Occupational Dental wear and disorders among cement factory workers in Madhya Pradesh, Central India - A cross sectional survey

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Abstract

Background: The evidence of occupational exposure and oral health hazards related to cement dust exposure is evident as cement factories provide an environment which may contain abrasive particles in form of silica and other minerals dust. This study is taken up with the aim to study the effects of exposure of workers to cement dust and its relationship with oral health. **Material and Methods:** This cross sectional study was conducted in a cement factory located in Indore of Madhya pradesh in February 2016. Hundred workers participated in the study. The survey was conducted in natural light outside the factory premises. The data was collected by oral examination and using a proforma with the help of four examiners and recording clerks. The data was analysed using SPSS package version 16. Chi square test was used to see association between tooth wear, caries, oral hygiene status, lesions with age, education, brushing habits and betel nut use. **Results:** Out of 100 participants, 46 used powder to clean teeth whereas 54 used paste. Maximum (84%) had habit of brushing once a day. 28% had the habit of Gutkha chewing and 16% had habit of Bidi smoking. Attrition and abrasion cases were maximum followed by erosion. **Conclusion:** It was evident from the study that tooth wear in form of attrition, abrasion and erosion was present in all age groups. Further studies should be carried out to study general health effects of cement dust and positive measures should be taken to improve general and oral health.

Key words: Cement factory, occupational health, tooth wear, ghutka, tobacco

Key message: Oral health hazards related to occupational health in cement factory workers are subjected due to lack of knowledge about the abrasive dust exposure and deleterious oral habits amongst workers. Protection and safety measures taken during working hours can reduce the burden of occupational disorders.

Introduction

The cement industry includes not only the cement factory workers but also workers involved in transport and construction work. The evidence of occupational exposure and health hazards related to cement dust exposure is evident as cement factories provide an environment which may contain abrasive particles in form of silica and other minerals dust. Abnormal tooth surface loss in form of attrition or abrasion could be squealed to occupational exposure. Also respiratory illness related to occupational dust exposure is a common finding.[1] The various production processes in the cement industry such as the raw material, crusher, rotary kiln, cranes, mills, storage silos and packing section produce pollutants, i.e. airborne respirable dust levels from less than 5 to more than 40 mg/m3 which have been recorded in the work place air of cement factory workers. The aerodynamic diameter of the cement dust ranges from 0.05 to 20 micrometer, making the whole respiratory tract a target for cement deposition.[2]

The harmful effects of cement dust on periodontal health are also evident from many studies. Cement dust was causally related to Tooth Wear (TW), Calculus (CAL) formation and gingival Recession (R).[3]The clinical manifestations among cement factory workers also include Aphthous ulcer, caries, plaques and unhealthy gums.[2] Exposure to chemical, physical, and biological agents in the workplace can result in adverse effects on workers ranging from simple discomfort and irritation to debilitating occupational diseases such as lung fibrosis, neuropathy, deafness, organ damage, and cancers of various sites. For the overall well-being of the person, dental health is as essential as total body health.[4] This study is taken up with the aim to study the effects of exposure of workers to cement dust and its relationship with oral health. With objectives to:

1. To examine cement factory workers for presence of tooth wear.

2. To study the association of socio-demographic and host variables.

No such studies have been done in Indore beforehand hence it becomes essential to carry out such study and bring forth the health status of cement factory workers.

Material and Methods

The present study was conducted in a cement factory located in Indore of Madhya pradesh in February 2016. Almost all workers were tried to be included in this study. There were total 100 workers who gave consent and participated in the study. Written permission was taken from the

authority of factory to carry out this cross-sectional study. Ethical clearance was obtained from ethical review committee of the institution.

The survey was conducted in natural light outside the factory premises. The seating arrangement was done using simple chair and benches for the workers to sit and examine. Sterilized diagnostic instruments used were mouth mirror and explorer, kidney tray. Mouth mask and gloves were used for self protection. The workers who participated were in the age group of 20-60 years. Pilot study was conducted to check the feasibility of study.

Results

This cross sectional study was conducted to assess the oral health of cement factory workers. In the age group of 20-34 years 32 workers were there. Whereas in the age group of 35-44 yrs and 45-60yrs age group there were 42 and 26 workers respectively. Total 100 cement factory workers were included in this study and all were males (Table 1). Out of hundred workers 46 used powder to clean teeth whereas 54 used paste. Maximum (84%) had habit of brushing once a day. 28% had the habit of Gutkha chewing and 16% had habit of Bidi smoking.

Proforma Details: The data was collected by face to face interview and oral examination and using a proforma with the help of four examiners and recording clerks.

The proforma consisted of sociodeographic details and details of oral health care habits, oral deleterious habits and other variables such as dental caries, tooth wear, oromucosal lesions.

Statistical Analysis: The data was analysed using SPSS package version 16. Chi square test was used to see association between tooth wear, caries, oral hygiene status, lesions with age, education, brushing habits and betel nut use. P value < 0.05 was considered statistically significant.

Table 2 shows association between age and other host variables. Maximum caries (24) were present in the age group of 35-44 years and the results were statistically significant.(P- 0.008). Maximum workers had fair oral hygiene. (statistically significant p value 0.007). Out of all lesions maximum observations of OSF were seen in all age groups. (p value 0.05, statistically significant). As compared to erosion maximum cases of attrition and abrasion were present but the result was not statistically significant.

Table1: Sociodemographic details of cement factory workers

Sr. no.	Demographic variables	Frequency n%
1	**Age(yrs)**	
	20-34	32
	35-44	42
	45-60	26
2.	**Education**	
	Illiterate	28
	primary	16
	middle	26
	high	20
	diploma	2
	Graduate/ PG	6
	professional	2
3.	**Oral hygiene practices**	
	Material used	
	a. Paste	54
	b. Powder	46
	Method of brushing	
	Horizontal	92
	Vertical	02
	Both	06
	Brushing frequency	
	Once	84
	Twice	16
4.	**Deleterious oral habits**	
	No habits	20
	Tobacco	28
	betelnut	8
	Ghutka	28
	Bidi	16

Table 2: Association of dental caries, oral hygiene, oral lesions and wasting diseases with Age.

Sr No	VARIABLES	AGE(In Years)			P-value
1.	**CARIES**	20-34	35-44	45-60	0.008
	Present	14	24	22	
	Absent	18	18	04	
2.	**ORAL HYGIENE**				
	Good	0	8	2	0.007
	Fair	26	18	14	
	Poor	6	16	10	
3.	**LESIONS**				
	No lesions	22	26	20	0.05
	OSMF	8	8	4	
	Leukoplakia	0	8	2	
	Ulcers	2	0	0	
4.	**ATTRITION**				
	Present	20	29	18	0.80
	Absent	12	13	8	
5.	**ABRASION**				
	Present	14	17	12	0.89
	Absent	18	25	14	
6.	**EROSION**				
	Present	0	4	6	0.00
	Absent	32	38	20	

P- value ≤ 0.05% - statistically significant.

Table 3: Association of dental caries, oral hygiene, oral lesions and wasting diseases with Education

Sr No	Variables	Illiterate	Primary	Middle	High	Diploma	Graduate or post graduate	P-value
1.	**CARIES**							
	Present	10	4	14	8	0	4	0.00
	Absent	18	12	12	12	2	2	
2.	**ORAL HYGIENE**							
	Good	2	6	0	2	0	0	
	Fair	16	6	14	16	2	4	0.004
	Poor	10	4	12	2	0	2	
3.	**LESIONS**							
	No lesions	20	14	14	14	2	2	
	OSMF	6	2	4	4	0	4	
	Leukoplakia	2	0	6	2	0	0	0.14
	Ulcers	0	0	2	0	0	0	
4.	**ATTRITION**							
	Present	10	5	6	8	0	2	
	Absent	18	11	20	12	2	4	0.34
5.	**ABRASION**							
	Present	16	7	12	14	2	4	0.31
	Absent	12	9	14	6	0	2	
6.	**EROSION**							
	Present	2	2	2	0	0	0	0.06
	Absent	26	14	24	16	2	6	

P- value ≤ 0.05% - statistically significant.

Table 3 exhibits association of host variables with education. Except for Diploma holder's caries were present in all education group from illiterate to graduate or post graduate. Maximum cases (16) of fair oral hygiene were seen in illiterate workers and in those educated upto High school followed by middle school educated (14) (P-value 0.004). Maximum cases were of OSF followed by leukoplakia. (p- value 0.14). Maximum workers had abrasion

followed by attrition and erosion and the results were not statistically significant.

Table 4 represents deleterious oral habits with host variables. 20 workers having habit of Tobacco chewing had caries. 16 workers having habit of Tobacco chewing had poor oral hygiene and 20 workers having Gutkha chewing habit had fair oral hygiene (P- value 0.01). 12 workers having habit of Gutkha chewing had oral submucous fibrosis. 4 cement factory workers who had habit of bidi smoking had leukoplakia.

Discussion

In a study done by Abdulla M.I & Al-Waheb A.M the cement factory workers age ranged from 25-55 years which is in line with our study in which workers age group ranged from 20-60 years.[1] The use of tobacco and related products is present ubiquitously amongst factory workers irrespective of type of factory. Tobacco and betelnut products consumption leads to occurrence of halitosis, tooth wear, TMJ problems, periodontal disease, oro-mucosal premalignant lesions and conditions. Still it is preferred by workers to be used as it relieves them of fatigue and stress after strenuous work. In a study done by Shyagali TR, Salama HL, Bhavya DP on tobacco use among mine workers it was reported that in mine workers the use of Gutkha was highest (38.6 %) followed by tobacco chewing (19.20%) and Bidi smoking(16 %). Similar trends were seen in the present study.[5]

Similar to our study, in a study done by Praveena RRM et al in 2013 the workers in the portland cement factory, workers were exposed to abrasive dust particles in the form of silica, dust, gypsum, fly ash, limestone without safeguard measures which causes environment pollution, respiratory disorders and wasting diseases. (Portland cement). As shown in Table 2 wasting diseases were seen in all age groups but statistical significant association was seen only with erosion. (P- 0.00).In a study done on cement factory workers in Rajasthan almost 50 percent of workers had wasting diseases.[6]

Dental erosion is an irreversible pathological condition characterized by loss of hard dental tissue due to chemical produced by acids without bacterial involvement. In the present study dental wear in the form of attrition was found maximum (Table 2) in all age groups as compared to erosion and abrasion. Overall 10 cases of erosion were found in all age groups. While in a study done by Pulkit et al in 2015 in Rajasthan, India, enamel erosion was found in 62.93% of workers.[7]

Conclusion

It was evident from the study that tooth wear in form of attrition, abrasion and erosion was present in all age groups. Due to lack of occupational protection cement dust was affecting oral health as well as the strenuous work stress lead to consumption of tobacco and betel nut, thus oromucosal lesions were also present. Further studies should be carried out to study general health effects of cement dust and positive measures should be taken to improve general and oral health.

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Conflicts of Interest: Nil

References:

1. Abdulla MI, Al-Waheb AM. Occupational dental wear among El-Kubasis cement factory workers - An observational study. J Bagh College Dentistry 2014; 26: 135-7.
2. Praveena MRR, Clevin RR, Ghattargi CH, Dorle AS, Lalitha DH. Effects of occupational dust exposure on the health status of portland cement factory workers. Int J Med Public Health 2013; 3: 192-6.
3. EL-Ghandour I. Effect of Cement Dust on Periodontal Health of Workers in Rabak Cement Factory. Master thesis, College of Dentistry. Khartoum University 2006.
4. Verma DK, Purdham JT, Roels HA. Translating evidence about occupational conditions into strategies for prevention. Occup Environ Med 2002; 59: 205-14.
5. Shyagali TR, Salama MH, Bhayya DP. Prevalence of tobacco usage and its effect on the periodontal health parameters in the ining employees and the general population- A comparative study. Brazilian Journal of Oral Science 2017; 16: 1-9.
6. Sharma A, Thomas S, Dagli RJ, Solanki J, Arora G, Singh A. Oral health status of cement factory workers, Sirohi, Rajasthan, India. J Health Res Rev 2014; 1: 15-9.
7. Chaturvedi P, Bhat N, Asawa K, Tak M, Bapat S, Gupta VV. Assessment of Tooth Wear Among Glass Factory Workers: WHO 2013 Oral Health Survey. J Clin Diagn Res 2015; 9: ZC63-ZC66.

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