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LUNG FUNCTION OF FUEL HANDLERS EXPOSED TO VOLATILE ORGANIC COMPOUNDS

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Introduction and objectives: The respiratory system is a target for effects from air pollutants, including vehicle emissions composed of volatile organic compounds (VOC), particulate matter and other noxious gasses. Our objective was to study the association between selected VOCs and lung function in a cohort of fuel handlers.

Method: Forty-four fuel handlers (men) from the Gampaha district of Sri Lanka aged 19-65 years were selected using consecutive sampling with a group of 38 males matched by age, without occupational exposure to fuel recruited as controls. Spirometry was performed using a Vitalograph Alpha Touch spirometer, according to ATS guidelines. Pre and post shift VOC levels were measured in end exhaled air samples.

Results: The spirometry parameters were not significantly different between the two groups but obstructive (47.72% vs. 34.21%) and restrictive ventilatory patterns (31.81% vs. 21.05%) were higher among the fuel handlers. FVC and FEV1 negatively correlated with age ($r=-0.672$, $p<0.001$ and $r=-6.888$, $p<0.001$ respectively) and number of days of exposure ($r=-0.329$, $p=0.033$ and $r=-0.306$, $p=0.049$ respectively). Among the fuel handler's, benzene exposure negatively correlated with FVC ($r=-0.552$, $p=0.012$) and FEV1 ($r=-0.476$, $p=0.034$) and toluene exposure negatively correlated with PEF ($r=-0.488$, $p=0.034$). Although levels of all VOCs measured were significantly low among the controls, toluene exposure levels negatively correlated with all spirometry parameters ($p<0.05$).

Conclusions: A decline in lung function is seen with more days of exposure as a fuel handler. The different VOCs' affect the volume parameters and flow parameters uniquely and even non-occupational exposure causes an alteration of spirometry parameters among adult males.