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An Epidemiological Study on Health Status of Cement Workers

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Abstract: ***Workers engaged in construction field are exposed to various occupational hazardous substances. Various health problems and progressive complications have been reported to result from long term cement exposure. Recent studies suggest that occupational exposure to cement dust may have deleterious effect on lung, liver and epithelial tissues. The present study comprises 633 cases which include masons, helpers, concrete mixers, tile workers and loading and unloading workers. Seventy four percent cases have more than 10 years of exposure in cement work and 16 % over 20 years. Forty three percentages of individuals are masons, 15 % helpers, 9 % concrete mixers, 6 % tile workers and 27% loading and unloading workers. Masons and tile workers have high frequency of cutaneous problems. Pulmonary impairment and skin related problems are reported by most of helpers and concrete mixers. Loading and unloading workers have all these symptoms in higher percentage.***

Keywords: Epidemiologic, Cement Workers

1. Introduction

Construction industry is considered as one of the major industries in the world, essential contributor to the development of country. Workers who are engaged in this field are considered as second largest workforce in an unorganized sector. Cement is the inevitable constituent of construction field. Portland cement is a finely odorless grey powder and it contains silica, lime, alumina and iron oxide. Heavy metals like nickel, chromium, lead and trace amounts of magnesium, sodium, potassium, selenium, thallium and other impurities are also present in it.

Exposure to Portland cement can occur through inhalation, ingestion and eye or skin contact. Portland cement cause eye irritation and prolonged or repeated contact of the cement dust with skin causes dermatitis (Hathaway *et al.*, 1991). Chronic exposure to cement dust may cause respiratory ailment in the form of cough, sputum, wheezing dyspnea, chronic bronchitis and adversely alter the pulmonary function indices. Long term contact of skin with cement result in inflammatory changes or in some cases chemical burns. Chronic exposure to wet cement damages skin, leads to chemical burning, rashes on skin and inflammation.

A variety of additives such as alkaline hardeners may be used to produce special purpose cement and these increase the health risk. Cement dust irritates the skin, the mucous membrane of the nose and the respiratory system. Its deposition in the respiratory tract causes a basic reaction leading to increased pH values that irritates the exposed mucous membranes (Zeleke *et. al*., 2010). Recent epidemiological studies reveals that 2-8 % of all cancer is due to exposure to carcinogen at workplace and some studies have indicated that cement and concrete constituents might be carcinogenic (Sudha *et. al*,2010).

The present epidemiological study focused on health hazards of cement workers (masons, helpers, tile setters, loading and unloading workers and concrete mixers) in Thrissur district of Kerala state.

2. Materials and Methods

The present study was conducted between November 2011 and October 2013 in Thrissur District of Kerala state. The study population comprises masons, helpers, loading and unloading workers, tile workers and concrete mixers. The loading and unloading workers are in the cement goods-shed of the railway station at Ollur and in the nearby depot. All others are working in their respective workplaces. A questionnaire was prepared by focusing questions on all probable health hazards to which the study group were exposed. All the members of the study group were visited personally and data collected individually.

The study comprises 633 cases. The study group is categorized into 3 based on their duration of work in the cement related labour (less than 10 years, 10-20 years and more than 20 years). Health hazards studied include persistent cough, breathlessness, wheezing, sneezing, burns and rashes on skin, irritation of skin, eyes and throat, head ache, hair loss and colour change. These symptoms are indicators of pulmonary and cutaneous problems.

3. Results

The study comprises 633 cases (table-1). In helper category, 33 cases were females and not separately analyzed. Seventy percent cases have more than 10 years of exposure in cement work and 16 % over 20 years. Out of 633 individuals interviewed for the study 43% were masons, 15% helpers, 9% concrete mixers, 27% loading unloading workers, and 6 % tile workers. Individuals under each category (based on nature of work) were further divided in to three based on their duration of exposure to cement.

Table 1: Category and duration wise distribution of the study group

Category	Duration as cement workers			Total
	<10 years	10-20 tears	>20 years	
Masons	53	175	47	275
Helpers	37	49	11	97
Concrete Mixers	19	25	10	54
Tile workers	20	11	4	35
Loading & unloading Workers	45	97	30	172
Total	174	357	102	633

Health hazards of construction workers such as masons, helpers, concrete mixers and tile workers and transporters like loading & unloading workers are focused in this study. Frequency of lung function impairment and cutaneous problems are more observed in these workers. Persistent cough, breathlessness and wheezing are taken to be indicators of lung function impairment. Frequency of cement workers with lung function impairment is shown in table -2

Table 2: Frequency of lung function impairment in different classes of workers

symptoms	*Masons*	*helper*	*Concrete Mixers*	*Tile workers*	*Loading & unloading Workers*
Persistent cough	32	27	26	7	56
Breathlessness	28	34	30	8	68
Wheezing	10	18	12	4	35
sneezing	12	15	5	12	30

Workers who were exposed to wet cement have more cutaneous problems than dry cement workers. Cutaneous effects include burning effect, skin rashes/ inflammations and irritation to skin. Frequency of cutaneous symptoms are shown in table -3.

Table 3: Frequency of Cutaneous symptoms in different classes of workers

Symptoms	Masons	Helper	Concrete mixers	Tile workers	Loading & unloading worker
Burning effect	66	60	70	70	30
Skin rashes/inflammation	26	40	30	38	12
Irritation to skin	36	46	32	25	16
Hair loss and colour change on body	80	75	65	85	78

Masons have reported more cutaneous symptoms. Altogether 90% have skin related symptoms. Sixty six percentage have skin burns, 26 % have skin irritation and 36 % have skin rashes and 80% have hair loss or change in hair colour on body. Persistent cough is reported by 32% and breathlessness is reported by 28% of masons.

Cutaneous problems are more frequent in helper category compared to lung function parameters. Above 80 % have cutaneous problems in this group. Forty percentage have skin rashes and skin irritation is also reported in 46 % of helpers. Thirty four percentage of helper group also complained by breathlessness.

Tile workers and concrete mixers also have skin related problems. Out of 54 concrete mixers, 70 % have skin burning, 30 % have skin rashes and 65 % of workers have reported hair loss & colour change on body. Twenty six percentages of workers have persistent cough and breathlessness is also reported in 30% of workers. Seventy percentages of tile workers have cutaneous problems. Sneezing is also reported by 12 % of these workers.

All the symptoms under study are more prevalent among loading and unloading workers. Of all symptoms considered respiratory tract and skin diseases are the highest. Fifty six percentages have persistent cough, 68% have breathlessness and 30% have skin burns. Hair loss and change in hair colour on body are reported by 78% of loading and unloading workers.

4. Discussion

Construction workers are more exposed to cement than other labours. Wet cement preparations are more handled by construction workers. Construction workers reported more symptoms related with skin than respiratory tract. Actually they are handling with cement preparations of different combinations rather than in dust form. Hence the chances of inhaling are less in comparison to loading and unloading workers. When the cement dust comes in contact with water, hydroxides are formed that impair natural water alkalinity, living tissue leads to burning, skin rashes and inflammation. However, pulmonary problems were also observed in the study group of masons. They have more than fifteen years of exposure. This shows that there is a correlation between and symptoms years of exposure.

Burning and skin rashes are important symptoms seen in workers exposed to wet cement. Moist cement burns occur on lower leg, ankle and dorsal regions of hand. In some workers it will leads to scaling of skin, oozing and itching. Exposure to wet cement can also cause inflammation called Irritant Contact Dermatitis due to the presence of hexavalent chromate in cement. This hexavalent form penetrates the skin easily than other forms (Korrallus U *et al* 1984).

Loading and unloading workers showed maximum frequency of symptoms like persistent cough, breathlessness, wheezing etc. This is caused by the exposure to dry dust particles which is in definite correlation with their nature of work. Portland cement contains some insoluble residues. A fraction of the insoluble residue may be free respirable silicates, which can cause silicosis, fibrosis of lungs and possibly cancer. Hence Portland cement can be considered as potential cause of occupational lung disease. Inhaling high levels of dust may occur during emptying cement bags. Short term exposure to cement dust irritates the nose and throat and causes choking and difficulty in breathing.

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