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Deputy Minister of Health Malaysia

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## CHROMOSOME BREAKAGE AMONG THE WORKERS IN THE LOW EXPOSURE BENZENE

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### Background:

Many oil and gas Industries are producing benzene, even though exposures to the workers are limited to low levels compared to other industries. It is well known that benzene is a carcinogen. This study's objective is to evaluate the prevalence and risk factors of lymphocyte chromosome breakage among workers who are exposed to low levels of benzene at the workplace.

### Materials & Method:

The design of this study was cross sectional. The study was conducted in a Gas and Oil Company from September 2007 to April 2010. The population of this study was all permanent workers from the production department and the head office. The sample size was 115. Data collection was conducted by interview, physical examination, laboratory examination and observation of work practices. Variables included in this study were level of benzene exposure from the workplace, age, and work period, type of work, history of work, increasing risk factors, anti-oxidant consumption, behavior and management, health status, levels of urine s-PMA, passive sampler, CYP4502E1, and other exposures.

### Results:

The prevalence of lymphocyte chromosome breakage was 62.61%, almost in number 3 and 6. Type of work ( $p=0.010$ ; Crude OR=3.32; 95% C.I.=1.33-8.30), low antioxidant consumption ( $p=0.033$ ; Adjusted OR=3.07; 95% C.I.=1.10-8.56), work practices and management ( $p=0.008$ ; Crude OR=0.33; 95% C.I.= 0.16-0.76) and benzene exposure at the workplace ( $p=0.018$ ; Crude OR=2.53; 95% C.I.=1.16-5.49) had significant relationships with lymphocyte chromosome breakage. Whereas age, work history, lifestyle, CYP4502E1 polymorphism, s-PMA urine levels, other benzene exposure and other exposures, showed no significant relationship. The CYP4502E1 enzyme expressions are 87.8% homozygote wild type, 11.3% heterozygote and 0.9% homozygote mutant.

### Conclusion:

The prevalence of lymphocyte chromosome breakage was 62.61%. Benzene exposure in the workplace, occupation, and antioxidant intake resources were related to lymphocyte chromosome breakage. Low antioxidant consumption is an increasing risk factor. It is recommended that benzene exposure should be further controlled to minimal levels and consumption of antioxidants should be encouraged.

### Keywords:

lymphocyte chromosome breakage, low exposure benzene, antioxidant sources