

Prevention of occupational traumas by developing an ergonomic design and modifying farmers' postures in walnut gardens of Tuyserkan, Iran

ABSTRACT

Background and Objectives: Occupational traumas are known as work-related disorders, associating with some sorts of factors such as repetitive tasks, body postures, workstations, and hand tools. These traumas cause various problems for both workers and employers. Due to occupational hygiene considerations, problems such as cumulative trauma disorders, occupational trauma, low back pain (LBP), and work-related musculoskeletal disorders should be controlled. In this regard, ergonomic interventions can have efficient outcomes toward controlling occupational traumas. In this study, the focus was on working at some walnut gardens in the city of Tuyserkan in Iran, to reach an ergonomic analysis base, in which hand tools were assessed. The main objective was to develop a new ergonomic design for workers using hand tools. **Subjects and Methods:** In this cross-sectional study, 19 workers participated and filled out the Nordic Musculoskeletal Questionnaire (NMQ). Their body postures during harvesting walnuts were evaluated by the Ovako Working Posture Analysis System method. Hand tool analysis was also performed by ergonomic risk assessments. **Results:** The results showed that 15% of the farmers experienced some sorts of trauma during the harvest while using traditional hand tools. The results also emphasized that 61.5% of the workers' body postures should be modified. In addition, according to the NMQ, the most common problems among workers were wrist disorders, LBP, and knees' and shoulders' disorders. **Conclusions:** Considering experimental data, a new device was developed in which the weight, adjustability, and form of hand tools were modified under ergonomic considerations. The benefits of the new design were confirmed by SOLIDWORKS software. Since this new device helps farmers to decrease extra force exertion in awkward postures, it is expected to improve farmers' condition while using it.

Keyword: Ergonomics; Hand tool; Nordic musculoskeletal questionnaire; Occupational trauma; Ovako working posture analysis system