IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

International Conference on Occupational Health & Safety Measures - 2025

OCCUPATIONAL HEALTH RISKS IN HANDLOOM WEAVING

Pratistha Singh[1] and Dr. Namrata Arora Charpe[2]

1 Research Scholar, [2]Associate Professor

[1,2]Department of Home Science

[1,2]Banasthali Vidyapith, Newai, Rajasthan, India

Abstract: Work-related musculoskeletal disorders (WMSDs) are common occupational hazards across various sectors, with many sectors implementing ergonomic measures to mitigate their impact through ergonomic interventions, however weaving sector in particular, faces a heightened risk of musculoskeletal disorders due to inadequate occupational safety measure, limited access to health services, and substandard working conditions. The objective of this study was to evaluate the occupational health risks associated with traditional handloom weaving, focusing on pain intensity and discomfort among 30 participants aged 20–39, all with a minimum of six months of experience. Pain assessment was done using the Nordic Body Map (NBM), while pain frequency and its impact on daily activities were evaluated through a modified Nordic Musculoskeletal Questionnaire (NMQ) and unstructured interviews respectively. The findings indicated that all participants reported at least one MSD, with 50% classified at a "Moderate risk" level and the other 50% at a "High risk" level. The discomfort significantly interfered with daily activities, contributing to fatigue, headaches, and vision problems. Chronic pain arose from repetitive movements and poor posture, with many weavers seeking medical assistance only when symptoms become severe. Additional hazards include stomach pain from engaging in the operation without protective and specialized equipment, the task involves excessive bending of the right hand while using an iron rod, leading to potential strain and respiratory issues resulting from the inhalation of fiber dust. This study underscores the critical need for ergonomic interventions, such as workstation modifications, mechanical aids, structured breaks and medical assistance to mitigate MSD risks. Addressing these occupational health challenges is essential for enhancing the health and productivity of weavers and safeguarding the sustainability of the handloom industry.

Index Terms- Occupational health, Musculoskeletal disorder, Working conditions, Unergonomic workstation.

1. INTRODUCTION

Musculoskeletal Disorders often termed ‘Ergonomic injuries’ developed as a result of the body's repeated use of muscles, tendons and ligament while performing tasks particularly in awkward posture or through frequent movement. Sustained exposure to these conditions can progressively lead to discomfort and injury. The primary factors contributing to these disorders are overexertion and repetitive motion (U.S. Bureau of Labour Statistics). Parida and Ray (2012) identified a correlation between musculoskeletal disorders (MSDs) and occupational factor. This underscores the necessity of evaluating occupational risk factors particularly within the unorganized sector, with a specific focus on weaving industry in India. Weaving encompasses a range of task that demands consistent and repeated motion of all extremities, including the operation of pedals and shuttles, often with arm extended away from the body. Consequently, weaving and other handloom related activities are considered as high risk occupation for musculoskeletal disorder, frequently resulting in physical strain, particularly in the lower back, shoulder and neck. The combination of

repetitive, monotonous tasks and poorly designed workstation further heightens the risk of these injuries, adversely affecting both workers' health and overall productivity

Handloom weaving in India is a traditional craft passed down through generations, with artisans acquiring their skills from their ancestors. This practice remains widespread in rural regions, serving as a significant source of employment for a large segment of rural artisans.

Although india handlooms have secured a distinct position in the global market, awareness regarding the occupational health risk associated with weaving remains insufficient. Weaving and related tasks expose artisans to various health hazards, which not only contribute to physical strain and stress but also pose significant health risks (Goel & Tyagi, 2012). The study endeavours to analyze the occurrence of musculoskeletal disorders among handloom weavers and their effects on overall well-being of workers.

2. Literature Review

Pavana et al. (2021) demonstrated that extended occupational exposure and ergonomic strain of maintaining awkward posture contribute to a higher prevalence of WMSDs among traditional weavers.

Siddiqui et al. (2021) discovered that handloom weavers are at increased risk of developing MSDs compared to their Powerloom counterparts.

Ramdan et al. (2018) highlighted that women weavers in Samarinda, Indonesia, face severe MSDs due to repetitive tasks and awkward postures, requiring immediate intervention.

Sharma et al. (2017) found that most women in weaving industries faced occupational health issues from continuous physical labor, with 68% reporting back pain due to prolonged sitting and 60% experiencing visual problems from inadequate ventilation and exposure to intense lighting.

Neeraja et al. (2016) conducted a study to assess the incidences of musculoskeletal pain and visual fatigue in handloom weavers and their association with occupational factors. According to the findings, weavers reported a substantial amount of pain or discomfort. Based on study findings, it is necessary to take a methodical approach to mitigate the risk associated with weaving

Koiri (2020) examined the occupational health of handloom weavers. The study revealed that the existing working postures of weavers have negative effects on their health. To reduce these negative effects, the study recommended incorporating ergonomic design into weaver workstations

This highlights that handloom weavers, especially women, face significant health risk due to poor working posture, repetitive tasks, and inadequate workplace conditions. Studies consistently show high prevalence of musculoskeletal disorders, back pain, and visual strain among weavers, emphasizing the urgent need for ergonomic improvements. Addressing these issues through better workstation design and preventive measures can help reduce health risk and improve the overall well-being of weavers

3. Materials and Methods

3.1 Study Design: This study employed a cross sectional research design to determine the rate of Musculoskeletal disorders (MSDs) among handloom weavers Kota, India.

3.2 Sampling Technique: Convenience sampling method was used.

3.3 Sample Size: The study population consisted of 30 handloom weavers

3.4 Data Collection: A multi method approach was used to assess Work-related Musculoskeletal Disorders (WMSDs) among handloom weavers. The Nordic Body Map evaluated body discomfort, while the nordic questionnaire (Kuorinka et al., 1987) measured pain intensity and frequency across body regions. Additionally, unstructured interviews were conducted with the weavers to gain qualitative insights into their occupational health challenges, daily work experiences, and the impact of musculoskeletal pain on their quality of life.

4. Study Findings

The study employed Nordic Body Map to evaluate the intensity of perceived pain and discomfort, in conjunction with a modified nordic musculoskeletal questionnaire to quantify the frequency of reported pain. The NMQ was specifically utilized to assess the pain experienced over the past 12 months and 7 days, its impact on occupational performance, the incidences of injuries resulting from accidents, and the extent to

which participants sought medical intervention for pain -related concerns preceding year. The findings corresponding to these location-specific assessments are presented in figure 1 to 5.

As illustrated in figure 1. Lower back pain was the most prevalent issue affecting all participants succeeded by upper back pain which impacts 96% of individuals, along with shoulder pain and ankle pain each affecting 90% Neck pain also remains significant,impacting 76.6 % of individuals. As shown in figure.2 lower and upper back disorders were the most prevalent musculoskeletal disorder issues affecting daily activities, with an incidence rate of 76.6% each. These were subsequently followed by ankle and foot complications (30%) and discomfort in the hip and thigh regions (26.6%).

Figure 1 Trouble in Last 12 Months

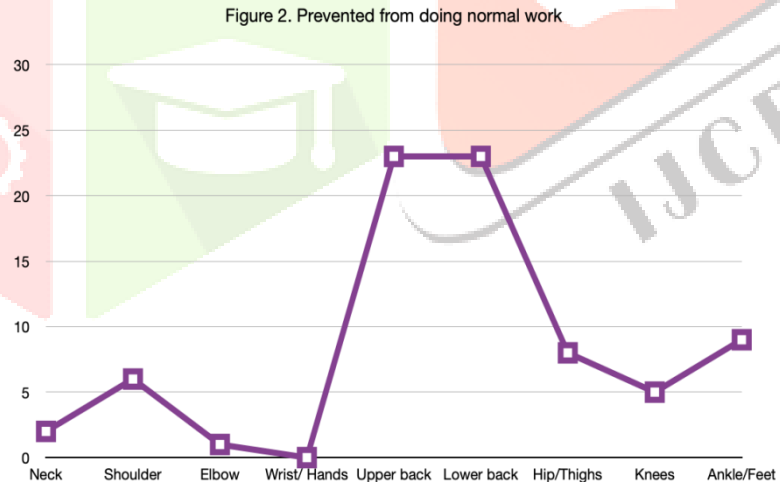

Figure 2 Prevented From Doing Normal Work

Figure 3 demonstrates that 76 % participants reported experiencing lower and upper back pain, whereas 50% identified shoulder pain, and 46% indicated ankle pain. Figure 4 shows that 50% of participants consulted for medical intervention regarding lumbar pain while 40% for upper back pain. Additionally 10% pursued medical issues related to the neck region, shoulder area, and thigh muscles with 5% experiencing the issue in wrist, knee and ankle over the past twelve months.

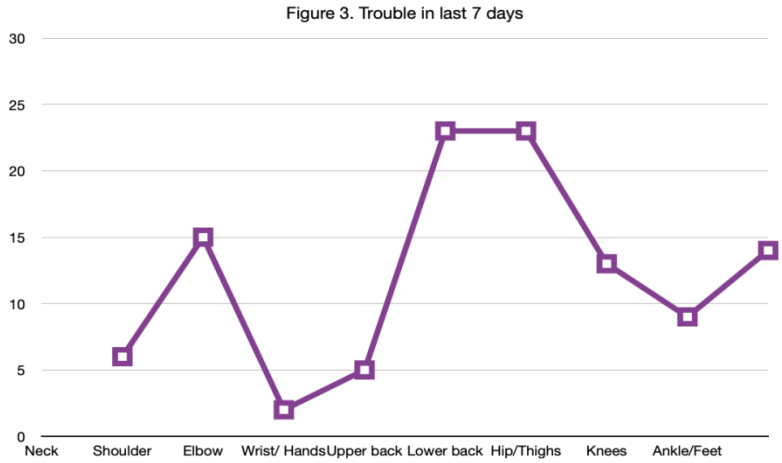

Figure 3 Trouble in Last 7 Days

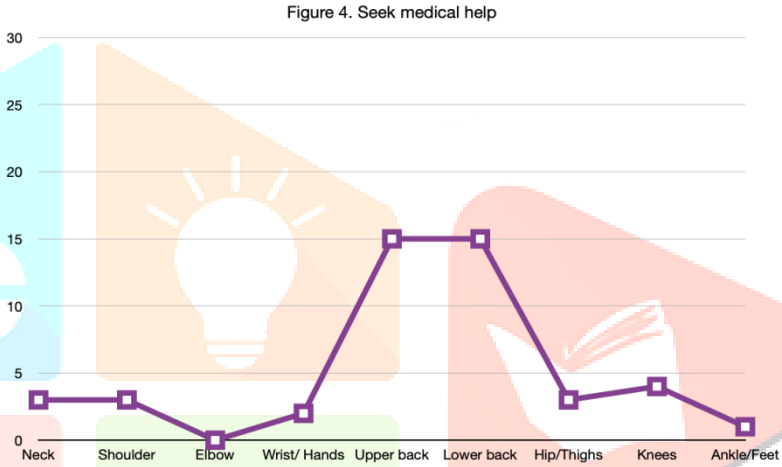

Figure 4 Seek Medical Help

Figure 5 reveals that participants reported minimal number of injuries with single occurance recorded for the upper and lower back, thighs. The finding suggests that weavers are at heightened risk of developing musculoskeletal disorder particularly in the lower and upper back. The results of this study, derived from Nordic Body Map scores and qualitative interview data, emphasize a notable occurrence of musculoskeletal disorders (MSDs) among handloom weavers. As reflected in Table 1, no participants were categorized in either the low-risk or very high-risk groups. Instead, the respondents were evenly split, with 50% falling under moderate risk and the other 50% under high risk. These findings suggest that a significant proportion of weavers face a moderate to high risk of developing MSDs.

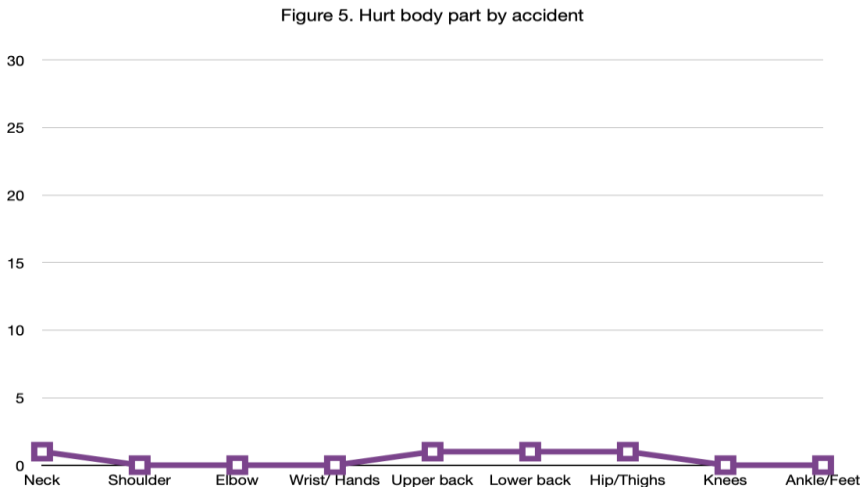

Figure 5 Hurt Body Part by Accident

Evaluation of physical strain and Discomfort:

Table 1. Classification of respondents based on Nordic Body Map scores.

Score Range	Risk Level	Number of Respondents (N%)
28-49	Low Risk	-
50-70	Moderate Risk	15 (50%)
71-91	High Risk	15 (50%)
92-112	Very High Risk	-

Pain and discomfort were predominantly reported in the lumbar and upper back region, with moderate levels of pain observed in the shoulders, wrists, and neck. The nature of handloom weaving, which involves repetitive movements and prolonged static postures, was identified as a key contributor to musculoskeletal strain and fatigue. Interview findings further corroborated these observations, as many participants reported experiencing severe pain that hindered their ability to perform routine household tasks, such as cooking and lifting objects.

Additional findings from the qualitative data include the following:

- Chronic Pain and Health-Seeking Behavior: Many weavers reported experiencing persistent pain, particularly in the side waist and one side of the body, due to sustained leaning postures. Over time, they have become accustomed to this discomfort and only seek medical attention when the pain becomes unbearable.
- Occupational Health Issues: In addition to musculoskeletal pain, many respondents reported experiencing stomach pain due to the physical effort required to wrap cloth onto the beam manually, headaches caused by loom noise, and vision impairments, likely attributed to prolonged exposure to poor lighting and visual strain.
- Early Workforce Entry and Intergenerational Practice: Many participants reported that they began weaving as early as 13 years of age, as the profession is traditionally passed down through generations.
- Gender-Based Educational Limitations: Young girls within weaving households are discouraged from pursuing higher education due to the expectation that they will continue working in handloom weaving, even after marriage, thereby limiting their educational and professional opportunities.

These findings indicate that the physical, social, and economic dimensions of handloom weaving contribute significantly to occupational health risks, which, in turn, impact the overall well-being and daily functioning of the weavers.

Conclusion

The data obtained from the study underscore the significant occupational health challenges faced by handloom weavers, particularly the prevalence of musculoskeletal disorders (MSDs) resulting from prolonged exposure to physically demanding tasks, repetitive motions, and non-ergonomic working conditions. Given that the majority of weavers in this study are housewives, the impact of MSDs extends beyond occupational discomfort, affecting their ability to manage household responsibilities and exacerbating work-life conflict. The absence of ergonomic interventions, inadequate workstation design, and lack of healthcare support further contribute to chronic pain and long-term health risks.

To ensure the well-being and productivity of weavers, it is imperative to implement targeted ergonomic interventions, including modifications to workstation design, the introduction of adjustable seating, and mechanical aids to minimize physical strain. Additionally, regular medical check-ups, workplace training programs on posture correction and injury prevention. Without immediate action, the continued physical strain associated with handloom weaving will not only compromise workers' health and quality of life but also threaten the long-term sustainability of the sector. Addressing these concerns from both a public health and labor policy perspective is essential to breaking the cycle of occupational discomfort and restricted socio-economic mobility. Future research should focus on developing cost-effective, scalable ergonomic solutions and assessing the prolonged effect of interventions on weavers' well-being and productivity.

References

1. Anoop, G. A., & Binoosh, S. A. (2019). A study on musculoskeletal disorders among two-wheeler riders of Kerala state in India. Proc 4th Kerala Technol Congr, 6, 411-8.
2. Awasthi, S., Singh, P., & Awasthi, N. (2018). Risk assessment of handloom weavers for musculoskeletal disorder in durrie unit. *The Pharma Innovation Journal*, *7*(7), 94-98.
3. Choobineh, A., Lahmi, M. A., Hosaini, M., Jamali, M., & RezaeeGorji, Z. (2003). Musculoskeletal problems and corrective measures in Iranian hand-woven carpet industry. In Proceedings of the XVth Triennial Congress of the International Ergonomics Association and the 7th Joint Conference of Ergonomics Society of Korea/Japan Ergonomics Society (pp. 270-273). Seoul, Korea: Ergonomics Society of Korea.
4. Choobineh, A., Tosian, R., Alhamdi, Z and Davarzanie, M. (2004). Ergonomic intervention in carpet mending operation. *Applied Ergonomics*.35(5): 493-496.
5. Gallagher, S. 2005. Physical limitations and musculoskeletal complaints associated with work in unusual or restricted postures: a literature review. Journal of Safety Research. 36(1): 51-61.
6. Haftu, D., Kerebih, H., & Terfe, A. (2023). Prevalence of work-related musculoskeletal disorders and its associated factors among traditional cloth weavers in Chencha district, Gamo zone, Ethiopia, an ergonomic study. PLoS One, 18(11), e0293542.
7. Kuorinka, I., Jonsson, B., Kilbom, A., Vinterberg, H., Biering-Sørensen, F., Andersson, G., & Jørgensen, K. (1987). Standardized Nordic questionnaires for the analysis of musculoskeletal symptoms. Applied ergonomics, 18(3), 233-237.
8. Koiri, P. (2020). Occupational health problems of the handloom workers: a cross-sectional study of Sualkuchi, Assam, Northeast India. *Clinical Epidemiology and Global Health*, *8*(4), 1264-127
9. Natosba, J., & Jaji, J. (2016). Pengaruh Posisi Ergonomis terhadap Kejadian Low Back Pain Pada Penenun Songket di Kampung BNI 46. *Jurnal Keperawatan Sriwijaya*, *3*(2), 8-16.
10. Neeraja, T., Bhargavi, A., & Manjulatha, C. (2016). Musculoskeletal disorders and visual strain among handloom weavers. International Journal of Information Research and Review, 3(10), 2942-2945.
11. Pandit, S., Kumar, P., & Chakrabarti, D. (2013). Ergonomic problems prevalent in handloom units of North East India. *Age (yrs)*, *26*(2), 18-35.
12. Suryati, Y., & Nggarang, B. N. (2020). Analysis of Working Postures on the Low Back Pain Incidence in Traditional Songket Weaving Craftsmen in Ketang Manggarai Village, NTT. Journal of Epidemiology and Public Health, 5(4), 469-476.

13. Singh, P., & Charpe, N. A. (2024, April). Correlational Analysis of Posture and Body Pain Among Handloom Weavers. In International Conference on Business and Technology (pp. 247-253). Cham: Springer Nature Switzerland.