

Postural analysis of the entrepreneurs while conducting tailoring activity drafting and cutting

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■ **ABSTRACT** : The gender participation in running the enterprise was studied and it revealed that about 80 per cent of women entrepreneurs were involved in the tailoring enterprise. The main objective of this study was to assess the postural analysis of women entrepreneurs while performing drafting and cutting activity in existing method as well as improved methods. The use of multipurpose tailoring stand developed by AICRP College of Home Science, M.A.U., Parbhani was considered as an improved method. This investigation consisted survey and experiment which was conducted in the respective locations of tailoring enterprises of thirty selected women entrepreneurs between the age range of 25-35 yrs. Women entrepreneurs responses regarding perceived postures and localized postural discomfort were recorded by using 7 and 5 point scale, respectively. Ergonomic evaluation was worked out to find out the effect of multipurpose tailoring stand. Postural analysis of tailoring and related activities showed that angle of deviation at cervical and lumbar region of women was reduced when work was performed with the help of tailoring stand while performing tailoring activity-drafting and cutting in improved method. Criticality index was reduced for the entire discomfort regions of the body. It has been concluded that there was highly significant reduction in postural problems when tailoring activity drafting and cutting was performed by improved method.

■ **KEY WORDS** : Postural analysis, Angle of deviation, Tailoring activity, Ergonomics

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Indian woman plays an important role in the unorganized sector. Her work often demands more time and energy resources. She performs the activities in her usual way adopting casual postures without realizing the cost of energy and other muscular efforts which ultimately result in muscular skeletal problems leading to drudgery. According to Saha (1999), the major health problems related to abnormal working posture are the 'problems of aches' of the muscular skeletal system. Researchers have proved that any work design or work environment that helps to perform the work with minimum energy and put minimum stress on cardio vascular system and muscular system is the best design of work (Varghese *et al.*, 1994). So working posture becomes an important factor while designing ergonomically sound tools and equipment. Similarly, Corlett *et al.* (1983) showed how the need to adopt poor working posture in order to perform task could lead to postural stress, fatigue and pain which may in turn force the

operator to stop work until the muscle recovers. Kroemer (1994) described the relationship between health complaints and musculo-skeletal injury as a mountain with a wide base of common occurrences of tiredness, fatigue and discomfort.

■ RESEARCH METHODS

The present study was carried out in Parbhani town of Marathwada region in Maharashtra state in the year 2011. Purposive random sampling was followed to select thirty subjects between age range 25-35 years who were involved in tailoring enterprise and performing drafting and cutting of the sari blouse. Questionnaire schedule was developed to note down the responses of the entrepreneurs. M.A.U. multipurpose tailoring stand developed by AICRP, Family Resource Management, College of Home Science was used as new technology. The activity of drafting and cutting of the

blouse was considered to know the difference between traditional and improved methods.

Determination of criticality index:

Perceived posture:

The entrepreneur was asked to rate their perception of the posture of the neck, back, left shoulder, right shoulder, left upper arm, right upper arm, left lower leg, right lower leg, left foot and right foot. This response was based on seven point scale (1=very favourable, 3=favourable, 5=unfavourable, 7=very unfavourable, scores of 2, 4 and 6 were indicated the intermediate responses). The operators were asked to rate as per the favourable or unfavourable conditions of the different postures of the human body (Balraj *et al.*, 2005).

Localized postural discomfort:

The entrepreneurs were asked to rate their postural discomfort of the neck, neck/ upper back, back, upper neck/ back, neck/ back, left shoulder/ neck, right shoulder/ neck, left leg, right leg and whole body. The responses were based on five point scale (0=No discomfort, 1=Some discomfort, 2=Minor discomfort, 3=Major discomfort, 4=Severe discomfort and 5=Very severe discomfort).

Criticality index was calculated by using the given formula:

$$\text{Criticality index} = \frac{\sum X_1 Y_1}{\sum X_1}$$

where, Y_1 =Perception of the entrepreneurs in specific category

X_1 =Weightage given to each point on scale (Balraj *et al.*, 2005)

RESEARCH FINDINGS AND DISCUSSION

Postural analysis was done of the entrepreneurs while conducting tailoring activity-drafting and cutting. Postural analysis of the entrepreneurs has been done by calculating the criticality index of perceived postures and localized postures. The angle of deviation of the entrepreneurs while performing the activity both in traditional and improved methods were recorded with the help of Goniometer.

Response rate of women entrepreneurs for perceived postures:

Traditional method:

As shown in Table 1, the criticality index of posture of back in traditional method was higher (5.35) as compared to other postures of the body parts. The lowest criticality index was for the posture of right lower leg (2.78). As per the data presented in this table, the critical perceived postures while performing drafting and cutting activity were posture of back (5.35), right shoulder (4.89), neck (4.46) and right upper arm

Table 1 : Response rate of women entrepreneurs for perceived postures

Parameters	Discomfort areas																			
	Posture of neck		Posture of back		Posture of left shoulder		Posture of right shoulder		Posture of left upper arm		Posture of right upper arm		Posture of left lower leg		Posture of right lower leg		Posture of left foot		Posture of right foot	
	T	I	T	I	T	I	T	I	T	I	T	I	T	I	T	I	T	I	T	I
Very favourable	-	20	-	18	-	21	-	17	-	2	-	2	-	22	-	22	-	21	-	20
Intermediate response b/w 1 and 3	-	6	-	11	-	6	-	12	-	18	-	25	-	8	-	10	-	8	-	10
Favourable	5	4	1	1	12	4	1	1	14	10	8	5	19	-	19	-	17	-	16	-
Intermediate response b/w 3 and 5	15	-	6	-	10	-	13	-	15	-	14	-	-	-	-	-	3	-	4	-
Unfavourable	10	-	15	-	2	-	12	-	1	-	5	-	-	-	-	-	-	-	-	-
Intermediate response b/w 5 and 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Very unfavourable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Criticality index	4.45	1.5	5.35	1.53	5.5	1.53	4.89	1.57	3.82	2.42	4.59	2.25	2.82	1.35	2.78	1.35	2.89	1.39	2.92	1.42

T= Traditional method
I= Improved method
b/w – between

(4.39). These findings are in line with the results obtained by Balraj *et al.* in the year 2005.

Improved method:

The criticality index of posture of back was highest (1.53) in case of improved method compared to other postures of body parts. The least criticality index of posture was noted for right lower leg (1.35).

Hence, the results revealed that, as the criticality index of perceived postures was higher in traditional method, response rate of perceived posture was unfavourable while carrying out the activity drafting and cutting. In improved method, criticality index of perceived postures were lower and accordingly favourable response rate was increased while carrying out the drafting and cutting activity.

Perception of women entrepreneurs about localized postural discomfort:

Traditional method:

As shown in Table 2, the criticality index was highest (6.46) in case of discomfort of whole body when activity of drafting and cutting was performed in traditional method. It was followed by discomfort of back (criticality index=5.86), neck (criticality index=5.66) and right shoulder (criticality index=4.93). It indicated that as the criticality index was highest in case of back, neck and right shoulder the need of technology to improve the posture and to reduce the pain of these body parts was necessary. The critical postures while performing drafting and cutting activity were posture at neck, back and right shoulder.

Improved method:

When the work of drafting and cutting was performed on M.A.U. tailoring stand, the criticality index was reduced in all the selected discomfort areas of body. The highest reduction of criticality index in case of neck/upper back (4.2) followed by whole body (3.46) and back (3) was observed.

It can be concluded from the data that feeling of discomfort was highest in case of critical postures *viz.*, at neck/upper back, back and right shoulder when work was performed in existing method. The decrease of critical index in improved method showed reduction in discomfort level experienced by women entrepreneurs.

Angle of deviation at the time of performing tailoring activity:

Drafting and cutting:

Table 3 indicates the angle of deviation of the women entrepreneurs while performing tailoring activity- drafting and cutting. The table revealed that angle of deviation at cervical region was in the range of 10⁰-40⁰ while performing tailoring activity in traditional method compared to the angle of deviation in improved method *i.e.* 7⁰-20⁰. Similarly, the angle of deviation at lumbar region was in the range of 15⁰-30⁰ while

Table 2 : Perception of women entrepreneurs about localized postural discomfort

Parameters	Discomfort areas														Discomfort of whole body					
	Discomfort of neck		Discomfort of neck/upper back		Discomfort of back		Discomfort of upper neck/back		Discomfort of neck/back		Discomfort of right shoulder/neck		Discomfort of left leg			Discomfort of right leg				
	T	I	T	I	T	I	T	I	T	I	T	I	T	I		T	I			
No discomfort (0)	-	16	-	1	-	-	-	-	5	5	20	-	9	15	22	19	28	-	-	
Some discomfort (1)	9	11	-	18	-	17	-	27	-	10	21	10	4	15	5	8	3	2	-	15
Minor discomfort (2)	15	3	12	10	7	13	19	3	15	15	4	-	15	6	10	-	8	-	1	15
Major discomfort (3)	3	-	11	1	18	-	9	-	15	-	-	-	4	-	-	-	-	-	21	-
Severe discomfort (4)	3	-	7	-	5	-	-	-	-	-	-	-	7	-	-	-	-	-	8	-
Very severe discomfort (5)	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Criticality index	4	1.13	5.66	1.46	5.86	2.86	5	2.2	5	2.56	1.93	0.66	4.93	1.8	1.66	0.53	1.26	0.13	6.46	3

T= Traditional method
I= Improved method

Table 3: Angle of deviation at the time of performing tailoring activity drafting and cutting

Name of body parts	Angle of deviation in			
	Traditional method		Improved method	
	Minimum	Maximum	Minimum	Maximum
Cervical region	10 ⁰	40 ⁰	7 ⁰	20 ⁰
Lumbar region	15 ⁰	30 ⁰	4 ⁰	10 ⁰

performing drafting and cutting activity in traditional method compared to the improved method *i.e.* 4⁰-10⁰.

Hence, the average reduction in angle of deviation at cervical region was more compared to the average angle of deviation at lumbar region. It can be concluded from the data that posture at cervical and lumbar region was improved with the help of M.A.U. tailoring stand.

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