HEALTH EFFECTS OF TRAFFIC AIR POLLUTION IN BANGKOK

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This study aims to assess the possible adverse health effects of air pollutants, particularly PAHs, on traffic policemen through the use of biomarkers. PAHs in ambient air collected by personal air pumps have been used to measure the exposure. The biomarkers used include urinary 1-hydroxypyrene, PAHs-DNA adducts in lymphocytes, p53 gene mutation and serum p53 protein level. Non-smoking police officers from various police stations in Bangkok were included in the study, and the level of exposure was compared between office policemen (low exposure) and traffic policemen (high exposure). Exposure in the traffic policemen was monitored on three instances: at the initiation of the experiment, after worked with the protective mask for 2 weeks and without the mask for 1 week. The inter-individual differences in biomarker levels were observed.

The levels of PAHs in ambient air, urinary 1-hydroxypyrene levels and PAHs-DNA adducts were significantly higher in the traffic policemen than those in the office policemen. No significant differences in serum p53 protein were shown between traffic and office policemen. In the traffic policemen, and PAHs-DNA adducts were significantly higher when working without mask than with mask. For mutations of p53 gene and serum p53 protein level, the point mutation that was found in the office policemen showed the G:C to A:T transversion at codon 237 within exon 7 while the G:C to A:T transversion at codon 140 within exon 5 was observed in the traffic policemen. However, the serum p53 protein levels were unrelated to the occurrence of mutant p53 gene found. The genetic differences in xenobiotic metabolism were investigated. The distribution of genotypes of all three genes did not significantly differ between the office and traffic policemen. From these distributions of CYP1A1, GSTM1 and NAT2 genes, it can be assumed that Thai policemen approximately 4.5% were mutant type CYP1A1, 60% were null GSTM1, 45% were fast acetylator and 45% were slow acetylator.

The present data shows that there is a much higher level of PAHs on the roadside in Bangkok than that in the indoor environment generally. The high exposure group had a higher level of PAHs-DNA adducts which indicates that the traffic policemen may have an elevated risk of lung cancer development from exposure to PAHs. However, no clear correlation between the mutation of p53 gene and the serum p53 protein level in individual with mutant p53 gene.

Although the biomarkers have certain limitations, this study showed that they are useful in the assessment of the risk of exposure to air pollution and eventually to cancer epidemiology.

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