Health risk assessment of occupational exposure to crystalline silica in a tile & ceramic Industry

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Abstract

Background: Silicosis as a most important work-related lung disease is generated of inhalation crystalline silica dust. Chemicals health risk assessment is essential to decide on priorities for control action and reduce the risk to an acceptable level. The aim of this study is evaluate workers' exposure to crystalline silica (quartz) and determine the qualitative and quantitative health risk level.

Methods: In this cross– sectional descriptive, analytical study, the total, respirable and crystalline silica dust was measured. Total and respirable dust measured by gravimetric method and crystalline silica amounts measured based on X-ray diffraction technique by $NIOSH_{7500}$ method. Semi-quantitative risk assessment methods for Occupational Safety and Health Association of Singapore was used for Health risk assessment.

Results: The results showed that the average exposure of workers to total dust was 7.38±5.15, respirable 4.35±3.5 and crystalline silica 0.21±0.19 milligrams per cubic meter. Workers' exposure to crystalline silica in production units, including crusher, presses, ball mill, mucilage production and spray dryer are higher than Iran occupational exposure level. Also, the mean of total dust, respirable and crystalline silica in the different units, showed significant differences ($p \leq 0.05$). The result showed the high level of Risk in crusher, presses ball mill and glazing production units.

Conclusions: Crystalline silica amount and risk level of risk is high in crusher, presses, ball mill and mucilage production and the exposure control measures are necessary.

Key words: Crystalline Silica X- ray diffraction, Health risk assessment, Tile & ceramic, Quartz

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