

Original Article

Frequency of Musculoskeletal Disorders in Tailors of Lahore, Pakistan

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ABSTRACT

Background: Tailoring is a posture-dependent occupation involving prolonged sitting, repetitive upper-limb activity, sustained visual attention, and limited postural variation. These ergonomic exposures may contribute to work-related musculoskeletal disorders, particularly in the spine, shoulder girdle, upper limbs, and lower limbs. **Objective:** To determine the frequency and anatomical distribution of musculoskeletal disorders among tailors working in Lahore, Pakistan. **Methods:** A descriptive cross-sectional study was conducted among 244 tailors selected through convenience sampling from different stitching and tailoring units in Lahore. Data were collected using a structured demographic and work-related questionnaire, Visual Analogue Scale, and Nordic Musculoskeletal Questionnaire. Demographic variables, working posture, break period, working hours, work experience, and regional musculoskeletal symptoms were recorded. Data were analyzed using SPSS version 21, and categorical variables were summarized as frequencies and percentages. **Results:** The mean age of participants was 32.65 ± 9.66 years. Of 244 participants, 154 (63.1%) were male and 90 (36.9%) were female. Most participants worked in sitting posture (240, 98.4%), and 187 (76.6%) worked 6 or more hours per day. The most frequently reported 12-month musculoskeletal trouble involved the lower back (42, 17.2%), shoulders (35, 14.3%), and knees (34, 13.9%). Similar patterns were observed for activity limitation, physician consultation, and 7-day trouble. **Conclusion:** Lower back, shoulder, and knee symptoms were the most frequently reported musculoskeletal disorders among tailors in Lahore. Ergonomic education, workstation modification, and preventive movement strategies are recommended for this occupational group. **Keywords:** Musculoskeletal disorders; Tailors; Occupational health; Nordic Musculoskeletal Questionnaire; Ergonomics; Lower back pain; Lahore.

EDITORIAL INFORMATION

Author Contributions: Concept: AS; Design: AS and RR; Data Collection: AS; Analysis: AS; Drafting: AS, RR, and HR.**Ethical Approval:** University of Wolverhampton, Wolverhampton, United Kingdom**Informed Consent:** Written informed consent was obtained from all participants**Conflict of Interest:** The authors declare no conflict of interest; **Funding:** No external funding; **Data Availability:** Available from the corresponding author on reasonable request; **Acknowledgments:** N/A.

INTRODUCTION

Work-related musculoskeletal disorders are among the most common occupational health problems affecting workers who perform prolonged, repetitive, and posture-dependent tasks. These disorders commonly involve muscles, tendons, ligaments, joints, peripheral nerves, and supporting soft tissues, and they may present as pain, discomfort, numbness, stiffness, functional limitation, or reduced work capacity. In occupations requiring sustained sitting, repetitive upper-limb movement, forward head posture, trunk flexion, and limited postural variation, musculoskeletal symptoms frequently develop in the neck, shoulders, upper back, wrists/hands, lower back, knees, and ankles. Tailoring is one such occupation because it requires prolonged static positioning, repeated hand and foot activity, continuous visual attention, and frequent forward bending during cutting, stitching, and finishing tasks (1).

Tailors are exposed to multiple ergonomic stressors during routine work. Sewing and stitching tasks are commonly performed in a seated position for several hours, often with inadequate chair support, poorly

adjusted work surfaces, and limited opportunities for active movement. These postural and workstation-related demands may increase biomechanical loading on the cervical spine, shoulder girdle, lumbar region, and lower limbs. Previous studies among tailors and sewing-machine operators have reported musculoskeletal complaints in several anatomical regions, particularly the neck, shoulders, wrists/hands, lower back, and knees, suggesting that the occupational pattern of tailoring is strongly linked with regional musculoskeletal discomfort (2,3). Work-organization factors such as daily working hours, years of experience, rest breaks, repetitive movements, and workstation design may further contribute to symptom development or persistence (4).

Evidence from international and regional studies indicates that musculoskeletal disorders are common among workers involved in tailoring, garment production, and sewing-machine operation. Kazemi et al. reported musculoskeletal symptoms among tailors using the Nordic Musculoskeletal Questionnaire and emphasized the role of poor posture and upper-extremity strain in symptom distribution (1). Banerjee et al. also documented work-related musculoskeletal morbidity among tailors and highlighted the occupational burden associated with prolonged sitting and repetitive activity (2). Similar findings have been reported in sewing-machine operators and garment workers, where upper-body complaints, low back symptoms, and discomfort related to workstation design were frequently observed (4,5). Ergonomic intervention studies further suggest that workplace modification, postural education, rest breaks, and exercise-based programs may reduce musculoskeletal complaints among workers exposed to sustained or repetitive occupational demands (6–8).

Despite growing evidence on work-related musculoskeletal disorders in tailoring and garment-related occupations, local data from Pakistan remain limited. Lahore has a large tailoring workforce working in small shops, stitching units, and informal occupational settings, where ergonomic standards, workstation adjustment, and preventive health awareness may vary considerably. However, the frequency and regional distribution of musculoskeletal disorders among tailors in Lahore have not been adequately documented. Local evidence is important because occupational conditions, working hours, machine type, rest practices, and access to healthcare may differ from those reported in other countries and may influence the pattern of musculoskeletal symptoms.

Therefore, this study was conducted to determine the frequency and anatomical distribution of musculoskeletal disorders among tailors working in Lahore, Pakistan. The study specifically aimed to identify the most commonly affected body regions using the Nordic Musculoskeletal Questionnaire and to describe relevant demographic and work-related characteristics of the study population. The research question was: What is the frequency of musculoskeletal disorders among tailors in Lahore, and which anatomical regions are most commonly affected?

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted among tailors working in different stitching units and tailoring workplaces in Lahore, Pakistan. The study was designed to estimate the frequency and anatomical distribution of musculoskeletal disorders in this occupational group at a single point in time. Data collection was completed over a period of three months after approval of the synopsis. The study setting included tailoring and stitching units in Lahore, including commercial tailoring workplaces such as Dandy Designs, Rex Tailors, and other similar stitching units.

The study population comprised adult male and female tailors working in Lahore. Participants were selected through a non-probability convenience sampling technique. Eligible participants were tailors aged 18 to 50 years who were actively involved in tailoring work, including cutting, stitching, sewing, or related occupational tasks. Participants were included if they had relevant exposure to tailoring work involving sitting, standing, or combined working postures; daily working hours within the reported occupational range; use of sewing machines; and work experience within the documented range for this study. Tailors with recent musculoskeletal trauma, known tumors, degenerative musculoskeletal disorders, systemic diseases of bone or soft tissues, chronic conditions directly affecting musculoskeletal function, history of upper-limb surgery or trauma, upper-limb deformity, or a second occupation likely to

influence musculoskeletal symptoms were excluded. General comorbidity status was recorded as a demographic and health-related variable rather than used as a blanket exclusion criterion, allowing the analysis to remain consistent with the reported results.

The sample size was calculated as 244 using an expected population proportion of 0.47, a 95% confidence level corresponding to a Z value of 1.96, and an absolute precision of 0.05. After obtaining informed consent, data were collected using a structured questionnaire containing demographic, occupational, and health-related variables. Demographic variables included age, gender, marital status, and comorbidity status. Work-related variables included working posture, period of break during work, daily working hours, work experience, type of machine, and machine-use duration. Pain and musculoskeletal symptoms were assessed using the Visual Analogue Scale and the Nordic Musculoskeletal Questionnaire. The Nordic Musculoskeletal Questionnaire was used to record musculoskeletal trouble in nine anatomical regions: neck, shoulders, upper back, elbows, wrists/hands, lower back, hips/thighs, knees, and ankles/feet.

The primary outcome was the frequency of musculoskeletal trouble in different anatomical regions during the previous 12 months. Additional outcomes included whether symptoms prevented normal activities during the previous 12 months, whether participants had consulted a physician for the condition during the previous 12 months, and whether they had trouble in the same anatomical regions during the previous seven days. These outcomes were recorded as categorical responses for each anatomical region. Work-related exposure variables were recorded descriptively to characterize the occupational profile of the participants.

Bias was addressed by applying predefined eligibility criteria, using the same questionnaire format for all participants, obtaining responses directly from participants, and maintaining consistency in data collection procedures across study settings. To reduce information bias, participants were informed about the purpose of the study and were asked to report symptoms according to the specified time frames in the questionnaire. Since the study was descriptive, no causal inference was attempted. Potential confounding variables such as age, gender, working hours, work experience, posture, break period, and comorbidity status were recorded to describe the sample and to support interpretation of the findings.

Data were entered and analyzed using SPSS version 21. Continuous variables were summarized using mean and standard deviation, while categorical variables were summarized using frequencies and percentages. Age was reported as mean $\pm$ standard deviation with minimum and maximum values. Gender, marital status, comorbidity status, posture, break period, working hours, work experience, and regional musculoskeletal symptoms were reported as n (%). Because the objective was descriptive, the analysis focused on estimating the frequency and percentage distribution of musculoskeletal disorders across anatomical regions. Missing or incomplete responses were checked during data entry, and available valid responses were used for descriptive analysis.

Ethical approval was obtained from the relevant ethical committee and the Department of Azra Naheed Medical College before data collection. Participation was voluntary, and informed consent was obtained from each participant before enrollment. Confidentiality and privacy were maintained throughout the study, and collected data were used only for research purposes. Data integrity was maintained by using a standardized data collection form, reviewing completed questionnaires for completeness, and entering data into SPSS using consistent variable coding.

RESULTS

A total of 244 tailors were included in the study. The mean age of participants was 32.65 ± 9.66 years, with an age range of 18 to 50 years.

Table 1. Age Distribution of Participants

Variable	n	Minimum	Maximum	Mean $\pm$ SD
Age, years	244	18	50	32.65 ± 9.66

The participants represented an adult working-age tailoring population, with a mean age of 32.65 years and a relatively broad age range from 18 to 50 years.

Table 2. Sociodemographic Characteristics of Participants

Variable	Category	n (%)
Gender	Male	154 (63.1)
	Female	90 (36.9)
Marital status	Married	139 (57.0)
	Single	105 (43.0)
Comorbidity status	Yes	76 (31.1)
	No	168 (68.9)

Of the 244 participants, 154 (63.1%) were male and 90 (36.9%) were female. More than half of the participants were married, 139 (57.0%), while 105 (43.0%) were single. Comorbidity was reported by 76 participants (31.1%), whereas 168 participants (68.9%) reported no comorbidity.

Table 3. Work-Related Characteristics of Participants

Variable	Category	n (%)
Working posture	Sitting	240 (98.4)
	Standing	2 (0.8)
	Both sitting and standing	2 (0.8)
Period of break during work	Yes	232 (95.1)
	No	12 (4.9)
Working hours per day	1–3 hours	21 (8.6)
	4–5 hours	36 (14.8)
	6 or more hours	187 (76.6)
Work experience	2 years or less	68 (27.9)
	3–5 years	59 (24.2)
	6–10 years	92 (37.7)
	11–15 years	23 (9.4)
	16 years or more	2 (0.8)

Most participants worked in a sitting posture, 240 (98.4%), while only 2 (0.8%) worked in standing posture and 2 (0.8%) used both sitting and standing postures. Break periods during work were reported by 232 participants (95.1%). A large proportion of participants, 187 (76.6%), worked 6 or more hours per day. The most common work-experience category was 6–10 years, reported by 92 participants (37.7%), followed by 2 years or less in 68 participants (27.9%) and 3–5 years in 59 participants (24.2%).

Table 4. Regional Distribution of 12-Month Musculoskeletal Trouble

Body Region	n (%)
Lower back	42 (17.2)
Shoulders	35 (14.3)
Knees	34 (13.9)
Wrists/Hands	26 (10.7)
Elbows	24 (9.8)
Hips/Thighs	23 (9.4)
Neck	22 (9.0)
Upper back	22 (9.0)
Ankles/Feet	16 (6.6)

The lower back was the most frequently reported region of 12-month musculoskeletal trouble, affecting 42 participants (17.2%). Shoulder trouble was reported by 35 participants (14.3%), followed by knee trouble in 34 participants (13.9%). The lowest frequency was reported for ankles/feet, affecting 16 participants (6.6%).

Table 5. Physician Consultation for Regional Musculoskeletal Conditions During the Previous 12 Months

Body Region	n (%)
Lower back	40 (16.4)
Knees	35 (14.3)
Shoulders	35 (14.3)
Wrists/Hands	26 (10.7)
Elbows	24 (9.8)
Neck	23 (9.4)
Hips/Thighs	23 (9.4)
Upper back	22 (9.0)
Ankles/Feet	16 (6.6)

Physician consultation during the previous 12 months was most frequently reported for lower back symptoms, 40 participants (16.4%). Knee and shoulder complaints each led to physician consultation in 35 participants (14.3%). Consultation was least frequently reported for ankles/feet, 16 participants (6.6%).

Table 6. Activity Limitation Due to Regional Musculoskeletal Trouble During the Previous 12 Months

Body Region	n (%)
Lower back	40 (16.4)
Shoulders	35 (14.3)
Knees	34 (13.9)
Wrists/Hands	26 (10.7)
Elbows	24 (9.8)
Neck	23 (9.4)
Hips/Thighs	23 (9.4)
Upper back	22 (9.0)
Ankles/Feet	17 (7.0)

Activity limitation due to musculoskeletal trouble during the previous 12 months was most frequently reported for the lower back, 40 participants (16.4%). Shoulder-related activity limitation was reported by 35 participants (14.3%), while knee-related activity limitation was reported by 34 participants (13.9%). Ankles/feet showed the lowest activity limitation frequency, 17 participants (7.0%).

Table 7. Regional Distribution of 7-Day Musculoskeletal Trouble

Body Region	n (%)
Lower back	40 (16.4)
Shoulders	34 (13.9)
Knees	34 (13.9)
Wrists/Hands	26 (10.7)
Hips/Thighs	25 (10.2)
Elbows	24 (9.8)
Neck	22 (9.0)
Upper back	22 (9.0)
Ankles/Feet	17 (7.0)

During the previous 7 days, lower back trouble remained the most frequently reported symptom, affecting 40 participants (16.4%). Shoulder and knee trouble were each reported by 34 participants (13.9%). Recent trouble was least frequently reported for ankles/feet, affecting 17 participants (7.0%).

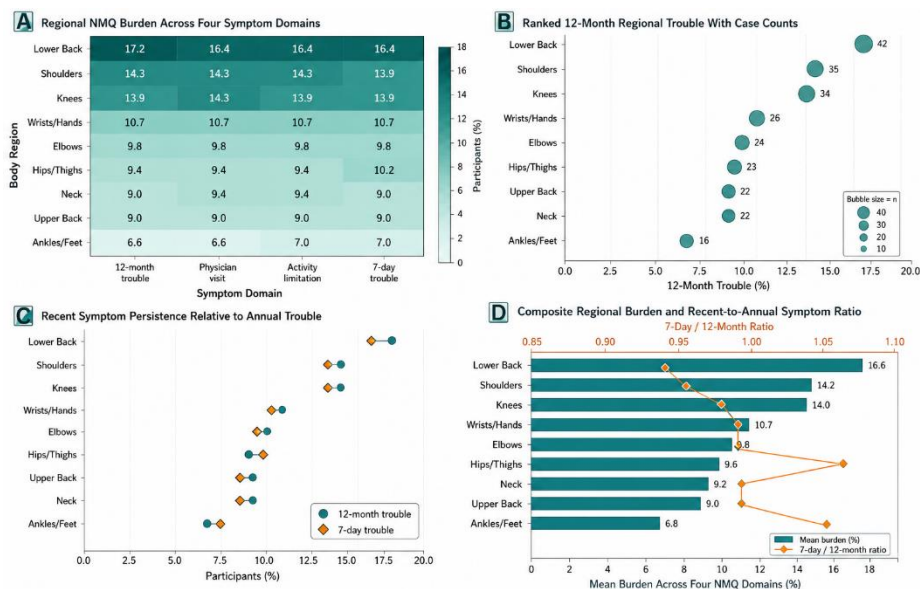


Figure 1 Regional musculoskeletal disorder burden among tailors in Lahore based on Nordic Musculoskeletal Questionnaire domains. Panel A shows the percentage distribution of symptoms across four NMQ domains by anatomical region. Panel B ranks 12-month regional trouble with corresponding participant counts. Panel C compares 12-month and 7-day trouble to show recent symptom persistence relative to annual reporting. Panel D presents the mean regional burden across the four NMQ domains and overlays the 7-day/12-month symptom ratio. Lower back showed the highest overall burden, followed by shoulders and knees, while ankles/feet showed the lowest reported burden.

Table 8. Musculoskeletal Disorder Burden Across Nordic Musculoskeletal Questionnaire Domains

Body Region	12-Month Trouble n (%)	Physician Consultation n (%)	Activity Limitation n (%)	7-Day Trouble n (%)
Lower back	42 (17.2)	40 (16.4)	40 (16.4)	40 (16.4)
Shoulders	35 (14.3)	35 (14.3)	35 (14.3)	34 (13.9)
Knees	34 (13.9)	35 (14.3)	34 (13.9)	34 (13.9)
Wrists/Hands	26 (10.7)	26 (10.7)	26 (10.7)	26 (10.7)
Elbows	24 (9.8)	24 (9.8)	24 (9.8)	24 (9.8)
Hips/Thighs	23 (9.4)	23 (9.4)	23 (9.4)	25 (10.2)
Neck	22 (9.0)	23 (9.4)	23 (9.4)	22 (9.0)
Upper back	22 (9.0)	22 (9.0)	22 (9.0)	22 (9.0)
Ankles/Feet	16 (6.6)	16 (6.6)	17 (7.0)	17 (7.0)

Across all Nordic Musculoskeletal Questionnaire domains, the lower back consistently showed the highest burden, with 42 participants (17.2%) reporting 12-month trouble and 40 participants (16.4%) reporting physician consultation, activity limitation, and 7-day trouble. Shoulders and knees showed the next highest burden across domains. Wrists/hands, elbows, hips/thighs, neck, upper back, and ankles/feet showed lower but still measurable symptom frequencies.

DISCUSSION

This descriptive cross-sectional study examined the frequency and anatomical distribution of musculoskeletal disorders among 244 tailors working in Lahore, Pakistan. The findings showed that musculoskeletal trouble was reported across all assessed anatomical regions, with the highest 12-month frequency observed in the lower back, followed by the shoulders and knees. Lower back trouble was reported by 42 participants (17.2%), shoulder trouble by 35 participants (14.3%), and knee trouble by 34 participants (13.9%). A similar regional pattern was observed for physician consultation, activity limitation, and recent 7-day trouble, indicating that lower back, shoulder, and knee symptoms represented the main musculoskeletal burden in this occupational group. These findings are consistent with the biomechanical demands of tailoring, where prolonged sitting, forward trunk inclination, sustained neck posture, repetitive upper-limb activity, and restricted postural variation may contribute to regional discomfort and functional limitation (1,2).

The predominance of lower back symptoms is clinically plausible because tailoring commonly requires prolonged seated work with repeated trunk flexion and limited lumbar support. In the present study, 240 participants (98.4%) reported working in a sitting posture, and 187 participants (76.6%) worked for 6 or more hours per day. Sustained sitting, especially when combined with forward bending and poorly adjusted workstations, can increase static loading on the lumbar spine and surrounding soft tissues. Previous occupational studies have similarly identified prolonged static posture and awkward working positions as important contributors to low back symptoms among tailors and sewing-machine operators (2,3). The consistency between 12-month lower back trouble (17.2%), activity limitation (16.4%), physician consultation (16.4%), and 7-day trouble (16.4%) suggests that lower back symptoms were not only common but also recently persistent and functionally relevant among affected participants.

Shoulder symptoms were the second most frequently reported regional complaint, affecting 35 participants (14.3%) during the previous 12 months. Shoulder involvement among tailors may be related to sustained arm positioning, repetitive hand activity, continuous fabric handling, cutting, stitching, and static shoulder girdle loading during sewing tasks. Previous studies among tailors and sewing-machine operators have also reported upper-body musculoskeletal complaints, particularly involving the neck, shoulders, wrists, and hands (1,4). In the present study, shoulder-related physician consultation and activity limitation were both reported by 35 participants (14.3%), while 7-day shoulder trouble was reported by 34 participants (13.9%). This close correspondence across symptom domains suggests that shoulder symptoms had a persistent pattern rather than being limited to isolated past complaints.

Knee symptoms were also frequent, with 34 participants (13.9%) reporting 12-month trouble and activity limitation, and 35 participants (14.3%) reporting physician consultation for knee-related symptoms. Although tailoring is primarily considered a seated occupation, knee symptoms may be associated with prolonged flexed sitting, limited lower-limb movement, foot-pedal use, restricted workspace, and repeated

transitions between sitting and standing during cutting, stitching, and finishing tasks. This pattern indicates that tailoring-related musculoskeletal burden should not be limited conceptually to the upper limbs and spine. Lower-limb posture and workstation ergonomics should also be considered when designing preventive strategies for this workforce.

The findings also showed moderate symptom frequencies in the wrists/hands, elbows, hips/thighs, neck, upper back, and ankles/feet. Wrist/hand trouble was reported by 26 participants (10.7%), which is relevant because tailoring involves repetitive hand movements, gripping, fabric manipulation, and fine motor control. Elbow symptoms were reported by 24 participants (9.8%), while neck and upper-back symptoms were each reported by 22 participants (9.0%) during the previous 12 months. These findings are compatible with previous reports that repetitive upper-limb work, static neck posture, and prolonged visual concentration may contribute to musculoskeletal discomfort in sewing-related occupations (4,5). However, the observed regional percentages were lower than those reported in some previous studies, which may reflect differences in study population, work setting, case definition, symptom recall, ergonomic exposure, sampling strategy, or reporting behavior.

The work-related characteristics of the sample provide important context for interpreting the findings. Most participants worked in a sitting posture, most reported having break periods, and more than three-quarters worked 6 or more hours per day. Although 232 participants (95.1%) reported taking breaks, the manuscript did not specify the frequency, duration, quality, or active nature of these breaks. Therefore, the presence of breaks alone cannot be interpreted as adequate ergonomic protection. Similarly, although posture was recorded as sitting, standing, or both, no direct ergonomic assessment of workstation height, chair design, back support, pedal position, lighting, repetition rate, or task rotation was performed. These unmeasured factors may explain variation in symptom burden and should be included in future research.

The study has practical occupational health implications. The concentration of symptoms in the lower back, shoulders, and knees suggests that preventive strategies for tailors should prioritize lumbar support, seated posture correction, workstation adjustment, appropriate chair height, pedal positioning, shoulder unloading, task rotation, and structured movement breaks. Previous ergonomic intervention studies have suggested that workplace modification, exercise programs, posture training, and participatory ergonomic strategies may reduce musculoskeletal complaints in workers exposed to sustained or repetitive tasks (6–8). For tailoring workplaces in Lahore, low-cost interventions may be especially important because many tailors work in small commercial or informal settings where expensive ergonomic redesign may not be feasible.

This study also has several limitations. The cross-sectional design limits interpretation to frequency and distribution of symptoms and does not allow causal inference. Convenience sampling may limit generalizability to all tailors in Lahore or other cities of Pakistan. Symptoms were self-reported and may be affected by recall bias, reporting bias, or differences in pain perception. The study did not include direct ergonomic observation, validated workstation risk scoring, physical examination, or inferential analysis of associations between work-related factors and musculoskeletal symptoms. Although comorbidity status was recorded, the available results do not provide detailed diagnostic categories or adjusted analysis, so its influence on musculoskeletal symptoms cannot be determined. Future studies should use probability-based sampling where feasible, include standardized ergonomic exposure assessment, examine associations between occupational risk factors and regional symptoms, and evaluate the effectiveness of targeted ergonomic interventions among tailors.

Overall, the present study contributes local descriptive evidence on musculoskeletal disorders among tailors in Lahore. The findings indicate that lower back, shoulder, and knee symptoms were the most frequently reported musculoskeletal complaints, with similar patterns across annual symptoms, recent symptoms, activity limitation, and physician consultation. These results support the need for ergonomic awareness, workplace modification, and preventive musculoskeletal health strategies in tailoring and stitching workplaces.

CONCLUSION

Musculoskeletal disorders were reported across multiple anatomical regions among tailors working in Lahore, with the lower back, shoulders, and knees emerging as the most frequently affected areas. Lower back trouble was reported by 42 participants (17.2%), followed by shoulder trouble in 35 participants (14.3%) and knee trouble in 34 participants (13.9%). Similar patterns were observed for recent 7-day trouble, activity limitation, and physician consultation, suggesting that these regions represent the main musculoskeletal burden in this occupational group. The findings highlight the need for ergonomic education, improved seated workstation design, appropriate rest and movement strategies, and preventive occupational health measures for tailors.

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