ENVIRONMENTAL AND LIFESTYLE FACTORS AFFECTING BIOMONITORING OF BENZENE UPTAKE AMONG RESIDENTS NEARBY A PETROCHEMICAL PLANT

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Background and Aims: Biomonitoring urinary excretion of benzene, we inquired into factors affecting benzene uptake in a general population sample living nearby a petrochemical plant.

Methods: Our study population included a random sample of 143 subjects: 33 workers of a petrochemical plant (W), 30 residents within 2 km from the plant (2kmR) and 26 residents from 2 to 4 km from the plant (4kmR), and 54 large city residents 25 km apart (25kmR). Exposure to benzene was evaluated by personal air sampling and urinary benzene (BEN-U) monitoring (specimens collected before and at the end of air sampling).

Results: Median air benzene exposure was 25, 9, 7 and 6 µg/m³ benzene among W, 2kmR, 4kmR, and 25kmR respectively, with the highest levels in W and no difference among the other groups. Median BEN-U was 3 to 10-fold higher in smokers compared to non-smokers; among non-smokers BEN-U was the highest in W (median 236 ng/L), and lower in 2kmR (48 ng/L) and 4kmR (63 ng/L) than in 25kmR (120 ng/L). Among non-smoking general population individuals the inverse association between BEN-U and distance of residence from the petrochemical plant was significant (p<0.001), and possibly related to urban traffic increasing with the distance from the plant. A multiple linear regression analysis performed among non-occupationally exposed subjects showed that up to 73% of BEN-U variability was accounted for by active smoking, air benzene, urinary creatinine and distance from the plant (for each p≤0.002); marginal influences of personal characteristics and environmental tobacco smoking were also observed (p≤0.074).

Conclusions: Our study showed that benzene uptake is the highest among petrochemical workers. Among subjects non-occupationally exposed, smoking and urban traffic currently contribute to benzene exposure more than living in the proximity of a petrochemical plant.