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Velivelli Vijaya Lakshmi
Principal Scientist (FRM),
AICRP-H.Sc., Professor
Jayashankar Telangana State
Agricultural University,
Rajendranagar, Hyderabad,
Telangana, India

Jangeti Deepika
Senior research fellow, AICRP-
H.Sc., Professor Jayashankar
Telangana State Agricultural
University, Rajendranagar,
Hyderabad, Telangana, India

Machavarapu Milcah Paul
Research scholar, Dept of
Resource management and
consumer sciences, College of
Home science, Saifabad,
Hyderabad, Telangana, India

Correspondence

Velivelli Vijaya Lakshmi
Principal Scientist (FRM),
AICRP-H.Sc., Professor
Jayashankar Telangana State
Agricultural University,
Rajendranagar, Hyderabad,
Telangana, India

Impact of work station on health of handloom weavers in Nalgonda district

Velivelli Vijaya Lakshmi, Jangeti Deepika and Machavarapu Milcah Paul

Abstract

Weaving Ikat fabrics is the main occupation of the villagers for the past several generations in Koyalagudem village. Ikat weaving involves resist dyeing technique where yarn is dyed before weaving the fabric. It includes various operations like warping, weaving design on warp yarn, tying and drawing the warp yarn, weft making and final weaving. All these operations require sitting position with forward head posture by both male and female workers without any support to the back and for arm rest. An interview schedule was used to elicit information from 15 male and 15 female weavers who were selected by purposive sampling technique. Nearly 83.3 per cent felt that their work station did not permit them to have full range of movements while working. Eighty three per cent of the respondents reported the pain in the right and left buttocks and thighs. About one-fifth of the respondents had only 2-4 hrs of sleep when they were affected by pain.

Keywords: Weaving, Ikat, posture, low back pain, work station

Introduction

Weaving ikat fabrics is the main occupation of the villagers for the past several generations in Koyalagudem village. Ikat weaving involves resist dyeing technique where yarn is dyed before weaving the fabric. It includes various operations like warping, weaving design on warp yarn, tying and drawing the warp yarn, weft making and final weaving. All these operations require sitting position with forward head posture by both male and female workers without any support to the back and for arm rest.

Males participate in loom activity whereas female participate in winding the thread on charka. Since the majority of the weavers work for 6-8 hrs in poor postures, it leads to various health problems. This industry is set with obsolete technology, low productivity with occupational health problems. Few studies have been conducted in India on their socio economic status, problems of handloom sector etc. but very little research has been done on work station analysis and its impact on health. Hence the present study had been taken up to understand the impact of work station on low back pain of the weavers.

Materials and methods

Descriptive cum experimental research design was adopted. The sample comprised 15 male and 15 female weavers from Koyalagudem village, Choutuppal mandal, Nalgonda district of Telangana state. Purposive sampling technique was followed depending on the willingness of the sample to participate in the research study. Interview method was followed for collection of data from the weavers. Standardized checklists were used to elicit information about work station and low back pain experienced by the weavers.

Results and discussion

General information

All the respondents belonged to backward caste. About 73 per cent of the respondents belonged to small family which comprised of up to 4 members. Educational level was maximum up to high school with 43 per cent being illiterates. Weaving was the main occupation for 90 per cent of the respondents while others were working as wage earners in weaving enterprise. Ninety per cent of them were skilled workers

Table 1: General in formation (N=30)

S No	Variables	Frequency	Percentage (%)
1.	Age (in years)		
	a. 20-30	7	23.33
	b. 30-40	10	33.33
	c. 40-50	6	20.00
	d. Above 50	7	23.33
	Mean \pm SD	40.73 \pm 12.9	
2.	Gender		
	a. Male	15	50.00
	b. Female	15	50.00
3.	Variables		
	Frequency		
	Percentage (%)		
	Number of years since working in enterprise		
	a. 0-5	2	6.67
	b. 5-10	5	16.67
	c. 10-15	6	20.00
d. 15-20	5	16.67	
e. Above 20	12	40.00	
	Mean \pm SD	20.33 \pm 10.8	
4.	Nature of operation		
	a. Manufacturing	30	100.00
	b. Assembling		
	c. Processing		
	d. Job work		
	e. Repairing and		
	f. servicing		
g. Others			
5.	Labour wages/day		
	a. Below Rs. 200	21	70.00
	b. Rs. 200-300	4	13.33
	c. Rs. 300-400	3	10.00
	d. Rs. 400-500	2	6.67
6.	Working hours/day		
	a. 0-4 hrs.	1	3.33
	b. 4-6 hrs.	2	6.67
	c. 6-8 hrs.	21	70.00
	d. Above 8 hrs	6	20.00
	Mean \pm SD	7.90 \pm 1.3	

All female weavers were having normal weight as per BMI of obesity class 2 i.e. BMI was between 35 to 39.99. while majority of the male workers came under the category

Table 2: Work Station Checklist (N=30)

S No.	Work station checklist	Strongly Disagree (-2)	Disagree (-1)	Neutral (0)	Agree (+1)	Strongly Agree (+2)
		Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
1	Work space allow for the full range of movement	12 (40.0%)	13 (43.3%)	5 (16.7%)	--	--
2	Mechanical aids and equipments available	--	--	3 (10.0%)	12 (40.0%)	15(50.0%)
3	Height of the workstation adjustable/suitable	15 (50.0%)	5 (16.7%)	5 (16.7%)	4 (13.3%)	1 (3.3%)
4	Workstation is designed to reduce or eliminate Bending or twisting of the wrist	13 (43.3%)	4 (13.3%)	4 (13.3%)	7 (23.3%)	2 (6.7%)
5	Workstation is designed to reduce or eliminate Reaching above the shoulder	21 (70.0%)	4 (13.3%)	4 (13.3%)	--	1 (3.3%)
6	Workstation is designed to reduce or eliminate Static muscle loading	15 (50.0%)	4 (13.3%)	4 (13.3%)	5 (16.7%)	2 (6.7%)
7	Workstation is designed to reduce or eliminate Full extension of the arms	22 (73.3%)	5 (16.7%)	3 (10.0%)	--	--
8	Workstation is designed to reduce or eliminate Raised elbow	10 (33.3%)	4 (13.3%)	4 (13.3%)	10 (33.3%)	2 (6.7%)
9	Workstation is designed to reduce or eliminate Raised shoulder	18 (60.0%)	4 (13.3%)	4 (13.3%)	--	4 (13.3%)
10	Workers are able to change posture	9 (30.0%)	8 (26.7%)	4 (13.3%)	4 (13.3%)	5 (16.7%)
11	Work surface can be titled or angled	7 (23.3%)	5(16.7%)	4 (13.3%)	11 (36.7%)	3(10.0%)
12	Hands and arms are free from the sharp edges on work surfaces	5 (16.7%)	8(26.7%)	8 (26.7%)	8(26.7%)	1(3.3%)
13	Armrest is provided where needed	--	--	5 (16.7%)	14 (46.7%)	11 (36.7%)
14	Footrest is provided where needed	10 (33.3%)	5(16.7%)	7 (23.3%)	4 (13.3%)	4 (13.3%)
15	The floor surface flat or free of obstacles	19 (63.3%)	5 (16.7%)	4 (13.3%)	2 (6.7%)	--
16	Cushioned floor mats provided for employees required to stand for long periods	--	--	5 (16.7%)	16 (53.3%)	9 (30.0%)
17	Chairs or stools easily adjustable and suited to the task	--	1(3.3%)	5 (16.7%)	8 (26.7%)	16(53.3%)
18	All task elements visible from comfortable positions	--	5(16.7%)	5 (16.7%)	11 (36.7%)	9(30.0%)
19	Regular servicing /maintenance for mechanical aids, tools, and other equipment	16 (53.3%)	7(23.3%)	5 (16.7%)	1 (3.3%)	1(3.3%)
20	There is enough natural light to perform the task without stress	19 (63.3%)	5 (16.7%)	5 (16.7%)	1 (3.3%)	--
21	Availability of artificial light to ease the operations during day time	6 (20.0%)	2 (6.7%)	3 (10.0%)	9(30.0%)	10(33.3%)
22	The workplace temperature is comfortable	8 (26.7%)	8 (26.7%)	3 (10.0%)	4(13.3%)	7(23.3%)
23	Workplace is noise free	3 (10.0%)	5 (16.7%)	9(30.0%)	10 (33.3%)	3 (10.0%)



Fig 1: Weaving at loom



Fig 2: Winding the thread

Workstation analysis is done to understand the equipment or tools used by the worker, observe the lay out of the work station, stress and strain experienced by the worker due to the work station design which in turn has an impact on worker's health. A check list was prepared with 23 statements describing the work station lay out and existing environmental parameters. A rating scale was used where the worker was asked to respond for each statement and score was assigned as -2 for strongly disagree, -1 for disagree, 0 for neutral, +1 for agree and +2 for disagree with the work situation described. Analysis of work station revealed that nearly 83.3 per cent felt

that their work station did not permit them to have full range of movements while working. Major problems expressed with the work station were floor surface not flat or free of obstacles and there was not enough natural light to perform the task without stress (80%), workstation not suitable to reduce raised shoulder (73.3%), and height of the workstation either not adjustable/nor suitable (66.7%).

Low back pain assessment:

Low Back Pain Rating scale is an index scale which includes measurements of pain intensity, disability, and physical impairment.

Table 3: Low Back Pain Assessment (N=30)

S No	Statements	Response	Freq. (%)
1	In the past 2 weeks how many days did you suffer pain in the back or leg (s)?	None at all	6 (20.0%)
		Between 1 and 5 days	21 (70.0%)
		Between 6 and 10 days	1 (3.3%)
		For more than 10 days	2 (6.7%)
2	On the worst day during the past 2 weeks how many pain killers did you take?	None at all	14 (46.7%)
		Less than 4 tablets	16 (53.3%)
		Between 4 and 8 tablets	--
		Between 9 and 12 tablets	--
3	Is the pain made worse by any of the following?	More than 12 tablets	--
		Coughing	18 (60.0%)
		Sneezing	6 (20.0%)
		sitting	--
		Standing	2 (6.7%)
4	Do any of the following movements ease the pain?	Bending	4 (13.3%)
		walking	--
		Lying down	24 (80.0%)
		Sitting down	1 (3.3%)
5	In your right leg do you have any pain in the following areas	Standing	5 (16.7%)
		walking	--
		Pain in buttock	25 (83.3%)
		Pain in the thigh	25 (83.3%)
6	In your left leg do you have any pain in the following areas	Pain in the shin or calf	3 (10.0%)
		Pain in the foot or ankle	11 (36.7%)
		Pain in buttock	25 (83.3%)
		Pain in the thigh	24 (80.0%)
7	Do you have any loss of feeling in your legs?	Pain in the shin or calf	3 (10.0%)
		Pain in the foot or ankle	13 (43.3%)
		No	11 (36.7%)
		Yes just one leg	14 (46.7%)
8	In your right leg do you have any weakness or loss of power in the following areas	Yes both legs	5 (16.7%)
		Hip	2 (6.7%)
		Knee	3 (10.0%)
		Ankle	15 (50.0%)
9	In your left leg do you have any	foot	10 (33.3%)
		Hip	25 (83.3%)

	weakness or loss of power in the following areas	Knee	2 (6.7%)
		Ankle	3 (10.0%)
		foot	--
10	If you were to try and bend forward without bending your knees how far down to you think you could bend before the pain stopped you?	I could touch the floor.	6 (20.0%)
		I could touch my ankles with the tips of my fingers.	1 (3.3%)
		I could touch my mid thighs with the tips of my fingers.	16 (53.3%)
		I could not bend forward at all.	7 (23.3%)
11	On the worst night during the last week how badly was your sleep affected by the pain	Not affected at all.	5 (16.7%)
		I didn't lose any sleep but needed tablets.	9 (30.0%)
		It prevented me from sleeping	10 (33.3%)
		I only had 2-4 hours of sleep.	6 (20.0%)
		I had less than 2 hours of sleep.	--
12	On the worst day during the last 2 weeks did the pain interfere with your ability to sit down	I was able to sit in any chair as long as I liked	12 (40.0%)
		I could only sit in my favourite chair as long as I liked	6 (20.0%)
		Pain prevented me from sitting more than 1 hour	5 (16.7%)
		Pain prevented me from sitting more than 30 minutes	--
		Pain prevented me from sitting more than 15 minutes	1 (3.3%)
		Pain prevented me from sitting	6 (20.0%)
13	On the worst day during the last 2 weeks did the pain interfere with your ability to stand	I could stand as long as I wanted without extra pain.	9 (30.0%)
		I could stand as long as I wanted but it gave me extra pain	10 (33.3%)
		Pain prevented me from standing more than 1 hour	7 (23.3%)
		Pain prevented me from standing more than 30 minutes	3 (10.0%)
		Pain prevented me from standing more than 15 minutes	1 (3.3%)
		Pain prevented me from standing at all	--
14	On the worst day during the last 2 weeks did the pain interfere with your ability to walk	Pain did not prevent me walking any distance	16 (53.3%)
		Pain prevented me walking more than 1 hour	8 (26.7%)
		Pain prevented me from walking more than 30 minutes hour	4 (13.3%)
		Pain prevented me from walking more than 15 minutes	2 (6.7%)
		I can walk but less than 1/4	--
		I was unable to walk at all	--
15	In the last 2 weeks did the pain prevent you from carrying out your work/ housework and other daily activities	No not at all	12 (40.0%)
		I could continue with my work suffered	12 (40.0%)
		Yes for one day	6 (20.0%)
		Yes for 2-6 days	--
		Yes for 7 days or more	--
16	In the last 2 weeks for how many days have you had to stay? In bed because of the pain?	None at all	26 (86.7%)
		Between 1 and 5 days	4 (13.3%)
		Between 6 and 10 days	--
		For more than 10 days	--
17	In the last 2 weeks have your leisure activities been affected by your pain?	Not affected by the pain	7(23.3%)
		Mildly affected by the pain	4(13.3%)
		Moderately affected by the pain	17(56.7%)
		Severely affected by the pain	2(6.7%)

Table 4 indicated the intensity of pain in the lower back. Eighty three per cent of the respondents reported the pain in the right and left buttocks and thighs. About 70 per cent of them felt the pain in back or legs for 1-5 days in the previous 2 weeks. Pain in the right foot or ankle was reported by 36.7 per cent and pain in the left foot and ankle was reported by 43.3 per cent. Loss of feeling in one leg was experienced by 46.7 per cent of the respondents.

About 83 per cent felt weakness in the hip. Only 20 per cent reported that they could touch the floor without bending the knees. While majority (53.3%) said they could touch mid thighs with the tips of fingers. More or less an equal per cent (30-33%) of the respondents reported that either pain has prevented them from sleeping or just needed tablets but not lost the sleep. About one-fifth of the respondents had only 2-4 hrs of sleep when they were affected by pain. Nearly 17 per cent reported that pain prevented them from sitting for more than one hour and 20 per cent felt pain prevented them from sitting at all in the past two weeks.

Even standing posture was affected due to pain. Around one-third of the respondents expressed that the pain prevented them from standing for more than one hour. In 26.7 per cent of the cases, pain prevented them from walking for more than one hour. Forty per cent of the respondents' work suffered due to the pain in the last 2 weeks. However 86.7 per cent said that they didn't stay in bed because of pain, only 13.3 per cent had to stay in bed between one and five days. Majority (56.7%) of the respondent's leisure activities were moderately affected by the pain.

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Conclusion

There was an equal participation of men and women in weaving of ikat fabrics. Both male and female weavers are skilled workers and indulged in this activity for the past 15-40 years. Since work station did not permit them to have full

range of movements while working, majority of the weavers had bulges on neck and thumb; pains in back, legs, knee and neck. About one-fourth of the respondents experienced severe pain in their legs due to their working posture which prevented them walking for more than one hour. The study recommends the need to improve the work station design so that weaver's health can be improved. Interventions will be given in the next phase of project and improvement of health would be analysed.

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