

STUDY ON THE EFFECT OF DUST EXPOSURE ON THE VENTILATORY FUNCTION OF THE LUNG, AMONG WORKERS IN CERAMIC FACTORY IN PETALING JAYA, SELANGOR, 1997

KESAN PENDEDAHAN DEBU KE ATAS FUNGSI VETILATORI PARU-PARU DI KALANGAN PEKERJA KILANG SERAMIK, PETALING JAYA, 1997

Sadih Abdullah, Jamal Hisham Hashim

ABSTRACT

A cross-sectional study of the effect of dust exposure on 294 ceramic factory workers in Petaling Jaya, Selangor was carried out on January 1997. Questionnaire, physical examination, measurement of ventilatory function and respirable dust level were used in this study. The age of the worker were between 20 to 57 years old. The workers were divided into two groups according to exposures, the high exposure and the low exposure group. Among the high exposure group 27% have abnormal lung ventilatory function compared to 20% among the low exposure group. The level of respirable dust and quartz was found to be significantly high in the factory areas, the concentration of respirable dust, at the spraying area (42.27 mg/m^3), compared to the level in the office (5.51 mg/m^3). The 'quartz' concentration was high at casting and spraying area (0.3 mg/m^3) and exceeded the permissible level of the mineral regulation, The Factories and Machinery Act 1967. The ventilatory function of the lung of the workers was significantly lower than the predicted value $p < 0.05$. The mean FEV1 was $2.61 \pm 0.53 \text{ L}$ while the predicted value was $2.92 \pm 0.53 \text{ L}$. The mean FVC of the worker were slightly lower than the predicted value, where the mean FVC was $3.26 \pm 0.6 \text{ L}$ while the mean predicted FVC was $3.31 \pm 0.43 \text{ L}$. All the ventilatory functions were negatively correlated with duration of exposure. There were significant correlation between % FEV1/FVC and total exposure of dust and quartz, however there was no significant correlation with the pack year smoking. The height, age, race and sex are the main determinant of FEV1 and FVC. Symptoms of respiratory disorders are more frequent among the low dust exposure as there were high prevalence of bronchial asthma in this group. The prevalence of lung disorders among the workers of this ceramic factory are 7% for restrictive, 6.2% for obstructive and 0.7% for mixed lung disorders among the workers in this ceramic factory.

ABSTRAK

Satu kajian irisan lintang telah dijalankan pada bulan Januari 1997 di kilang seramik Petaling Jaya, bagi tujuan melihat kesan pendedahan debu di tempat kerja kepada paru-paru. Seramai 294 responden, iaitu yang berumur antara 20 hingga 57 tahun. Kajian dijalankan dengan temuduga, menggunakan borang soal selidik, pemeriksaan fizikal, dan juga ujian spirometri. Aras debu dan kandungan 'quartz' mengikut kawasan telah diukur. Kajian juga membandingkan dua kumpulan, iaitu kumpulan pekerja yang terdedah (operator) dan yang kurang terdedah (penyeliaan). Pentus pekerja dengan fungsi ventilatori yang terjejas adalah lebih tinggi di kalangan pekerja yang terdedah (27.2%) berbanding dengan pekerja yang kurang terdedah (20%). Terdapat pemusatan aras debu 'respirable' dan konsentensi 'quartz' yang signifikan mengikut kawasan kerja. Pada keseluruhannya aras debu dan 'quartz' melebihi daripada aras yang dibenarkan mengikut Peraturan Habuk Galian (1989), Akta Kilang dan Jentera 1967. Pemusatan debu 'respirable' iaitu yang tertinggi di kawasan 'spraying' 42.27 mg/m^3 dan yang terendah di kawasan pejabat 5.51 mg/m^3 . Bagi konsentensi 'quartz' yang tertinggi ialah di kawasan 'casting' dan 'spraying' iaitu 0.3 mg/m^3 , dan tidak terdapat di dalam pejabat. Ujian spirometri di kalangan pekerja kilang seramik pada keseluruhannya Min FEV1 $2.61 \pm 0.53 \text{ L}$ dan FVC $3.26 \pm 0.6 \text{ L}$ adalah lebih rendah dan signifikan $p < 0.05$ dibandingkan dengan nilai 'predicted' iaitu FEV1 'predicted' $2.92 \pm 0.41 \text{ L}$ dan FVC 'predicted' $3.31 \pm 0.43 \text{ L}$ yang diukur mengikut formula kajian lalu bagi pekerja Industri normal, menurut bangsa Melayu, Cina, India dan jantina. Kesemua fungsi ventilatori berkorelasi negatif dengan lama pendedahan dan Ujian %FEV1/FVC berkorelasi signifikan dengan faktor pendedahan iaitu faktor pendedahan debu dan 'quartz' di tempat kerja dan tempoh pendedahan. Kesemua ujian fungsi ventilatori tidak berkorelasi kepada rokok 'pack year'. Faktor umur, tinggi, bangsa dan jantina merupakan peramal bagi fungsi FEV1 dan FVC. Terdapat gejala-gejala penyakit paru-paru yang lebih ketara di kalangan pekerja yang kurang terdedah ini disebabkan gejala penyakit asma yang tinggi di kalangan pekerja penyeliaan. Kajian mendapati keabnormalan fungsi paru-paru adalah 7% 'restrictive' dan 6.2% 'obstructive' dan juga 0.7% bagi 'mixed' di kalangan pekerja kilang seramik tersebut.