

# OCCUPATIONAL HEALTH PROBLEMS OF STONE CRUSHER IN WEST BENGAL – A PILOT STUDY AT BIRBHUM DISTRICT

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Stone crushing units are situated mainly in districts bordering West Bengal, Bihar and Jharkhand and in West Bengal most of them are situated in Bankura, Birbhum, Mindnapore and Purulia districts. This unorganized sector (small scale industry) with very few number of workers deals with crushing of stones to different sizes as per requirement. During the different processes of operation dust is evolved and the evolved dust if contains free silica in higher percentage may lead to silicosis. One of the areas in Birbhum district from where cases had been referred to the District Hospital at Suri for chest illness. The Chest Physician, Dr. R. Ghosh of the hospital was surprised to know the cases appeared to be suffering from tuberculosis were not being responded to the treatment. Considering the cases to be resistant one different regiment of ATD tried but in vain. On enquiry he could gather that the patients were coming from the area where the stone crushing units are there. He visited the place and approached the Institute of Wetland Management and Ecological Design, Govt. of West Bengal and then to this Centre. Both IW MED and ROHC(E) approached the Dept. of Environment, Govt. of West Bengal for funding for a study to ascertain the cause. The Govt. of West Bengal through State Pollution Control Board released some funds as well as the Director, NIOH, also contributed for conducting the study.

The objectives of the study were a) to assess the working environmental conditions around a crusher unit, b) to evaluate the health status of the workers engaged in these stone crushing units and c) to suggest the remedial measures, if any for this. The environmental monitoring as per Central Pollution Control Board around the crushing units revealed that respirable particulate matter (RPM) and suspended particulate matter (SPM) were a few fold higher than the prescribed limit value applicable to this industry. The increased values were recorded for RPM and non respirable particulate matter (NRPM) during 6 a.m. to 2 p.m. compared to rest times of the day whereas the values were found to be reduced during 10 p.m. to 6.30 a.m. The free silica estimation of the settled dust by FTIR method revealed that it is in non-detectable range.

Total 402 subjects (control male 74, female 49, exposed male 143 and female 135) had been covered for the study. The age of control and exposed subjects according to sex were comparable. A substantial number of male subjects of both the groups were smokers. A good number of subjects used to take country liquor. The duration of work to the present job was male 7.17+5.85 and female 6.25+5.35 years. They were working for about 8-9 hours per day. The different categories of jobs were stone breaker, loader, chelli labour, khalasi and miscellaneous. Loader constituted about 54% of the exposed subjects – more in female. Loading to the crusher was the main job, as such the highest number of workers were involved in it. The main subjective complaints have been categorized as general symptoms, respiratory symptoms and musculo-skeletal symptoms. The distribution of general symptoms according to category of subjects sexwise has been given in Fig.1. The pain abdomen was comparable in both the groups. The prevalence rates of vertigo and loss of weight were significantly high in exposed male compared to control male. Passing of worms were comparable in both the groups. The pain abdomen may be due to irregular food habits, non-hygienic food intake, bad personal hygiene and worm infestations. Due to less amount of food intake and worm infestations might cause loss of weight. The vertigo may be due to carrying of loads on the head causing degenerative changes in cervical spine. Distribution of respiratory symptoms (Fig.2) suggested cough, cold and sputum had significantly higher prevalence rates in exposed group compared to control group ( $P < 0.0001$ ,  $p < 0.001$ ). Breathlessness and chest pain were comparable. Exposure to different climatic conditions might have its effect on respiratory system. However, the most important, the exposure to dust in the working area, was one of the most important aspects needing due consideration for causation of these complaints. The complaints related to musculo-skeletal system have been depicted in Fig.3. Headache, backache, weakness, joint pain and muscular pain were more in exposed group. The repetitive movements, stress and strain and carrying heavy loads might lead to osteoarthritis of the joints. Bad postures might also be responsible for the aches and pains.

The pulmonary functions tests did not show any significant difference in lung volumes of male subjects. However, in case of females the values were less than the control subjects. The pulmonary function impairment of the subjects has been given in Fig.4. It has been noted that restrictive type of pulmonary function impairments were more in exposed group but the obstructive and combined type of impairments were more in control groups. The restrictive type of impairments is a feature of dust related morbidity involving the lungs.

The radiological picture of the chest x-rays suggested 2.88% of suspected pneumoconiosis and 1.8% of definite pneumoconiosis. Considering the free silica level in non-detectable range, the

prevalence rates were on lower side compared to the environmental exposure. Moreover, their duration of exposure was also low. However, the type of pneumoconiosis needs to be ascertained.