

# The Respiratory Effects of Compressed Natural Gas (CNG) on Pump Men of CNG stations in Yangon

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## Introduction

This study was carried out to evaluate the effect of CNG on respiratory function in 60 participants worked as pump men and office staffs of CNG stations in Yangon. Thirty pump men and thirty office staffs of CNG stations and thirty healthy control male subjects were studied.

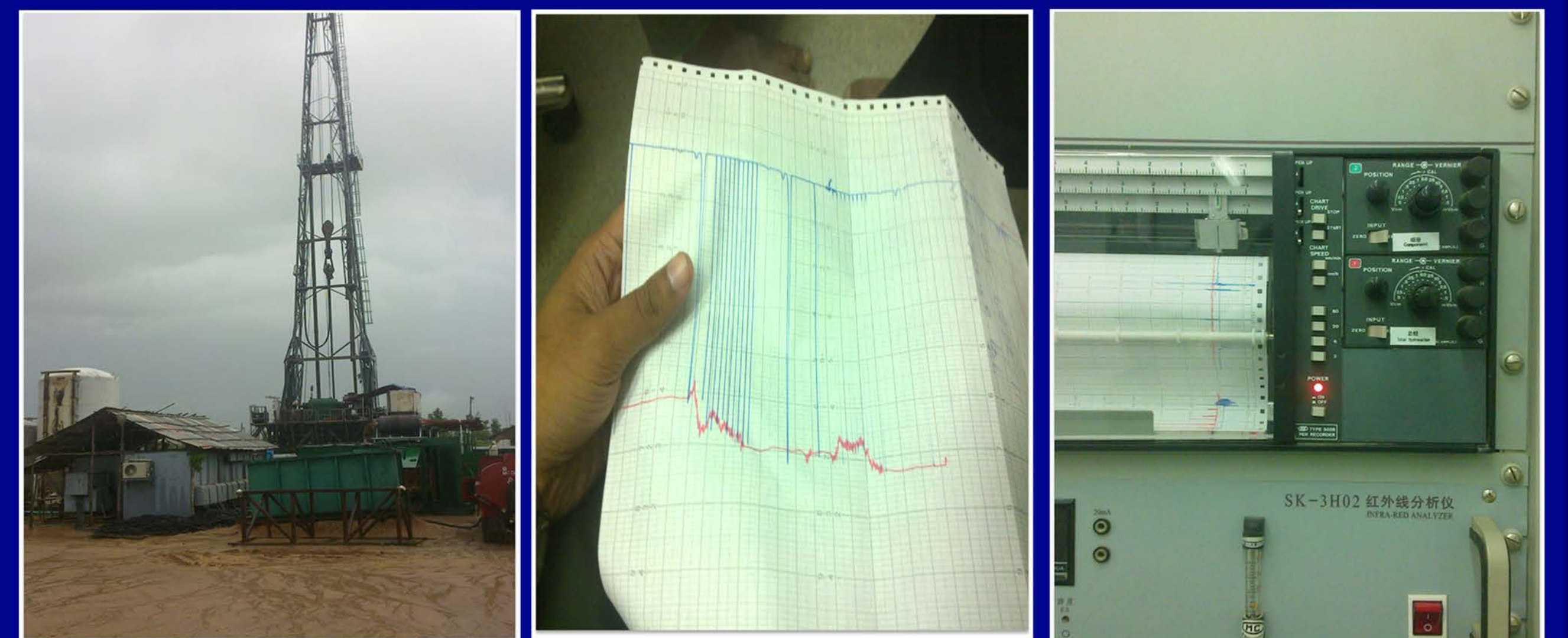


Air Sample collection at CNG stations

## Results & Discussion

Respiratory function tests were performed by using DATO spir-120. In order to avoid confounding effects of age, height and race, percentage of predicted lung function values were calculated.

Pump men and office staffs had significantly lower percentage of predicted value as regards to forced vital capacity (FVC) and forced expiratory volume in the first second (FEV<sub>1</sub>) than control subjects.



GCMS identification of CNG in air sample (Mann Oil Field)

Reduced both FVC and FEV<sub>1</sub> indicated that lung function impairment could be restrictive problem. The percentage of predicted value of FEV<sub>1</sub> and FVC were correlated with duration of exposure to compressed natural gas in pump men group.

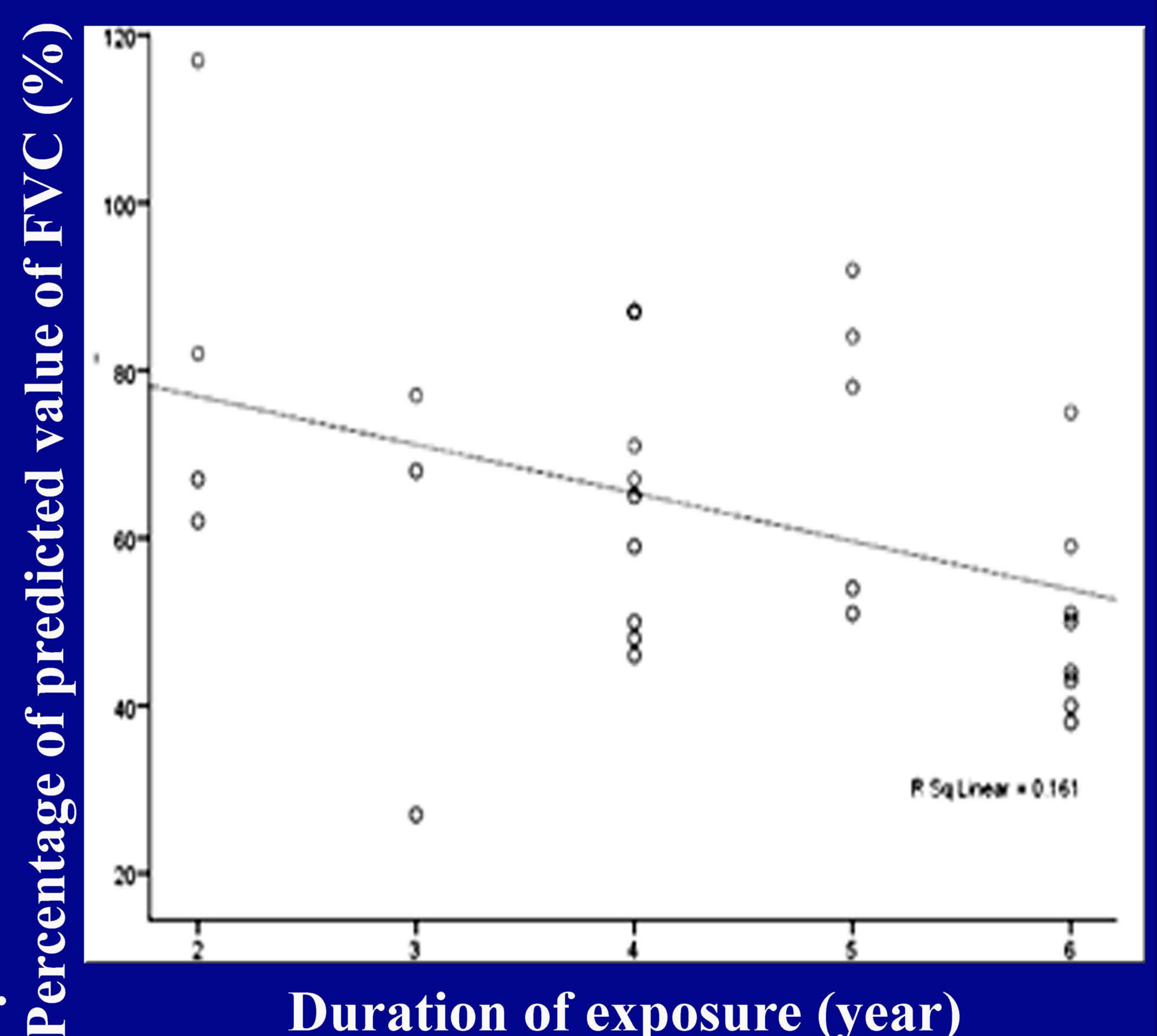


Lung Function Test on CNG Stations' Workers (Digital Spirameter DATO Spit 120)

The negative correlation between the percentage of predicted value of FEV<sub>1</sub> & FVC ( $r = -0.34$  and  $r = -0.40$  respectively) and duration of exposure in years of service in CNG pump men pointed out that the more the duration of exposure, the more the damage of lungs.

These results explain the fact that prolonged CNG exposure can change the ventilatory function into restrictive type and it affects more on the FVC. The longer duration of CNG exposure repeated the inflammatory reactions in pulmonary interstitium and alveolar epithelial cell injury.

It caused more activation TGF- $\beta$ 1 and deposition of collagen and other extracellular matrix molecules. So, the most possible reason for more decrement in FVC than FEV<sub>1</sub> is the pulmonary fibrosis.



## Conclusion

Restrictive respiratory problems in pump men of CNG station might be associated with duration of CNG exposure at the pump station.

Correlation of the percentage of predicted value of FVC with duration of exposure to compressed natural gas in pump men ( $r = -0.40$ ,  $p = 0.03$ )