

MANUSCRIPT TITLE: EPIDEMIOLOGY AND OCCUPATIONAL  
CORRELATES OF MECHANICAL NECK PAIN AMONG SURGEONS: A  
CROSS-SECTIONAL STUDY

Zainab Noor Qazi<sup>1</sup>, Mahnoor Younas<sup>2</sup>, Sana Sabir<sup>3</sup>, Ayesha Farrukh<sup>4</sup>, Soaiba Gondal<sup>5</sup>,  
Bushra Riaz<sup>6</sup>, Madiha Fayyaz<sup>7</sup>, Rida Razaq Janjua<sup>8</sup>

<sup>1</sup>Senior Lecturer, Margalla Institute of Health Sciences

<sup>2</sup>Physiotherapist, UK

<sup>3</sup>Lecturer, National Excellence Institute

<sup>4</sup>Clinical Physiotherapist, Ayesha Rehabilitation and home services

<sup>5</sup>Physiotherapist, Shifa Rehab Department

<sup>6</sup>Student, Margalla Institute of Health Sciences

<sup>7</sup>Instructor, Army Medical Corps

<sup>8</sup>Lecturer, Margalla Institute of Health Sciences

<sup>1</sup>[zainabnoorqazi@gmail.com](mailto:zainabnoorqazi@gmail.com), <sup>2</sup>[mahnoor.sheikh7@gmail.com](mailto:mahnoor.sheikh7@gmail.com), <sup>3</sup>[sanasabir1998@gmail.com](mailto:sanasabir1998@gmail.com),  
<sup>4</sup>[ayeshafarrukharoha@gmail.com](mailto:ayeshafarrukharoha@gmail.com), <sup>5</sup>[soaibahaider2021@outlook.com](mailto:soaibahaider2021@outlook.com), <sup>6</sup>[bushrariiaz42@gmail.com](mailto:bushrariiaz42@gmail.com),  
<sup>7</sup>[madihafayyaz44@gmail.com](mailto:madihafayyaz44@gmail.com), <sup>8</sup>[ridarazaq95@gmail.com](mailto:ridarazaq95@gmail.com)

DOI: <https://doi.org/10.5281/zenodo.17973449>

**Keywords**

Mechanical Neck Pain, Surgeons,  
Neck Pain, Duration of Surgery,  
Posture during surgery

**Article History**

Received: 18 October 2025

Accepted: 30 November 2025

Published: 18 December 2025

Copyright @Author

Corresponding Author: \*

Zainab Noor Qazi

**Abstract**

**Background**

Neck pain is defined as the discomfort, or pain, that is experienced in the neck area which may or may not extend to the upper limbs and lasts at least one day. Mechanical neck pain (MNP) refers to pain that occurs in the neck due to micro-trauma in the neck muscles, ligaments, cervical spine region joint or bones. This type of pain can be a result of living in a posture that causes stress to the neck or awkward posture taken during the normal day-to-day life activities of excessive stress and force.

**Objective**

The primary objective of this study was to establish the prevalence of mechanical neck pain among surgeons and the identification of the risk factors of mechanical neck pain among surgeons.

**Methods**

The study was a cross-sectional study that was carried out at Watim Medical and Dental College between September 2024 and February 2025. 278 surgeons with mechanical neck pain and a 3 months duration were involved in the study. The participants used were recruited by non-probability convenient sampling. The intensity of pain was measured with the help of numeric pain rating scale. The assessment and confirmation of Mechanical Neck Pain was done using the self-designed questionnaire and physical assessment.

**Results**

The prevalence of mechanical neck pain among the surgeons was significant. The risk factors like duration of surgery; gadget use and position during surgery also

contributes to neck pain. However, no statistically significant association was found between the risk factors and mechanical neck pain among surgeons.

### **Conclusion**

Neck pain is prevalent and risk factors are present among surgeons. Although, a minority of the surgeons breaks off work because of mechanical neck pain, the majority of the surgeons experience work related mechanical neck pain. Top in the list were the general surgeons.

## **INTRODUCTION**

Neck pain is defined as the pain or discomfort that is experienced in the area of the neck and may or may not extend to one or both upper limbs and lasts at least one day. The variability of the symptoms makes it harder to currently correctly diagnose and treat neck pain as the constellation of symptoms does not apply in all cases [1]. The ability to have different definitions and experience of neck pain in different individuals suggests the need to have a universal approach to diagnostic and treatment. The provision of treatment guidelines that put into account such factors assists physicians to come up with interventions that best suit the individual and result in improved health outcomes thereby alleviating the impacts of the neck pain to the patients and the society.[2]

Mechanical neck pain is described as pain experienced in the neck area, which comes as a result of micro-trauma of the muscles, ligaments, and joint or bones of the cervical region of the spine. Such pain might be as a result of the stay in a situation that puts a strain on your neck or that awkward posture you take as a result of your day to day activities that involve excessive strain and force. It is usually limited to the neck area and can be accompanied by the feeling of stiffness and loss of movement of the neck and occasional mild pain radiation. It is usually unrelated with nerve root lesion or any other notable pathology process hence it can be classified as non-specific neck pain.

MNP has been demonstrated to possess structural and functional and pathological constituent. It is hypothesized that the primary causes of MNP in different studies are muscle unbalance, posture distortion and repetitive use. These factors may result in overworking of the muscles, tension and even lead to the injuries of the muscle. Also, degeneration of disc, osteophyte growth, and

arthropathy of facet joints of cervical spine have been included among the causes of mechanical neck pain. Mechanical neck pain has been found to have several psychosocial factors such as stress, anxiety, and depression to be considered as major maintaining and aggravating factors of mechanical neck pain. MNP can also be a consequence of whiplash and other traumas, although the pain is not necessarily connected with some obvious injury.[3]

The prevalence rate of neck pain was approximately 2,696.5 per 100000 in 2019 and age-standardized. The disease cuts across a big percentage of the world and the incidence of neck pain increases with age predominantly among women. The pattern of neck pain is not any different to the global burden of LBP; neck pain has been nearly stagnant in its incidence between 1990 to 2019; though it is anticipated that the number of individuals with neck pain will grow in the future due to population increase as well as the ageing population [4] .

Research has shown that mechanical neck pain is linked with some work-related hazards such as the use of computers and insufficient ergonomic production and awkward neck positions.[5]. Mechanical neck pain is a significant problem to surgeons specifically in orthopedics and spine surgery. This is evidenced by this expose of these professionals to a plethora of occupational risk factors that bring about musculoskeletal disorders. Some of them are spending majority of their time in non-neutral positions, repetitive actions and maintaining unnatural positions during surgeries all of which cause pressure on the neck. Moreover, the musculoskeletal strain upon the neck structure of the creature resulting in the neck soreness may be added by the working position of the magnifying devices like loupes.

Besides physical risks, the work stress, excessive hours, and workload imposed by the surgeries could treat and strengthen the occurrence of the neck pain in surgeons. Some reports have also reported that age, which may elevate the age of surgeons or high stress may also be identified as musculoskeletal risks [6].

Various studies have confirmed that surgeons experience neck pain and that the overwhelming percentage of them develops symptoms that interfere with their operations as they undertake their duties. The frequency of MNP in this category varies, though, depending on the information sources it can range between 60 and 70 percent, the relative density may be increased in the individuals having extensive work experience or working in professions that demand labor, among which are poor workstation design and lack of neck and back support [7]

The study design narrowed down to the focus of mechanical neck pain in the surgeons as life-style of current surgeons is turning into a more sedentary one. It is interesting to note that our study establishes new risk factors that add to the current scenario such as age, gender, marital status, diabetes, hypertension and gadget use that is not available in other research. The study will offer superior adjustment and ergonomics to the surgeons and they are able to work longer without getting exhausted.

## METHODOLOGY

The study was cross-sectional research conducted in Watim Medical and Dental College, Islamabad between September 2024 and February 25 following the consent of Institutional Review board of Yusra institute of Rehabilitation Sciences, Ref. No. YIRS/PRIN/24/33. Rao soft was used to compute the sample size 278 surgeons with confidence interval of 95 percent and 50 percent response rate as well as 5 percent margin of error. The non-probability convenient sampling technique was applied to select the participants. Male and female surgeons experiencing mechanical neck pain of 3 months length were selected to take part in the study. Patients with neck pain, except mechanical neck pain, trauma, cervical spine injury, migraine, infection or cervical radiculopathy were out of the

study. Self-structured questionnaire and neck pain rating scale were used in collecting the data. The NPRS is a device that is utilized to gauge the severity of pain. ICC of NPRS scale is (ICC0.67) in patients having mechanical neck pain.[8]. Surgeons completed self- structured questionnaire with the informed consent attached. The questionnaires were printed in paper copies and handed out to surgeons at the hospital. The surgeons were also questioned on intensity of pain, positions of muscles that fatigue and general positions that cause more neck pain in addition to demographic information.

The study data were entered, analyzed, and represented using IBM SPSS version 23 in the form of tables and charts.

## RESULTS

The participants in the study were 278 surgeons in total and the response rate was 100 percent. The average age constituted 38.85 standard deviation of 8.782 out of 278 surgeons and 152 (54.6) and 126 (45.3) male and female surgeons respectively. Dissemination of the specialties among respondents indicates that, the General surgeons have the highest representation with 33.5 percent of the valid responses. In third place, dental surgeons are followed where they represent 20.9 percent of the respondents. Others include, Orthopedic surgeons 14.4% Neurologists: 7.9% Gynecologists 7.6% Urologists 7.4% Cardiac surgeons 4.7%. 86.3% of the respondents agreed that they do not have a history of diabetes but 81.6 percent of the participants indicated they do not have a history of hypertension. (Figure 1)

Figure 1: Frequency of Distribution of Specialty Among Surgeons

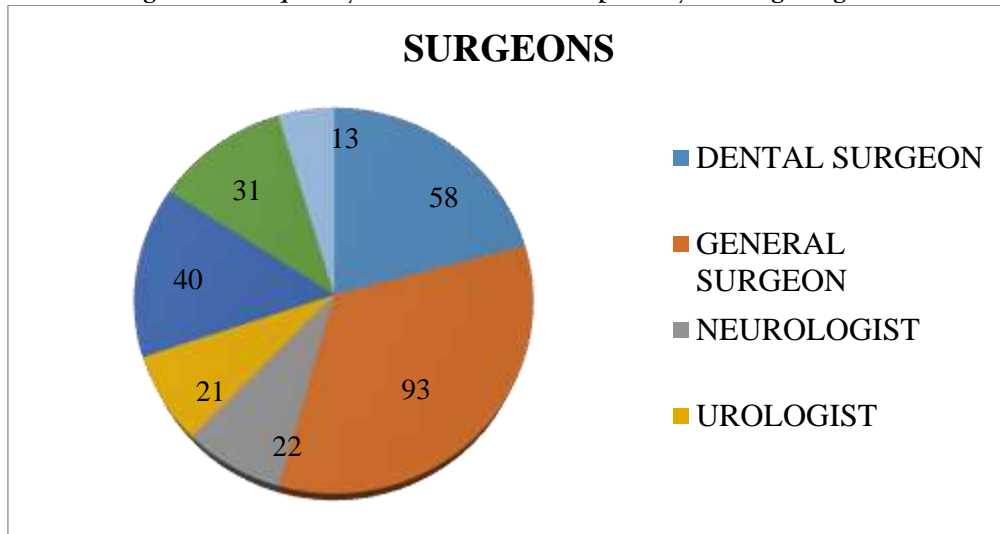


Table 1: Demographic Data

Category	Frequency	Percentage
<b>Gender</b>		
Female	126	45.3%
Male	152	54.6%
<b>Marital Status</b>		
Married	204	73.4%
Unmarried	74	26.6%
<b>Participants having Diabetes</b>		
Yes	38	13.7%
No	240	86.3%
<b>Participants having Hypertension</b>		
Yes	48	17.3%
No	230	82.7%
<b>Participants having Pain</b>		
Pain Level	Mean	SD
0-9	5.06	1.64

Our study investigated the relationship of neck pain with hypertension, hours of surgery, position of surgery, gadget use, specialty, diabetes, age and gender. There was statistically non-significant relationship between association of neck pain and hypertension with the correlation (r) of 0.038 and the p-value of 0.532. The correlation (r) between the length of hours spent in surgery and neck pain was not significant with a correlation of 0.023 and a p-value of 0.699. There was non-significant association between the position of surgery and neck pain that

was correlated (r) 0.048 and p-value 0.423. The correlation (r) 0.012 and p-value 0.847 indicate that study investigates the association between neck pain and gadget use is not significant. The correlation between neck pain and specialty also resulted in non-significant findings of the correlation (r) 0.047 and p-value 0.437. Correlation (r) 0.014 and p-value 0.812 were non-significant results of the association between neck pain and age. The correlation (r) 0.110 and p-value 0.067 were mild with neck pain and diabetes. The correlation (r) 0.108 with p-value 0.071

also indicated mild correlation with neck pain and gender.

Table 2: Association of Neck pain

	Correlation coefficient (r)	P-value
Hypertension	0.038	0.523
Hours of Surgery	0.023	0.699
Position of Surgery	0.048	0.423
Gadget use	0.012	0.847
Specialty	0.047	0.437
Diabetes	0.110	0.067
Age	0.014	0.812
Gender	0.108	0.071

### DISCUSSION

The aim of the study is to identify the prevalence of neck pain and risk factors related to its occurrence in surgeon of twin city. The findings of our result show that the rate of neck pain among the surgeons was noteworthy although there was a weak correlation of neck pain with gender and diabetes.

According to the research conducted by Amani K. Elshaer in 2020, among the total 67% of orthopedic surgeons report musculoskeletal pain. Low back pain is most frequently followed by neck which is also similar to our results. The theme that we also tend to focus the research on is mainly neck pain among surgeons as a result of long time in operating rooms, improper postures and bad ergonomics. Despite the lack of correlation in our research, showing that neck pain is not contingent on other factors but is influenced by alternative factors does not imply that posture during surgery or their use of gadgets has no impact. Other causes of musculoskeletal pain are also caused by factors such as smoking, age and body mass index among others. It was therefore concluded that musculoskeletal pain in orthopedic surgeons was commonplace [9].

The result in the study of Daniel Pozzobon et.al that indicates that diabetic people tend to report low back pain more particularly neck pain (P=0.001) as compared to non-diabetic people. Individuals with diabetes that have higher BMI are more likely to experience neck pain that is more pertinent to this study due to the fact that the surgeons with higher BMI experience more neck pain. As well as hyperglycemia and hyperlipidemia cause greater tissue damage that influences the blood vessels which is a sign of pain. Thus, diabetes is related to neck

pain complicating work of surgeons [10]. Our work made us find out that diabetes bears mild correlation with neck pain (0.067) and diabetes is the predictor of neck pain in surgeons.

The outcome of our research indicates that there is no correlation between the position of surgeons at surgery and neck pain regardless of whether the surgeon is sitting or standing during his or her surgery time as opposed to the outcome of studies by McQuivey et.al on orthopedic surgeons whose findings indicate the importance of procedural positions and surgeon ergonomics on the neck pain of the surgeon. The dental surgeons complained of more of neck pain as compared to the orthopedic surgeons [11].

Research by Somaye Kazeminasab was carried out in 2022 which revealed that the factors of long term stress, anxiety and depression are significant factors of developing neck pain. It has been demonstrated that such demographic factors as age, and female gender in particular, affect the prevalence and etiology of the neck pain as it is in our research since according to the outcome, female surgeons experience more neck pain than men. Since women experience higher stress level, they experience the neck pains because of their hormonal variations and poor body structure [12].

When addressing the relationship between age and mechanical neck pain, a systematic review study conducted by Nicolý Machado Maciel (2018) also notes older age as a risk factor of non-specific neck pain development, which makes it possible to conclude that age might be relevant to the progress of neck pain in the general population. This is unlike in our research where the association between age

and mechanical neck pain among surgeons was established as insignificant ( $r = 0.014$ ), thus there was no significant relationship. Although this, neck pain afflicts this people regardless of their age. This could be explained by variation in the study populations, as well as the nature of neck pain being examined. The systematic review is concerned with non-specific neck pain in more general, asymptomatic groups of the population, and that includes multiple etiologies. Mechanical neck pain, on the contrary, has been specifically studied by us in relation to surgeons, a population with peculiar work requirements and ergonomic problems. These variables are probably likely to reduce the effect of age on neck pain in our study because occupational stressors and procedural postures are favored over other aspects [13].

Comparing our work with that of spine surgeons conducted by Hriday Acharya in 2022, the two works focus on the contribution of work-related factors to neck pain, including ergonomics and posture. But the study on the spine surgeon showed that there is a significant correlation between neck pain and variables such as a sedentary lifestyle and use of a loupe, whereas in our study there was a weak correlation ( $r = 0.048$ ) between the surgical position and neck pain. This implies that position in the operating room may have some role, but other risks, including lifestyle and ergonomics, may have a greater role in the incidence of neck pain as was observed in our study. In comparison, other studies find the relationship between position and neck pain weak, which is stronger in the case of the spine surgeon study. This might be a pointer that other factors like lifestyle habits and ergonomic behavior might have a stronger influence on neck pain amongst surgeons [14].

## CONCLUSION

Our current research results offer detailed informative background regarding the incidence of neck pain and incidence of risk factors amongst surgeons. Although minority of surgeons break their work because of mechanical neck pains most of them experience work related mechanical neck pains. Top of list were among them general surgeons. Consequently, one can consider improvement in terms of education of surgeons to avoid mechanical neck pain. The research also found that association

with the risk factors such as gender and diabetes has been observed with neck pain whereas there is no association of other factors i.e hypertension, age, marital status and gadget use with mechanical neck pain.

## REFERENCES

- Kazeminasab, S., et al., Neck pain: global epidemiology, trends and risk factors. *BMC musculoskeletal disorders*, 2022. **23**: p. 1-13.
- Childress, M.A. and S.J. Stueck, Neck pain: initial evaluation and management. *American Family Physician*, 2020. **102**(3): p. 150-156.
- Kiapour, A., et al., Biomechanics of the sacroiliac joint: anatomy, function, biomechanics, sexual dimorphism, and causes of pain. *International journal of spine surgery*, 2020. **14**(s1): p. S3-S13.
- Dewitte, V., et al., The interrater reliability of a pain mechanisms-based classification for patients with nonspecific neck pain. *Brazilian journal of physical therapy*, 2019. **23**(5): p. 437-447.
- Kılınç, H.E. and B. Ünver, Effects of sleep quality and mental and physical fatigue on mechanical neck pain. *Adnan Menderes Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, 2022. **6**(1): p. 116-124.
- Ryu, R.C., et al., Are we putting ourselves in danger? Occupational hazards and job safety for orthopaedic surgeons. *Journal of orthopaedics*, 2021. **24**: p. 96-101.
- Govaerts, R., et al., Prevalence and incidence of work-related musculoskeletal disorders in secondary industries of 21st century Europe: a systematic review and meta-analysis. *BMC musculoskeletal disorders*, 2021. **22**: p. 1-30.
- Young, I.A., et al., Reliability, construct validity, and responsiveness of the neck disability index and numeric pain rating scale in patients with mechanical neck pain without upper extremity symptoms. *Physiotherapy theory and practice*, 2019. **35**(12): p. 1328-1335.
- Al-Mohrej, O.A., et al., Work-related musculoskeletal disorders among Saudi orthopedic surgeons: a cross-sectional study. *Bone & Joint Open*, 2020. **1**(4): p. 47-54

- Pozzobon, D., et al., Is there an association between diabetes and neck and back pain? A systematic review with meta-analyses. *PloS one*, 2019. **14(2)**: p. e0212030.
- McQuivey, K.S., et al., Surgical ergonomics and musculoskeletal pain in orthopaedic surgery residents: a multicenter survey study. *JAAOS Global Research & Reviews*, 2021. **5(3)**: p. e20.
- Kazeminasab, S., et al., Neck pain: global epidemiology, trends and risk factors. *BMC musculoskeletal disorders*, 2022. **23**: p. 1-13.
- Bento, T.P.F., et al., NECK PAIN IN ADULTS: IMPACT ON QUALIT Y OF LIFE. *Saúde e Pesquisa*, 2020. **13(4)**.
- Acharya, H., et al., Prevalence and risk factors of neck pain in spine surgeons-Are we our own patients? *Journal of Clinical Orthopaedics and Trauma*, 2022. **33**: p. 102012.

