INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : Mallampalli K Chaitanya

Roll Number : 176105103

Programme of Study : Ph.D.

Thesis Title: Designing and Evaluating an Ergonomic Intervention to Minimise Risk of Musculoskeletal Disorders in Indian Small and Medium Scale Cashew Nut Processing Mills

Name of Thesis Supervisor(s) : Dr. Debayan Dhar

Dr. Swati Pal

Thesis Submitted to the Department/ Center : Design

Date of completion of Thesis Viva-Voce Exam : 18.06.2022

Key words for description of Thesis Work : Cashew nut shelling, Ergonomic intervention, MSD risk

SHORT ABSTRACT

India is one of the largest producers and processors of cashew nuts in the world. The vast export capabilities and local demand for cashew nuts are fuelling the growth of the cashew industry in India. There are nearly 3650 cashew nut processing mills that are spread across India. These mills are primarily labour-intensive and provide significant employment opportunities for rural people. However, the health and well-being of workers employed in these mills are highly compromised due to the use of traditional tools/equipment. Moreover, investigations related to occupational health, and ergonomic design and development of work equipment from an ergonomics perspective have barely been studied to date in Indian small and medium-scale cashew nut processing mills. Therefore, this research presents an assessment of existing working conditions in relation to the musculoskeletal health of cashew workers in Indian small and medium-scale cashew nut mills. Subsequently, it provides the design and evaluation of an ergonomic intervention to minimize the risk of musculoskeletal disorders in Indian small and medium-scale cashew nut processing mills from an ergonomics perspective. This entire research work was broadly divided into three phases.

In the first phase, a cross-sectional survey with 290 cashew workers across four different states in eastern India was conducted. Survey results showed that the awkward working postures were prevalent, and around 70.3 % of cashew workers suffered from prevalence of work-related musculoskeletal disorders (WMSDs). It was observed that workers engaged in shelling activity adopting poor working posture, performing repetitive actions, and using traditional hand-cum-pedal operated cashew nut sheller suffered more due to WMSDs. Information gathered during

this first phase study and on-site observations informed the redesign of the existing cashew nut sheller, which could improve the working posture and reduce musculoskeletal load among workers. Thus, in the second phase, a participatory design process involving stakeholders' viewpoints and their feedback was used to redesign the existing traditional cashew nut sheller. A combination of steps, including identifying stakeholders' needs, concept generation, and concept screening sessions, were carried out to conceive a new ergonomic cashew nut sheller design. The redesigned sheller is hand-operated type, and thus it was named as a hand-operated cashew nut sheller in this thesis. The final phase of the study (phase 3) comprised of the development and field testing of hand-operated cashew nut sheller. Overall, a comparative study conducted between the old and the new designs highlighted that the proposed ergonomic design intervention effectively improved the working postures and provided sufficient confirmation of minimizing the risk of musculoskeletal disorders of cashew nut workers, specifically for shelling workers.

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