

ERGONOMIC ASSESSMENT OF WORK PATTERN AND RELATED MUSCULOSKELETAL DISCOMFORT AMONG TAILORS

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Abstract: Work related musculoskeletal discomforts (WMSDs) are musculoskeletal injuries occurred during work and among the major health problems in tailoring profession. This study was conducted with aim of evaluating tailors job, their working pattern, posture adopted during work and assessment of discomfort in performing various tailoring activities. Sixty male tailors were selected for conducting descriptive study at Pantnagar, Uttarakhand (India). Descriptive data was gathered by interview schedule and developing questionnaire, whereas assessment of musculoskeletal discomfort was done by standardized Nordic questionnaire. It was revealed that nearly 8 % tailors had 30-40 years of work experience in tailoring profession. About 34% tailors reported pain in neck in cutting, 40% in lower back in stitching and 48% in neck in ironing activity. Results also revealed that more than half percent of the tailors experienced discomfort in lower back, neck and shoulder. Hence, the findings indicate that the tailors were engaged for more than 8 working hours but not realizing the risks of musculoskeletal discomforts associated with their poorly designed workstation, tasks and awkward working postures.

Keywords: Tailors, Tailoring Activities, Musculoskeletal Discomfort, Awkward posture, Standardized Nordic questionnaire.

INTRODUCTION

Musculoskeletal disorders (MSD) contains a wide variety of degenerative and inflammatory conditions which are causing pain and discomfort among the tendons, ligaments, muscles, joints, supporting blood vessels and nerves. Any mismatch between the requirements of the work, worker's physical capacity and work environment leads to WMSDs. The etiology of WMSDs ranges from forceful or repetitive movements to poor working postures or environments and it affects worker's body (**Kuorinka, et al. 1987**). **Da Costa and Vieira (2010)** studied that excessive repetition, awkward posture and poor working environment are the main risk factors of WMSDs.

Tailor (Darzi) is a self employed garment workers who work in their own work shop and only prepare garment as per the choice of customers through creating new piece of clothing from patterns and designs or alter existing garments to fit to the customers. Generally, their work relates to sewing, joining or finishing of cloths (**Chan, et al., 2002**). The main activities

performed by the tailors at their workstation are dealing with the customer, taking measurement of the customer, cutting of the fabric, stitching of the fabric, finishing of the stitched garment, ironing to the stitched garment and inspection of stitched garment.

Tailors were performing a range of monotonous and repetitive activities at their workplace from morning to late night in a sitting posture with head bent over the sewing machine and upper back curved. The work of a tailor is very visually demanding as well as requires a high degree of concentration. Therefore, the prevalence of work related musculoskeletal discomforts has been high due to the characteristics of tailoring activities. The severity of the discomfort have been measured according to the nature of job i.e. constrained and sustained work postures, highly repetitive actions and strong visual demands.

Prolonged sitting in awkward postures is not uncommon and is often accompanied with seats that have no backrests. Thus, the high physical burden upon tailors leads to problems at their shoulder, neck, back and in the lower extremities. These problems either arise from or become more pronounced when bending the head, lifting the arm and working in forward leaning posture, and by the less than optimum ankle and knee angles while working for extended periods in a seated position. **Edith (2001)** conducted a research on working conditions and associated problems in the garment workstation unit and observed that work environments with poor ergonomic features, including constrained postures, repetitive motions and strong visual demands. Hence, the present study was undertaken with the following objectives:

- To analyze the tasks performed by tailors at their work station.
- To assess the different work posture and associated musculoskeletal discomfort among various body parts of tailors

METHODOLOGY

Purposive random sampling design was used to select the respondents and study area. The present study was conducted at Pantnagar, District U. S Nagar of Uttarakhand state (India). Total sample sizes of 60 male respondents were taken for the study and these all respondents were working in 14 tailor shops.

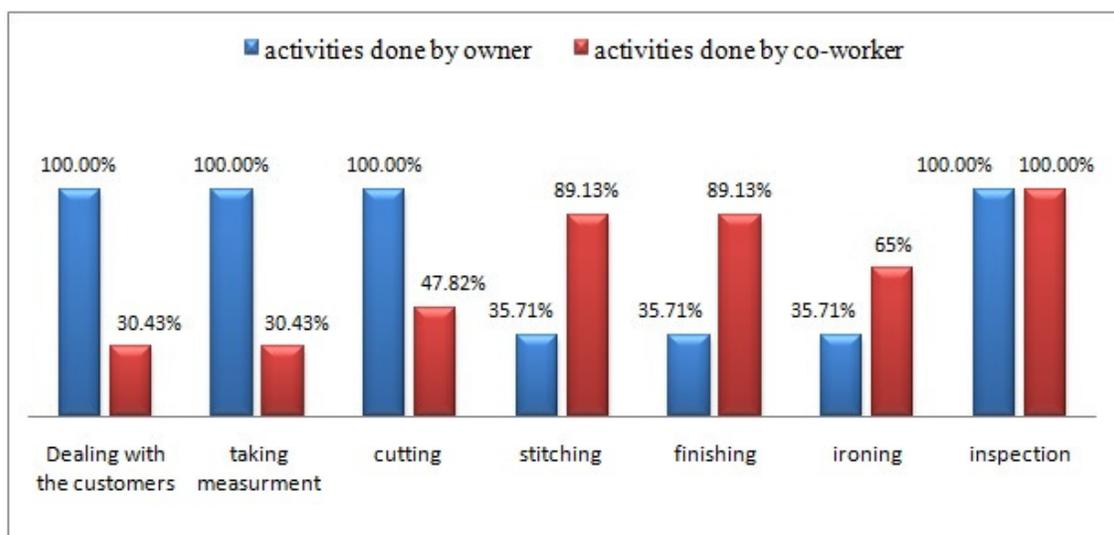
A questionnaire was developed for collecting the descriptive data regarding tailoring activities and their working pattern. The standardized Nordic questionnaire was used to evaluate the musculoskeletal discomfort among the tailors selected for the study at various times of performing activities at the workstation throughout the day.

RESULTS AND DISCUSSION

Activities of tailors at the workstation

Figure 1 depicts the seven tailoring activities performed by owner and co-workers at the workstation of tailors shop. In the profession of tailoring, to maintain healthy relationship with the customers and to attract them by showing their creativity, tasks like dealing with the customer, taking measurement from the customer, cutting the fabric and inspection of the stitched garment were mainly done by owner of the tailor shops. Whereas, activities like stitching of the garment, finishing and ironing to the stitched garments were performed by co-workers of the shop.

Figure 1: The different activities performed by the owners and co-workers at the workstation (n=60, owner =14, co-worker = 46)



Working patterns (main occupation and work done)

Table 1 represents data regarding the distribution of sample respondents by working parameters like main occupation and work done continuously with number of years of experience. It was revealed that majority of the respondents started this business as their own idea. About 79.99 percent of the respondents have the tailoring as the main occupation out of which 45 percent had 20-30 years of experience; whereas 21.66 percent had 10-20 years of experience and nearly 8 percent of the respondents were engaged in tailoring from 30-40 years. The respondent who had 39 years of experience in tailoring was working since 1974. Besides, 20 percent of the respondents, this was not the main occupation as they also have earning from other sources.

Table -1. Distribution of samples by working pattern (n=60)

| Numbers of years experience | Main occupation | | | | Work done continuously | | | |
|-----------------------------|-----------------|-------|-------|------|------------------------|-------|------|-------|
| | Yes | | No | | Yes | | No | |
| | f | % | f | % | f | % | f | % |
| 1-10 years | 3 | 5.0 | 9 | 15.0 | 10 | 16.66 | 2 | 3.33 |
| 10-20 years | 13 | 21.66 | 3 | 5.0 | 11 | 18.33 | 5 | 8.33 |
| 20-30 years | 27 | 45.0 | - | - | 22 | 36.66 | 5 | 8.33 |
| 30-40 years | 5 | 8.33 | - | - | 3 | 5.0 | 2 | 3.33 |
| Total | 49 | 79.99 | 11 | 20.0 | 46 | 76.65 | 14 | 23.32 |
| Mean | 21.93 | | 12.27 | | 20 | | 17.5 | |

Pain in different body parts while performing different tailoring activities

The data regarding pain realization by the respondents in different parts of the body like neck, shoulder, arm, wrist, lower back, fingers while doing various different activities like cutting, stitching, finishing and ironing etc. was shown in table 2. It was revealed that none of the respondents had fatigue while dealing with customers, taking measurement and inspection of the garments tasks because the respondents did not apply any kind of force in these activities. However, in the cutting task, respondents reported pain in neck (56.66%), shoulder (31.66%), lower back (31.66%) and only 8.33 percent felt pain in arms. In addition, while stitching at the workstation respondents felt pain in lower back (65 %), neck (63.33%) and shoulder (20%). In this task, the main cause observed of pain in neck and lower back was long working hours and bending posture during whole stitching task.

In the process of ironing, respondents experienced pain in neck (48%), lower back (40%), wrist (6.66%) and arms (5%). Moreover, in garments finishing task, respondents experienced pain in neck (16.66%), lower back (10%), shoulder (3.33%) and wrist (3.33%).

Table 4.17: Pain in different parts of the body parts while doing different activities (n = 60)

| Activity | Shoulder | Neck | Arm | Wrist | Lower back | No pain |
|---------------------------|-----------|-----------|---------|-------|------------|-----------|
| | f(%) | f(%) | f(%) | f(%) | f(%) | f(%) |
| Dealing with the customer | - | - | - | - | - | 60(100) |
| Taking measurement | - | - | - | - | - | 60(100) |
| Cutting | 19(31.66) | 34(56.66) | 5(8.33) | - | 19(31.66) | 23(38.33) |

| | | | | | | |
|------------|----------|-----------|--------|---------|----------|-----------|
| Stitching | 12(20.0) | 38(63.33) | - | - | 39(65.0) | 9(15.0) |
| Finishing | 2(3.33) | 10(16.66) | - | 2(3.33) | 6(10.0) | 40(66.66) |
| Ironing | - | 29(48.33) | 3(5.0) | 4(6.66) | 24(40.0) | - |
| Inspection | - | - | - | - | - | 60(100) |

Prevalence of musculoskeletal Discomfort

The assessment of musculoskeletal discomfort by standardized Nordic questionnaire among tailors examined pain and discomfort and revealed in the last 12 month 51.67 percent tailors felt pain in their lower back, this may be due to their prolong sitting posture they used to adopt while performing various tailoring activities. However, the shoulder, neck and upper back experiencing 38.33percent, 31.67percent and 28.33 percent respectively, were most affected body part. Twenty three (38.33%) of the tailors had felt trouble in their lower back in the last 30 days and 30 percent suffering from pain and discomfort in shoulder. Whereas, in the last 7 days, the most affected body part from pain and discomfort were lower back (21.67%) and neck (15%). The findings of presents study were agrees with the previous studies.

Table 2: Prevalence of MSDs in different body part while performing activities
(n=60)

| Body Parts | Last 12 month f (%) | Last month f (%) | Last 7 days f (%) |
|-------------------|------------------------|---------------------|----------------------|
| Neck | | | |
| Yes | 19(31.67) | 14(23.33) | 9(15.00) |
| No | 41(68.33) | 46(76.67) | 51(85.00) |
| Shoulder | | | |
| Yes | 23(38.33) | 18(30.00) | 8(13.33) |
| No | 37(61.67) | 42(70.00) | 52(86.67) |
| Elbow | | | |
| Yes | 11(18.33) | 9(15.0) | 4(6.67) |
| No | 41(81.67) | 51(85.00) | 56(93.33) |
| Wrist | | | |
| Yes | 14(23.33) | 11(18.33) | 9(15.0) |
| No | 46(76.67) | 41(81.67) | 51(85.00) |
| Upper back | | | |

| | | | |
|---------------------|-----------|-----------|-----------|
| Yes | 17(28.33) | 14(23.33) | 7(11.67) |
| No | 43(71.67) | 46(76.67) | 53(88.33) |
| Lower back | | | |
| Yes | 31(51.67) | 23(38.33) | 13(21.67) |
| No | 29(48.33) | 37(61.67) | 47(78.33) |
| Hips | | | |
| Yes | 11(18.33) | 5(8.33) | 4(6.67) |
| No | 49(81.67) | 55(91.67) | 56(93.33) |
| Knees | | | |
| Yes | 16(26.67) | 8(13.33) | 6(10.00) |
| No | 44(73.33) | 52(86.67) | 54(90.00) |
| Ankle / feet | | | |
| Yes | 16(26.67) | 7(11.67) | 5(8.33) |
| No | 44(73.33) | 53(88.33) | 55(91.67) |

CONCLUSION

Tailors are the workers who performed work at the workstation for longer period of time with repetitive and monotonous task like cutting, stitching, finishing and ironing the garment etc., where they mainly adopt awkward posture repeatedly in each continuous process of preparing garments. Therefore, it was concluded from that tailors suffer from high musculoskeletal discomfort, mainly in neck, shoulder and lower back. This conditions lead to high absenteeism and poor confidence amongst the tailors. Therefore, awareness and knowledge about proper work pattern, associated risk factors and musculoskeletal discomfort at the workstation and environment is essential.

REFERENCES

- [1] Chan, J.; Janowitz, I.; Lashuay, N.; Stern, A.; Fong, K. *et al.* (2002). Preventing musculoskeletal disorders in garment workers: Preliminary results regarding ergonomics risk factors and proposed interventions among sewing machine operators in the San Francisco bay area. *Applied Occupational Environmental Hygiene*, 17: 247-253.
- [2] Da Costa, B. R and Vieira, E. R. (2010). Risk factors for work-related musculoskeletal disorders: A systematic review of recent longitudinal studies. *Am J Ind Med*. 53: 285-323.

- [3] Edith, M. (2001). Lighting and occupational health and safety among sewing machine operators. *Ergonomics*, 13(3): 507-509.
- [4] Kuorinka I, Jonsson B, Kilbom A, Vinterberg H, Biering-Sørensen F, et al. (1987). Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. *Appl Ergon* 18: 233-237.
- [5] Upasana and Vinay, D. (2016). Ergonomic evaluation of work related musculoskeletal disorders among tailors. *International Journal of Home Science*. 2(3): 683-686.
- [6] Upasana and Vinay, D. (2017). Work Posture Assessment of Tailors by RULA and REBA Analysis. *International Journal of Science, Environment and Technology*, 6(4): 2469 – 2474.