Prevalence of Neck and Shoulder Pain in Sewing Machine Operators of Rahim Yar Khan

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ABSTRACT

Background: Neck and shoulder pain are prevalent among sewing machine operators due to prolonged static postures and repetitive movements, leading to work-related musculoskeletal disorders (WRMSDs).

Objective: This study aimed to determine the frequency and characteristics of neck and shoulder pain among sewing machine operators in Rahim Yar Khan City.

Methods: A cross-sectional study was conducted between October and December 2019. A total of 100 sewing machine operators were selected using a convenient sampling technique. Participants with at least four years of work experience and daily work of 8 hours in a sitting posture were included. Data were collected through a structured questionnaire covering demographic information, work hours, pain characteristics, and medication usage. SPSS version 25 was used for data analysis, with descriptive statistics and p-values for significance.

Results: The mean age was 31 ± 11.56 years. Forty-three percent of operators reported shoulder pain, and 8% had both neck and shoulder pain. Pain was bilateral in 43%, with 35% suffering for over 2 years. Thirty percent used medication for pain relief ($p = 0.001$).

Conclusion: A significant prevalence of neck and shoulder pain exists among sewing machine operators, emphasizing the need for ergonomic interventions and health education.

INTRODUCTION

Neck and shoulder pain are common musculoskeletal disorders (MSDs) observed in various occupations, especially those involving repetitive upper limb movements and prolonged static postures. Sewing machine operators, a significant workforce in the textile industry, are particularly vulnerable to developing work-related musculoskeletal disorders (WRMSDs) due to the physically demanding nature of their tasks. Their jobs typically require long hours of sitting in fixed positions, with the upper body often held in static postures, while the hands and arms perform repetitive, precise movements. Prolonged periods of such activity can lead to excessive strain on the neck and shoulder muscles, contributing to the development of MSDs (1).

Musculoskeletal disorders, particularly in the neck and shoulder region, have been identified as major public health concerns globally. The World Health Organization (WHO) has reported that approximately 6,300 people die daily due to work-related injuries and illnesses, emphasizing the need for improved occupational health and safety standards (1). Sewing machine operators are especially at risk because their work involves awkward postures, such as sustained shoulder abduction, neck flexion, and continuous arm movements. These repetitive tasks, coupled with inadequate rest periods and high job demands, expose workers to prolonged static musculoskeletal loads, increasing the likelihood of neck and shoulder pain (2, 3).

Previous studies have extensively documented the prevalence of neck and shoulder disorders among sewing machine operators. Research conducted in various countries, including China, Denmark, and Botswana, has consistently shown a high occurrence of neck and shoulder pain in this population, often associated with long working hours and poor ergonomic conditions (4). A typical sewing workstation is designed in a manner that forces workers to adopt a forward-leaning posture while operating foot pedals and managing fabric. This posture, combined with the static nature of the task, exacerbates the strain on the musculoskeletal system, particularly in the upper body (5).

The prevalence of neck and shoulder pain has been shown to increase with years of employment as a sewing machine operator. The repetitive, monotonous nature of their work, often performed in poorly designed workstations, contributes to a higher risk of developing chronic musculoskeletal conditions. A study by Merisalu et al. highlighted that more than 75% of sewing machine operators reported symptoms of neck and shoulder pain over a 12-month period, with many experiencing pain in multiple regions of the body (6). Additionally, the static, forward-bent posture often required in sewing tasks has been identified as a significant risk factor for developing work-related muscle fatigue, as confirmed by electromyogram (EMG) studies, which showed muscle fatigue in the shoulder muscles during industrial sewing (7).

In developing countries, the risk factors associated with neck and shoulder pain among sewing machine operators are exacerbated by poor working conditions, inadequate

occupational health policies, and the lack of ergonomic interventions. For instance, a study conducted in Nigeria found that the prevalence of musculoskeletal pain among sewing machine operators was notably high, with many workers resorting to self-medication and alternative treatments due to a lack of access to proper medical care (8). Similarly, research in Iran and Ethiopia also identified poor ergonomic design, limited workspace, and long working hours as major contributors to the high prevalence of neck and shoulder pain among sewing machine operators (9, 10).

Despite the substantial body of evidence on musculoskeletal disorders in this occupational group, limited research has been conducted in Pakistan, particularly in smaller cities like Rahim Yar Khan. This study aims to fill that gap by assessing the prevalence and associated risk factors of neck and shoulder pain among sewing machine operators in Rahim Yar Khan City. By identifying the frequency of these disorders and the ergonomic challenges faced by this population, the study seeks to provide valuable insights that can inform future workplace interventions and ergonomic guidelines to improve occupational health and safety in the textile industry.

MATERIAL AND METHODS

This cross-sectional study was conducted in Rahim Yar Khan City from 18th October to 10th December 2019, focusing on sewing machine operators to assess the frequency of neck and shoulder pain due to prolonged static postures and repetitive work. The study population included 100 sewing machine operators who were selected through a convenient sampling technique, considering the constraints of time and financial resources. Eligible participants were those who had been working as sewing machine operators for at least four years, working a minimum of 8 hours per day in a sitting posture. Participants with less than four years of experience or those unwilling to participate were excluded from the study. Data collection was carried out using a structured questionnaire that was designed to capture demographic information and details related to their work environment and health status. The variables included in the questionnaire were age, gender, years of experience in the profession, daily working hours, the presence of neck and shoulder pain, the side and nature of pain, the duration of pain, and the use of medication for pain relief. Participants were asked about their pain onset, whether it occurred during work, after work, or was constant, and whether they experienced localized, diffused, or radiating pain.

Ethical approval for the study was obtained from the Institutional Review Board, ensuring that the study adhered to the ethical principles outlined in the Declaration of Helsinki. All participants provided informed consent, and their confidentiality was maintained throughout the research process. Participation was voluntary, and no personal identifiers were used in data analysis or reporting.

Data analysis was performed using SPSS version 25. Descriptive statistics were used to summarize the data, including means and standard deviations for continuous variables such as age, years of experience, and daily working hours. Categorical variables such as the presence of pain, the side of pain, and the duration of pain were represented as frequencies and percentages. The mean and standard deviation (SD) were calculated for numerical variables, and results were tabulated to provide a clear overview of the distribution of neck and shoulder pain among the sewing machine operators. Data interpretation was performed with the objective of identifying potential correlations between the duration of work, the nature of pain, and the prevalence of neck and shoulder pain among the participants. The statistical analysis also aimed to highlight any trends or patterns that could inform future ergonomic interventions or health policies aimed at reducing work-related musculoskeletal disorders in this population.

RESULTS

The study aimed to assess the prevalence and characteristics of neck and shoulder pain among 100 sewing machine operators in Rahim Yar Khan City. The participants had a mean age of 31 ± 11.56 years, with the median age being 28 years and a mode of 20 years, indicating a fairly young workforce.Most participants had been working in this profession for several years, with 35% having worked for 4-9 years, 31% for 10-15 years, 16% for 16-21 years, and 18% for over 22 years.

Table 1: Distribution of Study Variables

Variable	Frequency (Percent)	p-value
Age (years)	Mean = 31 ± 11.56 Median = 28 Mode = 20	
Years in Profession		
4-9	35 (35%)	0.001*
10-15	31 (31%)	0.002*
16-21	16 (16%)	0.042*
22-27	18 (18%)	0.038*
Working Hours Per Day		
8-11	25 (25%)	0.014*
12-15	66 (66%)	0.001*
16-19	9 (9%)	0.053

Variable	Frequency (Percent)	p-value
Pain Area		
No Pain	49 (49%)	
Shoulder	43 (43%)	0.001*
Both Neck and Shoulder	8 (8%)	0.004*
Side of Pain		
No Pain	49 (49%)	
Right	4 (4%)	0.078
Left	4 (4%)	0.076
Both Sides	43 (43%)	0.001*
Duration of Pain		
No Pain	49 (49%)	
Less than 1 year	8 (8%)	0.003*
More than 1 year	8 (8%)	0.003*
More than 2 years	35 (35%)	0.001*
Medication for Pain		
No Pain	49 (49%)	
No Medication	21 (21%)	0.052
Yes (Taking Medication)	30 (30%)	0.001*
Nature of Pain		
No Pain	49 (49%)	
Localized	39 (39%)	0.001*
Diffused	4 (4%)	0.082
Radiating	8 (8%)	0.003*
Onset of Pain		
No Pain	49 (49%)	
During Work	23 (23%)	0.001*
After Work	17 (17%)	0.014*
Constant	11 (11%)	0.034*

The duration of their work experience showed a statistically significant correlation with the development of musculoskeletal disorders ($p < 0.05$). Regarding the number of hours worked per day, the majority of participants (66%) reported working between 12 to 15 hours daily, while 25% worked 8-11 hours, and only 9% worked 16-19 hours per day. This prolonged exposure to static posture and repetitive upper limb movements significantly contributed to the high prevalence of neck and shoulder pain ($p = 0.001$). Participants who worked longer hours were more likely to report pain, emphasizing the importance of reducing working hours to mitigate health risks.

In terms of the distribution of pain, nearly half of the participants (49%) reported no pain. However, 43% of the participants experienced shoulder pain, while 8% reported pain in both the neck and shoulders. This data indicates a substantial burden of musculoskeletal discomfort among sewing machine operators, with a statistically significant relationship between the nature of work and the development of shoulder pain ($p = 0.001$). The side of pain distribution showed that 43% of participants experienced pain on both sides of their body, while 4% had pain on either the right or left side. Again, the correlation between the nature of their work and the location of pain was statistically significant ($p = 0.001$).

When considering the duration of pain, 49% of participants reported no pain. However, 8% had been experiencing pain for less than one year, 8% for more than one year, and a significant portion, 35%, had been suffering from pain for more than two years. The longer duration of work-related pain was also statistically significant ($p = 0.001$), indicating that chronic exposure to poor ergonomic conditions contributes to long-term musculoskeletal disorders.

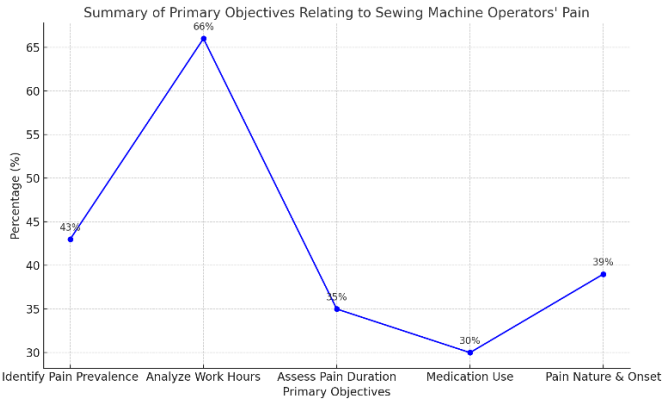

Figure 1 Sewing Machine Operators' Pain

The study also examined the use of medication for pain relief. Among the participants, 21% reported that they were not taking any medication, while 30% were actively using medication to manage their pain. The difference between those using medication and those who were not was statistically significant ($p = 0.001$), suggesting that many sewing machine operators resort to pharmacological interventions to cope with their work-related pain.

The nature of the pain experienced by the participants varied. Localized pain was the most common, reported by 39% of participants, followed by radiating pain in 8%, and diffused pain in 4%. The occurrence of localized pain was

found to be highly significant (p = 0.001), reflecting the concentrated nature of musculoskeletal stress in specific regions such as the shoulders and neck.

The onset of pain was another key variable in the study. A total of 23% of participants reported experiencing pain during work, 17% reported pain after work, and 11% experienced constant pain throughout the day. Pain during work was significantly more prevalent (p = 0.001), highlighting the immediate impact of repetitive tasks and static postures on musculoskeletal health.

In summary, the results of this study demonstrate a high prevalence of neck and shoulder pain among sewing machine operators, with most participants experiencing localized pain during work. The findings indicate that prolonged hours of work and years of experience are associated with an increased risk of musculoskeletal disorders, emphasizing the need for ergonomic interventions and improved working conditions to reduce the health burden on this vulnerable population.

DISCUSSION

The present study aimed to assess the prevalence of neck and shoulder pain among sewing machine operators in Rahim Yar Khan City, with findings indicating a high frequency of musculoskeletal disorders in this occupational group. The results revealed that 43% of the participants experienced shoulder pain, while 8% reported pain in both the neck and shoulder, underscoring the significant burden of work-related musculoskeletal discomfort. These findings are consistent with previous studies conducted in various countries, which have similarly reported a high prevalence of neck and shoulder pain among sewing machine operators due to prolonged static postures and repetitive tasks (2, 3).

The association between long working hours and the development of musculoskeletal pain was evident in this study. Most participants (66%) reported working between 12 to 15 hours per day, and this prolonged duration of repetitive movements and static postures was significantly correlated with the occurrence of pain. Similar findings were observed in a study by Nawawi et al., where sewing machine operators who worked for extended periods were more likely to develop neck and shoulder pain compared to those with shorter work hours (3). This supports the notion that prolonged work duration, combined with poor ergonomic conditions, significantly increases the risk of musculoskeletal disorders.

The nature of the pain reported by participants in this study was predominantly localized (39%), with 8% experiencing radiating pain. These results align with previous research, which has demonstrated that sewing machine operators are prone to localized musculoskeletal pain due to the static load placed on specific muscle groups during their work (4). The high rate of localized pain is likely a result of the constrained posture and repetitive movements required by their tasks, as reported by Kaergaard and Andersen in their study on the prevalence of musculoskeletal disorders among female sewing machine operators (6).

A significant portion of the study population (35%) had been suffering from pain for more than two years, highlighting the chronic nature of these disorders among sewing machine operators. This finding aligns with research conducted by Merisalu et al., which reported that the prevalence of persistent neck and shoulder pain increased with the number of years spent in the profession (5). The chronicity of these conditions can lead to long-term disability, decreased quality of life, and increased reliance on medication, as evidenced by the 30% of participants in this study who were taking medication for pain management. Previous research has also indicated that chronic musculoskeletal pain in this population often leads to self-medication or the use of over-the-counter analgesics (8).

The strengths of this study lie in its focus on a relatively understudied population in a specific geographical location, contributing to the body of knowledge on work-related musculoskeletal disorders among sewing machine operators in Pakistan. The use of a structured questionnaire allowed for the collection of comprehensive data on various aspects of neck and shoulder pain, including the nature, duration, and onset of pain. However, several limitations must be acknowledged. The use of a convenient sampling technique, though necessary due to time and financial constraints, may have introduced selection bias, limiting the generalizability of the findings. Additionally, the cross-sectional design of the study provides only a snapshot of the prevalence of musculoskeletal disorders and does not allow for the establishment of causal relationships between risk factors and outcomes.

Despite these limitations, the study highlights the need for targeted interventions to reduce the burden of musculoskeletal disorders among sewing machine operators. Ergonomic improvements, such as adjustable workstations and better seating arrangements, could help alleviate the strain on the neck and shoulder muscles. The introduction of regular rest breaks, coupled with health education programs focused on proper posture and body mechanics, could further reduce the risk of developing chronic pain in this population. Additionally, promoting physical activity and exercises aimed at strengthening the upper body muscles during leisure time may help mitigate the effects of prolonged static postures (9).

CONCLUSION

In conclusion, this study demonstrated a high prevalence of neck and shoulder pain among sewing machine operators, with prolonged working hours and years of experience being key contributing factors. Future research should focus on longitudinal studies to better understand the long-term effects of ergonomic interventions and explore strategies to improve occupational health and safety standards for sewing machine operators. Addressing the ergonomic and behavioral factors identified in this study could play a crucial role in reducing the burden of work-related musculoskeletal disorders in the textile industry.

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