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Research Article

Oral health status and treatment needs of soft drink factory workers of Bareilly City: A cross-sectional study

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Abstract

Background: General health is closely related to oral health. Communication is made simpler and a person's dignity and individuality are enhanced by optimum dental health. The working conditions of soft drink industry employees affected their oral health.

Objective: To determine the level of oral condition and treatment requirements for soft drink employees in Bareilly City.

Method: 175 employees of soft drink factories participated in cross-sectional research. The individuals gave their informed consent and we received ethical approval. The 2013 WHO Oral Health Assessment Form for Adults was used to get the findings.

Results: The findings indicate a higher frequency of oral health issues among soft drink industry workers, including dental caries, gingivitis, periodontal pockets, loss of attachment, fluorosis and tooth erosion.

Conclusion: According to the survey, these soft drink industry employees have poor oral health and require more dental care than usual.

Introduction

Each person's dental health is a valuable asset and a key factor in determining their overall health. Environmental factors are the most important aspects that have an impact on both general and oral health. Numerous occupational disorders are susceptible to the complex and dynamic occupational setting. Industrial environmental factors among workers are to blame for a number of mouth diseases [1].

Poor oral health may result from a variety of factors, including poor quality food, alcohol and tobacco use, poor oral hygiene and stressful work environments. The term "working environment" refers to the collection of external factors that affect employees' health. This atmosphere exposes hazardous materials and causes mishaps. The individual's pathologic adaption to his workplace results in occupational hazards [1].

The only workers who are exposed to acid at work are those who clean containers used to store dyestuff and those who work in the battery and galvanizing (Zn-Al) sectors. Dental caries, periodontal disease and dental erosion are just a few of the health problems that these factory employees are susceptible to [2]. India accounts for over 80% of the load of employment disease worldwide as a result of "our country's improper industrialization" [3].

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All age groups have drastically increased their soft drink consumption as a result, there has been a rise in the number of soft drink producers. Workers who produce soft drinks suffer grave oral health consequences. They experience tooth wear, gingivitis, periodontal disease and dental caries [4]. Use of carbonated beverages is connected to GERD and regurgitation, both of which can result in tooth erosion [5].

The aim of the study was to assess Oral Health Status among Soft Drinks Factory Workers in Bareilly City using World Health Organisation oral health assessment form (2013) and oral hygiene index-simplified (OHIS).

Studies on the oral health of soft drink production workers are scarce. This research will assess the oral health conditions and treatment requirements of Bareilly City's soft drink industry employees [5].

Materials and method

Cross-sectional research was carried out in the soft drink factory of Bareilly city from December 2021 - April 2022. The study was approved by the Institutional Review Board, Institute of Dental Sciences, Bareilly. Prior to beginning the research, the production lines head provided written approval for it to be carried out there. The sample size has been scientifically estimated using G Power V 3.1 Software which yielded a minimum sample size of 175 workers (Significance level or α-error (allowable type I error) = 0.05, Power of the study = 0.80 (80%) and Effect of size was 0.10).

Soft drink factory workers who were working there at least for 5 years and above, who were willing to give their consent and who were able to cooperate for the study were included in the study. Subjects who have a cognitive impairment, reported psychological problems any systemic diseases, with trouble opening their mouths for whatever cause and those who did not want to take part in this research were eliminated.

Participants received all information regarding the research that is listed on the participant information sheet. After thoroughly explaining the technique in their native tongue, a signed informed consent form will be collected from each participant. 175 soft drink factory workers will be the total sample size for the clinical examination, which was done in the available natural light.

The demographic information, including age, education level, socioeconomic status, past medical and dental treatment and oral hygiene habits, was gathered via a self-administered questionnaire. Both the degree of health literacy among manufacturing workers and the level of education through frequency distribution were not assessed. The researcher interviewed the participants by asking them questions in their native tongue in order to prevent self-administered questionnaire misinterpretation and maintain the universality of questionnaire responses.

Following the questionnaires, the investigator performed a clinical examination. An authority in the subject trained the investigator. To standardize clinical practices and reduce the possibility of an error during data collection, intra-examiner reliability was conducted. The intra-examiner reliability for the diagnosis of caries was 0.82; for the diagnoses of plaque, calculus and bleeding on probing, the values obtained were 0.92, 0.9 and 1, respectively. Most examinations were predicted to have an agreement rate of 90%. A Type III ADA Specification examination was conducted. The subjects were comfortably sat on a regular chair while being examined in daylight. A conventional mouth mirror and a CPI probe were used for oral screening.

The inspections were performed without brushing or wiping the teeth and the tools utilized for the procedure were a mouth mirror with a number 4, tweezers and a specially made, lightweight CPITN-C probe (clinical). Using the 2013 WHO Oral Health Assessment Form, the oral health status was evaluated. Every examination was held in sterile conditions setting.

The gathered information was compiled. The pc was used to analyze the data obtained using SPSS. A significant association is shown by a *p*-value less than 0.05. Purely descriptive data were used, hence the frequency distribution was presented.

Results

The bulk of the survey participants was between the ages of 31 and 40. (44%). The majority of research respondents were from the upper-lower class (66.9%; Table 1). According to the investigation, 140 out of 175 individuals (about 80%) had dental caries. An estimated 82% of the individuals experienced gingival hemorrhage. 13.7 and 15.4% of the subjects, respectively, were impacted by periodontal pockets and loss of attachment (Table 2). According to a dental fluorosis examination of the workers, 79.1% (45.1%) had a normal range of fluorosis, 1.1% (2) had very mild levels, 26.3% (46) had light levels, 22.3% (39) had moderate levels, and 5.1% (9) had severe levels (Table 3). 89 of the individuals, or about 50.9%, had enamel degradation (Table 4). The majority (80%) of subjects demanded immediate care and scaling, while the rest 20% recommended precautions.

Discussion

Any country's population is largely made up of workers or laborers. The World Health Organization estimates that in 2007, half of the world's population was employed globally

Table 1: Demographic Details Among Soft Drink Factory Workers in Bareilly City.

Variable	Frequency	Percentage
175	175	100
Up to 20 years	5	2.9
21–30 years	74	42.3
31–40 years	77	44
Above 40 years	19	10.8
Gender		
Male	98	56
Female	77	44
Socio-economic status (Kuppusamy Scale 2017)		
Lower-middle class (Grade 3)	58	33.1
Upper-lower class (Grade 4)	117	66.9

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Table 2: Oral Health Status Among Soft Drink Factory Workers in Bareilly City.

Factor	Number	Percentage
Dental caries		
Present	140	80
Absent	35	20
Gingival bleeding		
Present	145	82.90
Absent	30	17.10
Periodontal pockets		
Present	24	13.70
Absent	151	86.30
Loss of attachment		
Present	27	15.40
Absent	148	84.60

Table 3: Dental Fluorosis and Dental Erosion Among Soft Drink Factory Workers in Bareilly City.

	Participants	
	Number	Percentage
	Fluorosis	
Normal	79	45.1
Very mild	2	1.1
Mild	46	26.3
Moderate	39	22.3
Severe	9	5.1
	Erosion	
No sign of erosion	77	44
Enamel lesion	89	50.9
Dentinal lesion	9	5.1
Pulp involvement	–	–

Table 4: Intervention Urgency Among Soft Drink Factory Workers in Bareilly City.

	Participants	
Intervention Urgency	**Number**	**Percentage**
Preventive/routine treatment needed	35	20.0
Prompt treatment including scaling needed	140	80.0

(about 3,300 million). 60 to 70% of adult males and 30 to 60% of adult females worldwide are officially counted among the working-age population [3].

Numerous jobs expose employees to dangerous working conditions, including acids and chemicals, among those employed by the battery and galvanizing (Zn-Al) industries, munitions manufacturers, soft drink producers, and cleaners of containers for dyestuff. India's consumption of soft drinks has risen in recent years across all age groups, which has directly increased the number of factories producing the drinks. Dental erosion and caries may be made more likely by workplace acid exposure in industries [6].

The goal of the current study was to describe the frequency and kind of oral health issues among employees of a soft drink industry in Bareilly City. A survey of the literature found few studies in this area, thus there is little to compare. All employees at the soft drink facility participated in the survey, and there was a 100% response rate.

A total of 175 factory workers were included in the current study. The sample had 77 girls and 98 males, aged 20 to 45, making up 44% of the total population. This allocation is comparable to one from a study by Kumar S, et al. [4], which included 51% men and 49% women and in which the majority (66.9%) belonged to the lower-upper class. In the present research, the majority (66.9%) belonged to the lower-upper class. Using the WHO proforma, the dentition status was reported (2013). It states that 80% of Bareilly's soft drink factories have tooth caries. Rajkumar Maurya, et al. [6], did research in India where the prevalence of caries was 67% and the mean DMFT was 4.09. The greatest DMFT index, 67%, was seen in decayed teeth. An earlier study suggested a high frequency of caries, which was likely brought on by regular consumption of sugar-sweetened soft drinks and poor oral hygiene habits. The findings of this study indicate that there is a high prevalence of periodontal disease in the population under study, with gingival bleeding occurring in 82.9% of cases, periodontal pockets in 13.7% of cases and loss of attachment in 15.4% of cases. This could be because oral hygiene is not maintained properly due to low literacy rates.

According to Sudhanshu Sanadhya et al. [7], the most common kind of dental fluorosis among the study participants (n=232; 23.7%) was severe fluorosis. Only 5.5% of the subjects had fluorosis which was dubious. Gender and dental fluorosis showed a strong correlation (p=0.001). Compared to men, women showed a considerably higher prevalence of dental fluorosis (71.7%). 11 A total of 54.9% of the study subjects (n=175) had dental fluorosis, with 1.1% having very light fluorosis, 23.4 having mild fluorosis, 22.9 having moderate fluorosis and 5.7 having severe fluorosis, respectively. The area's water fluoride concentrations, which range from 0.28ppm to 3.6ppm, can be credited for the high prevalence of dental fluorosis and lower mean dental caries score.

According to research by Kumar S, et al. [4], people who worked in these small-scale soft drink factories frequently drank soft drinks. Additionally, studies have indicated that individuals who frequently drink soft drinks have a higher prevalence of tooth erosion [4]. According to the current study, workers at soft drink factories had a significant prevalence of dental erosion. It turns out that 51.9% (89) and 5.1% (9) of the workers, respectively, had enamel lesions and dentinal lesions, which may have happened as a result of workers being exposed to carbon dioxide gas at work and increasing their use of soft drinks.

According to Roman and Pop [8-10], oral prophylaxis was the most common treatment requirement, which is consistent with the results of the current investigation. It demonstrates that 80% (140) of the workers required immediate treatment, comprising scaling and restorations, while 20% (35) of the workers required preventive or routine dental care.

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This study's limitations include its use of a single soft drink factory's convenient sampling. Future studies should be conducted on a big scale to evaluate the oral health of such workers and to determine the best course of therapy.

Conclusion

The workers at the soft drink factories in Bareilly City have a significant prevalence of dental caries, gingival bleeding, dental fluorosis and tooth erosion. Dental degradation develops as a result of exposure to carbon dioxide gas. A high percentage of impacted employees suggests that the workplace is hazardous. The employees of the soft drink factories, who made up around 80% of the workforce, need immediate scaling and restorations.

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