

## **Ergonomic evaluation of physiological stress of building construction workers associated with manual material handling tasks**

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**A**- Conception and study design; **B** - Collection of data; **C** - Data analysis; **D** - Writing the paper; **E**- Review article; **F** - Approval of the final version of the article

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### **ABSTRACT**

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**Purpose:** In India, the cost of manpower is very low; hence Manual Material Handling (MMH) is the cheapest solution. This study aimed to quantify the cardiac strain and postural stress of male building construction workers associated with MMH tasks.

**Materials and methods:** Mean (SD) age (years) and job experience (years) of the workers were 31.0(4.65) and 8.8 (3.23), respectively (n=35). Working peak heart rate was recorded by polar heart rate monitor, posture analysis was done by the Ovako Working Posture Analysis System (OWAS) and the Rapid Entire Body Assessment (REBA) method, body part discomfort was assessed by the Nordic questionnaire, and perceived exertion was evaluated by the Borg scale. Two-tailed unpaired Student's t test was performed between peak heart rate of workers associated with MMH tasks and upper extremity intensive tasks (n=31).

**Results:** Results revealed that mean peak heart rate of the workers was significantly different (higher) compared with that of the upper extremity intensive workers ( $p<0.05$ ). This study showed that most of the working postures were hazardous. The magnitude of risk for musculoskeletal disorders (MSD) was much higher as per REBA compared with OWAS. Most of the workers suffered from pain in the head, neck, shoulder, lower back, and arm region. As per the Borg scale, the rate of perceived exertion was 'hard and heavy' among most of the workers (68.57%).

**Conclusions:** Postural stress and cardiac strain beyond the safe limit indicates the heavy nature of the job. Load limit optimization, ergonomic lifting technique, and rescheduled work-rest cycle are essential to reducing physiological and perceived work load.

**Key words:** Construction industry, Manual Material Handling, posture, peak heart rate.

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DOI: 10.5604/01.3001.0010.2413