

Oral hygiene habits amongst chromium mine workers-A cross sectional study

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ABSTRACT

Background: Oral health means much more than just having healthy teeth. Various oral diseases have significant side effects on general health; also systemic diseases can show a reciprocal effect on oral health. So oral health needs to be regarded by multi-professional approaches and should be combined into comprehensive health-promotion strategies and actions. The present study aimed to determine oral hygiene habits amongst chromium mine workers. **Materials and Methods:** The present observational, cross-sectional study was conducted for a period of 4 months from April to October 2017. The present study evaluated the oral hygiene habits amongst the chromium mine workers of Odisha. A total of 1140 males were enrolled in the study. The study was conducted after the institutional ethical board clearance and informed written consent for participation in the study and written consent was obtained from all in their vernacular language. Data were entered using MS-EXCEL 2016 and the statistical analysis was done using SPSS software. **Results:** There were 91.9% of subjects who brushed once a day, 6.9% brushed twice a day and 1.1% brushed after every meal. The results of the study showed that 75.9% and 8.1% of subjects used tooth paste and tooth powder respectively for brushing their teeth regularly. The results of this study also showed that 11.9% of study participants used indigenous means (other means) as an aid to tooth brushing. **Conclusion:** There is a lack of awareness and education about oral hygiene practices amongst mine workers due to which they do not resort to good oral hygiene practices.

Keywords: Brushing, chromium mine workers, health, hygiene, oral

Introduction

The mining sector is an essential economic sector for numerous nations and consists of the consumption of various metallic and nonmetallic minerals.^[1] The mine workers around the world are exposed to a hazardous environment through multiple and persistent injuries, along with various disabilities.^[2] It has been reported in previous literature on occupational hazards that there is a drastic decline in the number from 1979 to 2004. It has

reduced from 267 to 55 as projected by the Mine Safety and Health Administration.^[3] The employment of the Indian mining sector approximates to 5,60,000 which is a total of 87% from the public sector and 13% belonging to the private sector.^[4] The mine workers are exposed regularly to various pollutants and toxicants present in their working environment including heavy metals such as mercury, chromium, cadmium, lead, manganese, arsenic, aluminium, fluoride, etc.^[4] Inhalating and absorbing these pollutants through the skin are the most commonly affected routes. The distribution of India's rich mineralogical resources stretches over a wider geographical location involving over 1.5 million persons directly or indirectly. India ranks second among the world population in barites, chromite, and talc, third in lignite and coal, fourth in iron ore, sixth in bauxite and seventh in manganese in 2002–2003. Chromium (Cr) is an essential nutrient as well as a health hazard.

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Distinctively, Cr in oxidation state +6, is measured harmful even in minute intake quantities while Cr in oxidation state +3, is measured essential for superior health in the reasonable intake.^[5] Oral hygiene is the exercise of making the oral cavity healthy and clean by proper brushing and flossing to stop tooth decay and gingival conditions.^[6] Oral health means much more than just having healthy teeth. The World Health Organization has a defined good oral health as “Being free of chronic oral and facial pain, oral cancer, sores, birth defects like cleft lip and palate, periodontal disorders, tooth caries and tooth loss, and any other related diseases and disorders that can afflict the mouth and oral cavity”.^[7] Various oral diseases have significant side effects on general health; also systemic diseases can show a mutual effect on oral health. Hence, oral health needs to be regarded by multi-professional approaches and should be combined into comprehensive health-promotion strategies and actions.^[8] A complete healthcare needs the combined actions of both the medical and dental professions.^[9] Dental caries was seen in 67.5% of people working in factories, of whom 49.7% were observed to have decayed, missing, filled teeth criteria of 1-3.^[10] Most people residing in rural areas had limited admission to important oral health centers due to geographic and economic barriers.^[11,12]

For understanding the oral health practices of the individuals, it is always advisable to understand and review the oral health knowledge and behaviors of the chromium mine workers towards oral hygiene maintenance. Thus the present study aimed at determining oral hygiene habits amongst chromium mine workers.

Materials and Methods

An observational, cross-sectional comparative study was conducted for 4 months from April to October 2017. The present study was conducted to evaluate the oral hygiene habits amongst the chromium mine workers of Odisha. The ethical approval was obtained from the Institutional Research and Ethics Committee, KIIT University, Bhubaneswar (KIMS/KIIT/IEC/133/2015) 10.10.2015. Prior to the commencement of the study, the participants were explained details about the study, and written informed consent was obtained from each of them in their vernacular language.

Tool used

The questionnaire was translated into the local Odiya language and the validation was done by an experts panel including two public health dentists, one language school teacher, one bio-statistician and one periodontist. Training and calibration of the examiner and recording assistant (Internee) were carried out in the Department of Public Health Dentistry, Kalinga Institute of Dental Sciences, Bhubaneswar, under the guidance of the guide. The calibration took place for 3 days on random patients visiting the outpatient department. The inter-examiner reliability was derived to be 0.80. This was done to ensure uniform interpretation, understanding, and application of the codes and criteria used to be observed and recorded.

Sample size derivation

The sample size derivation was done after the pilot study with $n = 40$ keeping the confidence interval at 95% and precision value at 5%. The sample size was derived to be 1000 by using the formula, $n = Z^2 P(1-P)/d^2$ where n is the total sample size, Z is the statistic corresponding to the level of confidence, P is expected prevalence percentage derived from the pilot study and d is precision (corresponding to effect size). The final sample recruited was 1140.

Methodology

Males aged between 18 and 54 years were enrolled in the study. Subjects with chronic systemic diseases, failure to consent and uncooperative patients were excluded from the study. All the subjects were given a pretested questionnaire in their vernacular language and were made to fill that. The study involved the completion of an open- and closed-ended pre-designed questionnaire that collected details of the demographic data, deleterious habits diet sweet consumption, oral hygiene practices, medical/dental insurance policies, visit the dentist, working environment, and personal protective Measures (PMM) used while working. All the data thus obtained were entered into the datasheet using the MS EXCEL 2016 by the trained assistant under the supervision of the principal investigator. The data were checked for any missing entries and re-confirmed with the datasheets. Data analysis was done using IBM SPSS Statistics for Windows, version 21 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to report continuous variables.

Results

Table 1 depicts the distribution of the study population according to the frequency of brushing. There were 91.9% of subjects who brushed once a day, 6.9% brushed twice a day and 1.1% brushed after every meal. Table 2 depicts the distribution of the study population as per the mechanical aid for cleaning. There were 78.07% who used a brush, 15.9% of subjects used finger and 6.1% resorted to other means. Table 3 shows the distribution of

Table 1: Distribution of study population according to frequency of brushing

Frequency of brushing	Frequency	Percentage (%)
Once	1048	91.9
Twice	79	6.9
After every meal	13	1.1
Total	1140	100

Table 2: Distribution of study population according to Mechanical aids used for cleaning

Mechanical aids used	Frequency	Percentage (%)
Brush	890	78.07
Finger	182	15.9
Others	70	6.1
Total	1140	100

Table 3: Distribution of study population according to material used for cleaning

Material used	Frequency	Percentage (%)
Nil	45	3.9
Toothpaste	866	75.9
Others	136	11.9
Toothpowder	93	8.1
Total	1140	100

subjects according to the material used for cleaning. The results of the study showed that 75.9% and 8.1% of subjects used tooth paste and tooth powder respectively for brushing their teeth regularly. The results of this study also showed that 11.9% of study participants used indigenous means (other means) as an aid to tooth brushing and 3.9% of study participants used water as an aid to clean their teeth.

Discussion

The chromium mine workers should be considered among the high-risk group in matters of general and oral health due to their constant exposure to harmful chemicals. As mentioned earlier, oral health is an integral part of the general health; hence, it should be the duty of the family physicians, primary healthcare professionals along with the dentists handling such patients to educate them with the basic knowledge for preventing oral diseases and thereby preventing multiple health problems. Unfortunately, in spite of the advancements in the medical sciences and various primary healthcare services, there is no regular screening of the patients for oral hygiene. Thus, it would be beneficial if screening for vitals would be accompanied by oral hygiene screening. The recommendation for the family physicians would help in strengthening the primary healthcare centres which serve as the first line of treatment for the population. The study was conducted to understand the patterns of oral hygiene maintenance. In India, the majority of dental services are financed on a fee for service basis, and hence, the fee barrier could hinder the utilization of various dental services among the general population also. The result of the present study was correlating with the previous study conducted on Jordanian adults which stated that people kept dental health at a lower priority in their lives, especially for the more expensive dental treatment thus extraction of teeth was the most commonly accepted treatment modality among lower socio-economic societies.^[13] This study finding was also in conformity with a previous study done on the Finnish industrial population that concluded that there was a progression of periodontal diseases with advancing age.^[14] The results of the present study were correlating with an earlier study done among South Australian workers which concluded that there was an earlier study done among South Australian employees which concluded that there was a significant regression in the periodontal status as age advantages.^[15] In the present study, many workers didn't pay any heed to oral hygiene practices and preferred brushing only once a day. These findings conformed with a previous study conducted

among the Japanese mine workers in Osaka that concluded that in a group of people of poor oral hygiene the negative effects of smoking were evident resulting in unhealthy periodontal tissues.^[16] This could be attributed to the lack of knowledge regarding the need to efficiently brush the teeth. Our finding was also in conformity with the earlier study done on a citizen of Oulu in Finland, which concluded that periodontal pocketing increased with diminishing tooth brushing frequency and an unhealthier lifestyle.^[17] Among Danish chromium industrial workers there was a 70% prevalence of twice a day brushing habit and hence revealed better periodontal health which was contrasting our study.^[18] According to a study conducted by Jitender Solanki *et al.* amongst 510 men working in stone mines to evaluate the periodontal health and the wasting disease and experience years and found that oral hygiene was poor amongst subjects with 74% having dental caries and it was concluded that they should be provided better medical and dental facilities.^[19] As per the study by Pushpa Thapa *et al.* amongst 4200 adults and found that 95% of subjects cleaned teeth only once a day and fluoridated toothpaste was used by 71.4% subjects.^[20] As per a study by Simranpreet Kaur *et al.* to evaluate knowledge and attitude towards dental treatment and found that males had higher oral health knowledge compared to females. The use of fluoridated toothpaste over non-fluoridated toothpaste might not be known to the mine workers. This would advocate the need to educate and communicate the benefits of fluoride in maintaining optimal oral health. Oral health knowledge was average amongst the subjects.^[20]

Conclusion

Mineworkers represent a special, an enclosed and high priority population group or community who deserve to be attended on their oral and general health due to the various occupation and environmental hazards they encounter in their daily life. There is a lack of awareness and education about oral hygiene practices amongst mine workers due to which they do not resort to good oral hygiene practices. The findings of this study summarize the need to educate the chromium mine workers about the need for maintaining oral hygiene and the adverse effects of improper oral hygiene maintenance on general health. This would improve the oral health habits and attitudes of the mine workers and help them attain optimum oral health.

Declaration of patient consent

Written informed consent was taken from individual subjects before the commencement of the main study.

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Conflicts of interest

There are no conflicts of interest.

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