

Frequency of work related musculoskeletal disorders and ergonomic risk assessments among tailors

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Abstract

Objectives: To determine the frequency of work-related musculoskeletal disorders and to assess postural ergonomic risk among tailors.

Method: The cross-sectional study was conducted from September 2017 to February 2018 in Rawalpindi and Islamabad, Pakistan and comprised tailors of both genders aged 25-60 years, working for more than 6 months and having small and medium enterprises. To calculate ergonomic risk of work posture, Quick Exposure Check was used and work-related musculoskeletal disorders were determined through body mapping chart. Data was analysed using SPSS 20.

Results: Of the 400 tailors, 382(95.5%) were males. The overall mean age of the sample was 36.9±10.96 years. The mean Quick Exposure Check score was 46.11±14.83. Acceptable work posture was found in 373(93.25%) subjects. The most common work-related acute musculoskeletal symptoms were found in the upper back 320(80%).

Conclusion: Most tailors had acceptable work posture but work-related pain in upper back was common.

Keywords: Body mapping chart, Ergonomic risk assessment, Posture, Quick exposure check, Tailors.

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Introduction

Work-related musculoskeletal disorders (WMSDs) constitute a major occupational problem globally, according to the World Health Organisation (WHO).¹ WMSD arises when there is mismatch between physical working capacity of human body and job demand. These disorders can affect the muscles, ligaments and joint structure and the disc.^{1,2} Workers affected with musculoskeletal (MSK) symptoms complain of joint or muscle pain, tenderness and aches. There are number of occupations in which MSK disorders affect the workers.² The prevalence of MSK disorders is greater in occupations which require repetitive monotonous task in improper posture with poorly-designed seat-and-table adjustment, heavy manual lifting, daily prolonged working and exposure to vibration. The risk of development of MSK disorders can also increase with respect to magnitude and duration of work.³

Tailors are creative personnel with excellent manual and machine skills and sew garments that fit properly to their customers. They sit for a longer time in chair or on the floor, performing repetitive activities with improper body postures.⁴ This causes MSK discomfort among tailors and also results in back and neck pain. The posture they

assume during stitching a garment is bending their neck forward, raising their elbows above / below the shoulders, bend their wrist downward and inward and bend their back forward and this leads to postural discomfort that increases with years of employment.⁵ They also experience muscle stiffness, pain and swelling in the affected area. This aching and muscle stiffness lead to severe pain and inability to continue their occupation and in later cases, inability to sleep as well.⁶

Ergonomic assessment among tailors is highly required as ergonomic is preventive medicine for occupation-related MSK problems. Improper ergonomic conditions negatively affect their physical conditions and working capacity.⁶ Tailors are usually unaware of ergonomic guidelines. The understanding of the individual worker's capacity and limitation is essential. It is highly needed to guide them for safe and effective working in a comfortable environment. Application of proper ergonomic principles increases the worker's productivity and safety.^{7,8}

Tailoring is a source of employment for both men and women in Pakistan. Majority of tailors belong to the lower socioeconomic status. They lack the facilities for occupational health and safety so their poor health and poverty go side by side.⁹ There is limited literature on this topic in the country. The current study was planned to explore the burden of WMSD and MSK pain in different body parts among tailors.

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Subjects and Methods

The descriptive cross-sectional study was conducted in Rawalpindi and Islamabad, Pakistan, from September 2017 to February 2018. After approval from the ethics review committee of Riphah International University, Islamabad, the sample size was calculated using Raosoft calculator¹⁰ with 5% margin of error, 95% confidence interval (CI) and 50% response rate. As the population size was unknown, it was assumed as 20,000. The sample was raised using non-probability convenience sampling technique from among local tailors aged 25-60 years, working for more than 6 months, having their own small and medium enterprises. Those having any recent history of MSK trauma or road traffic accident (RTA) causing body aches, diagnosed systemic arthropathies and any congenital or acquired deformity were excluded. Data was collected after taking informed consent from the participants.

The technique of body mapping was used for subjective reporting of MSK discomforts. The participants were required to indicate one or more body areas of discomfort on a simple diagram using the body mapping questionnaire.¹¹ It contained questions about body regions that experienced pain and discomfort during the preceding three months and the preceding seven days which was affecting their daily activities.

To determine postural ergonomic risk of different body parts, the pre-validated Quick Exposure Check (QEC) was used.¹²

Initially, the most repeated work posture was identified, then direct observation of postures was done by the researchers who completed the observer portion of the QEC tool. Then tailors were asked to answer the worker-related assessment questions. Later, all the assessments were manually scored, including total QEC score and risk exposure

scores for back, shoulder/arm, wrist/hand and neck. Risk assessment of job stress, vibration exposure and workpace were scored as part of QEC assessment.

Data was analysed using SPSS 21. The data of QEC score was normally distributed as checked by Shapiro Wilk test. P<0.05 was taken as significant.

Results

Of the 400 tailors, 382(95.5%) were males. The overall mean age of the sample was 36.9±10.96 years and mean working experience was 13.54±8.96 years. The mean body mass index (BMI) score was 25.6±5.14 and the working hours/day were 9.30±2.55.

There were 317(92.8%) tailors working in shops and 29(7.3%) were home-based. Also, 207(51.8%) tailors had tables as their workstations, while 193(48.3%) had a floor-sitting arrangement.

Overall, 26(6.5%) tailors had received some informal ergonomic training, while 374(93.5%) had no exposure at all. When asked, 255(63.8%) tailors said they required ergonomic training for better work posture, while 145(36.3%) denied any such need.

The mean QEC score was 46.11±14.83 (range: 19-93%).It

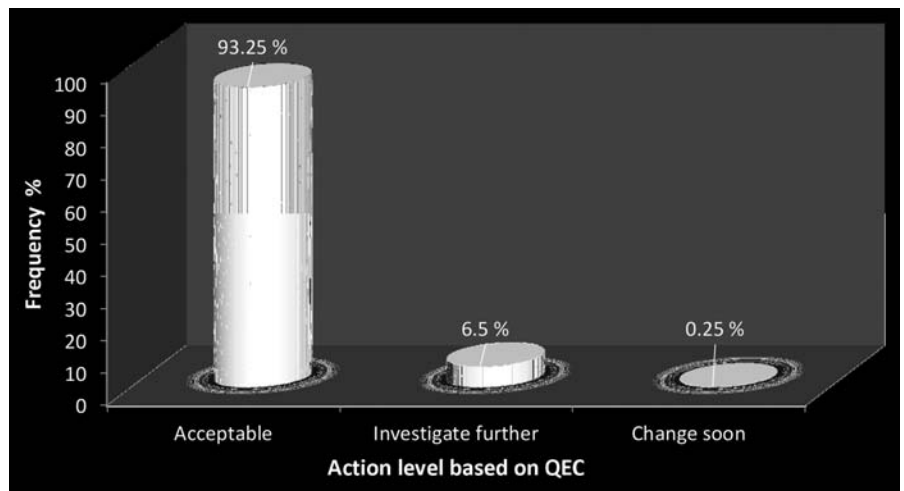


Figure-1: Action levels based on Quick Exposure Check (QEC).

Table-1: Quick Exposure Check (QEC) body regions risk exposure percentage scores.

Variables of QEC	Low	Moderate	High	No risk
Back Risk Exposure (static):	15.25%	1.50%	-	83.25%
Back Risk Exposure (moving):	60.25%	23.75%	0.25%	15.75%
Neck Risk Exposure:	51%	41%	9%	-
Shoulder Arm Risk Exposure:	40.75%	49.25%	7.25%	2.75%
Wrist/Hand Risk Exposure:	63%	26%	8%	3%

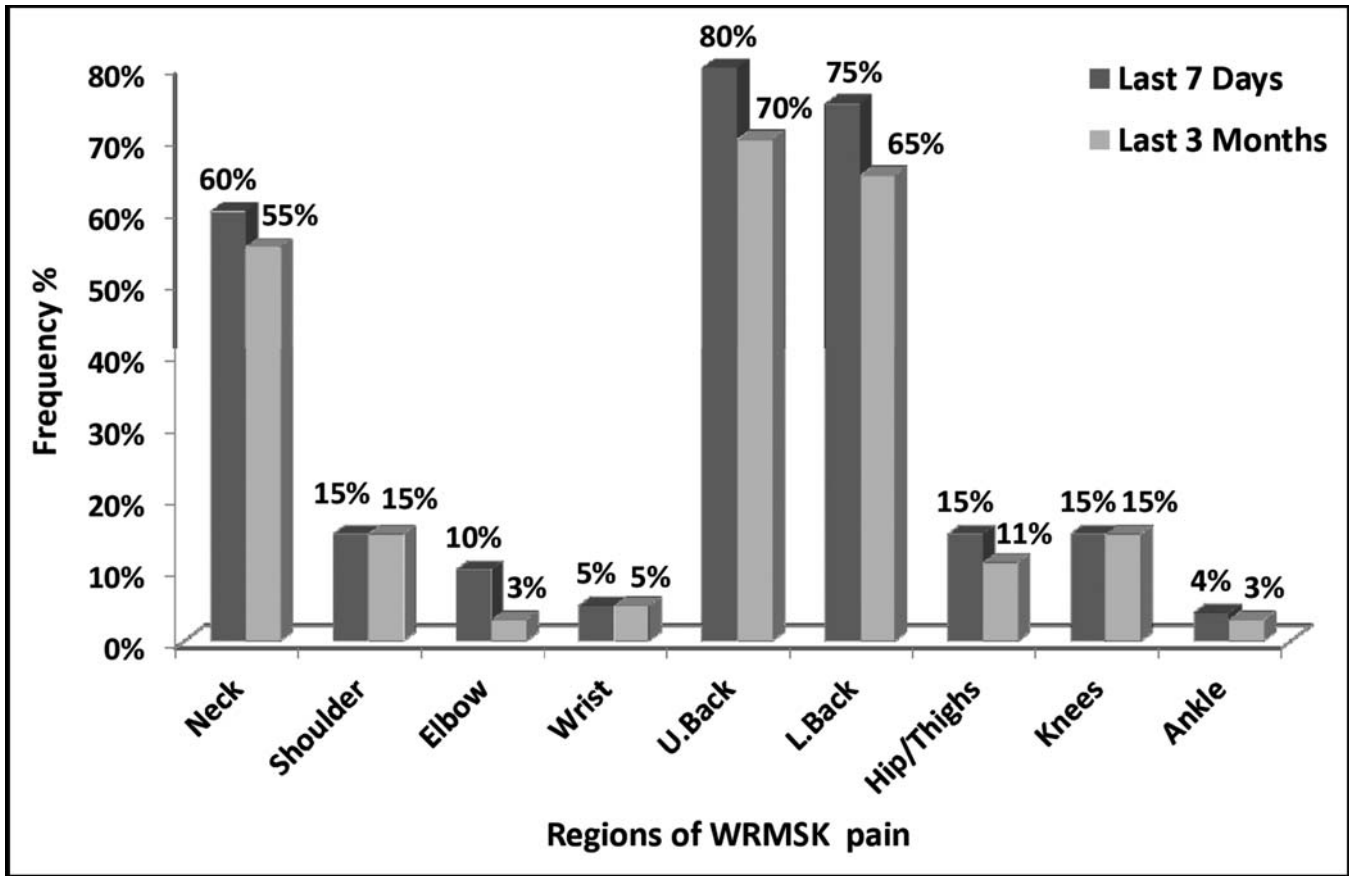


Figure-2: Acute and chronic work-related musculoskeletal pain.

was observed that 373(93.25%) tailors had acceptable action level category, 26(6.5%) needed further investigation and only 1(0.25%) required change in work posture (Figure-1). The QEC scores also provided level of postural ergonomic risk exposure scores for different body regions categorised as low, moderate, high and very high risk (Table).

Work-related pain was common in upper back 320(80%), lower back 300 (75%) and neck 240(60%) in the preceding 7 days. Likewise, there was chronic pain in upper back 280(70%), lower back 260(65%) and neck 220(55%) in the preceding 3 months (Figure-2).

The frequency of work stress among tailors was low 155(38.8%), moderate 156(39.8%), high 84(21.1%) and very high 24(6.1%). Likewise, work-pace risk was low 222(55.8%), moderate 169(42%), high 24(6.3%) and very high 7(1.8%). Exposure to vibration during work was low 338(84%), moderate 19(4.8%) and high 45(11.2%).

Discussion

The occupation of tailoring may contribute to

development of MSK disorders because of working in awkward and static postures with poorly-designed seat or table adjustment.

According to literature, majority tailors (65%) are exposed to high postural ergonomics risks measured by different but similarly valid tools.¹³ Öztürk et al. also evaluated posture and ergonomic risk among female tailors by Rapid Upper Limb Assessment (RULA) and has reported mean score of 6.9, indicating tailors' postures at high risks that need to be investigated and urgent changes recommended.¹⁴

The current study's findings are contrary to these, as observed ergonomics risk exposure score amongst tailors was 46.11±14.83, indicating low to moderate risk exposure for MSK disorders with 93% participants having acceptable posture at work. Similarly, these results are very much different to the findings of a previous study in which mean QEC score before ergonomic training to tailors was 79.04±80.02 indicating high risk exposure with urgent corrective measures required.⁷ The difference may be due to the fact that in the current study most of tailors

were found to be working in almost neutral posture, as height of the tables were good enough that enabled the tailors to work in sitting position with slight bending of the upper back. In addition, this study has calculated risk exposures for different body regions by QEC and found no risk for back (static), low risk for back (moving) and neck, moderate for shoulder/arm and high for wrist/hand and neck. As compared to the findings of another study that found moderate for back (static) and back (dynamic), high for shoulder/arm and very high for wrist/hand and neck for sewing workers.¹⁵

In the current study, subjects were assessed for MSK pain in different body regions and it was found that the most common affected area was upper back, followed by lower back and neck. These results are almost comparable with the results of a study which found back pain 78.2% to be the most common problem followed by ankle 76.3% and knee pain 73.7% among tailors.¹⁶ In another study, the most common MSK problems among tailors were neck pain 91%, shoulder pain 88%, wrist pain 83% and back pain 76%.¹⁷ Similar to the findings of our study, MSK symptoms among female tailors in Turkey showed the trunk 62.5%, neck 50.5% and shoulder 50.2% to be the commonest pain sites.¹⁴ The current study also found that 63.8% tailors showed interest in ergonomic training. A study revealed that ergonomic training is required to reduce MSK disorders in tailors.⁹

There were few limitations in the current study, as convenient sampling technique was used that affected random diversity amongst participants. More male tailors were conveniently selected which has minimised female tailors' representation. Besides, the study used a valid observational tool for the assessment of ergonomic risk exposure and future studies need to include objective tools to identify postural ergonomic risks and relation to MSK disorders among tailors.

Conclusion

Most tailors were exposed to low levels of ergonomic risks and had acceptable work posture. Upper back, lower back and neck were common MSK pain areas.

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Conflict of Interest: None.

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