



# Ergonomic evaluation of weaving activity and ergonomic intervention for drudgery reduction of weaver

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## ABSTRACT

Weaving is a common enterprise performed predominantly by women of Assam. Weaving is done mainly for preparation of articles both for household and commercial purpose. Fly shuttle loom is an improved loom used by weavers for higher production as compared to traditional hand loom. It was observed that seating arrangement was fixed with the loom is not comfortable to the fly shuttle weavers. An attempt was made to design an improved ergonomically weaving chair for the fly shuttle weavers (40 inches- height of the loom) for enhancing greater efficiency. For the testing effectiveness of the ergonomically designed weaving chair, the physical fitness of weavers, physiological workload, muscular and postural stress involved in the weaving activity by using both fixed and ergonomically designed chair were assessed. Rating of Perceived Exertion (RPE) was calculated using Borg's 5 point rating scale. Body Map was used to identify pains in different parts of the body. Twenty rural women without any health problem in the age group of 20-45 years were selected for this experimental study. Lean Body Mass (LBM) of the respondents was 30.60 kgs. Aerobic capacity ( $VO_2$ ) and fat percentage of the women were found to be 31.80 ( $ml. kg^{-1}. min^{-1}$ ) and 20.20. About 55 per cent of the respondents were having very good physical fitness. Results indicate that working heart rate and energy expenditure of the respondents while using fixed seat were 98.36  $b.min^{-1}$  and 6.87 kJ/min and ergonomically designed weaving chair were 90.44  $b.min^{-1}$  and 5.67 kJ/min, respectively. On the basis of average and peak heart rate and energy expenditure, the physiological workloads of weaving in both the conditions were categorized as 'light'. Average rating of perceived exertion (RPE) was 3.2 in fixed seats and ergonomically designed chair 2.5 in 5 point scale. The angle of deviation of the weavers were 4.35<sup>0</sup> in fixed seat and 3.80<sup>0</sup> in ergonomically weaving designed chair. The incidences of musculo skeletal problems in different parts of the body were observed to be 'severe' to 'moderate' in fixed seat and 'mild' to 'very mild' while using improved ergonomically designed weaving chair. And intensity of pain was decreased in ergonomically designed weaving chair. Use of fixed seat compelled the weavers to adopt awkward postures while performing weaving activity. Ergonomic interventions of such an ergonomically designed improved chair can enhance work efficiency comfort level of the fly shuttle weavers.

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