Effectiveness of Self-Care Training Module for Work-Related Musculoskeletal Disorders Among Handloom Weavers at Udaynarayanpur, West Bengal

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Abstract

This study attempted to describe the interpretation of self-care behaviors of handloom weavers having musculoskeletal disorders (MSD) and the influence of the training module, which ultimately enhances their self-care habits. Handloom weavers adopt uncomfortable postures, which lead to poor performance and MSD. As a result, both individuals and organizations suffer economic losses. MSDs are among the main workplace hazards for ergonomists. Many handloom weavers also work in risky occupations. Weavers worked in static positions with pressure on their legs, feet, hands, and wrists. Based on this factor, we explored MSD prevalence among handloom weavers. The Self-Care Habit Assessment Questionnaire includes general care, recognizing early signs of discomfort, and evaluating the effectiveness of workouts for work-related MSD. Researchers collected data through structured interviews with 50 handloom weavers who met the inclusion criteria. Participants in the study received a guidebook on treating work-related MSD with proper explanations. A post-knowledge examination was conducted for the same study participants fifteen days later using the same questionnaire. Researchers found that the mean score for general instructions improved from 1.76±0.32 in the pre-knowledge to 2.76±0.21 in post-knowledge, and the mean score for identifying pain and discomfort increased from 2.06±0.52 to 2.34±0.32. Besides, knowledge related to workout assessment improved from 2.02±0.36 in the pre-knowledge to 2.71±0.28 in the post-knowledge, with a statistically significant improvement of $p<0.5$. The written instructional guidelines with explanation enhanced better understanding and promoted self-care habits among handloom weavers performing workouts. Research shows that practicing Self-Care Training Modules for Work-Related MSD can reduce the risk of MSD among handloom weavers and attenuate physical and emotional discomfort.

Keywords: Musculoskeletal disorders, handloom weavers, instructional module, self-care habits, discomfort.

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Introduction

Handlooms from India have always attracted attention from people worldwide because of their exquisite craftsmanship. Handlooms are a cottage industry in India where traditional weaving methods still exist. Weaving is the oldest living craft globally (Roy, 2020). Workers in this sector work long hours, earn meager wages, lack job security and social security benefits, and live in unsatisfactory conditions. Weaving with a handloom requires several activities, including preparing yarn, winding it, denting it, and sitting in one position for the entire process (Awasthi et al., 2018). Handloom workers adopt uncomfortable postures during the weaving process, which is considered the most significant factor in their low working performance and prevalence of musculoskeletal disorders (MSD). Pedals and shuttles are operated using the lower and upper limbs, while the arms are raised above the body with repeated motions. (Nag et al., 2016).

As a result, weaving and other handloom activities become a high-risk occupation for developing MSD (Awasthi et al., 2018). A widespread health issue and a substantial cause of disability globally is MSD (Durlov, 2014). Disability-related economic losses affect the individual, the organization, and society (Kemmlert, 1994). MSD is one of the most significant issues faced by ergonomists in the workplace worldwide. (Vanwonterghem, 1996). Preventing work-related MSD has become a national concern in many countries (Spielholz et al., 2001; Waters, 2004). Handloom weavers also perform several occupations with risk factors.

Weavers usually worked in static positions with discomfort on the legs, feet, hands, and wrists. In WSD disorders, muscles, joints, nerves, tendons, or soft tissues of the body are often overused, resulting in pain and discomfort. The impact of WMSDs on workers' health and productivity makes them one of the most costly occupational disorders (WHO, 2003). MSDs contribute significantly to morbidity and are the leading cause of occupational injuries, illnesses, and disabilities in many countries. In 2000–2010, WHO declared the Bone and Joint Decade in response to the burden of MSDs worldwide (Siddiqui et al., 2021). Studies have concluded that neck, shoulder, back, and wrist injuries are the most commonly reported work-related MSDs (Choobineh et al., 2004). The prevalence of MSD among handloom workers has been shown in past studies, primarily associated with working conditions and aggravated by work-related stress. Several studies found that Indian weaving workers suffered significant work-related MSDs (Pandit et al., 2013). The economic loss due to such diseases affects the individual, organization, and company. Studies on MSDs in the handloom sector are scarce in the Indian context. The study looked at the prevalence of MSD among handloom weavers in Gaza Tantubay Samabay Society Limited, Udaynarayanpur Handloom Cluster, West Bengal, under the National Handloom Development Programme. Presently, the handloom cluster mainly produces hand-woven sarees, dhotis, and dress materials with support from the West Bengal Khadi &

Village Industries Board (WBKVIB), Kolkata. This research attempted to explain the understanding of handloom weavers with MSD self-care behaviors and the effect of the training module, which eventually improves their self-care habits.

Review of Literature

MSD account for one of the most common and costly occupational health problems (Erick and Smith, 2011). Work-related MSD is becoming a significant health concern for professionals as social production becomes highly mechanized (Shuai et al., 2014). The prevalence of occupational MSD correlates linearly with age and length of service (Cardoso et al., 2011). In many industrialized countries, work-related MSD is the second most prevalent occupational disease after occupational mental disorders. Different work characteristics, conditions, and working strengths can influence MSD (Walsh et al., 2005). MSD reduces the workplace's productivity through sick leave, absenteeism, and early retirement [16]. The muscles and joints are also adversely affected by prolonged work, extended standing or sitting, and repetitive overhead activities (Veerkumar, 2021). Musculoskeletal injuries can be prevented and controlled with health education and ergonomic training (Sundstrup et al., 2020). Santos et al. showed that directing a specific educational program toward the prevention of MSD affected functioning and quality of life more than general health education. The literature on the relationship between manufacturing workers and MSD dates ten years or more (Redivo and Olivier, 2021).

One of the oldest crafts in the world is weaving (Pandit et al., 2013). The handloom industry is an established cottage industry in India, where traditional weaving methods are still widely used. Cottage industries account for the majority of the workforce in the informal sector. In handloom weaving, workers adopt awkward postures that hinder productivity and contribute to MSDs. Globally; MSDs cause significant disability and are an essential health concern. Individuals, organizations, and society suffer economic losses due to these disorders (Kemmlert, 1994). Ergonomists encounter MSDs in the workplace around the world regularly (Vanwonterghem, 1996). It has become a national priority in many countries to prevent work-related MSDs (Spielholz et al., 2001). In Udaynarayanpur, West Bengal, workers were also engaged in risk-related occupations. Their work requires them to maintain static and awkward postures and to apply pressure to their wrists and hands. Weavers of handlooms still have a lack of information regarding MSD prevalence. Our study examined the prevalence of MSD and postural discomfort in various body regions among handloom weavers from Udaynarayanpur. This study will present evidence-based intervention strategies for handloom weavers to reduce these potentially career-ending injuries.

Research Gap

Work-related complaints about MSD are common. They reduce the productivity and income of many handloom weavers throughout India. Dealing with MSD allows for higher productivity and better quality of life. Physiotherapy sessions with specialists are one of the most common methods of treatment. Despite extensive research on the implications of MSD and the need to address them, there is not much research on how weavers experience MSD. The healthcare sector has extensive literature about MSD, but the handloom sector has little data, and there have been no similar studies. While few published works in this area, there is a research gap and the need for an integrated approach to MSD prevention. Weavers in this study may be able to fill a knowledge gap by providing documented evidence of the prevalence

of MSD and advocating preventative measures to reduce its impact.

Research Objectives

After an intervention, the study examined handloom weavers' knowledge of work-related MSD treatment and care. Select demographic variables correlate with knowledge of handloom weavers on work-related MSD. This study aimed to assess the existing ability among handloom weavers in the care of work-related MSD. Assess the handloom weavers' understanding of the care of work-related MSD after an intervention. Analyze the relationships between selected demographic factors and knowledge of handloom weavers regarding work-related MSD.

Research Methodology

Study design and sample size

The research design selected for this experimental study is the analysis of pre and post-knowledge of a group of handloom weavers. A non-probability-purposive sampling technique was employed. The study assessed the prevalence of work-related MSD among 50 willing participants practicing handloom weaving. The study measures the pre and post-intervention instructional guidelines regarding self-care habits of work-related MSD.

Data collection

The current study understands the impact of socio-demographic variables on the effectiveness of instructional guidelines on self-care habits of work-related MSD among handloom weavers in the cluster. Socio-demographic variables include age, gender, educational status, job, underlying work-related MSD, duration of MSD, number of workout sessions, duration of workout sessions, history of previous MSD, and treatment with heat therapy in the recent six months.

Self-Care Habit Assessment Questionnaire with 20 items about self-care habits has been developed, including work-related MSD general care, recognizing early signs of discomfort, and evaluating the effectiveness of workouts. We collected data by interviewing 50 handloom weavers who met the inclusion criteria. Participants in the study were given an instructional guideline on caring for work-related MSD with thorough explanations. Instructional procedures include meaning, purpose, complications, and management related to working-related MSD. After fifteen days, a post-knowledge was conducted using the same questionnaire for the same study participants. Using Cronbach's Alpha, the instrument was reliable, as shown by the value of 0.71.

Analysis and Discussion

The researchers analyzed the data collected from willing participants. The sample used for data collection was examined for demographics before testing various hypotheses. This analysis proved that the collected data were from the actual respondents. The descriptive statistics show the levels of MSD variables. In this context, a study was conducted to evaluate the efficacy of general instruction on the self-care of MSD. The proposed hypotheses were:

H1: A significant difference exists between the mean score pre and post-knowledge intervention regarding self-care habits of work-related MSD among handloom weavers.

H2: A significant association exists between the pre-knowledge of self-care habits of work-related MSD among handloom weavers and their selected demographic variables.

Characteristics of the study participants

Table 1 reveals that the study sample's ages are mainly above 31 years old. Regarding the gender of the respondents, it shows that most of them are male (80%) while 20% are female. Most of the handloom weavers in the sample are in a secondary school of education and are engaged in full-time work. Nearly 54% of them have no diseases. Only 84% of handloom weavers have workout sessions once a day and 50% have experienced pain/discomfort for the last 1-2 years.

Table 1: Participant characteristics of the sample (N=50)

Variable	Categories	n	(%)
Age	(20-30)	13	26
	(31-50)	18	36
	51 and above	19	38
Gender	Female	10	20
	Male	40	80
Educational status	Secondary school	34	68
	High school	6	12
	University	10	20
Job	Full time	39	78
	Part-time	11	22
Underlying diseases	Diabetes	10	20
	Hypertension	11	22
	Multi disease	2	4
	No Disease	27	54
Duration of pain/discomfort	0-1 year	17	34
	1-2 years	25	50
	Over two years	8	16
Number of workout sessions	Once a day	42	84
	Twice a day.	8	16
Duration of workout sessions	15 minutes	24	48
	30 minutes	22	44
	Over 30 minutes	4	8
History of previous pain/discomfort	Yes	24	48
	No	26	52
Treated with heat therapy in recent six months	Yes	26	52
	No	24	48

Table 2 shows a comparison conducted using a paired sample T-test with a significance level of 0.05. To study the effectiveness of Self-Care Management Guidelines on general instructions, identifying pain and discomfort, and benefits of workouts. The p-value shows a significant difference in the mean values before and after applying knowledge. The tabulated t-value for 70 degrees of freedom is 1.96, and the calculated value is more significant than it.

The calculated values are much higher than the tabulated value. This level of significance is statistically acceptable. There is a substantial difference, and the mean post-knowledge of handloom weavers on the benefits of workouts is higher than the mean before conducting the Self-Care Training Module for work-related MSD. The study shows that respondent scores increased after being aware of such knowledge.

Table 2: Testing the hypothesis: Effectiveness of instructional guidelines (N=50)

Self-Care Management Guidelines	Pre knowledge		Post-knowledge		t- value	P-value
	M	SD	M	SD		
General Instruction	1.76	0.32	2.76	0.21		
Identifying pain and discomfort	2.06	0.52	2.34	0.32	4.2	0.00
Benefits of workouts	2.02	0.36	2.71	0.28	13.0	0.00
Overall	1.95	0.23	2.60	0.15	22.4	0.00

T (70, 0.025) = 1.96

We aim to find an association between selected demographic variables and knowledge of handloom weavers on the benefits of workouts (H2). Analysis of variance (ANOVA) and an independent t-test in SPSS 22 find the correlation between pre-knowledge and demographic variables such as age, gender, education, job, underlying diseases, activity duration, workout frequency, and previous MSD history of six months. The analysis outcome in Table 3 reveals no association between pre-knowledge and demographic variables such as age, duration of workouts, and history of previous MSD. It explains that the p-value is greater than 0.05, implying no significant difference between the pre-knowledge and demographic variables. Other demographic variables that have an association with pre-knowledge are:

- Gender: The average male response is higher than the average female response.
- Educational status: High school weavers are more likely to respond to other academic levels.
- Underlying diseases: The weavers with other multi-diseases have a higher average than others.
- Duration of pain/discomfort: The weavers having pain/discomfort for 1-2 years have a higher average.
- The number of workout sessions: Weavers who work out once a day have a higher average than those who work out twice a day.
- Duration of workouts: The weavers who practice exercises for over 30 minutes have a higher response average than others.
- Treated with heat therapy in recent six months:

Weavers not treated with heat therapy in recent six months have a higher average response than others who received the treatment.

The study findings showed that most participants were over 31 years and were male. Recording secondary school education, 68%, and 78% perform a full-time job. Most participants (54%) have no diseases, and only 16% have had pain and discomfort for over two years. The average number of workout sessions per day was 84%.

Table 3: Association between pre-knowledge of handloom weavers on the care of MSD and demographic variables (N=50)

Variable	Categories	N	M	SD	t/F- value	P-value
Age	(20-30)	13	1.9	0.28	0.3	0.7
	(31-50)	18	1.9	0.21		
	51 and above	19	1.9	0.22		
Gender	Female	10	1.7	0.15	6.8	0
	Male	40	2	0.2		
Educational status	Secondary school	34	1.9	0.19	8.9	0
	High school	6	2.1	0.18		
	University	10	1.8	0.26		
Job	Full time	39	1.9	0.2	1.9	0
	Part-time	11	1.8	0.3		
Underlying diseases	Diabetes	10	2.1	0.17	10.1	0
	Hypertension	11	1.8	0.2		
	Multi disease	2	2.3	0		
	No Disease	27	1.8	0.21		
Duration of pain/discomfort	0-1 year	17	1.9	0.21	2.5	0
	1-2 years	25	1.9	0.24		
	Over two years	8	2	0.22		
Number of workout sessions	Once a day	42	1.9	0.23	2.4	0
	Twice a day.	8	2	0.18		
Duration of workout sessions	15 minutes	24	1.8	0.22	3.5	0
	30 minutes	22	1.9	0.22		
	Over 30 minutes	4	2.1	0.24		
History of previous pain/discomfort	Yes	24	1.8	0.15	1.7	0
	No	26	1.9	0.28		
Treated with heat therapy in recent six months	Yes	26	1.8	0.2	2.5	0.01

Around half of the respondents (48%) had a history of previous pain and discomfort and most respondents (52%) got relief from heat therapy within six months. One of the oldest, easiest, and safest complementary therapy ways is to dip in hot water or add a warm compress. Studies have shown that heat treatments can relax stiff joints and ease achy muscles. People should be self-reliant and responsible for their self-care. The deficiency of cognitive information related to their health makes an individual deficient and unable to think and carry out specific actions. Thus, a person neglects and does not follow the recommendations to preserve and care for MSD. Illiterate people are less likely to comply with self-care. Participants with a higher level of education will better define their self-care needs (Kovačević et al., 20018). Besides, the sick person affects their autonomy. Lack of knowledge will lead to a lack of self-care and decreased participation in their care. The theoretical self-care model of Dorothea Orem (Orem, 1985) also suggests that self-care requires behavioral regulation consistent with how people behave to regulate their functioning, growth, and self-maintenance (Basavanthappa, 2009; David, 2005).

The present study findings showed a positive effect of general instructional guidelines on self-care with MSD related to freehand exercises with muscle strengthening and stretching and anti-inflammatory medications in or around the painful sites among the weavers. There is a significant increase in the mean score from 1.76*0.32 in pre-knowledge to 2.76*0.21 in post-knowledge, with p-value * = 0.05 showing statistical significance. This finding confirms H1. The weavers need to know about the aching, fatigue, weakness, and reduced capacity for repetitive work related to MSD and the remedial measures.

So weavers with MSD must be informed about inspecting their pain site. There was a statistically significant difference between the pre-and post-knowledge regarding MSD signs and symptoms, 2.06*0.52 versus 2.34*0.32, respectively. It implied that instructional guidelines with teaching enabled the study participants to learn MSD signs and symptoms.

Benefits of workouts were shown by an increase in the mean score of MSD assessment-related information from 2.02±0.36 in pre-knowledge to 2.71±0.28 in post-knowledge, with an improvement in the statistical significance $p < 0.05$. Individual subjects were informed about the need and methods for MSD assessment.

This result shows the weavers' unawareness of the caring process of pain sites and the necessity for education. It also reveals the association between the quality of self-care, underlying pain and discomfort, workout sessions and their duration, medical treatment schedules, and care to be taken during such treatment. Therefore, many studies have recommended that professionals working in handloom clusters disseminate information on the essential aspects of MSD care and encourage weavers to take care of their health.

Research Findings

The study sample is mostly older than 31 years old. Regarding gender, 80% of the respondents are male, 20% are female, and most cross secondary schools and work full-time. More than 54% have no diseases. Weavers rarely exercise on handlooms; only 84% have done so in the last two years, and 50% have suffered from pain.

Researchers found that general instructional guidelines on self-care with MSD related to freehand exercises with muscle strengthening and stretching and anti-inflammatory medications in or around painful sites resulted in positive outcomes. The weavers need to understand how MSD leads to aching, fatigue, weakness, and a decreased capacity for repetitive work.
Researchers found that weavers were unaware of

the caring process for pain sites and the need for education. This study also reveals the relationship between self-care quality, underlying pain and discomfort, workout sessions and their duration, medical treatment schedules, and tips on taking care of oneself while undergoing treatment.

Conclusion

KVIB should conduct awareness sessions/teaching programs. The instructional guidelines, with clarification given, were successful. Handloom weavers with MSD performing workouts should be encouraged to attend the awareness sessions/teaching programs since these programs would be highly successful in increasing their knowledge and improving self-care habits. Physiotherapy experts must take responsibility for planning teaching activities to deal with MSD among handloom weavers. The emphasis should be on conducting discussions and workshops in the handloom cluster region to increase the awareness of experts and handloom weavers on self-care activities. Conducting longitudinal research on many participants can determine the success of the awareness campaign.

Recommendations

It is common for handloom weavers to adopt uncomfortable postures, which can cause poor performance and MSD. Study findings explored how handloom weavers with MSD perceive their self-care behavior and how training influences their self-care behaviors. The study can design a preventive intervention program that reduces the occurrence of MSD symptoms among weavers.

Limitations

The research was based entirely on a questionnaire survey, which provided the data. The problem of standard method variance is therefore possible. Using questionnaires relying on symptoms can overestimate MSD problems. Therefore, symptoms alone may be an unstable indicator of MSD in a working population (Gerr et al., 1996). A medical exam is necessary to confirm a clinical diagnosis.

Scope for Future Research

A generalized model can estimate MSD prevalence among weavers in the handloom sector. The survey can be completed by different weaving communities in India, allowing the results to be analyzed to determine the prevalence of MSD in the industry. Individual factors, such as sleep hours and leisure time, can influence the prevalence of MSD. We can also investigate the effects of weaving on health. Research combining experimental and observational (field) methods could improve the understanding of MSD symptoms in weavers. Using visual analog scales can apply to experiments. An electromyogram can predetermine musculoskeletal symptoms in various parts of the body. A standardized clinical examination can also study MSD in weavers in the future.

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