CEMENT DUST EXPOSURE ON HUMAN HEALTH

Dr. K. SHOBHA*

VENNILA GOPAL**

India is facing a serious double burden of disease. Most of the old infectious diseases like malaria, filariasis and kala-azar have not yet disappeared; indeed they are bouncing back. At the same time, other chronic non-communicable diseases such as cancer, cardiovascular disease and respiratory disorders are becoming more dominant. It is becoming clear that the pattern of economic growth that we are adopting is becoming increasingly associated with environmental pollution. A study comparing the rates of economic growth and the rates of growth of vehicular pollution and industrial pollution shows that during 1975–1995, the Indian economy grew by 2.5 times, but the industrial pollution load grew by 3.47 times and the vehicle pollution load by 7.5 times. Indeed, Indian cities are being exposed to high levels of air pollution and people living in these cities are paying a price for the deterioration in air quality. The World Bank has estimated that Indians are spending Rs 4550 crores every year on treatment of diseases caused by ambient air pollution (Current Science, 1999).

Air quality affects human health. Nearly 1.4 billion urban residents in the world breathe air that fails the WHO air quality standards. At the global level, mortality due to exposure to outdoor air pollution is estimated to range from 200,000 to 570,000.In Indian cities, among the most polluted in the world, available mortality and morbidity statistics indicate that respiratory infections and chronic conditions are widespread. The Indian cement industry is a potentially high polluter and the country's biggest excise payer. Among the industrial sectors, the cement industry

* ASSOCIATE PROFESSOR IN ECONOMICS, GOVERNMENT ARTS COLLEGE, COIMBATORE -641018.

** ASSISTANT PROFESSOR IN ECONOMICS, NEHRU ARTS AND SCIENCE COLLEGE, CBE. 105.

is the second largest emitter of carbon dioxide, and accounts for 5% of global human-made carbon dioxide emissions (Deep basu 2010).

The important features characterizing the industry is that it may potentially have adverse environmental impact through three different routes: (a) converting culturable/ non-culturable land from their present uses into quarries and thus, disturbing the vegetation and ecosystem; (b) removing the limestone from the soil and thereby affecting the moisture profile as well as the structure of aquifers; and (c) creating air pollution which could be hazardous for human as well as animal health and for crop-yields(Amita Shah, 2006).

This study was carried out in Madukkarai of Coimbatore District. Kurumbapalayam was identified as highly polluted area (HPA), since the people residing and working in that area are more exposed to cement dust. On the other hand Marapalayam, a low polluted area (LPA) is situated 5 km away from the cement factory with less exposure to the inhabitants. A sample of 120 respondents each was taken up from both LPA and HPA. Inclusion criteria for the study was that the person should be living and working in the selected areas for more than a year, be below 45 years and be a non smoker. A pretested structured interview schedule was prepared to collect the data. Respondents were interviewed regarding their socio-economic status and exposure history. Respondents were asked to rate these symptoms as 'yes' or 'no'. The present study was undertaken to assess the pattern of morbidity in two areas of Madukkarai in Coimbatore district. This study is an effort to identify the adverse health impacts due to cement dust.

Findings

In Kurumbapalayam area, out of the 120 respondents 55.82% were females and 44.17% were males. Similarly in Marapalayam area about 52.5% and 47.5% were females and males respectively. Females outnumbered males in both the areas. Above 50% and 39% of the Kurumbapalayam and Marapalayam respondents belonged to the age group of 35-45 years and 25-35 years respectively.

In Kurumbapalayam area about 47% were illiterate but in Marapalayam about 62% were educated till primary. About 45% and 75% of the respondents of Kurumbapalayam and

Marapalayam area earned a monthly income of ₹ 3000 - ₹ 6000 per month. More than 95% of the respondents in both HPA and LPA were residing in their respective areas for more than 25 years, since it was their own house.

Table 1

Selected Socio-Economic Characteristics (in %)

Variables		Area	
		Kurumbapalayam	Marapalayam
Gender	Male	44.17	47.5
	Female	55.83	52.5
Income	Less than ₹ 3000	35	17
	₹ 3000 - ₹ 6000	47	75
	Above ₹ 6000	16	08
Age (years)	25 – 35	41	39
	35 – 45	52	60
	Above 45	07	09
Educational Qualification	Illiterate	47	38
	Primary	53	62

Source: Based on primary data, 2011

Both the areas were aware about the cement dust as a hazard to health. The symptoms identified during the study are given in table – 2.

The number of symptoms observed in the study had more frequency of occurrence in HPA than LPA. The symptoms also varied with different duration of exposure. It is revealed from the table that a higher percentage of respondents of HPA suffered from different symptoms like 'watering of eyes', 'watering of nose', 'cough', 'sneezing', 'fever', 'suffocation' and 'skin diseases' but however in LPA the respondents suffered from 'cough', 'fever', 'febrile condition' and 'skin diseases'. To find out whether there exist any significant difference in the symptoms experienced by the respondents of HPA and LPA areas; Kruskal Wallis χ^2 test was adopted. The null hypothesis tested was

Ho: The respondents of HPA and LPA do not differ in the magnitude of symptoms experienced,

and

Ha: They differ

Table -2

Symptoms of diseases

Diseases	Kurumbapalayam(%)	Marapalayam(%)	χ^2
Irritation of eyes	46.7	33.3	4.43**
Irritation of nose	30	9.2	16.46*
Irritation of throat	31.7	24.2	1.67
Watering of eyes	64.2	20	47.820*
Watering of nose	65	30.8	27.948*
Respiratory infection	7.5	1.7	4.649**
Cough	89.2	65.8	18.656*
Dry cough	12.5	59.2	56.592*
Nose block	5	0.8	3.663***
Chest pain	12.5	0.8	13.070*
Sneezing	84.2	55.8	22.841*
Fever	76.7	72.5	0.547
Febrile condition	54.2	66.7	3.904**
Suffocation	63.3	49.2	4.873**
Ringing in ears	5.8	0	7.180**
Nausea	5.8	0	7.180**
Headache	18.3	25	1.565
Vomiting	6.7	0	8.241*
Asthma	12.5	0	15.933*
Wheezing	10.8	0	13.687*
Skin diseases	96.7	100	4.051**
Disability	6.7	0	8.241*
Poor eye sight	49.2	30	9.178*

Source: Based on primary data, 2011

*Significant at 1% level, ** Significant at 5% level, *** Significant at 10% level

The above table - 2 gives the calculated Kruskal Wallis χ^2 values. When the difference between various symptoms experienced by the respondents was compared, it was found that the symptoms were statistically significant except for a few symptoms like 'irritation of throat', 'fever' and 'headache'. Inhalation of cement dust has a deleterious effect on various systems of the body. Most of the health effects observed could be attributed to multiple pollutants.

Based on the earlier studies it was revealed that pulmonary function existed among the exposed workers. A higher percentage of the exposed workers reported recurrent and prolonged cough (30%), phlegm (25%), wheeze (8%), dyspnoea (21%), bronchitis (13%), sinusitis (27%), shortness of breath (8%) and bronchial asthma (6%) (Al-Neaimi, et.al, 2001).Several studies have demonstrated linkages between cement dust exposure, chronic impairment of lung function and respiratory symptoms in human population. Cement dust irritates the skin, the mucous membrane of the eyes 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).

Conclusion

Cement dust contains heavy metals like nickel, cobalt, lead, and chromium pollutants hazardous to the biotic environment, with adverse impact for vegetation, human and animal health and ecosystems. Efforts should be undertaken by the industry to upgrade the technology and adopt eco friendly practices in order to reduce the cement dust level. Government should take efforts to inform the people about the health hazard through information and education, not only that the people residing in that area should be relocated.

Reference

- Current Science, VOL. 77, NO. 3, 10 August 1999, www.google.com
- Deep basu 2010, Cement Industry Turns Environment Friendly, www.csrmonitor.in
- Indira Hirway and Amita Shah, 2006,"Industrial Growth and Regional Linkages: A Study of Cement Industry in Coastal Saurashtra", Gujarat, www.cfda.ac.in
- Zeleke, Z., B. Moen and M. Bratveit (2010). "Cement dust exposure and acute lung function: A cross shift study." BMC Pulmonary Medicine 10(1): P19.
- Al-Neaimi, Y. I., J. Gomes and O. L. Lloyd (2001). "Respiratory illnesses and ventilatory function among workers at a cement factory in a rapidly developing country." Occupational Medicine 51(6): pp 367-373.