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### PESTICIDE EXPOSURE AND HEALTH PROBLEMS AMONG HORTICULTURAL PESTICIDE APPLICATORS IN ARUSHA, TANZANIA

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**Introduction** Exposure to pesticides has been reported to cause adverse health effects, and great numbers of people have been affected globally. Annual severe pesticide poisoning cases amount to 3 million worldwide; 25 million symptomatic occupational pesticide poisonings occur each year among agricultural workers in developing countries. Increased health symptoms have been reported as a result of pesticide exposure. In Tanzania there is limited information on health symptoms associated with pesticides exposure among horticultural pesticide applicators.

**Methods** A cross-sectional study was conducted among 140 pesticide applicators working in horticultural farms in three districts of Arusha region. Data on demograph, types of pesticides used, spray duration, use of personal protection equipment and neurological symptoms were collected by using a structured questionnaire. To determine the intensity of pesticide exposure, acetylcholinesterase assay was done by using the Test-mate Model 400 device with a photometric sensor. Data were analysed by using SPSS version 20.0.

**Results** The pesticide applicators were men with mean age  $29.59 \pm 6.789$  years and mean work duration of  $5.76 \pm 3.036$  years. Organophosphate pesticides were commonly used by 95% of the pesticide applicators. Sixty percent of pesticide applicators reported to use personal protection equipment during pesticide application. The neurological symptoms reported were body weakness, perspiration, headache, painful part of the body, poor appetite, depression and irritation. The mean average of acetylcholinesterase was  $26.788 \pm 4.0952$  u/g hgb. About 27% of pesticide applicators had acetylcholinesterase level below the limit value of 24.5 u/g hgb.

**Conclusion** The study shows 27.1% of pesticide applicators had acetylcholinesterase level below the limit value suggesting that exposure to pesticide may result to the neurological symptoms reported. Therefore specific pesticide management interventions are needed to prevent pesticide exposure and reduce the incidence of neurological health symptoms among the pesticide applicators. Acetylcholinesterase monitoring is needed for horticultural farm workers' surveillance.

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### OCCUPATIONAL HEALTH SURVEILLANCE ACTIVITIES FOR AGRICULTURAL WORKERS AND ANIMAL BREEDERS IN SOUTHWEST OF IRAN

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**Introduction** There are about 1.3 billion workers engaged in agricultural sector which is one of the most hazardous jobs in the world. Farmers are mainly at risk of exposure to physical, chemical and biological or hazards in the workplace. This paper is part of a wide project that will be addressed in health surveillance activities for the agricultural workers, and characterising exposure to biological, chemical and physical

risks among farmers and animal breeders in the Region of Abadan district, southwest of Iran.

**Methods** A cross-sectional study was carried out in Abadan district, southwest of Iran. Two groups of farmers and animal breeders were included in the study. Personal data and socio-demographic and clinical information, personal habits and the results of physical and laboratory examination were obtained by the personal data collection forms through health surveillance activities by expert health professionals. Blood samples were collected from all the subjects, lung function was measured using a spirometer. Data were analysed using IBM SPSS statistics 22 software (IBM, Armonk, NY, USA).

**Results** The study stresses the significant increase of immune parameters in animal breeders in the Abadan district. Workers in rural areas were relatively at higher risk of zoonoses and occupational diseases than in urban areas.

**Conclusion** Despite underreporting of occupational diseases in agriculture setting, available data clearly show a significant health risk, and therefore there is a strong need for conducting health surveillance activities at the workplace in southwest of Iran. The implementation of health surveillance programs for agricultural workers relies on the possibility of creating a system able to reach the workers at their workplaces and with the collaboration of employers' associations, will be able to support enterprises in several issues, including risk assessment and management

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### OCCUPATIONAL EXPOSURE TO ACEPHATE AMONG OIL PALM PLANTATION WORKERS: GLOVE PERMEATION STUDY

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**Introduction** Spills or splash during mixing, loading and application organophosphate insecticide may entail significant dermal exposure to agricultural workers. Although gloves are religiously worn, the level of chemical protection afforded by these gloves is unclear. In this study, the influence of exposure temperature and duration on glove permeation were investigated for acephate, an organophosphate insecticide used for trunk injection on oil palm trees. Potential contamination on the skin of the workers was also investigated.

**Methods** Nitrile gloves used by oil palm plantation workers during trunk injection were tested at room temperature and elevated temperature (45°C), using standard permeation cells. Skin wipe samples were collected from the face and hands of the workers to examine whether acephate still contaminated their skin. Chemicals analysis was via HPLC-UV.

**Results** Higher maximum flux and greater cumulative permeation of acephate were observed over the 4 hour exposure period. Gloves with 5% simulated abrasion showed reduced performance compared to new gloves. Contamination on the face and hands of the workers were minimal.

**Conclusion** Limited protection is provided by gloves, even for diluted acephate, especially at 45°C. The findings indicate the need for more suitable gloves, with frequent change, especially when working in warmer conditions and where abrasion is observed on the gloves. While workers behaviour was good, emphasis on the correct techniques of glove removal may assist in avoiding transfer of contaminants.