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Work-related health problems in salt workers of Rajasthan, India

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Abstract

Background: About 20,000 men and women are engaged in the production of salt in Rajasthan alone, which is an important unorganized sector. The salt workers are exposed to adversities of environmental conditions as well as salt in the environment. There is a lack of information about their occupational health problems. **Aims:** The study aimed to identify work-related health problems experienced by the salt workers. **Settings and Design:** Data were collected in the health camps held near salt sites. **Materials and Methods:** Workers of salt manufacturing units were invited for their free health examination. **Statistical Analysis:** Analysis of the data was carried out using Epi-Info 2002 software. **Results:** Prevalence of ophthalmic symptoms was 60.7%, that of dermatological symptoms was 43.8% and symptoms like headache, giddiness, breathlessness, muscular and joint pains were experienced by 52.1% salt workers. The ophthalmic problems were most common, probably due to irritation by direct sunlight and its glare caused by salt crystals and brine as well as irritation caused by fine salt particles suspended in the air of the working environment. Traumatic ulcers, dermatitis, muscular and joint pains, headache and giddiness were other more common symptoms observed among the workers. Prevalence of hypertension was 12.0%. **Conclusions:** Looking at the large number of salt workers exposed to salt and facing occupational health problems, there is a need for developing a mechanism for prevention of these problems in them.

Key words: Occupational health problems, prevalence, salt-workers, symptoms

INTRODUCTION

About 20,000 workers are engaged in the production of salt in Rajasthan, which is an important unorganized sector[1] in western India. Inland water or lake water rich in salt content is kept in wide and open pans manually constructed on the surface of earth from where water evaporates under direct sunlight and salt crystallizes at the bottoms of brine pans. Salt workers engage in various processes of salt manufacturing - viz., sweeping the salt crystals with a wooden spade; heaping of salt crystals at the edges of pans; loading, weighing, milling, packing or transportation of salt. The workers are exposed to adversities of environmental conditions as well as salt in the environment. A cross-sectional study was carried out to identify the work-related health problems experienced by salt workers.

MATERIALS AND METHODS

The occupational health camps were organized at Sambhar, Nawa and Phalodi in collaboration with owners of salt-manufacturing units and the Department of Salt, Government of India. The sites were selected on the basis of total production of salt at different sites. Workers of nearby salt manufacturing units were invited for their free health examination. The workers who were absent on the days of the health camp were excluded from the study. Each camp lasted for about 5 days. The workers who visited the camp were registered and interviewed after obtaining their informed consent. Information on age (in completed years), gender, detailed occupational history including exact nature of job and duration of working in salt industry was recorded in the pre-designed schedules. After initial rest for 5 min, three readings of blood pressure were taken using electronic blood pressure instrument (Omron T4 model) in supine position on right arm at an interval of 3-5 min. JNC-VI criteria were used for making the diagnosis of hypertension.[2] Analysis of the data was carried out using Epi-Info 2002 software. This project was approved by the Scientific Advisory Committee of the National Institute of

Occupational Health, Ahmedabad, India. The procedures followed were in accordance with the Helsinki Declaration.

RESULTS

In all, 865 salt workers were studied; 84.5% of them were males. All the workers were above the age of 14 years. Their general characteristics are described in Table 1. Prevalence of work-related symptoms was 85.9% among salt workers. Prevalence of ophthalmic symptoms was 60.7%, that of dermatological symptoms was 43.8% and symptoms like headache, giddiness, breathlessness, muscular and joint pains were present in 52.1% of salt workers [Table 2]. The common ophthalmic symptoms were glare (45.7%), redness of eyes (41.6%) and burning sensation in eyes (38.7%). Smaller number of workers also complained of excessive watering in eyes (10.6%), dimness of vision (9.9%), photophobia (2.1%) and pain in eyes (1.5%). Among dermatological symptoms, itching (8.9%), ulceration (9.5%), thickness of skin (8.1%), cracks in skin (6.5%) and burning sensation in skin (4.8%) were complained of by the salt workers. Thickness of skin was complained of mainly over palms of male workers. Symptoms pertaining to other systems like giddiness, headache, pain in joints, pain in muscles and general weakness were more prevalent in females (73.9%) than in males (48.0%) ($P<0.005$). Giddiness was particularly complained of while standing up from sitting posture during working hours. Headache, joint pain and muscular pain were other work-related symptoms and the severity of these symptoms reduced after taking some rest. Breathlessness was complained of by 6.2% of workers.

The prevalence of hypertension among the workers increased with age in both the sexes. It was 6.1% in male workers below 25 years age, though hypertension was not observed in females of the same age. Overall prevalence of hypertension was 12.0%. It was not significantly different in males and females.

Table 1: General characteristics of the study subjects

Characteristics	Salt workers (n=865)
Age (years)	32.17 ± 10.78
Gender M/F (%)	84.5/15.5
Literacy (%)	43.6
Income (Rs. per annum)	20077 ± 14882
Smokers (%)	32.6
Alcohol users (%)	9.5
BMI Kg/m^2	19.08 ± 2.82
Duration of salt work (years)	10.12 ± 7.37
Vegetarians (%)	66.4

DISCUSSION

Working in salt industry exposes the working population to direct contact with inhalable salt dust, salt crystals as well as concentrated brine, physical stress of hard manual labor, direct bright sunlight and glare due to sunlight reflected by salt crystals and brine surface. Most common symptoms observed among salt workers were those pertaining to eyes. These might be due to irritation caused by exposure to salt dust and reflection of bright sunlight by salt crystals and brine. Itching, cracks and burning sensation in skin might be caused by direct contact with salt and the impurities found in salt, like sulfates, magnesium, calcium, potassium, etc. Ulcers on skin were mostly traumatic in origin. These were present on feet, legs and hands. When workers collect the salt crystals using spades, the crystals hit the feet and legs, while hands sustain injury from the spade. Thickening of skin over palms and feet may be due to hyperkeratosis caused by friction with spades and salt crystals. The physical stress of hard work in sunlight might be a potent cause of headache, giddiness, muscular pain, joint pain and general weakness present among the workers. These symptoms were more common in females, probably due to higher prevalence of anemia in them. Notable prevalence of visual defects (7.7%), hypertension (4.7%) and musculoskeletal problems has also been reported among fishermen, who are also exposed to salty sea water and sunlight.[3]

Present study did not reveal high prevalence of hypertension in salt workers. In a study in villages of Rajasthan, 12% males had borderline isolated systolic hypertension, 2% had definite isolated systolic hypertension and the overall prevalence of hypertension and its subtypes was 24% in males and 17% in females.[4,5] Skrobonja and Kontosic[6] also reported hypertension in 10.6% of harbor workers of Croatia, who were also exposed to salt rich water and hard manual labor. In a study of hypertension in workers exposed to salt, O'Sullivan and Parker[7] reported that prevalence of hypertension in salt workers was not found to be different from a similar group of

Table 2: Percent prevalence of various symptoms among salt workers

Ophthalmic symptoms	% Prev.	Dermatological symptoms	% Prev.	Other symptoms	% Prev.
All ophthalmic symptoms	60.7	All dermatological symptoms	43.8	All other symptoms	52.1
Glare	45.7	Itching	8.9	Giddiness	28.2
Redness of eyes	41.6	Ulceration	9.5	Headache	26.8
Burning of eyes	38.7	Thickening of skin	8.1	Joint pains	23.7
Excessive watering	10.6	Cracks	6.5	Muscular pain	22.4
Dimness of vision	9.9	Burning sensation	4.8	Breathlessness	6.2
Photophobia	2.1	Dryness	3.5	General weakness	3.9
Pain in eyes	1.5				
Night blindness	0.7				

workers not occupationally exposed to salt. Present study highlights the need for developing provision for prevention of occupational health problems in workers engaged in salt production.

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