

The Prevalence of Musculoskeletal Disorders in Handicraft Workers Because Of Hand Tools

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Abstract

Aim: The aim of the present study is to study the relevance of practical applications of Ergonomics and advances of physical therapy to overcome the challenges in Handicraft works to improve professional capabilities and evaluate upper extremity repetitive motion injuries”

Design: A convenient, descriptive-correlation type of study design.

Material & Methodology: A total of 159 subjects were selected by simple convenient sampling for study after signing the informed consent according to the inclusion and exclusion criterion.

The related questionnaires are held in different handicraft factories after the related coordination with the owner of those factories permission in order to gather the related data. These questionnaires have been also distributed among the participated handicraft workers and then gathered completely.

Results: The Handicrafts Sector plays a significant & important role in the country's economy. It provides employment to a vast segment of craft persons in rural & semi urban areas and generates substantial foreign exchange for the country. The Handicraft sector has, however, suffered due to its being unorganized, with the additional constraints of lack of education, low capital, and poor exposure to new technologies, absence of market intelligence, and a poor institutional framework.

Conclusions: Both males and females are equally affected by the musculoskeletal disorders. The musculoskeletal disorders in body region for existing hand block tool shows that almost all the joints are affected, but shoulder was the most affected region.

Keywords: Musculoskeletal disorders, Work related musculoskeletal disorders, Handicraft Workers

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I. Introduction

India is one of the important suppliers of handicrafts to the world market. The Indian handicrafts industry is highly labour-intensive cottage-based industry and decentralized, being spread all over the country in rural and urban areas. Numerous artisans are engaged in crafts work on part-time basis. The industry provides employment to over six million artisans who include a large number of women and people belonging to the weaker sections of the society. The Handicrafts Sector plays a significant & important role in the country's economy. It provides employment to a vast segment of craft persons in rural & semi urban areas and generates substantial foreign exchange for the country, while preserving its cultural heritage.

The Handicraft Industry: India is known for its rich culture which includes many art forms. The handicraft industry has a history of several centuries. The artisans in the earlier days were known worldwide for their skill and craftsmanship. The carvings on the temples testify this fact. Exports of Indian hand-crafted goods have taken place from time immemorial (Rao, 1979). This sector, which forms a major part of this rich cultural heritage of the country, utilizes the traditional skill of artisans in various crafts such as wooden ware, metal ware, textile weaving, printing, marble & stone crafts, leather works and jewellery etc.

This skill is handed down from generation to generation in the form of family tradition. True to its name, the “Handicraft” (crafts made by hands) industry uses conventional manual methods instead of advanced technology for making various items. It is an unorganized, decentralized, labour intensive cottage industry. (Handbook of Statistics and Indian Economy, 2006)

It is currently difficult to quote the exact size of the industry as the census of the Handicraft Industry is in progress, clearly indicating how ignored this industry has been in the past. The Minister of State for Textiles, Panabaaka Lakshmi, in a written reply to the Lok Sabha stated that, as per the results made available on

different parameters pertaining to the handicrafts sector based on enumeration undertaken till now, the estimated artisans in India during 2010-11 were 6.8 million (PTI, 2013). The handicraft industry in India involves large number of artisans from rural and semi urban areas. The rural segment accounts for 78.2% of the units produced and 76.5% of the artisans while the urban segment accounts for the rest (Ernst &Young, 2012). Most of these are women & people from the economically disadvantaged groups.

II. Methods & Methodology

This chapter deals with the methods and material used for this study. These include information on the subjects, procedures used in data collection, and about variables.

Participants and Recruitment

A total of 159 subjects were selected by simple convenient sampling for study after signing the informed consent according to the inclusion and exclusion criterion.

Inclusion criteria

- Male/ Female
- Age group: 18-45 years
- Subject who are working as handicraft workers for more than a year.
- Subjects who agreed to fill informed consent.

Exclusion Criteria

- History of recent back injury.
- Subjects having history of lower extremity or upper extremity injury.

Procedures

The related questionnaires are held in different handicraft factories after the related coordination with the owner of those factories permission in order to gather the related data. These questionnaires have been also distributed among the participated handicraft workers and then gathered completely. The necessary explanations have been completely achieved before distributing the questions because this makes all participants aware of the purposes and targets of the related questionnaires. Each participant was required to sign a consent form prior to filling out the survey packet, which was completed and immediately returned to the researcher, indicating that they understood the purpose of the study and their rights as a participant.

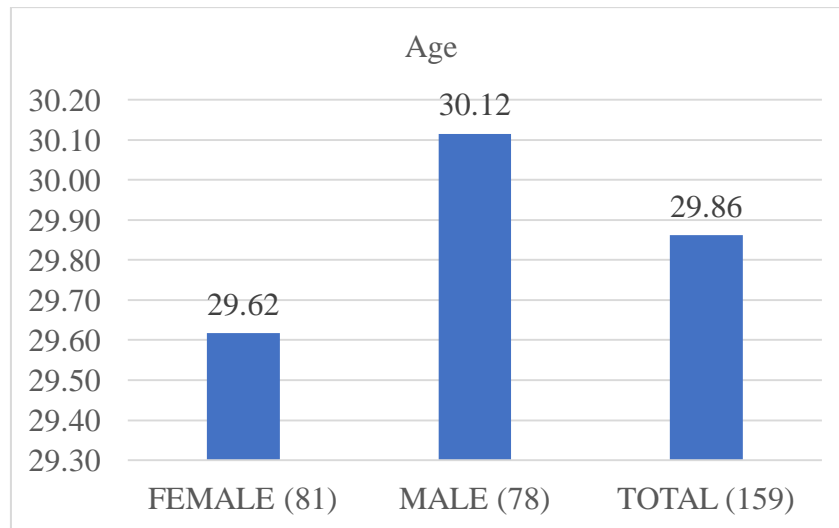
III. Results

It deals with the presentation of the result once the collected information was tabulated and was analyzed using appropriate analysis tools.

Descriptive data

159 samples (81 females and 78 males) were recruited for the study. Mean and standard deviation of age was given below (Table 1. and Graph 1.)

Sex	Age	
	Mean	Sd
Female (81)	29.62	7.55
Male (78)	30.12	9.08
Total (159)	29.86	8.31



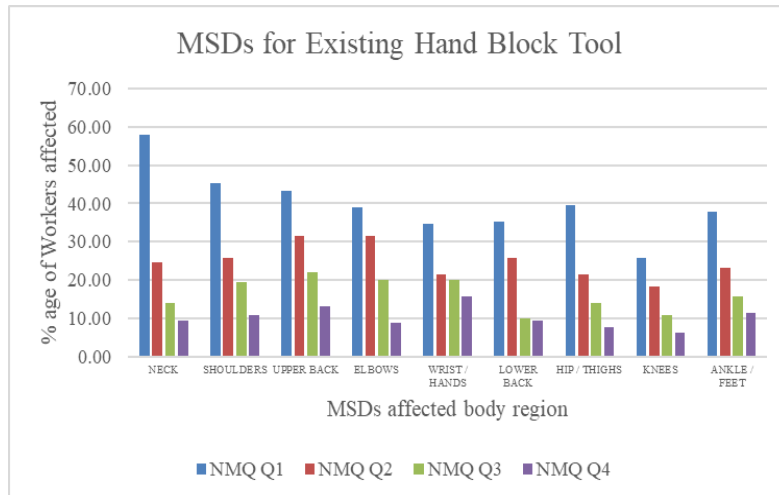
Graph 1 Descriptive Statistics for the Variables

Descriptive variable of the age, CQH score and RULA score of the handicraft workers shown that males and females have almost same scores in all the variables. It means that both males and females are equally affected by the postures which they maintain during their work.

MSDs for Existing Hand Block Tool

The musculoskeletal disorders in body region for existing hand block tool are presented in Table 2. The prevalence of musculoskeletal disorders among workers for existing tool was evaluated using modified musculoskeletal disorder questionnaire. Table 2 and Graph 2. show that there is significant reduction in MSDs pain with new hand block tool.

	Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness) in	During the last 12 months have you been prevented from carrying out normal activities (e.g., job, house work, hobbies, because of this trouble in	During the last 12 months have you seen a physician for this discomfort	During the last 7 days have you had trouble in
Neck	57.86	24.53	13.84	9.43
Shoulders	45.28	25.79	19.50	10.69
Upper Back	43.40	31.45	22.01	13.21
Elbows	38.99	31.45	20.13	8.81
Wrist / Hands	34.59	21.38	20.13	15.72
Lower Back	35.22	25.79	10.06	9.43
Hip / Thighs	39.62	21.38	13.84	7.55
Knees	25.79	18.24	10.69	6.29
Ankle / Feet	37.74	23.27	15.72	11.32



Graph 2. MSDs for existing hand block tool by NMQ

IV. Discussion

The Handicrafts Sector plays a significant & important role in the country's economy. It provides employment to a vast segment of craft persons in rural & semi urban areas and generates substantial foreign exchange for the country. The Handicraft sector has, however, suffered due to its being unorganized, with the additional constraints of lack of education, low capital, and poor exposure to new technologies, absence of market intelligence, and a poor institutional framework. The primary purpose of this study was to determine to investigate the prevalence of musculoskeletal disorders in workers and to analyse the handicraft worker's posture by using RULA technique. From the results of Comfort Questionnaire for Hand tools (CQH), it is observed from present study that working with existing available hand tool is not comfortable. All the handicraft workers either males or females are equally affected by the musculoskeletal disorders.

The results are summarized as:

- Both males and females are equally affected by the musculoskeletal disorders.
- The musculoskeletal disorders in body region for existing hand block tool shows that almost all the joints are affected, but shoulder was the most affected region.

Musculoskeletal Problems in Handicraft workers

In this study we found that the musculoskeletal problem associated with handicraft workers is very serious. Both males and females are equally affected by the musculoskeletal problems in handicraft workers. Major health disorders in the hand block textile printing industries arise from ergonomic risk factors, particularly awkward working postures. Therefore, the questionnaire design is based on modifying the SNQ to investigate the risk factors for work-related MSDs within the hand block textile printing industry by identifying the body regions which exhibit significant discomfort. In literatures, there was extensive evidence that WMSDs are significant burden in handicraft profession.

In India, the handicraft industry is the second highest employment providing industry which includes more than 7.6 million working people of the country after agriculture Working Group (India, 2011). While craft is a major source of employment in India, in countries other than India, it is practiced more as a leisure activity than as a profession and there have been no rigorous ergonomic studies (Mukhopadhyay P., 2010) Reporting responses to standardized questions is an efficient way to assess health problems, and therefore, a carefully constructed set of survey questions can greatly assist the research efforts.

In the current study, we used different validated tools for evaluating prevalence of WMSDs in different body regions among the handicraft workers. We have used Nordic musculoskeletal questionnaire (NMQ) to assess the musculoskeletal disorders because it is the mostly used musculoskeletal problems evaluation tool in the research groups. NMQ was designed to function as a sensitive, rapid screening tool for analysing musculoskeletal symptoms in different body regions in the context of occupational health and ergonomics (Kuorinka I. et.al. 1987). Several researches recommended NMQ as a self-reported musculoskeletal disorders measurement tool of high utility and substantial reliability (Dickinson CE, et.al.1992). However, self-reporting of workers' perceived discomfort may lead to an argument of bias, but self-reported health condition is considered a good indicator of health status (Kaplan RM et.al. 1997). Physical examination and assessment can help to get more accurate results, but the methods are expensive and time consuming, and therefore less used in literature (Salve UR. 2015).

Recommendations and suggestions

- In light of literatures on handicraft industries presented above, following recommendations are advised to enhance worker-workplace productivity. These are:
- There should be improvement in safety aspects at every stage of working procedure so as to ensure worker-safety and avoidance of any kind of accidents.
- Regular training programs of workers would result in its learning and improvement of productivity.
- Awareness should be created among the workers about the loss to the industry and to themselves as a result of worker absenteeism.
- Providing adequate ergonomic resources and improving quality control of ergonomics issues. V. Hand tools should be modified.
- A job should not require workers to stay in awkward posture, such as bending, reaching, or hunching over for long duration of time.
- More recreational facilities and welfare measures should be provided by the industry to reduce work stress and to enhance the satisfaction of their working environment. Conducting some games for the workers once in a month or taking the workers for some entertainment trip will help in motivating and retaining the workers. This will also help in reducing the stress level of the workers.

Limitations and Future Scope

- Small sample size for the analysis is the limitation of this study. Generalizability of the results should be increased by carrying the study on large sample size from different parts of India.
- Real implementation of ergonomically designed workstation (i.e., working table and hand tools) is also needed to further explore empirical evidence affecting the worker's quality of work life and productivity of hand block textile printing industries.
- Due to lack of funds and infrastructure, many of the resources like EMG Force plate, and Biofeedback could not be used to make the results clearer and to see the effect of different postures on different group of muscles.

V. Conclusion

Handicraft sector is a part of the small-scale manufacturing industries. The handicraft sector being informal sector suffers with the constraints of lack of education, high manufacturing cost, absence of proper incentives and poor exposure to new technologies. Most of the workers in these industries are dissatisfied with the existing working environmental conditions. Absenteeism of workers at workplace may be due to working in polluted air, poor illumination, high intensity noise, working with bare bodies in front of the kilns and odour nuisance results in physical as well as mental disorders. Unscheduled absenteeism of workers causes hindrance to progress of an organization resulting in loss of productivity, increases costs of hiring additional staff and low morale among workers. Ergonomic intervention and ergonomic redesign of workstations to improve posture and working conditions would result in improving quality of work life for the workers of handicraft industries. No scientific research was found that systematically deals with the relationship between the workload and strain of handicraft workers. Therefore, a comprehensive research is required in this particular area. During the past decade, handcrafting tools and machines have technologically developed and affected the handcrafting methods. Hence, more research is required having warranted emphasis on the relationship between handcrafting tools, equipment, methods and their impact on workers' workability. This surely alleviate the problem like MSDs. Development and implementation of both micro/macro ergonomic strategies in handicraft sector, would reduce physical and psychosocial stresses that in turns improves productivity of workers in totality.

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