik Peterson. Dental health among the workers of Danish chocolate factory. Community Dent Oral Epidemiol.1983; 11:337-341.
  16. Kal E Massalin. Dental caries risk in relation to dietary habits and dietary services in two industrial population. J. Public Health Dent.1994; 54(3):160-165.
  17. Cheung C. et al. Effectiveness of an oral health care education program delivered by elderly ambassadors. Asian J Gerontol Geriatr. 2006; 1:5-13.