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ORIGINAL ARTICLE

FREQUENCY OF NECK PAIN, DECREASED RANGE OF MOTION AND DISABILITY AMONG HISTOPATHOLOGISTS

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ABSTRACT

Neck pain is common among professionals with a static posture for prolonged periods. Histopathologists, using microscopes, are particularly susceptible to awkward postures, pain, and limited Range of motion in the cervical region, which can adversely affect their daily activities. **Objective:** The study aimed to determine the frequency of neck pain, Range of motion and disability among Histopathologists. **Methods:** A cross-sectional study was carried out with 150 participants, including male and female histopathologists aged 25-45 years, working 5-7 hours 5 days a week in different laboratories of Lahore. A non-probability convenience sampling technique was used. Data was collected using a questionnaire called the numerical Pain Rating Scale (NPRS) for pain, the Neck Disability Index (NDI) for functional disability, and a goniometer to assess the neck's Range of motion. Data was analyzed using SPSS V. 25. A chi-square test was used to find the association of variables. **Results:** Out of 150 questionnaires distributed, 74(49.3%) were male and 76(50.7%) were female. All the participants responded, and the response rate was 100%. The overall frequency of neck pain was 99%, and disability was 98 %.In comparison, 86% had limited flexion, 88% had limited extension, 88% had limited right rotation, 76% had limited left rotation, 51% had limited left side bending, and 40% had limited right side bending. There was no association between gender, BMI, and age with pain, Range of motion, or disability index. **Conclusion:** This study concluded that the frequent use of microscopes in a flexed posture for extended period's results in neck pain, reduced Range of motion and difficulty in activities of daily life (ADLs) among Histopathologists. Through this study, histopathologists' awareness of their cervical posture will spread. They will know about the correct cervical spine alignment and Range of motion.

Keywords: Histopathologists, Microscope, Musculoskeletal Disorders, Neck pain, Neck disability, Range of motion

INTRODUCTION

Musculoskeletal disorders (MSDs) refer to injuries or illnesses affecting the bones, ligaments, joints, muscles, nerves, and vascular system, which can impair the overall functioning of the human body[1]. Workplace-related musculoskeletal disorders (WMSDs) are physical injuries or health conditions affecting the musculoskeletal system that arise from work-related activities. These conditions are typically caused by repetitive or sustained movements, awkward postures, or excessive force while performing work tasks. Common movements leading to WMSDs include bending, twisting, lifting, pushing, and pulling[2].

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Maintaining an awkward posture without movement for extended periods can cause long-term muscular fatigue, discomfort, or pain. This can be made worse when there is ongoing static loading on the muscles and joints, which can lead to changes in the normal structure of soft tissues, such as shortening or other pathological effects. Work-related musculoskeletal disorders (MSDs) are typically associated with various symptoms that may occur individually or in combination, such as pain, numbness, sleep disturbances, anxiety, depression, fatigue, dizziness, headaches, and irritable bowel syndrome. The onset of these symptoms can be gradual and insidious rather than sudden[3]. WMDs also cause absenteeism and work time loss, with quality of life being disturbed[4]. Neck pain, also known as spinal pain, is a prevalent health issue affecting around 50% of the adult population[5]. Some etiological factors may involve psychological factors[6].

Mechanical neck disorder (MND) is not associated with a systemic issue, such as degenerative changes that occur after 40- 45 years of age in the cervical spine or soft tissue injuries. Improper head posture can lead to pain, decreased muscle strength, and limited Range of motion (ROM). Neck pain can also cause changes in posture and spinal movements[7]. Mechanical neck pain can occur due to tense upper back and cervical muscles caused by prolonged partial neck flexion while working at a workstation. The upper extremity is the most commonly affected by it[8]. Body posture refers to the body's position at a particular moment, while ideal posture involves maintaining a balanced position with minimal muscular effort without experiencing any pain or discomfort[9]. Like many medical professionals, Histopathologists often spend long hours in a laboratory hunched over a microscope. This prolonged period in a fixed position can harm their musculoskeletal health, particularly in the neck and back areas[10].

Histopathologists frequently have to bend their necks forward and tilt their heads to examine slides and specimens, which can strain the muscles and joints in the neck. Additionally, their work's repetitive nature and poor posture can contribute to developing neck pain[11]. Histopathologists who experience neck pain may face several difficulties in their work. Firstly, the discomfort and pain can impact their ability to focus and concentrate on their tasks. The constant distraction from the pain can hinder their efficiency and accuracy in examining and analyzing specimens[12].

Additionally, neck pain can limit their Range of motion and flexibility, making it challenging to position themselves properly while working at the microscope or laboratory bench. This can lead to further strain on the neck and exacerbate the pain[13]. With the researcher's best knowledge, there is limited literature on the frequency of neck pain, decreased Range of motion and disability among histopathologists. This study aimed to determine the frequency of neck pain, decreased Range of motion and disability among histopathologists. This study will spread awareness among histopathologists about their cervical posture. They will know about the correct cervical spine alignment and Range of motion.

MATERIALS AND METHODS

The cross-sectional study was conducted in 3 different laboratories of Lahore, including Hamid Latif laboratories, Chughtai laboratories, and Shaukat Khanum laboratories. Permission from the ethics committee of Rashid Latif Medical College was taken (reference # IRB/2022/080). Cultural and religious considerations were duly taken into account during data collection. The sample size was 150, calculated using the formula: n= Z2p (1 − p)]/d2. The study was completed within six months after the approval of the synopsis. Using convenience sampling methods, participants included were male and female histopathologists aged 25-45 years working 5-7 hours 5 days a week[14]. Individuals suffering from respiratory disorders, cardiac disorders, fibromyalgia and cervical trauma were excluded. The participants signed informed consent in English and Urdu.

A numeric pain rating scale (NPRS) questionnaire was used to determine cervical pain. The reliability of NPRS is (ICC = 0.67) [15]. Pain was categorized as 0, meaning no pain; 1-3, meaning mild discomfort; 4-6,

meaning moderate pain; and 7-10, considered severe discomfort/pain. A goniometer was used to investigate the Range of motion of the cervical spine. The inter-rater reliability was 0.47-0.79 and the intra-rater reliability was 0.94-0.976[16]. ROMS were considered normal between 80° to 90° of flexion, 70° of extension, 20° to 45° of lateral flexion, and up to 90° of rotation to both side and any value less or more than these values were considered as abnormal.[17] Neck disability index (NDI) questionnaire was used to assess disability. The reliability of NDI is (ICC = 0.88) [15]. Disability was categorized as 0-4 points (0-8%) no disability, 5-14 points (10 – 28%) mild disability, 15-24 points (30-48%) moderate disability, 25-34 points (50- 64%) severe disability, 35-50 points (70-100%) complete disability.[18]

Statistical Analysis

Data was collected and analyzed using IBM SPSS version 25. All qualitative variables are presented in Mean±SD, and all quantitative variables are presented in frequency and percentage. p-value <0.05 of the chi-square test was considered significant.

RESULTS

Results showed that out of 150 participants, 106 had normal BMI, but 43 were overweight. Out of 106 normal (BMI) people, 24 had mild pain, 59 had moderate pain, and 23 had severe pain. In the Population sample, 74 participants were males, while 76 were females. Out of those 74 males, 21 had mild, 39 had moderate, and 14 had severe neck pain. Out of 76 female participants, only 1 had no pain, 20 had mild pain, 39 had moderate pain, and 1and severe pain, while 27 were 24-30 years of age (1 had no pain, four had mild, 15 had moderate, and 7 had severe neck pain) as shown in Table 1.

Results showed that participants who were underweight according to their BMI had a mean and standard deviation of Flexion range of motion 60.0±3.59, extension 55.0±1.23, right rotation 65.0±2.19, left rotation 86.0±1.00, left side bending 22.0±1.02 and right side bending 46.02±1.00. On the other hand, participants who were overweight had a mean and standard deviation of flexion range of motion 58.25±10.68, extension 53.04±10.66, right rotation 67.55±9.71, left rotation 72.30±11.36, left side bending 34.81±8.17 and right side bending 33.95±8.97 respectively. At the same time, participants who were >40 years of age had mean Range of Flexion, Extension, Right Rotation, Left Rotation, Left Side Bending and Right Side Bending 52.50± 3.53, 59.00± 8.48, 56.50± 2.12, 66.50±12.02, 39.00± 8.48, 27.50± 3.53 respectively as shown in Table 2.

In the current sample, 74 participants were males, while 76 were females. Out of those 74 males, 8 had mild, 61 had moderate and severe neck disability, while out of 76 females, four female participants underwent mild disability, seven had moderate, 63 had a severe disability, and two were disabled. When compared according to their age groups, most participants showed severe neck disability, as shown in Table 3.

The results showed that there was no statistically significant association between age, gender, BMI, pain, disability, and Range of motion, as the p-value was > 0.05, as shown in Table 4.

Table 1. Categories Neck Pain of Participants (N=150)

Variables	Category	No pain	Mild Pain	Moderate Pain	Severe Pain
BMI	Underweight	0	0	1	0
	Normal	0	24	59	23
	Overweight	1	17	15	10
Gender	Male	0	21	39	14
	Female	1	20	36	19
Marital Status	24-30	1	04	15	07
	31-40	0	22	39	15
	>40	0	15	21	11

Table 2. Mean Range of Motion of Participants (N=150)

Variables	Category	Flexion	Extension	Right Rotation	Left Rotation	Left Side Bending	Right Side Bending
BMI	Underweight	60.0±3.59	55.0±1.23	65.0±2.19	86.0±1.00	22.0±1.02	46.02±1.00
	Normal	60.0±11.16	53.62±11.52	69.83±9.60	70.13±11.06	33.34±8.14	34.22±8.66
	Overweight	58.25±10.68	53.04±10.66	67.55±9.71	72.30±11.36	34.81±8.17	33.95±8.97
Gender	Male	58.82±10.1	54.40±11.48	69.83±9.36	72.04±10.87	35.16±8.03	34.98±8.64
	Female	60.21±11.6	52.55±10.93	68.48±9.90	69.71±11.44	32.26±8.11	33.48±8.84
Age Range (Years)	24-30	40.0± 0.12	45.00±1.10	67.00±1.00	80.00±1.11	42.00±1.86	28.00±10.88
	31-40	66.50±12.8	54.58± 11.36	72.08± 09.86	66.75±09.42	33.41± 8.43	30.50± 08.76
	>40	52.50± 3.53	59.00± 8.48	56.50± 2.12	66.50±12.02	39.00± 8.48	27.50± 3.53

Table 3. NDI categories of participants

Variables	Category	Mild disability	Moderate disability	Severe disability	Crippled
BMI	Underweight	0	0	1	0
	Normal	3	13	84	6
	Overweight	1	2	39	1
Gender	Male	0	8	61	5
	Female	4	7	63	2
Age Range (Years)	24-30	1	1	21	3
	31-40	0	9	63	4
	>40	03	05	40	0

Table 4. Association of pain, Range of Motion and NDI

Variables	Pain	Range of motion	Neck disability Index
Age	0.81	0.81	0.66
Gender	0.59	0.22	0.17
BMI	0.15	0.72	0.78

DISCUSSION

It takes a lot of physical and mental endurance to work in histopathology. Good psychomotor skills, sharp vision, and the capacity to hold a steady posture for extended periods are among the physical traits. Injury or an inability to function effectively can arise from failing to maintain such a stable posture. Thus, hearing loss, musculoskeletal issues (pain in the neck, back, and shoulders), and injuries (ocular or percutaneous) are among the risks associated with their line of work for histopathologists. Pathologists are more likely to have musculoskeletal problems because of exposure to the workplace, individual differences in structure, psychosocial functioning, and sociocultural background.

Neck pain ranks as the second most common musculoskeletal problem experienced by pathologists. Due to the high prevalence of musculoskeletal problems in this population, there are implications for their everyday lives, work, and regular functional activities. It is typical for neck pain to be associated with forward head posture. The present study was conducted to study the frequency of neck pain, Range of motion and disability among histopathologists. The total no of participants was 150. In the current study, 74 participants were males while 76 were females; 21 had mild, 39 had moderate, and 14 had severe neck pain. The same results were obtained by a previous study conducted to determine occupational hazards for pathologists, microscope use, and musculoskeletal disorders, which concluded that practicing pathologists are at

high risk for developing MSDs of neck pain[14].

Another previous study conducted among dentists in Faisalabad showed that (62%) of the dentists suffered from neck pain, and the remaining 19 (38%) had no neck pain. The severity of the pain was reported as 18 (36%) having mild pain, the same as in the current study, where results showed that 0.7% of the population had no pain while 99.3% suffered from neck pain[19]. A study stated that microscope users at Punjab University in India showed that back pain and neck pain suffered mild disability, NDI and ODI. Similarly, a recent study had the same results, i.e. 97% of the population suffer from pain and neck disability[20].

The current study also indicates that histopathologists whose working hours -7 hours per day also reported neck pain and limited cervical Range of motion[21]. The studies state that repetitive use of a microscope can induce postural neck pain and neck remains in the same posture for a long duration, decreasing the Range of motion. [14] Other studies reported 16.6% neck pain in laboratory professionals and microscope workers at 7.5%[22]. The current study has shown no significant association between neck pain and disability index. However, previous studies have shown that chronic neck pain and disability index were significantly associated with musculoskeletal disorders[23].

The sample size was small, and data was collected from one city. The study did not discuss different factors, including working experience and BMI. Further studies can be carried out using ergonomic evaluation with specific positions, the number of trials in measurement, and its association with different body regions to help further understand the different postures involved in musculoskeletal pain. This can increase the internal validity of research.

CONCLUSION

This study concluded that the frequent use of microscopes in a flexed posture for extended periods results in neck pain, reduced Range of motion and difficulty in activities of daily life (ADLs) among histopathologists, which can be risk factors for neck disability.

DECLARATION

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