

Ergonomic Assessment of Women Tailors in Dharwad City

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ABSTRACT

Tailoring industry is one of common small scale service sector where women, belonging to the low income groups are employed in large numbers. As per the Tailoring Workers Forum, the members include those who are working as tailors, embroidery workers and self employed tailors. The aim of this paper is to assess tailors work organization, work space, extent of bodily discomfort and ergonomic risk factors experienced by the women working in tailoring units. The data was collected from 30 women tailors by using self structured questionnaire. Data was analyzed by five point likert scale. The results revealed that fifty three per cent have work experience of less than 5 years, 66.7 per cent of them work 7-8 hours in a day, 60 percent of them work along with others. Half of the workers had sufficient space to work, 70 per cent were disagreed that they could maintain good posture at work. All the respondents have experienced pain in lower leg and foot at the end of the day followed by head, forearm, wrist and hand, palm and fingers (96.7 %), neck, shoulder, upper leg (93.33 %), knee (73.33 %) and lower back (63.33 %). Pain relieving techniques adopted by respondents mainly was application of pain relieving balm, absenteeism from work was also a means of pain relieving techniques.

Keywords: Tailor, Discomfort, Work space, Pain relieving technique

INTRODUCTION

Tailoring industry is one of common small scale service sector where women, belonging to the low income groups are employed in large numbers. As per the Tailoring Workers Forum, the members include those who are working as tailors, embroidery workers and self employed tailors. A vast majority of women working in textile and apparel industries serve as sewing machine operators. Although the sewing process could provide a

qualitative improvement and a flexible work style to the worker when it is treated as a whole, the individual in the workplace is limited by the simple and repetitive tasks. The activity at the sewing machine with its high motion sensitivity and difficult gripping positions requires advanced sensor motor skills and configuration knowledge based on the nature of the fabric fixed position constantly, because of the sight requirements

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at the machine, leads to a static burden that threatens the health of the worker. This process not only effects the physical health but also and the sewing steps. The physical burden in the sewing process is considerably high. Sitting in a leads to a permanent charge on the sense organs in psychological area, because it requires a constant control of vision and highly focused concentration. (Erensal, 1987) Because of working in a constant and iterative position, injuries occur in shoulder, neck, back, and lower extremities of sewing machine operators.

Holding the left upper arm up, bending the body and the head and ankle and knee at non-optimum angles causes these injuries or makes the situation more serious. Work related musculoskeletal disorders are one of the greatest occupational health concerns of these women today. In this context ergonomics play an important role in making the workplace as efficient, safe and comfortable as possible and at the same time enhance human performance. Effective application of ergonomics in work system design can achieve a balance between worker characteristics and task demands, enhancing worker productivity, provide worker safety, physical and mental well-being and job satisfaction.

The studies that have been done so far show that the physical burdens lead to problems at the left shoulder, the neck, the back and in the lower extremities of sewing machine operators. These problems either arise from or become more pronounced when lifting the left arm, bending the head and body forward, and by the less than optimum ankle and knee angles while working for extended periods in a seated position. At the traditional sewing machine workstation, the position of

the body is restricted by the sightlines required for the visual control of the task, by the hand motions required to orient the fabric, and by the foot motions required to control the speed of the machine. These restrictions related to body positions should be considered in quantitative proposals related to the configuration of workstations to improve the position of the body at work and decrease the number of complaints. (Delleman & Dul, 2002)

OBJECTIVES OF THE STUDY

1. To assess the socio-economic background of women working in tailoring units.
2. To assess their work organization and work space.
3. To assess the extent of bodily discomfort and ergonomic risk factors experienced by the women working in tailoring units.
4. To assess their work load perception and job demands.
5. To analyze their work posture and suggest recommendations.

MATERIALS AND METHODS

The subjects selected for the study included women tailors working in small scale tailoring units and self employed women tailors. The cross sectional study was carried out and thirty subjects were selected from Dharwad, Karnataka. The interview schedule was used to collect information regarding worker characteristics, work organization, environmental parameters, job demands and health problems. A body part discomfort map (Corlett & Bishop, 1976) was used to identify discomfort in the different body parts. Data analysis was done with the help of SPSS software.



Women involved in stitching activity



Women involved in measuring and drafting the cloth

RESULTS**Table 1: General information about women****N=30**

	Details	Frequency	Percentage
Age (Years)	20-30	10	33.4
	30-40	18	60
	40-50	2	6.6
Education	High school	10	33.4
	Higher secondary	12	40.0
	College	8	26.66
Income	5000-7500	26	86.6
	7500-10000	4	13.4

Women included in the study belonged to the ages between 20 and 50 years. Of these women, the 60 per cent were between the ages 30-40 years, the 33.4 per cent were between 20-30 years, 6.6 per cent were between 40-50

years. Data regarding the income earned by women through tailoring job in month revealed that 86.6 per cent respondents earn 5000-7500/- and 13.4/- per cent of them earn 7500-10000/- Rs per month.

Table 2: Assessment of work space and work organization**N=30**

Details		Number	Percentage
Years of Experience (Years)	<5	16	53.33
	5-10	14	46.66
	>10	0	0
Duration of Work	<7	5	16.7
	7-8 hours	20	66.7
	>8 hours	5	16.7
Working hours	9am-4 pm	0	0
	9.30 am -5.30 pm	2	6.7
	10 am-6 pm	17	56.7
	other	11	36.7
Specific break intervals	Yes	0	0
	No	30	100
Break of fixed duration	Yes	0	0
	No	30	100
Working Pattern	Alone	12	40
	With others	18	60

The assessment of work organization revealed that fifty three per cent have work experience of less than 5 years, 46.66 per cent had 5 to 10 years and none of them had above 10 years of experience. Hours of work are the time that an employee is at the disposal of the employer. Around 66.7 per cent of them work 7-8 hours

in a day and equal per cent (16.7 %) of them work less than 7 hours and more than 8 hours respectively. All the respondents said that they don't have specific break interval of fixed duration during work. Working pattern showed that 60 percent of them work along with others while 40 percent worked alone in their homes.

Table 3: Work Space Design**N=30**

Factors	Yes (%)	No (%)
Having sufficient space to work	15(50.00)	15(50.00)
Work space permit stable neutral posture	9(30.00)	21(70.00)
Work motorized	11(36.7)	19(63.3)
Seat height adjustable	1(3.3)	29(96.7)
Chair have back rest	11(36.7)	19(63.3)
Work surface appropriate for visual and manual requirements	21(70.00)	9(30.00)
Use of aids	11 (36.7)	19(63.3)

The assessment of work space of the respondent revealed that half of the workers had sufficient space to work other half of the respondents didn't have sufficient space to work, 70 per cent were disagreed that they could maintain good posture at work and 30 per cent maintain good neutral posture, When 63.3 per cent of the women used motorized machines for stitching, 36.7 per cent stitched manually. The seat which they used was not adjustable for 96.7 per cent of the respondents

only 3.33 per cent use adjustable seat height chair, 63.3 per cent didn't had back rest for their chair while 36.7 per cent have back rest. The work surface was sufficient for the work for 70 per cent of the women and 30 per cent have sufficient work surface. 63.3 per cent of them don't use any aids like foot rest, lumbar pads to support lower back and arm rest for their chair while working while 36.7 per use aids while working.

Table 4: Body part experiencing discomfort while working

N=30

Body Parts	Discomforts				
	ND	MD	MOD	SD	ED
Headache	-	13(43.33)	17(56.7)	-	-
Neck	-	12(40.00)	17(56.7)	1(3.33)	-
Should	-	11(36.70)	18(60.0)	1(3.33)	-
Elbow	1(3.33)	10(33.33)	18(60.0)	1(3.33)	-
Fore arm	1(3.33)	19(63.33)	10(33.33)	-	-
Wrist and Hands	-	26(86.7)	4(13.3)	-	-
Palm and fingers	-	25(83.33)	5(16.7)	-	-
Lower Back	-	2(6.7)	2(6.7)	23(76.7)	3(10.0)
Knee	-	-	8(26.7)	20(66.7)	2(6.7)
Upper leg	-	5(16.7)	17(56.7)	8(26.7)	-
Lower Leg	-	4(13.33)	18(60.0)	8(26.7)	-
Foot	-	10(33.33)	14(46.7)	6(20.0)	-
Heel	-	10(33.33)	15(50.0)	5(16.7)	-

Discomforts: ND-No Discomfort, MD - Mild Discomfort, MOD- Moderate Discomfort, SD- Severe Discomfort, ED- Extreme Discomfort.

Assessment of body discomfort showed that 10 per cent of them indicated that they had extreme discomfort in the lower back followed by knee (6.7 %). Severe discomfort in the lower back was mentioned by 76.7 per cent of the workers followed by knee (66.7 %), upper leg and lower leg (26.7 %), foot (20%), heel (16.7 %), neck, shoulder and elbow (1.33 %). Equal (60 %) per cent of the respondents mentioned moderate pain in their shoulder, elbow and lower leg respectively followed by head, neck and upper leg

(56.7%), heel (50%), foot (46.7 %) forearm (33.33 %), knee (26.7 %), palm and fingers (16.7%), wrist and hand (13.3 %), lower back (6.7 %). Mild pain was experienced by 86.7 per cent of the respondents on the wrist and hands followed by palm and fingers (83.33 %) forearm (63.33 %), head (56.7 %), neck (40.00 %), shoulder (36.70 %), elbow, foot and heel (33.33 %), upper leg (16.7 %), lower leg (13.33 %), lower back (6.7 %) only 3.33 per cent of had no discomfort in their body part.

Table 5: Periodicity of Body Discomfort and Pain Relieving Techniques**N=30**

Body Parts	Period				Pain Relieving Technique				
	I	II	III	IV	1	2	3	4	5
Headache	-	-	1(3.33)	29(96.7)	2(6.7)	28(93.33)	-	-	-
Neck	-	1(3.33)	1(3.33)	28(93.33)	1(3.3)	28(93.33)	1(3.33)	-	-
Shoulder	-	1(3.33)	1(3.33)	28(93.33)	6(20.0)	22(73.33)	2(6.7)	-	-
Elbow	-	1(3.33)	29(96.7)	-	1(3.33)	9(30.0)	19(63.33)	1(3.33)	-
Fore arm	-	-	1(3.33)	29(96.7)	1(3.33)	17(56.7)	11(36.7)	1(3.33)	-
Wrist and Hand	-	-	1(3.33)	29(96.7)	25(83.3)	5(16.7)	-	-	-
Palm and fingers	-	-	1(3.33)	29(96.7)	25(83.33)	4(13.33)	1(3.33)	-	-
Lower Back	-	2(6.7)	9(30.00)	19(63.33)	11(36.7)	-	18(60.00)	1(3.33)	-
Knee	-	1(3.33)	7(23.33)	22(73.33)	3(10.00)	12(40.00)	14(46.7)	1(3.33)	-
Upper leg	-	-	2(6.7)	28(93.3)	17(56.7)	7(23.33)	6(20.00)	-	-
Lower Leg	-	-	-	30(100.00)	19(63.33)	7(23.33)	4(13.33)	-	-
foot	-	-	-	30(100.00)	22(73.33)	6(20.00)	2(6.7)	-	-

Periodicity : I- Beginning of the day, II- Mid morning, III- Lunch time, IV- End of the day

Pain Relieving Technique : 1-Change posture, 2-Apply pain relieving balm, 3-Cessation from work, 4-Absenteeism, 5-Complete rest.

Periodicity of the body discomfort indicated that those who experienced pain expressed that they used to get pain by the lunch time of the day. At the beginning of the day none of them have felt pain in their body. It was noted that during mid morning 6.7 per cent have pain in lower back followed by neck, shoulder, elbow, knee (3.33 %). During lunch time 96.7 per cent have pain in elbow followed by lower back (30.00 %), knee (23.33 %), upper leg (6.7 %), head, neck, shoulder, forearm, wrist and hand, palm and fingers (3.33 %). All the respondents have experienced pain in lower leg and foot at the end of the day followed by head, forearm, wrist and hand, palm and fingers (96.7 %), neck, shoulder, upper leg (93.33 %), knee (73.33 %) and lower back (63.33 %). Pain relieving techniques adopted by respondents mainly was application of pain relieving balm, absenteeism from work was also a means of pain relieving techniques.

Suggestion for work seating

- All work activities should permit the worker to adopt several different, but

equally healthy and safe, postures without reducing capability to do the work Seat should provide stable bodily support.

- Seat should be adjustable and seat width should cope with largest user hip widths. Seat depth (length) should cope with the shortest use thigh length.
- Seat height should be adjustable height, as it will reduce back bending as it was the discomfort indicated by most of the women.
- Seat should have backrest and must provide support for the lower back. To reduce postural strain and low back pain which is likely to result in the long run without any back support
- Seat surfaces should be lightly padded covered with non-slip material and with a “waterfall” edge at the front. Suggestions for work modification
- Cervical pain and pain in the muscles in the upper limbs could be alleviated by intermittent rest periods, which need to be determined.
- As the pace of work, working arrangements and pauses are human tailored each worker must have an

understanding of her own work and learn new skills through interpersonal enrichment.

CONCLUSION

The study found that tailoring women were suffering from work related musculoskeletal problems, as evidenced by the occurrence of low back pain, perceived fatigue and occupational stress. Preventive measures need to be adopted to eliminate body discomfort and maintain good posture, thereby increase in productivity. It was observed that the study group was unaware of efficient, safe and comfortable work place design. Hence an effective application of ergonomics in work place design, seating arrangement and environment is essential to achieve a balance between worker characteristics and task demands. This can enhance worker productivity, provide worker safety, physical and mental well-being and job satisfaction.

REFERENCES

- Corlett, E. N., & Bishop, R. (1976). A technique for assessing postural discomfort Ergonomics, pg-2, 175-185.
- Delleman, N.J., & Dul, J. (2002). Sewing machine operation: Workstation adjustment, working posture, and workers' perceptions. *International Journal of Industrial Ergonomics*, 30, 341-353.
- Dwivedi, P., & Kiran, U.V. (2013). Job strain and health problems among tailors, *Int.J. Sci. and Res.*, 135-138
- Erensal, Y.C. (1987). The evaluation of the workplace of women employed in various branches belonging to the manufacturing industry from an ergonomic point of view. First National Ergonomic Congress, 23-24 Nov. 1987, Istanbul, Turkey (s.158-168).
- Gandhi, D., & Babel, S., (2013). A study on occupational stress of females working in boutiques of Udaipur. *Asian J. Home Sci.*, 8(2), 445-448.
- Gandotra, V., & Kanna, S. 2010. Problems of women entrepreneurs running boutiques in Punjab *Asian. J. Home Sci.* 5, 142-144
- Naik, D., Zend, J. P., & Revanwar, M. (2012). Assessment of musculo-skeletal problems of women entrepreneurs performing tailoring activity-drafting and cutting. *Asian J. Home Sci.*, 7(2), 461-463.
- Padmini, D. S., & Venmathi, A. (2012). Unsafe work environment in garment industries, Tirupur, India, *Journal of Environmental Research and Development* 7(1A), 569-575.
- Yu, C.Y., & Keyserling, W.M. (1989). Evaluation of a new work seat for industrial sewing operations. *Applied Ergonomics*, 20(1), 17-25.