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## RESEARCH ARTICLE

### ORAL HEALTH STATUS OF THERMAL POWER PLANT WORKERS IN RAMAGUNDAM, TELANGANA STATE, INDIA – A CROSS-SECTIONAL STUDY

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#### ABSTRACT

**Background:** Health is multifactorial and every individual's biological makeup influences health through interaction with social and physical environments as well as behavior. In thermal power station different groups of employees are exposed to different working conditions and environmental factors at their work place in turn making them prone to various health hazards and succumbing to habits detrimental to their general and oral health.

**Objective:** To assess the oral hygiene status and practices.

**Methods:** A total of 294 thermal power plant workers were enrolled in the study. Data was collected using "WHO oral health proforma 2013". Intra oral examination and tobacco habits were recorded. Intra examiner reliability was 0.84-kappa value.

**Results:** Caries experience was found to be (46.3%) with a mean DMFT of 1.09±1.74. About 9% study subjects were with untreated dental caries and 15.6% subjects were with missing teeth. 40.4% subjects were having unhealthy periodontium in terms of gingival bleeding and/or periodontal pockets and about 239 (81.2%) and 52 (17.6%) of subjects were with 0-3mm and 4-5mm loss of attachment respectively. 40% of the workers were having habits like tobacco and alcohol consumption.

**Conclusion:** Though adequate periodic dental services are provided still majority of power plant workers had poor oral hygiene and moderate dental caries and periodontitis.

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## INTRODUCTION

Oral health is essential to general health and well-being at every stage of life (Kawalkar *et al.*, 2014; Gambir *et al.*, 2013). The World Health Organization (WHO) has a definition of good oral health: "Oral health means being free of chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay and tooth loss, and other diseases and disorders that affect the mouth and oral cavity" (Håkansson, 2010). A healthy mouth enables not only nutrition of the body, but also enhances social interaction and promotes self-esteem and feelings of well-being. Workers constitute a large and important population. The officially registered working population includes 60-70% of world's adult males and 30-60% of adult females (Sharma *et al.*, 2014). In 2012, there were around 487 million workers registered in India, the second largest after China. A person spends on an average, one third of his life at his work place; therefore, the environment in which he works can be a major factor in determining health (Singh *et al.*, 2015).

The occupational environment plays a crucial role in the general and oral health of workers. Thermal power plant is one of the main sources of electricity generation. At present 54.09% or 93918.38 MW of total electricity production in India is from coal based thermal power station. A very large number of people are working in thermal power plants in India. The modern industrial processes present many hazards to the health of the employees. It is an established fact that there is no occupation which does not have any health hazard. Thermal power plant has caused environmental impacts at all stages of the process in the area. It causes various occupational diseases to the workers as most of the work is dealt with coal, steam etc. which may have deleterious health effects (Abbas *et al.*, 2015). Each occupational disease and injury has a major effect on economy due to loss of productive hour, manpower losses, compensation to the victim's. There are several kinds of ailments which have been recorded in the thermal power plant workers. These include allergic reactions that interfere with breathing, asthma, emphysema, chronic bronchitis, lung cancer, pneumonia, tuberculosis, wheezing, stroke, chest pain, shortness of breath, cough, irregular heartbeat, swelling in legs and feet (not caused by walking), skin allergies, hypertension, anxiety, eye irritation and fatigue (Kumar *et al.*, 2015).

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Oral mucosa is subjected to pathological changes upon local, environmental, and systemic influences. Thermal power station workers are often exposed to different working conditions and environmental factors at their work place making them prone to various health hazards and succumbing to habits detrimental to their oral health (Harrington, 2001). Although many studies have been carried out on health hazards of thermal power plant workers, till date very less literature is available worldwide and in India concerning the oral health status of workers in the thermal power station. Hence the present study was carried out to assess the oral health status and tobacco habits of thermal power plant employees.

## METHODOLOGY

A cross sectional study was carried out on the thermal power plant workers in Ramagundam, Telangana state in the month of April 2015. Permission to conduct the study and a list consisting of the names of 4000 thermal power station workers were obtained from their authorities. Pilot study was conducted priorly to estimate the prevalence of dental caries. By using the formula  $z^2 pq/d^2$  and considering the prevalence of dental caries to be (25%) a sample of 294 workers was drawn. Ethical clearance was obtained from “ethical committee of research of Sri Sai College of Dental Surgery Vikarabad”. Subjects who were present at the time of the study and willing to participate were included in the study. The examiner underwent training and calibration on 10 subjects who were reexamined after one hour to evaluate the intra examiner reliability which was found to be 0.84-kappa value and was accompanied by an assistant for recording the data.

Oral examination was done on 20 individuals each day by using mouth mirrors and CPI probes. The data was recorded by “WHO Oral Health Assessment Form for Adults 2013” (WHO, 2013) which comprised of dentition status, periodontal status, the loss of attachment, dental fluorosis, traumatic injuries, dental erosion, oral mucosal lesions, prosthetic status, and treatment needs. Demographic details, oral hygiene practices, tobacco and alcohol habits were additionally recorded. Sterilization was done in an autoclave every day at the dental wing of general hospital situated in the premises of power plant. Statistical analysis was carried out using IBM SPSS package version 21.0 (2012). Descriptive statistics were generated using Microsoft excel and word.

## RESULTS

In the present study a total of 294 subjects were examined with an age range of 25-60 years. Table 1 shows the demographic details and the oral hygiene practices. Majority (34.1%) of the subjects were in the age groups of 52-60 years. Nearly 292 (99.4%) used tooth brush and tooth paste, 2 (0.6%) used neem stick as their oral hygiene aid. A prevalence of 37.5% tobacco and alcohol usage was observed. Of these (11.9%) subjects had only smoking, (8.5%) subjects used only chewing form of tobacco, (16.6%) subjects had a combination of any two habits and (0.3%) subjects had combination of all the three habits. Table 2 depicts the prevalence of dental caries and means DMFT. Where the mean DMFT of the study population was  $1.09 \pm 1.74$ . The highest DMFT score recorded was 11 and (2%) of subjects had DMFT scores  $\geq 7$ . Majority of the study population (46.3%) were having less caries experience.

**Table 1. Demographic data, oral hygiene practices, tobacco and alcohol habits**

VARIABLE	LEVELS	NO OF SUBJECTS	PERCENTAGE
AGE	25-33	32	10.9%
MEAN	34-42	68	23.1%
46.19±8.9	43-51	91	30.9%
	52-60	100	34.1%
EDUCATION	SCHOOL EDUCATION OR LESS	214	72.7%
	INTERMEDIATE	3	1.2%
	COMMUNITY/TECHNICAL COLLEGE	48	16.3%
	GRADUATION	29	9.8%
ORAL HYGIENE AID	NEEM STICK	2	0.6%
	TOOTH BRUSH	292	99.4%
FREQUENCY	ONCE A DAY	294	100%
	TWICE A DAY	0	0%
MATERIAL	NONE	2	0.6%
	TOOTH PASTE	292	99.4%
ALCOHOL/ TOBACCO HABITS	NONE	184	62.6%
	ONLY SMOKING	35	11.9%
	ONLY CHEWING	25	8.6%
	ONLY ALCOHOLIC	0	0%
	ANY TWO COMBINATION	49	16.6%
	ALL THE THREE	1	0.3%

**Table 2. Distribution of subjects in relation to dental caries status**

VARIABLE	LEVELS	NO OF SUBJECTS	PERCENTAGE
CARIES EXPERIENCE	NO CARIES EXPERIENCE	158	53.7%
	WITH CARIES EXPERIENCE	136	46.3%
DMFT	D: UNTREATED CARIES	58	9%
	M: MISSING TEETH	46	15.6%
	F: FILLED TEETH	64	21.7%
DMFT SCORES MEAN	0	158	53.7%
1.09±1.74	1-2	98	33.4%
	3-4	22	7.5%
	5-6	10	3.4%
	$\geq 7$	6	2%

**Table 3. Distribution of subjects based on periodontal status**

VARIABLE	LEVELS	NO OF SUBJECTS	PERCENTAGE
GINGIVAL BLEEDING	PRESENT	119	40.4%
	ABSENT	175	59.6%
PERIODONTAL POCKETS	ABSENT	274	93.1%
	SHALLOW POCKET 4-5mm	20	6.9%
	DEEP POCKET $\geq$ 6mm	0	0%
LOSS OF ATTACHMENT	0-3mm	239	81.2%
	4-5mm	52	17.6%
	6-8mm	3	1.2%

About 58 study subjects (19.7%) were with untreated dental caries, 46 subjects (15.6%) were with missing teeth and most of the subjects i.e. 64 (21.7%) were with filled teeth. Table 3 illustrates the periodontal status of the study population, and a high prevalence was found (40.4%). Subjects in the study population showed the signs of periodontitis in terms of gingival bleeding and/or periodontal pockets. The highest score, with loss of attachment (LOA) 0-3mm, 4-5mm, 6-8mm seen among the subjects were 239(81.2%), 52(17.6%), 3(1.2%) respectively.

## DISCUSSION

Health has evolved over the centuries as a concept from an individual concern to a worldwide social goal and encompasses the whole quality of life. In every workplace there are interactions between people and the physical demands involved with performing job. Oral health is a critical but an overlooked component of overall health and wellbeing among the people. Huge differences exist in health status including oral health between urban and rural population in India. Although there have been impressive advances in dental technology significant disparities remain in both the rates of dental disease and access to dental care among sub groups of population. (Gambhir *et al.*, 2013) As there was no previous data regarding the oral health status of thermal power station workers, the oral health status of other population workers working in similar conditions has been used for comparison.

It must be pointed out that the oral hygiene status of the workers was found to be good as all the study subjects were found brushing their teeth at least once a day regularly. This was in contrast with a study done by Nagarajappa *et al.* (2013) where majority of the kota stone workers did not brush their teeth and a study done by Amin *et al.* (2001) where very few workers of battery factory cleaned their teeth daily. Major section of the population used tooth brush and tooth paste as their oral hygiene aid and material and very few used neem twig as their means of oral hygiene aid which was not in concordance with a study done by Nagarajappa *et al.* (2013) where only 8.6% used tooth brush and paste. One possible explanation could be that entire workers population of the study included subjects from semi-urban and urban localities where there was better maintenance of oral hygiene. The reason for this could be their educational status and their healthy lifestyles. The overall addiction to tobacco, smoking and alcohol was found in 37% of the workers. Conversely, several studies have highlighted a much higher prevalence as seen in a study done by Unalacak *et al.* (2004) on coal workers. Thermal power plant is affianced with physical work throughout the year in irregular hours due to shift based working system because of which their natural circadian rhythm is interrupted. This may cause occupational stress which in turn leads to tobacco usage.

Night shift workers are mostly associated with sleep problems which may indulge most of the workers to consume alcohol. Dental caries experience of 46.3% was observed in the study subjects with majority of the subjects having their teeth filled. The findings of the present study show disparity with the study done on industrial workers by Chatrchaiwiwatana *et al.* (Chatrchaiwiwatana *et al.*, 2012) where the caries prevalence was found to be 57.3% and among which none of them had any filled teeth. Issuing dental allowances as an employment-related benefit for workers is one initiative that might have favored the relatively high utilization of dental services by the employees and also the efficient services provided by the dentist all together contributed its need as a whole. As the caries prevalence was moderate it needs a greater attention on the preventive procedures, such as hygiene instructions. Workers must also be oriented towards awareness aspects by motivating and making them aware about the oral health problems which can help them to maintain their oral health.

It is believed that periodontal disease is triggered by a disruption of the balance between host resistance and factors provoking the disease. In the present study more than half of the workers were having healthy periodontium and only 6.8% showed shallow pockets with none of them having deep pockets. These findings were in contrast with the study done on brass industry workers by Tirth *et al.* (2013) where only 6.6% of the brass industry workers had healthy periodontium with 10.2% showing shallow pockets and 0.6% of them deep pockets. In the present study significantly greater number of workers reported the use of tooth brush and tooth paste to clean their teeth which showed its effect on the periodontal status of the workers. This might be due to healthy lifestyle of the workers, less exposure of certain risk factors such as tobacco, and the efficient use of oral hygiene methods for cleaning teeth. Limitation of the study is that the general health's of the subjects were not taken into consideration which could have been an influencing factor on their oral health status.

## Conclusion

In the light of the present findings study concludes that existing oral health service which is mainly focused on treating domain should be oriented more towards preventive care by giving regular oral health education which will help the workers to improve their oral health. The findings of the present study highlight good oral hygiene, moderate level of caries and periodontal disease prevalence in accordance with the adequate dental services and allowances provided by the organization. The workers form the lifeline of any working area in a confined environment constituting with machines and high risks. However, many a times they are not given due importance.

Hence, continuous professional research and development is essential to improve overall as well as oral health of these workers.

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