

## Technical Report

The study consisted of two parts. The first part was an assessment of risk factors among silicosis patients in the construction industry and a comparison of these risk factors with a control group. The second part consisted of the development of suitable strategies for the reduction of such risks. The initial plan of the study was to compare and contrast the environmental and personal risk factors of silicosis patients, who were victims of a chronic, progressive occupational lung disease, with victims of occupational accidents at the construction work site, who suffered from 'acute' damages to their health. The working hypothesis was that there existed personal and environmental common features in both groups and the identification of such factors should help in the prevention and control of both 'acute' accidents and 'chronic' pneumoconiosis. Personality traits were considered as possible risk factors in determining risk taking behaviour in both cases. The study thus focused on firstly, case control studies. A total of 215 cases of silicosis, diagnosed within 6 months of the study period, were recruited from the Government Chest Clinic in Wanchai into our study. The profile of the silicosis cases are shown in Appendix 3. Accident cases (122 in number) were accrued from attenders of the Accident and Emergency Department of the Prince of Wales Hospital. Details of their profile have been described in a paper entitled 'Occupational injuries among construction workers in Hong Kong' published in Occupational Medicine in December 1994, volume 44, p247-252 (See enclosed). When controls were recruited, it soon became obvious that the comparison between silicosis cases, accident cases and another healthy control group was unsatisfactory because of the considerable differences in age groups and occupations between the silicosis cases and accident victims. Hence, we modified our approach to recruit controls of silicosis cases by selecting healthy construction workers (belonging to the age group similar to the silicosis cases) participating in a health screening programme which we offered to construction workers through the Hong Kong Federation of Trade Union. Each of the participants was given a physical examination and a chest x-ray. Those with radiological

evidence of silicosis were excluded, as were those suffering from major illnesses. Of 214 workers screened, 173 were eventually recruited as controls. For the occupational accident victims, we recruited work mates matched for age and occupation within the same work site as the cases. While this approach yielded controls comparable to the cases, the approach for the recruitment of silicosis controls suffered from a number of problems. Firstly, this was a volunteer group, with its inherent selection bias, i.e., those who participated in the health screening programme were not representative of the 'universe' of construction workers. Their participation in the health screening programme might be due to the fact that they were more health conscious or that they were in poor health. Secondly, we were not able to match for occupation. While we tried to recruit more 'high risk' occupations (e.g., stone splitters, caisson workers, etc.) into the control group to make the proportion of occupational types more similar to that of the cases, it was found that most construction workers in these occupations, on health screening, did suffer from silicosis. So it was very hard to get 'healthy control' from such occupations. We were also aware of the fact that in case control studies, the recall of past information might be subject to bias in recall.

Taking into account the above problems, we examined a number of risk factors for silicosis by multiple logistic regression analysis of data obtained from our cases and controls. The following were statistically significant risk factors: no formal education (odds ratio = 6.7), no vocational training (odds ratio = 7.6), current and past smoker (odds ratios = 2.3 and 5.7 respectively). Statistically insignificant risk factors (but with odds ratios greater than unity) were length of work history in the construction industry, lack of safety training and alcohol drinking. Those with 5 to 9 years of work history in the construction industry had 3 times the odds of silicosis while for those with a work history 10 years or more, the odds were almost 4 times. Odds ratios for those without safety training and for current and ex-drinkers were 2.5 and 1.5 respectively. Dust hazards were universally present in all construction sites. The use of dust masks was infrequent among both cases and controls. These risk

factors were broadly similar to those for accident victims, significant risk factors being: No safety training (odds ratio = 2.4), no formal education (odds ratio = 4.0) and current smoker (odds ratio = 3.1). Results of the mean personality scores (using Bortner's scale) showed no significant difference between cases and controls, both in the silicosis study and the accident study. This lack of significant difference, together with evidence that most work sites were found to be environmentally unsafe and excessively dusty, led us to conclude that an improvement of the work environment will be more relevant in the prevention and control of occupational diseases and accidents than other measures, e.g., the pre-employment selection of 'health and safety conscious' workers with certain personality traits. Indeed, the failure to adopt healthy and safe behaviour at work (which also coincides with unhealthy personal habits like smoking), can be linked to a low educational level and the lack of proper vocational and safety training. Hence, the second part of this study, namely the development of a comprehensive strategy for risk reduction, followed this line of thought.

The second part of the study aimed to reduce the health and accident risks through intervention programmes. Our approach was to develop health promotional material aimed at improving the knowledge of construction workers to health and safety risks and to change their behaviour through proper work practices. We conducted a 'before and after' study on 233 workers to assess any change in knowledge, attitude and work practice, after requesting them to study a health and safety educational pamphlet which covers the following aspects: accident prevention, dust control, noise control, cigarette smoking and alcohol drinking, the use of personal protective equipment, and several specific examples including scaffolding and platforms, excavations, material and passenger hoists and lifting appliances. In general, their knowledge of accident and disease prevention are satisfactory. From 75% to 80% (in various sections of the questionnaire) of workers were able to give us the correct methods and work practice which we defined as 'correct'. Perhaps as a consequence to this level of knowledge, slightly less than half

(48.9%) of workers think that the provision of practical training and education in occupational health and safety were needed. However, there seemed to be a discrepancy between knowledge and behaviour. In the 'after' study, 192 workers were successfully recalled. As the previous level of knowledge on health and safety was high, there was little improvement in this aspect. There was an overall improvement in their work practice conducive to safety, especially in terms of accident prevention. The sections concerning dust control, noise control, smoking and drinking were more disappointing, with 40% to 60% still clinging to unsafe/unhealthy practice. 49% and 31% of workers rated our educational pamphlet respectively as good and very good. The preferred method of health and safety education were (in order of preference): pamphlets, videotapes, posters, talks, exhibitions, films and slides. We reckon the limitations of educational programmes and are fully aware of the fact that for the prevention and control of silicosis and other health risks, a multi-sectoral approach is required. Our work on the evaluation of an educational pamphlet represents but the initial step towards the achievement of comprehensive disease and injury control.