# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20183063

# **Prevalence of symptoms of occupational lung diseases** in marble cutting workers

Ashish Shrivastava<sup>1</sup>, Shashi P. Tomar<sup>2</sup>\*, Mohit Patel<sup>1</sup>

Received: 23 April 2018 Revised: 19 June 2018 Accepted: 21 June 2018

# \*Correspondence: Dr. Shashi P. Tomar,

E-mail: tomarshashi9@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### **ABSTRACT**

Background: Occupational lung diseases occurs in the workers exposed to occupation related hazards. These include Asthma, COPD, Coal worker pneumoconiosis, Silicosis and Asbestosis. Marble cutting exposes workers to fine dust that can cause a number of pulmonary diseases. Usually these are people from rural areas and they are unaware of health hazards related to occupation. Spreading awareness is the key amongst these people. The objective of the To study the prevalence of symptoms related to occupational lung diseases in marble cutting workers, to estimate current status of preventive measures used and to assess adaptive changes after educational interventions

Methods: A cross-sectional study was done on the marble cutting workers of Bhedaghat who were exposed to dust from marble cutting. A survey of their working environment and level of awareness was done using questionnaires. The workers were questioned about their working environment, usage of local preventive measures and health related problems. They were then taught about occupational hazards and preventive techniques that can be adopted to prevent such hazards. In subsequent visits, again a survey was done on how many of them were using adaptive measures and relevant counselling was done.

Results: Most common reported respiratory problem was shortness of breath 26% and utilization of preventive measures was very poor only 5% but After the 2 follow-up visits including interventional measures and health education, the percentage of workers who started using preventive measures increased from 5% to 57.77%.

**Conclusions:** Prevention is the key to occupational lung diseases. Early diagnosis and treatment also play a major role as prolonged exposure to these risk factors may cause irreversible damage. Health education, periodic health checkups and use to protective measures are the essence in preventing occupational lung diseases.

Keywords: Health education, Occupational lung diseases, Marble, Silicosis

# **INTRODUCTION**

Occupational lung diseases are occupational diseases affecting the respiratory system, including occupational black lung disease (coal pneumoconiosis), chronic obstructive pulmonary disease (COPD), mesothelioma, and silicosis. 1,2 Exposure to substances like flock and silica can cause fibrosing lung disease, whereas exposure to carcinogens like asbestos and beryllium can cause lung cancer.<sup>3,4</sup> Marble used in the sculpturing of statues and the construction of buildings and monuments is a metamorphic limestone. Persons employed in carving statues from stones & marble rocks are exposed to the dust, containing particles of calcium carbonate and silica.<sup>5</sup> Complains including respiratory symptoms like coughing, shortness of breath, chest pain, chest tightness, abnormal breathing pattern are frequent with these workers. Occupational lung diseases,

<sup>&</sup>lt;sup>1</sup>MBBS, NSCBMC, Jabalpur, Madhya Pradesh, India

<sup>&</sup>lt;sup>2</sup>Department of Community Medicine, NSCBMC, Jabalpur, Madhya Pradesh, India

like other lung diseases, usually require an initial chest X-ray or CT scan for a clinical diagnosis. <sup>6,7</sup>

The worldwide incidence of pneumoconiosis and other occupational chronic respiratory diseases have been estimated at 453,000 and 2,631,000 cases per year, respectively.<sup>8</sup>

In recent estimates from India, more than 3 million workers exposed to silica dust, whilst 8.5 million more work in construction and building activities, similarly exposed to quartz. Several recent reports on lung function assessment show both restrictive and obstructive patterns.  $^{9,10}$  The reaction of the lung to mineral dusts depends on many variables, including size, shape, solubility, and reactivity of the particles. For example, particles greater than 5 to 10  $\mu m$  are unlikely to reach distal airways, whereas particles smaller than 0.5  $\mu m$  move into and out of alveoli, often without substantial deposition and injury. Particles that are 1 to 5  $\mu m$  in diameter are the most dangerous, because they get lodged at the bifurcation of the distal airways.

Bhedaghat the major attraction of tourism in Jabalpur inhabited with people employed in marble stone cutting works. These people live in poor socio economic conditions and are illiterate and unaware of the preventive measures while working. Ultimately they end up in chronic respiratory problems and various complications. All these problems are chronic and mostly neglected so it drove our attention to this underserved community and understanding this critical issue made us put a step forward and make an attempt to spread awareness and prevent the occurrence of such fatal disease conditions.

Hence the study to assess the prevalence of symptoms related to occupational lung diseases in marble cutting workers and estimate current status of preventive measures used by them carried out.

#### **METHODS**

A cross-sectional study was conducted on marble cutting workers of Bhedaghat, Jabalpur district for duration of three months. In January 14 study pro-formea development, subject selection and first assessment of study subjects was carried out. During February and march 14 follow up visits and repeat assessment was done. Hundred workers were selected by simple random sampling method. Educational intervention was carried out in each visit. Workers were asked about environmental conditions and use of preventive measures through a list of questionnaires by a group of volunteers. With the help of pamphlets and videos, educational interventions were provided. They also received safety masks and taught local preventive measures like use of clothing to cover the face while working and use of water to settle down the dust from cutting of marbles.

## Inclusion criteria

Both men and women who were residents of Bedaghat for more than 10 years duration and employed in stone cutting works were included in our study.

#### Exclusion criteria

People who were not qualified by inclusion criteria were excluded from the study. Physically or mentally disabled persons unable to follow simple questions / instructions were excluded.

# Data analysis

The data was entered in the pre-designed Microsoft office Excel and responses were coded and analysed by using pre-designed Microsoft Office Excel. The prevalence rates of common respiratory symptoms and use of preventive measures were determined by simple percentages.

#### **RESULTS**

The research was centered at people working in the marble cutting factory at Bhedaghat, Jabalpur. In our study a total of 100 stone cutter were surveyed. The mean (±SD) age (in years) of the participants was 37 (±9) years. All participants were divided into 5 age groups with 10 years age interval. Among the participants (34%) participants were between 21 to 30 years, nearly 33% were between 31 to 40 years, 14% were 41 to 50 years of age and 52 (08%) were above 51 years of age. Among total participants 87% were male and 13% were female.

Table 1: Socio-demographic profile of study subjects.

	Number	Percentage (N=100) (%)
Age in years		•
11-20	11	11
21-30	34	34
31-40	33	33
41-50	14	14
51 and above	8	8
Sex		•
Male	87	87
Female	13	13
Educational status		
Literate	64	64
Illiterate	36	36

Those educated primary and above were taken as literate.

Most common respiratory symptom complained by stone cutters was shortness of breath 26% followed by cough 19%. Symptoms were more in workers exposed to the dust for longer duration as evidenced by more symptomatic worker were among forty plus age groups (85.71% in 41-50 yrs and 62.5% in 51 and above respectively). The percentage of workers who were using

preventive measures was 5% before educational intervention after educational intervention carried out in two follow up visits it increased to 55.77%.

Table 2: Common respiratory symptoms and use of protective measure present in study subjects.

Common respiratory symptoms	Number (%) N=100	
Shortness of breath	26 (26)	
Chest pain	2 (2)	
Cough	19 (19)	
Loss of appetite	2(2)	
Weight loss	2(2)	
Protective measures used (mask)		
Used before intervention	5 (5)	
After educational intervention (N=95)	53 (55.77)	

Table 3: Study subjects showing symptoms of respiratory illness in each age category.

Age in years (N)	Number	Percentage (%)
11-20 (11)	1	9.09
21-30 (34)	4	11.77
31-40 (33)	10	30.31
41-50 (14)	12	85.71
51-60 (8)	5	62.5
Total	13	100

<sup>\*</sup>N=number of subject in that age category.





Figure 1 (A and B): Working conditions of stone cutters.

#### **DISCUSSION**

Occupational lung diseases are a major health problem in developing countries like India due to lack of safe working environment and awareness regarding hazards of working in such condition without adopting protective measures. In our study, the number of workers who were using protective measure in the beginning was only 5% showed unawareness of risk of dust exposure and negligent behaviour towards the use of preventive measures. Results are similar study carried out in from Jodhpur, India; none of the workers used dust masks. <sup>11</sup> In a study carried out in Netherlands mining population reported higher prevalence of use of dust protection masks (22%). <sup>12</sup>

In our study most common respiratory symptom complained by stone cutters was shortness of breath 26% followed by cough 19%. In a similar by Nwibo et al study among stone cutter reported the most common problems were occasional chest pain (47.6%), occasional cough (40.7%) and the results were comparable with the previous studies in Iran and Rio de Janeiro, Brazil. The study in Iran reported irritative cough in 75% of the respondents, while that in Rio de Janeiro reported cough in 31.9% with expectoration in 41.7%.

Early assessment of the symptoms and adaptive interventional changes will help in identification of diseases at early stage and creating awareness amongst them as in our study provision of education regarding dust exposure risk resulted in increased utilization of mask from 5% to 55.77% The symptoms were more severe in workers who were exposed to dust for longer duration. Similar findings were reported in a study in Rajasthan, India (2011) highlighted that awareness of personal protection and preventive measures against silicosis, such as the use of dust mask, can effectively improve the health status of mineworkers. <sup>16</sup>

Prevention from exposure to dust by using protective gears is the best approach as long term exposure to marble dust may lead to fibrosis and irreversible damage.

#### **CONCLUSION**

Prevention is the key to occupational lung diseases. Early diagnosis and treatment also play a major role as prolonged exposure to these risk factors may cause irreversible damage. Health education, periodic health check-ups and use to protective measures are the essence in preventing occupational lung diseases. So, this leads to a generalised ideation that prevention is the key and educational regarding use of personal protective measures, masks, timely health check-ups and use of medical advice as soon as any symptoms are noticed will lead to not only mortality but also the morbidity related to these diseases. Early interventions after development of symptoms are also important as they can decrease chances of further worsening of the condition.

## **ACKNOWLEDGEMENTS**

I would like to thank our college Dean Netaji Subhash Chandra Bose Medical College and The HOD Dr. PK Kasar Sir for providing this research opportunity. I appreciate the help of all other volunteer doctors Dr. Sonal Mahale, Dr. Ashita Punjabi and Dr. Swapnesh Sahu during our visit and during health education interventions in this research project. Overall, this project was a success and it was an attempt to spread awareness amongst the workers in underdeveloped areas and prevent the occurrence of diseases.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

#### REFERENCES

- 1. Kett WS. Occupational respiratory diseases. The New England J Med. 2000;342:406–13.
- 2. Paul; Muñoz, Xavier. Occupational lung diseases: from old and novel exposures to effective preventive strategies". The Lancet. Respiratory Medicine. 2017;5:445–55.
- 3. Sauler M, Gulati M. Newly Recognized Occupational and Environmental Causes of Chronic Terminal Airways and Parenchymal Lung Disease. Clinics Chest Med. 2012;33:667–80.
- 4. Chan-Yeung M, Ashley MJ, Grzybowski S. Grain dust and the lungs. Can Med Assoc J. 1978;118:1271-4.
- 5. Ogawa S, Imai H, Ikeda M. A 40-year follow-up of whetstone cutters on silicosis. Industrial Health 2003;41:69-76.
- Gurney JW, Unger JM, Von Essen SG. Agricultural disorders of the lung. Radiographics. 1999;11:625-34
- Kumar V. Robbins Basic Pathology 9th Edition. Philadelphia, Pennsylvania: Elsevier Saunders; 2013: 474–475.

- 8. Leigh J, Macaskill P, Kuosma E, Mandryk J. Global burden of disease and injury due to occupational factors. Epidemiology. 1999;10:626–31.
- 9. Jindal SK. Silicosis in India: past and present. 2013;19:163-8.
- 10. Bhattacharjee P, Paul S, Bhattacharjee P. Risk of occupational exposure to asbestos, silicon and arsenic on pulmonary disorders: Understanding the genetic-epigenetic interplay and future prospects. Environ Res. 2016;147:425-34.
- 11. Yadav S, Mathur M, Dixit A. Knowledge and attitude towards tuberculosis among sandstone quarry workers in desert parts of Rajasthan. Indian J Tuberc. 2006;53:187.
- 12. Mining and its effects on children, women. Adivasi and Dalits. Netherlands; 2016. Available at: http://www.indianet.nl/pdf/MiningAndItsEffectsOn Children.pdf.
- Nwibo AN, Ugwuja EI, Nwambeke NO, Emelumadu OF, Ogbonnaya LU. Pulmonary Problems among Quarry Workers of Stone Crushing Industrial Site at Umuoghara, Ebonyi State, Nigeria. Int J Occup Environ Med. 2012;3(4):178-85.
- 14. Mashaallah A, Mohammad RZ, Ali AF. Prevalence of Silicosis among workers in stone-cutter and Silica Powder Production Factories. Tanaffos. 2006;5:31-6.
- 15. Lemele A, de Araujo AJ, Lapa e SJR, Lima Fde P, Cardoso AP, Câmara Wde M, et al. Respiratory Symptoms and Spirometric Tests of quarry workers in Rio de Janeiro. Rev Assoc Med Bras. 1994;40:23-35.
- 16. Yadav SP, Anand PK, Singh H. Awareness and Practices about Silicosis among the Sandstone Quarry Workers in Desert Ecology of Jodhpur, Rajasthan, India. J Hum Ecol. 2011;33:191–6.

Cite this article as: Shrivastava A, Tomar SP, Patel M. Prevalence of symptoms of occupational lung diseases in marble cutting workers. Int J Community Med Public Health 2018;5:3368-71.