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AN ERGONOMICAL SURVEY OF HEALTH ISSUES FACED BY THE HANDLOOM WEAVERS IN CHINNALAPATTI REGION, DINDIGUL DIST

TAMIL NADU, INDIA

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Abstract: The handloom industry in India is a rural based cottage industry. It has become very popular because of the availability of different designs of fabric mainly done by manually. It plays an essential role in the economic development of the rural areas. It produces more employment opportunities to the rural poor at the same time it cause many health issues and pain to the weavers. For this, the data has been collected from 100 respondents through questionnaire. The data has been analyzed using simple bar diagram on the basis of Age, Gender, Marital status, Educational qualification, Family members. Family type, Monthly Income, Type of Occupation, Experience in Weaving, Working Hours, Resting Time, Physical Health issues. This study is mainly focused on health problems faced by weavers and give suggestion.

Index Terms - Ergonomics, Physical Health Issues, Handloom Weavers, Chinnalapatti Region, Suggestion and Solution

I. INTRODUCTION

Handloom is an important cottage industry, in developing nations where traditional weaving techniques are still widely used, such as China, Iran, Bangladesh, India, and Pakistan. In South Asia, the great majority of workers are employed in the unorganized sector, which includes cottage enterprises. These sectors provide a significant number of jobs, particularly for women. 4.60 million Handlooms are found worldwide, with over 3.9 million of those being in India. Weaving is acknowledged to be one of the oldest surviving crafts in the world. (Sangeeta Pandit,2013). Sari, Dhoti and angavasthram are finished exposed of silk yarn and cotton yarn. In the modern past, home furnishing items are also woven, mainly for export purposes. (R. Subramaniya Bharathy, 2017). The most often used handloom tool, sometimes called a lock, is a rectangular wooden loom with a handle attached, which is an essential component of the loom. (R. Subramaniya Bharathy, 2017). On a casual observation, weaving appears to be a very simple process but in reality it involves diligent processes and stages, involving a number of ergonomic risk factors. Weaving involves several steps, but for the purposes of this study, only the weaving activity has been considered because it is the main task component. Using handloom tools may require a significant amount of hand force, and eye, hand, neck, back, leg, head, stomach, nose noise, sitting, and routine work involving awkward postures have been identified as risk factors for problems.

1.1 WEAVING

Weaving is a process of interlacing two distinct sets of yarns at right angles to each other to form a fabric or cloth. The lengthwise yarns are called the warp yarn and the width wise yarns are called the weft yarn.

1.1.1 Basic Weaving Operation

The machine used for weaving fabrics is a loom. Before weaving yarns intended for warp must pass through such operations as spooling, warping and slashing to prepare them to with stand the strain of weaving process. These processes do not improve quality of yarns.

1.1.2 Basic Loom Operations in Weaving (Handloom)

- **Shedding**
  It is raising and lowering of warp yarns by the harnesses to make an opening for the weft yarns to pass through.
- **Picking**
  It is the actual process of placing the weft yarns in the shed. This is done using a device known as ‘ shuttle’.
- **Beating**
  Sometimes called beating in or beating up, consists of evenly packing the filling yarns into position in the fabric. It gives a compact construction to the fabric.
- **Taking up and letting off**

It involves taking up the newly manufactured fabric onto the cloth beam and letting off or releasing yarn from the warp beam.

1.2 Ergonomic Hazards

Weavers are exposing themselves to ergonomic dangers and health issues during yarn extraction, yarn pre-preparation, warp yarn preparation due to their posture deviation, including lengthy periods of standing leads to headaches, noise problems, eye strain, stretching, numbness in the fingers, and pains in the shoulder, neck, calf, back, butt, and foot. During the dyeing process, the workers are subjected to heat exposure, headache, and odor, numbness in the fingers and toes

1.3 Objectives of the Study

- To analyze the Physical problems faced by the handloom weavers of Chinnalapatti region.
- To suggest the solutions and recommendation for physical problems faced by the handloom weavers of Chinnalapatti region.

II. RESEARCH METHODOLOGY

2.1 Primary Date

The main source of the data was collected from the handloom weavers through proper questionnaire.

2.2 Secondary Data

The Secondary data has been collected by using published research papers, books and website related to the area.

III. DATA ANALYSIS AND INTERPRETATION

The health issues faced by the handloom weavers were presented in this article. The data has been collected from 100 respondents through questionnaire. The data has been analyzed by using simple bar diagram on the basis of Age, Gender, Marital status, Educational qualification, Family members. Family type, Monthly Income, Type of Occupation, Experience in Weaving, Working Hours, Resting Time, Physical Health issues.

Table 3.1 Gender wise distribution of respondents

Gender wise	Frequency	Percent	Cumulative percent
Male	46	46	46
Female	54	54	100
Total	100	100	-

The above table shows the Gender wise distribution of respondents. 46 % of the respondents were male and 54 % of the respondents were comes under female category.

Table 3.2 Marital status wise distribution of respondents

Gender wise	Frequency	Percent	Cumulative percent
Married	100	100	100
unmarried	-	-	-
Total	100	100	-

The above table shows the Marital status wise distribution of respondents. 100 % of the respondents were married.

Table 3.3 Educational qualification – wise distribution of the respondents

Educational qualification	Frequency	Percent	Cumulative percent
Primary	94	94	94
SSLC	6	6	100
HSC	-	-	-
Total	100	100	-

The above table shows the Educational qualification of the respondents. 94 % of the respondents had primary education. 6% of the respondents had SSLC education. No respondents had HSC education.

Table 3.4 Type of family- wise distribution of the respondents

Type of family	Frequency	Percent	Cumulative percent
Joint	24	24	24
Nuclear	76	76	100
Total	100	100	-

The above table shows the type of family. 24 % of the respondents belongs to joint family and remaining 76% of the respondents belongs to nuclear family.

Table 3.5 Type of occupation - wise distribution of the respondents

Type of occupation	Frequency	Percent	Cumulative percent
Hereditary	100	100	100
Non hereditary	-	-	-
Total	100	100	-

The above table shows the type of occupation - wise distribution of the respondents. 100 % of the respondents acquired the profession through hereditary.

Table 3.6 Monthly income- wise distribution of the respondents

Monthly income	Frequency	Percent	Cumulative percent
Below 5000	28	28	28
5000-10000	58	58	86
Above 10000	14	14	100
Total	100	100	-

The above table shows the - wise distribution of the respondents. 28 % of the respondents are earning below 5000 rupees per month and 58 % of the respondents are earning 5000-10000 rupees per month remaining 14% of the respondents are earning above 10000 rupees per month.

Table 3.7 Experience - wise distribution of the respondents

Experience in weaving	Frequency	Percent	Cumulative percent
1-5 years	-	-	-
5-10 years	-	-	-
10-15 years	-	-	-
More than 15 years	100	100	100
Total	100	100	-

The above table shows the experience- wise distribution of the respondents. 100 % of the respondents had more than 15 years of experience in weaving.

Table 3.8 Working hours - wise distribution of the respondents

Working hours	Frequency	Percent	Cumulative percent
1-5 hours	16	16	16
5-10 hours	58	58	74
10-15 hours	26	26	100
Total	100	100	-

The above table shows the working hour- wise distribution of the respondents. 16 % of the respondents were working 1-5 hours, and 58% of the respondents were working for 5-10 hours and remaining 26% of the respondents were working 10-15 hours.

Table 3.9 Resting hours - wise distribution of the respondents

Resting hours during working	Frequency	Percent	Cumulative percent
1 hour	26	26	26
1-2 hours	58	58	84
More than 2 hours	16	16	100
Total	100	100	-

The above table shows the resting hour during work - wise distribution of the respondents. 26% of the respondents had 1 hour rest during weaving, and 58% of the respondents had 1-2 hours of resting period and remaining 16% of the respondents had more than 2 hours of rest during work.

Table 3.10 Physical health- wise distribution of the respondents

Physical health	Frequency		Percent		Cumulative percent	
	Yes	No	Yes	No	Yes	No
Respiratory	6	94	6	94	6	94
Cardiovascular	16	84	16	84	16	84
Digestive	6	94	6	94	6	94
ENT	22	78	22	78	22	78
Eye problem	32	68	32	68	32	68

Piles	20	80	20	80	20	80
Skin disease	-	-	-	-	-	-
Muscle cramp	22	44	22	44	22	44

The above table shows the health wise distribution of the respondents. The maximum health complaints respiratory, cardiovascular, digestive, ENT, eye problem, piles, muscle cramp were significantly high among the handloom weavers.

Table 3.11 Pain in body parts- wise distribution of the respondents

Pain in the body	Frequency		Percent		Cumulative percent	
	Yes	No	Yes	No	Yes	No
Neck	96	4	96	4	96	4
Shoulder	98	2	98	2	98	2
Back pain	96	4	96	4	96	4
Leg pain	98	2	98	2	98	2
Wrist pain	98	2	98	2	98	2

The above table shows the pain in body parts- wise distribution of the respondents. . The maximum health complaints (neck, shoulder, back pain, leg pain, wrist pain) were significantly high among the handloom weavers.

IV. FINDINGS

4.1Personal Information

- 54% of the respondents were female workers.
- 100% of the respondents were married person.
- 94% of the respondents had primary education.
- 76% of the respondents belong to nuclear family.
- 100 % of the respondents acquired the profession through hereditary.
- 58 % of the respondents are earning 5000-10000 rupees per month.
- 100% of the respondents have more than 15 years of experience.
- 58% of the respondents work around 5-10 hours.
- 58% of the respondents had 1-2 hours of resting period.

4.2 Physical health problems:

- Respiratory Problems: Weavers may inhale dust, fibers, and other particles, leading to respiratory problems, such as asthma and bronchitis.
- Hearing Loss: Weavers may be exposed to loud noises from looms and other machinery, leading to hearing loss and tinnitus.
- Eye Strain and Vision Problems: Prolonged focus on intricate patterns and threads can cause eye strain, blurred vision, and other vision problems.
- Musculoskeletal Disorders (MSDs): Weavers often work in awkward positions, leading to MSDs, such as back pain, neck pain, and carpal tunnel syndrome.

4.3 Pain in the body:

- Neck pain: Weavers often have to look down or crane their necks to focus on their work, causing neck strain.
- Shoulder pain: Lifting and moving heavy looms or yarns can put pressure on the shoulders, leading to pain and discomfort.
- Back pain: Long hours of sitting and bending while weaving can lead to back strain and pain
- Leg and foot pain: Sitting for long periods can lead to poor circulation, causing pain and swelling in the legs and feet.

- Hand and finger pain: Repetitive movements and strain on the hands and fingers can cause pain, numbness, and tingling sensations.

V. SOLUTIONS AND RECOMMENDATIONS

- Ergonomic adjustments: Use a loom with adjustable height and angle to reduce strain on the neck, back, and shoulders. Provide a comfortable, cushioned seat with proper lumbar support to reduce back pain. Use a footrest to reduce strain on the legs and feet. Improve workspace design and equipment to reduce strain on the body.
- Regular breaks: Take regular breaks to stretch, move around, and rest the eyes. Get adequate sleep to help the body recover from the physical demands of weaving. Drink plenty of water throughout the day to stay hydrated and reduce muscle cramping.
- Exercise and stretching: Regularly stretch the neck to reduce strain and pain. Roll the shoulders to loosen tight muscles and improve posture. Stretch the wrists to reduce strain and pain. Regularly stretch the legs to reduce strain and pain. Practice yoga or meditation to reduce stress and improve overall well-being. Engage in regular exercise and stretching to maintain flexibility and strength.
- Proper posture: Maintain good posture while working to reduce strain on the muscles and joints. Wear a back support or lumbar roll to reduce strain on the lower back. Wear wrist splints to reduce strain and pain in the wrists. Stand on anti-fatigue mats to reduce strain and discomfort in the legs and feet.
- Health check-ups: Regular health check-ups can help identify and address health issues early on. Consult a healthcare professional for proper pain management and treatment.

VI. CONCLUSION

The handloom industry is gradually declining over the years and the handloom weavers are facing serious problems due to severe livelihood crisis. A results show that pain in the body parts and other health issues was the big problem of handloom weavers. The learning highlight the require for extra research concerning the postural strain of weavers and also suggests the implementation of yoga meditation and food taking plan into weaver workstations to the advice minimize the current working problems. Improving upon the weaver's work-posture could improve their quality of life.

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