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Chronic Pesticides Exposure and Certain Endocrine Functions Among Farmers in East Almnaif District, Ismailia, Egypt

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Abstract : Background: Exposure to pesticides is one of the most important occupational risks among farmers in developing countries. Along with the wide use of pesticides in the world, the concerns over their health impacts are rapidly growing. Objective: To investigate thyroid and reproductive hormones and fasting blood glucose levels among farmers chronically exposed to pesticide from East Almnaif district, Ismailia governorate. Methods: An analytical cross-sectional study was conducted on 43 farmers with active involvement pesticides handling and 43 participants not occupationally exposed to pesticides as the control group. A structured interview questionnaire measuring the sociodemographic characteristics, pesticides exposure characteristics, and safety measures was used. General examination including measurements of height, weight, and blood pressure was done. Moreover, levels of plasma cholinesterase enzyme (PChE), glucose, as well as reproductive and thyroid hormones (TSH, T4, and testosterone) were determined. Results: There were no statistically significant differences between both groups regarding their age, educational level, smoking status, and body mass index. The mean duration of exposure was 20.60 11.06 years. Majority of farmers (76.7%) did not use any personal protective equipment (PPE) during pesticides handling. The mean systolic blood pressure among exposed farmers was greater (134.88 17.18 mm Hg) compared to control group (125 14.69 mm Hg) with statistically significant difference (p = 0.003). The mean diastolic blood pressure was higher (84.02 8.69 mm Hg) compared to control group (78.79 8.98 mm Hg) with statistically significant difference (p = 0.006). The pesticide exposed farmers had statistically significant lower level of PChE (3969.93 1841U/L) than control group (4879.29 1950.08 U/L). Additionally, TSH level was significantly higher in exposed farmers (median =1.39µIU/ml) compared to controls (median = 0.91 µIU/ml) (p=0.032). While, the exposed group had a lower T4 level (6.91 1.91 µg/dl) compared to the control group (7.79 2.10µg/dl), with the statistically significant difference between the two groups (p = 0.045). The exposed group had significantly lower level of testosterone hormone (median=3.37 ng/ml) compared to the control group (median= 6.22 ng/ml) (p=0.003). While, the exposed farmers had statistically insignificant higher level of fasting blood glucose (median =89 mg/dl) than the controls (median=88 mg/dl). Furthermore, farmers who did not use PPE had statistically significant lower level of T4 (6.57 1.81µg/dl) than farmers who used PPE during handling of pesticides (8.01 1.89 µg/dl). Conclusion: Chronic exposure to pesticides exerts disturbing action on reproductive function and thyroid function of the male farmers.

Keywords : chronic occupational pesticide exposure, Diabetes mellitus, male reproductive hormones, thyroid function
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