JOURNAL OF LIAONING TECHNICAL UNIVERSITY (NATURAL SCIENCE EDITION)
ISSN: 1008-0562

PROPENSITY OF NECK PAIN AND ITS IMPACTS ON WORK PERFORMANCE AMONG SEWING MACHINE OPERATORS: A CROSS-SECTIONAL SURVEY

Eman Javed[1], Amber Iftikhar[1], Ayesha Javed[1], Irrij Javed Jadoon[1], Laiba Sajid[1], Zupash Sadaqat, Saima Babar[1], Sumbal Muhammad Shoaib[1], Adeeba Tabassum[1], Pakeza Sarwar[1]

[1]Women Institute of Rehabilitation Sciences, Abbottabad, Pakistan

ABSTRACT

Introduction: One of the most familiar musculoskeletal issues encountered by sewing machine workers is neck pain. Long period of time spend in this uncomfortable position might lead to neck ache. This kind of work demands a great deal of concentration, attentiveness and visual focusing that might lead to the cited condition.

Objectives: To find out the prevalence and intensity of neck pain among sewing machine operators of Abbottabad.

Methods: Descriptive cross sectional study design was chosen after the approval from the Institutional Review Board of Women Institute of Rehabilitation Sciences, Abbottabad. A sample size of 377 was deemed appropriate for the study, calculated via raosoft sample size calculator. Northwick Park Neck Pain Questionnaire (NPQ) was administered to the subjects selected in order to analyze the variables. Data was primarily collected by employing convenience sampling technique from the city of Abbottabad. The consent and willingness of the participants were ensured. Ethical guidelines were duly followed throughout the study.

Results: Out of the sample selected, 283 were males and 94 were females. Around 72.7% participants reported having neck pain and most of the operators ((40.6%) were found working for almost 7 years. 56.5% of operators were suffering from neck pain for more than one year. 49.6% were suffering with neck pain during activity and 52.5% had intermittent neck pain. Majority of participants' sleep was not interrupted by neck pain.

Conclusion: Sewing machine operators of Abbottabad have high prevalence and intensity of neck pain with faulty posture and continuous working hours as major risk factors.

Keywords: Neck pain, Sewing machine operators, Prevalence, Intensity.

INTRODUCTION:

Musculoskeletal problems have become more prevalent globally during the past few decades. Sewing machine operators are at a higher risk of developing such condition (1). In general, work-related musculoskeletal problems are caused by repeated damage or strain on muscles, tendons, joints, or bones over time, as a result of repeated labor without following ergonomic principles (2). Work-related musculoskeletal disorders (WRMD) are musculoskeletal injuries due to work-related activities (3).

In the general population, the frequency of neck discomfort among musculoskeletal problems varies from 0.4% to 86.8% (mean: 23.1%) and women have a higher incidence than men. Moreover, high-income countries have a higher prevalence than low and middle-income countries, and metropolitan areas have a higher prevalence than rural ones. The onset and progression of neck discomfort are affected by numerous environmental and psychological factors. A neck ache is pain that develops in neck area (4). One of the most frequent musculoskeletal problems in the overall population is neck discomfort. Acute neck discomfort is caused by bad posture, neck strains, work- related and sports-related injuries, and mental conditions (5).

Neck pain can range from mild irritation to intense disabling pain. Sewing machine operation is a monotonous and precise occupation that requires employers who use sewing machines must lean in to see the way of operation and if the machine is not appropriately matched to the user, serious health issues may result. Neck pain is one of the health concerns, which has a negative impact on the workers' standard of living, work efficiency, and production (4,5).

The purpose of our study is to evaluate the frequency and intensity of neck pain in sewing machine users and to our knowledge, there is no evidence that this type of research has already been done in Abbottabad. There is vast amount of data about neck pain, but the focus of this study was to look into the issues that are often ignored because there is less data present on sewing machine operators related to neck pain (6). This study will also aid in the development of new ideas in the area of sewing machine operators' posture and ergonomics that needs improvement.

METHODOLOGY:

Descriptive cross sectional study design was chosen after the approval from the Institutional Review Board of Women Institute of Rehabilitation Sciences, Abbottabad (Approval Ref. No: 1894). A sample size of 377 was deemed appropriate for the study with a 5% margin of error and a 95% confidence level, calculated via online raosoft sample size calculator. Northwick Park Neck Pain Questionnaire (NPQ) was administered to the subjects selected in order to analyze the variables. Data was primarily collected by employing convenience sampling technique from various shops and boutiques of the city of Abbottabad. The consent and willingness of the participants were ensured. Ethical guidelines were duly followed throughout the study. The duration of study was 6 months. The following criteria was gauged to recruit subjects:

a) **Inclusion criteria:**

- Gender: Male and Female sewing machine operators
- Age group: 18-60 years
- Minimum of 8 working hours
- Minimum working experience of 1 year (6,7)

b) **Exclusion Criteria:**

- Radiating pain to arm
- Any type of previous injury related to neck
- Any type of previous surgery related to neck (8)

DATA COLLECTION PROCEDURE:

After the approval of research proposal from the Institutional Review Board of Women Institute of Rehabilitation Sciences, Abbottabad, the study formally began. The Northwick Park Neck Pain Questionnaire (NPQ) containing 14 items with demographic characteristics was implicated to the subjects selected according to inclusion criteria. The consent form was signed by the subjects and the demographic details along with the questionnaire were filled by the subjects.

Table No. 1: Age Group Descriptive Statistics

Age Group	Frequency	Percentage
18-30 years	169	44.8%
31-40 years	112	29.7%
41-50 years	69	18.3%
Above 50 years	27	7.2%
Total	377	100%
Gender Descriptive Statistics		
Gender	**Frequency**	**Percentage**
Male	283	75.1%
Female	94	24.9%
Total	377	100%

DATA ANALYSIS PROCEDURE:

Analysis of the collected data was performed through SPSS Version 24. Data entry was performed manually and then was further organized into percentages and frequencies. The organized data further provided frequency variables and cross tabulations to determine the association by using descriptive statistical approaches.

RESULTS:

- **Demographic Details:**

Table no.1 shows the details regarding age groups and gender of the recruited participants.

- **Work Descriptives:**

Table No. 2 demonstrates the working hours and overall work experience of sewing machine operators.

Table No. 2: Work Descriptives

Working Hours		
Description	**Frequency**	**Percentage**
<8 hours/day	152	40.4%
8 hours/day	51	13.5%
>8 hours/day	174	46.2%
Total	377	100%
Working Experience		

Description	Frequency	Percentage
1-5 years	153	40.6%
6-10 years	92	24.4%
>10 years	132	35%
Total	377	100%

- **Neck Pain:**

Table No. 3 and 4 depict the details about the presence of Neck pain and other relevant descriptive variables such as duration, severity, onset, location, pattern and radiation of neck pain.

Table No. 3: Neck Pain

Description	Frequency	Percentage
Yes	274	72.7%
No	103	27.3%
Total	377	100%

Table No. 4: Neck Pain Description

Duration of Neck Pain		
Duration	**Frequency**	**Percentage**
Years (>1 year)	213	56.5%
Months (<1 year)	58	15.4%
Weeks (1-4)	3	8%
Total having Pain	274	72.7%
No Pain	103	27.3%
Severity of Pain (NPRS)		
Intensity	**Frequency**	**Percentage**
Mild	114	30.2%
Moderate	131	34.7%
Severe	29	7.7%
Total	274	72.7%
Radiating Pain to Other Areas		
Radiation of Pain	**Frequency**	**Percentage**
Yes	68	18.0%
No	206	54.6%
Total	274	72.7%
Onset of Neck Pain		
Onset	**Frequency**	**Percentage**
At Rest	24	6.4%
During Activity	187	49.6%
At Night	20	5.3%
All the time	43	11.4%
Total	274	72.7%
Exact Location of Neck Pain		
Location	**Frequency**	**Percentage**
Neck	190	50.4%
Cervico-scapular	11	2.9%
Shoulder	5	1.3%
All areas above	68	18%
Total	274	72.7%
Neck Pain Pattern		
Pain Behavior	**Frequency**	**Percentage**
Constant	76	20.2%
Intermittent	198	52.5%
Total	274	72.7%

- **Effects on Work Performance:**

Table No. 5 provides the details about the effects of neck pain on work performance.

Table No. 5: Effect of Neck Pain on Work Performance		
Work performance reduced due to neck pain	**Frequency**	**Percentage**
Yes	168	44.6%
No	106	28.1%
Total	274	72.7%

- **Effects on Sleep:**

Table No. 6 provides the details about the effects of neck pain on sleep.

Table No. 6: Neck Pain and Sleep		
Pain and Sleep	**Frequency**	**Percentage**
My sleep is never disturbed by pain	116	30.8%
My sleep is occasionally disturbed by the pain	91	24.1%
My sleep is regularly disturbed by pain	52	13.8%
Because of pain, I have <5 hours of sleep	15	4%
Total	274	72.7%

- **Test Of Association (Neck Pain with Working Experience):**

Table no. 7 shows that out of 274(72.7%) having neck pain, 87(31.8%) were working for 1-5 years, 80(29.2%) were working for 6-10 years, and 107(39.1%) were working from more than 10 years. When chi square test was applied to check for the association between neck pain and years of work, it was found that subjects working from 1 year onwards had significant association between their neck pain and years of work with a p- value of <0.000 for all working experience categories.

Table No. 7: Test of Association (*P-value= Chi-square test applied) *Neck Pain with Working Experience						
Since how many years you have been working in this profession?					Total	**P-value**
		1-5 years	6-10 years	>10 years		
Do you have neckpain?	Yes	87(31.8%)	80(29.2%)	107(39.1%)	274(72.7%)	**0.000***
	No	66(64.1%)	12(11.7%)	25(24.3%)	103(27.3%)	
Total		153(40.6%)	92(24.4%)	132(35.0%)	377(100.0%)	

- **Test Of Association (Neck Pain with Working Hours):**

Table no. 8 shows that out of 274(72.7%) having neck pain, 99(36.1%) were working 8 hours a day, 37(13.5%) were working less than 8 hours a day and 138(50.4%) were working more than 8 hours daily. When chi square test was applied to check for the association between neck pain and daily working hours, it was found that subjects working from 1 year onwards had significant association between their neck pain and working hours with a p- value of <0.016 for all working hour categories.

Table No. 8: Test of Association (*P-value= Chi-square test applied) *Neck Pain with Working Hours

How many hours per day do you work?					Total	P-value
	8 hours		<8 hours	>8 hours		
Do you have neck pain?	Yes	99(36.1%)	37(13.5%)	138(50.4%)	274(72.7%)	**0.016***
	No	53(51.5%)	14(13.6%)	36(35.0%)	103(27.3%)	
Total		152(40.4%)	51(13.5%)	174(46.2%)	377(100.0%)	

DISCUSSION

The results of a study titled "Prevalence, risk factors, description and intensity of neck pain in sewing machine operators", conducted by Muhammad Kumail Hassan Raza, et al. in 2017 showed that among the 191 participants, 56% reported having neck pain, compared to 44% who reported having no such pain (9) while in our study, 72.7% reported having neck pain and 27.3% reported having no neck pain. This is greater than the reported study.

Another study was carried out in 2018 by Tafese A et al. on sewing machine operators to analyze neck pain prevalence. In the study, there were 419 sewing machine operators in total, of which 391 (93.3%) were men and 28 (6.7%) were women. The age range of 30-39 years was represented by the majority of the respondents 135(32.2%). It was found that total 45.8% participants reported neck pain (10). In our study, there were 377 sewing machine operators in total, of which 283 (75.1%) were men and 94(24.9%5) were women. The age range of 18-30 years was represented by majority of the respondents 169(44.8%) in our study. Almost 72.7% of subjects reported neck pain which is higher than the previously reported study.

Biadgo GH et al. conducted a research in Mikelle City, Northern Part of Ethiopia. The objective of this study was to find out the burden of neck ache and related factors in sewing machine operators. There were enrolled 297 operators of sewing machines. In this study, 42.3% sewing machine operators experienced neck pain from more than a year (11) while in our study 377 sewing machine operators were included in the study and 58.5% were suffering from neck pain more than a year.

CONCLUSION:

Neck pain is a common condition in Pakistan as well as all over the world. Sometimes neck pain results in physical disability and generates significant societal costs. The findings of this study showed that there is 72.7% prevalence of neck pain among sewing machine operators of Abbottabad. In this

study, continuous work without break, prolong sitting, poor setting arrangements and highly repetitive activity are associated with neck pain. Poor posture is also associated with severity of neck pain. Thus, sewing machine operators can fully concentrate on their sewing activity by preventing these factors. There is an association between neck ache and

the gender of the participants. Females are more likely to to develop neck ache with the prevalence rate of 90.4% as compare to males with prevalence rate of 66.7%. There is also an association between neck pain and working experience. The prevalence of neck pain in operators working for more than 15 years (81%) is greater than the operators working from 0 to 7 years (56.4%).

LIMITATIONS:

The limitation to our study was that the number of female sewing machine operators was less as compared to male sewing machine operators. This is due to the fact that most of the females were confined to their houses and usually work within the boundaries of their own houses.

RECOMMENDATIONS:

The main recommendations would be:

1. The sample size of female sewing machine operators in our study was very low therefore we recommend further research with more number of female participants for better results.
2. Awareness of better sitting postures, proper sitting arrangements and correct sewing machine placements in order to minimize neck pain among Tailors.
3. Campaigns for the awareness of significance of physiotherapy along with medications for operators suffering from neck pain in order to provide relief.
4. Ergonomics advise and Exercise protocol.

REFERENCES:

1. Bodade AV, Thakrar G. Correlation of Pain and Kinesiophobia in Tailors with Neck Pain.
2. Rempel DM, Wang P-C, Janowitz I, Harrison RJ, Yu F, Ritz BR. A randomized controlled trial evaluating the effects of new task chairs on shoulder and neck pain among sewing machine operators: the Los Angeles garment study. LWW; 2007.
3. Maduagwu S, Sokunbi G, Bwala M, Akanbi O, Jajere A, Jaiyeola O, et al. Work-related musculoskeletal disorders among self employed sewing machine operators in maiduguri, Nigeria.
4. Biadgo GH, Tsegay GS, Mohammednur SA, Gebremeskel BF. Burden of Neck Pain and Associated Factors Among Sewing Machine Operators of Garment Factories in Mekelle City, Northern Part of Ethiopia, 2018, A Cross-Sectional Study. Safety and Health at Work. 2021;12(1):51-6.
5. Wagachchi D, Jayamanne M, Adikari A, Kodagoda I, Mudalige Y, Perera G. Prevalence of forward head posture and its' relationship with neck pain among sewing machine operators in two selected garment factories in Kaluthara district. 2020.
6. Raza MKH, Khalid M, Javed MA, Naseer R. Prevalence and Intensity of Neck Pain in Sewing Machine Operators. Pakistan Journal of Physical Therapy (PJPT). 2021:14-8.

7. Khatun T. Prevalence of neck pain among the female Sewing machine operators: Bangladesh Health Professions Institute, Faculty of Medicine, the University …; 2018.
8. A. DR, Patelv. PREVALENCE OF NECK PAIN AMONG TAILORS IN NORTH GUJARAT - A CROSS SECTIONAL STUDY. International Journal of Scientific Research. 28 September 2021;10(4- April-2021).
9. Hassan K, Khalid M, Zafar S, Ahmad A, Gilani SA, Imran A. Prevalence, risk factors, description and intensity of neck pain in sewing machine operators. Int J Scient Eng Res. 2017;8(7):1040.
10. Tafese A, Kebede G, Medhin G, Mariam T, Kindu M. Prevalence of Neck Pain among Self Employed Sewing Machine Workers in Northern Gondar, Amhara Region, Ethiopia. J Community Med Health Educ. 2018;8(610):2161-0711.1000610.
11. Biadgo GH, Tsegay GS, Mohammednur SA, Gebremeskel BF. Burden of Neck Pain and Associated Factors Among Sewing Machine Operators of Garment Factories in Mekelle City, Northern Part of Ethiopia, 2018, A Cross-Sectional Study. Safety and Health at Work. 2021;12(1):51-6.