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PREVALENCE OF TRAPEZIUS MYALGIA & ITS ASSOCIATED FUNCTIONAL LIMITATIONS AMONG SCHOOL TEACHERS IN LAHORE PAKISTAN

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ABSTRACT

There are many causes of muscle aches in the upper area of the neck and shoulder, including stress, trauma, and biomechanical factors. Teachers often face this muscle ache. Several research studies have determined the causes and risk factors of muscle pain frequency. It includes other fields of life, such as doctors, nurses, high-class business people, and computer users. Effects and causes of trapezius myalgia need to be evaluated in teachers.

Key Words: Biomechanics, Muscle Ache, Musculoskeletal disorders, Occupational trapezius myalgia, Trapezius myalgia

INTRODUCTION

Biomechanics of joint, joint stability, muscle size, and length are the causes of multidirectional movements and a wide range of motion of the upper extremity. There are three bones in the shoulder joint: Clavicle, scapula, and humerus. There are three articulations in the shoulder complex: sternoclavicular, glenohumeral acromioclavicular, and functional articulation. Stabilization and movement performance are played by the muscles of the upper extremity. (Margaret Schenkman, 1987)

Trapezius myalgia can be defined as the chronic pain of the upper back area. Trapezius muscle consists of Upper part, middle part, and lower part. It starts from the lower back of the head, and all the way runs down to the spine. That muscle is one of those parts of our body that we use a lot. Therefore, overuse of muscles, improper postures, and poor support of these muscles can damage the upper back region of the body. (Junction.)

Myalgia or muscle ache is simple pain and stiffness of the upper trapezius. This acute neck-shoulder pain can last for a few days, but it cannot be described as a medical condition. It can be a cause of persistent underlying conditions. (Trehout)

The spinal portion of the accessory nerve (cranial nerve XI) supplies trapezius muscle. In this process first five cervical nerves help rise motor innervation. (Brent Brookbush DPT, 2010) The Trapezius muscle gets its blood supply through the Superficial branch of a transverse cervical artery. (bot, 2020)

A fan-shaped muscle trapezius is divided into three main parts:

1. Upper trapezius
2. Middle trapezius
3. Lower trapezius

Recent research revealed that monotonous workload and poor gestures are not a single cause of Trapezius myalgia, but there are psychological

factors also involved. Mental stress, a poor work environment, and a toxic work culture are some of them. (Buxton, 2017)

According to a study, 20% of the population faces myalgia; we can't ignore that gender is a crucial cause, and females suffer more musculoskeletal disorders than males. So, muscular-related disorders need to be researched properly. (Andersen, Prevalence and anatomical location of muscle tenderness in adults with nonspecific neck/shoulder pain., 2011)

Problem Statement of Study

Despite the fact that teaching is one of the top ten professions in Pakistan, the frequent occurrence of trapezius myalgia and multiple MSDs has not been studied properly. This is the main reason that the lack of data leads to the challenges of understanding the problems and interventions to deal with their impacts. Therefore, teachers in Pakistan are at the highest risk of facing trapezius myalgia, and as a result, it can affect their overall well-being.

Objectives of the Study

Here are three main objectives of the study are

1. Identify the factors for developing trapezius myalgia in teachers
2. Determine the functional limitations in the upper back area of the teachers facing trapezius myalgia.
3. Access those professional and social aspects that cause the development of trapezius myalgia in school teachers.

Importance of the Study

It is important to identify the causes and effects of trapezius myalgia in teaching professionals for many reasons.

4. Highlight the need for intervention to reduce the development of trapezius myalgia in school teachers.
5. Provide useful data analysis regarding trapezius myalgia and its causes, which can lead to developing a strategy for its prevention.
6. Handling functional limitations related to trapezius myalgia improves teachers' well-being, job performance, and quality lifestyle.
7. Contribute to the literary body related to professionals' health in developing countries where limited research is available.

Literature Review

It is crucial to have a detailed look at the previous literature related to Trapezius myalgia. This section will provide key points and gaps from relevant studies. This study will focus on symptoms, causes, effects, functional limitations, risk factors, and prevalence rate of trapezius myalgia.

Trapezius Myalgia

Trapezius myalgia is a musculoskeletal disorder characterized by pain and stiffness in the trapezius muscle. It is caused by social psychological stress, continuous repetitive movements, and static posture. Symptoms include movement limitations, muscle aching, and tenderness in the back and neck muscles. Occupational activities that result in muscle stretching, like using computers, typing, or writing, can develop trapezius myalgia, which can be worsened by improper ergonomic habits.

Epidemiology

This study shows that the prevalence of trapezius myalgia among teachers is due to activities like writing on boards, Standing for a long period of time, and stretching muscles while writing and working on computers.

Other occupational individuals, such as office workers, computer operators, corporate employees, etc., also show the prevalence of this condition. However, its symptoms can vary among different populations.

Risk Factors:

Risk factors for the prevalence of trapezius myalgia can be divided into two main categories:

1. Occupational Factor
2. Non-occupational Factor

Occupational factors include poor sitting posture, repetitive movements, prolonged muscle stretch, and improper ergonomics.

Non-occupational factors include age, gender, social and psychological stress. Female and older citizens can be at a high and severe risk for developing the condition due to these non-occupational factors.

Impact on Functionality

Trapezius myalgia can significantly affect teachers' lifestyles. They can face acute trouble and muscle pain in the shoulder and back of the neck while writing on boards, doing classroom activities, or working on computers. They can feel increased cycles of pain, stress, and reduced body movements. As a result, they will not only experience less satisfaction in their jobs but also an increase in pain and discomfort.

B. Larsson's Study of Trapezius Myalgia

Looking into B. Larsson's and his colleagues' study regarding occupational trapezius myalgia, is obvious that was a control-group study conducted to find the connection between RR-fibers (ragged-red fibers) and COX-negative (cytochrome C oxidase-negative fibers) with trapezius myalgia. The purpose of the study was to identify and analyze the presence of COX-fibers and RR-fibers in professional female cleaners. They have grouped them into five groups. And the results showed that just two group showed some significant differences in these fibers. So, they formed the conclusion that.

1. Only COX-negative fibers depend on age
2. Tenderness in the trapezius muscle, occupation and age are contributing factors in the increase of RR-fibers.
3. Cleaners without tender points show less chance; those with tender points in trapezius muscles show a 5% increased chance of RR-fiber prevalence.
4. B. Larsson and his colleagues concluded that RR.fibers (ragged-red fibers) were related to all those factors, but COX-negative and COX-positive fibers were unrelated to occupation-based factors. (Larsson, 2000)

Lars L Anderson and Klaus Hansen's retrospective cross-sectional study

Lars L Anderson and Klaus Hansen highlighted their interest in a retrospective cross-sectional study on the anatomical location of the trapezius in adults. They started by taking a sample from Copenhagen and Denmark. This study includes samples of 23 males and 174 females, aged 25-65, who worked in large offices. The objective was to analyze the dominance of trapezius myalgia in office workers. The results showed

1. Severe discomfort in neck extensors, infraspinatus, and levator scapulae in 18-30% of females
2. Acute uneasiness in the upper trapezius and supra supinates in 13-19% of females
3. 0-1% of females experience tenderness in the medial deltoid. (Andersen L. e., 2011)

Mikkel Brandt and Emil Sundstrup's questionnaire survey

This questionnaire aimed to find and analyze the connection of trapezius tenderness among occupational individuals. The study of Mikkel Brandt and Emil Sundstrup includes the stats of the last three months and reveals the following facts;

1. 18% of females experience no pain in the upper back area
2. 59% of females experience some pain
3. 23% of females experience severe pain
4. 51% of males had no pain in shoulder and neck
5. 42% of males faced some pain
6. 7% of males faced severe pain
7. This study shows the strong connection between office workers' trapezius tenderness and shoulder and neck pain. (Brandt, 2014)

Kaj Bo Veiersted and Rolf H. Wastgaard's Prospective Study

Kaj Bo Veiersted and Rolf H. Wastgaard's study focused on the modern lifestyle. Their objective was to analyze the causes of shoulder and neck pain relevant to the biomechanics of modern workplaces. Data that was numerically collected explained the intensity of the development of work-related trapezius myalgia in female workers. The females used to perform light manual work, and data was collected during the first year of their employment.

1. 17 out of 30 females develop trapezius myalgia i.e., work-related
2. They complained within the 13th week of their joining on average

3. Weekends were less symptomatic due to less workload

This study shows the facts that repetitive light work in a workplace leads to the ongoing prevalence rate of developing work-related trapezius myalgia. (Veiersted, 1993)

Bjorn Gerdle and Britt Larsson's systematic review

Bjorn Gerdle and Britt Larson's systematic review aimed to find the cause and effects of persistent chronic trapezius myalgia. This study showed that physical, psychological, and social demands strongly correlate with muscular pain. This study on potential muscle biomarkers of chronic myalgia found that high amounts of glutamate are present in those who show symptoms of trapezius myalgia. (Gerdle, 2012)

Rolf Lindman and Mats Hagberg's study in muscle morphology

Rolf Lindman, Mats Hagberg, and his colleagues are known for their study on muscle morphology in this condition. Female patients who received the muscle biopsies were monitored and studied using histochemical enzymes. They perform a biochemical analysis on mixed muscle samples and single muscle samples. This analysis determines

1. Lactate concentration of mixed-muscle
2. Adenosine triphosphate in single-muscle
3. phosphocreatine level in single-muscle

As a result, Rolf Lindman and Mats Hagberg found that patients with trapezius myalgia had lower capillary but higher type I fibers. This imbalance can be a crucial factor in muscle tenderness and pain development. (Lindman, 1991)

Sven-Erik Larsson and Colleagues' study in chronic trapezius myalgia

Sven-Erik and et al. researched 17 patients as subjects. Their focus of studies was chronic trapezius myalgia and the importance of morphology and blood flow of the individuals. They observed the static workload of the patients through an open biopsy of bilateral painful upper muscle. This study suggests that isolated pathologic ragged red fibers were connected with the presence of myalgia. They observed this condition of disturbed mitochondria by using a laser-doppler flowmeter. Muscle pain was categorized in the presence of ragged red fibers. So, the study resulted in the fact that trapezius myalgia has a strong connection with the presence of changed mitochondrial functions and reduced blood flow in muscles. (Larsson S.-E. e., 1990)

A Study by Frederick Wolfe, Kathryn Ross, and Colleagues

Frederick Wolfe and his colleagues collected a sample of 3006 people from Wichita. They aimed to figure out the prevalence, causes, symptoms, and effects of fibromyalgia in the general population. The study revealed that older people are more affected by fibromyalgia, although it is a common problem. The common symptoms of this condition include

1. Severe pain
2. Functional disability
3. Severity in clinical populations. (Wolfe, 1995)

Gaps in Literature

Although Trapezius Myalgia is a widely researched topic, many gaps can be addressed in the future.

1. Prevalence of trapezius myalgia in school teachers in Lahore, Pakistan, lacks data.
2. Specific research is needed to consider cultural and occupational factors in Lahore.
3. Functional Limitations related to these conditions should be investigated thoroughly.

The methodology used to conduct the research

Operational Definitions

There are some key terms that we need to understand, including in-depth definitions and their context. In this section, we will interpret the key findings of the study of Trapezius myalgia and describe its implications through the methodology used to conduct this research.

Trapezius Myalgia

Stiffness and pain in the upper region of the trapezius muscle is called Trapezius myalgia. This musculoskeletal condition includes occipital bone and runs down the spine and shoulder. The trapezius muscle is most responsible for the movement of the shoulder and upper part of the

back. Trapezius Myalgia is the pain in this muscle that results from repetitive movements, stress, anxiety, poor standing or sitting posture, or some specific tasks like spending a lot of time in desk work and computer work. (Physiopedia, 2020)

Functional Limitations

Functional limitation can be described as the disability of an individual to perform his/her daily tasks properly. It can be challenging for them to walk, reach, and lift something, or even worse, they cannot participate in social activities like following personal car routines or exercising. These functional limitations resulting from trapezius myalgia may affect the quality of life of individuals facing this condition. (University, 2020)

Teacher

A teacher is an individual who is responsible for maintaining the classroom activities and learning process of students. This occupation requires long hours of standing, bending, writing, and computer work, which involves stretching the upper back or trapezius muscle. These factors contribute to making teachers the most vulnerable individuals to the condition called trapezius myalgia. (Williamson McDiarmid)

Prevalence

Epidemiological studies require data to measure specific conditions in a group of people. Prevalence is commonly known as the ratio providing data on a prevalent condition among a particular community. This study provides insights into the prevalence of trapezius myalgia in school teachers in Lahore, Pakistan. This data will help us understand how and why this condition is common in this particular occupation group. By identifying the causes of the prevalence of some conditions, researchers better understand the impact, scope, and reasons of the problem. Eventually, it will help them introduce better health policies for the workplace environment and targeted interventions to reduce the risk of musculoskeletal issues among school teachers in Lahore. (health, 2020).

Materials and Methods

We need to establish criteria to gain more relevant and accurate insights regarding trapezius myalgia and its impact on the routine life of school teachers in Lahore. This study ensures that the selection process and the results are not only reliable and valid but also provide a crystal-clear analysis and description of the functional limitations of trapezius myalgia in this particular occupational community.

Study Design

We collected the data from different schools in Lahore by using the cross-sectional study design. This design allows the flexibility of collecting data at the same time and shows the picture of the current situation of trapezius myalgia in school teachers in Lahore. This approach will help us to analyze the prevalence and its functional limitations of this condition among the specific occupation.

Population and Sample

We used to target a particular group of school teachers in Lahore who were showing the symptoms of trapezius myalgia because of the demand for their professional and physical activities. The non-probability convenient sampling method ensured the presence of a sample. We worked with the participants who were ready and willing to provide the data about their health conditions. Ninety-seven teachers from different schools in Lahore were selected on the basis of inclusion and exclusion criteria. We focused on a section of teachers facing muscle strains and pain by using this criterion, making them the most relevant subjects to study the prevalence and implications of trapezius myalgia.

Inclusion Criteria:

1. Teachers aged 25-45 years
2. At least join the teaching profession for 2 years
3. Teachers working for 6-8 hours daily

Exclusion Criteria:

1. Teachers who don't teach in Lahore
2. Individuals with a history of trauma or systemic illnesses
3. Diagnosed cases of fibromyalgia
4. Individuals with neurological conditions affecting the neck or shoulders
5. Teachers with neck malformations such as torticollis

6. Those who have undergone surgery or have a history of using steroidal or non-steroidal anti-inflammatory drugs.

Data Collection Methods:

Different tools and processes are used to gather detailed insights:

1. Numeric Pain Rating Scale (NPRS): Assessed neck pain levels.
2. Goniometer: Measured the range of lateral neck flexion to confirm upper trapezius muscle tightness. The goniometer was positioned at the 7th cervical vertebra.
3. Manual Palpation: Evaluated upper trapezius tenderness, rated by participants on a scale of 'No,' 'Some,' or 'Severe.'
4. Neck Disability Index (NDI) Questionnaire: Assessed functional limitations.
5.

Procedures

Trapezius myalgia and its effects on the trapezius muscle among school teachers needed a detailed analysis, so a structured process was developed to collect data. Numeric Pain Rating System (NPRS) was used to rate the pain in the neck of participants. NPRS allowed the participants to rate their pain on a scale of 0-10, From no pain to worst pain ever. This is a simple yet effective method to check neck pain in school teachers.

A goniometer was used to assess the muscle tightness by measuring the range of motion (ROM) of the subjects' necks. The tool helps to measure angles. We placed the goniometer at the 7th cervical vertebra and asked the participants to move their necks to record ROM. Less than 40 degrees ROM indicated the tightness of the upper trapezius muscle.

To further access and gain additional data on discomfort among school teachers due to this condition, researchers palpated the upper trapezius muscle manually. The teachers were asked to answer on the rate of 'No', "some', or 'Severe' tenderness by applying light pressure on the neck muscle.

The Neck Disability Index (NDI) was used to measure the impact of this condition on school teachers' daily life, their activities, and the functionality of neck muscles. The questionnaire consisted of crucial questions about their sleeping, working, headache, stress, writing, personal care and recreation activities, and facing the intensity of pain during these activities. Trapezius myalgia's functional limitations were recorded through the responses of participants.

Data Analysis

The static software SPSS version 25.0 was used to analyze and manage data, and it proved to be effective for us. Standard deviation was used for quantitative variables, like ROM and NPRS. Thus, we could summarize the variability and central tendency of neck pain among participants. Demographic aspects were measured and summarized through descriptive statistics to demonstrate the prevalence rate of this condition. We clearly visualize these stats and data through flow charts and frequency distribution.

Ethical Considerations

Researchers maintained the confidentiality of the participants by collecting their responses anonymously and securing data throughout the study. They removed the personal identifiers to protect the participants' privacy while securing data. Only the authority can access the stored data gathered from the research. We ensured data collection with ethics and by respecting the well-being and rights of participants.

The Institutional Review Board (IRB) 's affiliated university gave the study ethical approval. This was to ensure that the study followed the ethical guidelines and standards for research conducted on human subjects. We provided clear and precise information to participants, including the process, purpose, methods, benefits, and potential risks.

That's how we get consent from all the human subjects to participate in the research. The research process involved voluntary participation and understanding of the study. Participants were allowed to use their right to withdraw from the research process at any time.

Results

Now, we will present the results of our research regarding the prevalence of trapezius myalgia its functional limitations among school teachers in Lahore. We organized the results into sections that properly describe the prevalence rate, descriptive statistics, correlation analysis and functional limitations. Additionally, to precisely

comprehend the research, figures and tables visually represent key data points.

Figures and Tables

Figures and tables include key data points in a smart visual presentation. They highlight the prevalence and impact of trapezius myalgia, its functional limitations, and demographic features, helping readers understand the study's results comprehensively.

Descriptive Statistics

The researchers gathered data from 97 teachers from schools in Lahore by using the Neck Disability Index (NDI) questionnaire and visual pain measurement scale. They added a self-made questionnaire to assess the prevalence of trapezius myalgia.

1. There was a higher ratio of female teachers aged 30-35 years.
2. In the sample of male and female teachers, 16% of teachers were unmarried, 80% married, and 4% divorced.
3. 14% of the teachers experienced no neck pain, while 86% faced neck pain in the past year.

Correlation Analysis

The study found a correlation between trapezius myalgia and its functional limitations. It observed a notable decrease in the movement of shoulder and neck joints with severe pain issues. It was clear that pain and neck movement disability have a strong relation with Trapezius myalgia on top of its functional limitations, worsening the situation.

Discussion

This study investigated musculoskeletal-related health issues, occupational trapezius myalgia, its prevalence, and its effects on the body among school teachers. Teachers are one of the top professions in Pakistan. They indulge in activities like using computers and smartphones, writing on boards, and reading, which keeps them in improper posture for longer. Some key factors contributing to musculoskeletal issues are psychological, social, ergonomics, and biomechanical. Neck pain and trapezius myalgia are the most dominant health issues among school teachers.

Comparing the retrospective cross-sectional study of Lars L. Andersen and his colleagues targeted office workers in Denmark, our study focused on the school teachers in Lahore. Lars L. Anderson's analysis reveals that 18-30% of female office workers aged between 25 and 65 experienced severe tenderness in neck extensors and infraspinatus. In summary, they highlighted the issue of muscle tenderness in the shoulder and neck area among office workers. Our study, on the other hand, reveals the impact of trapezius myalgia on their daily activities of daily lives (ADLs) as well as a disability of moderate level among school teachers.

Mikkel Brandt and Emil Sundstrup conducted a questionnaire-based survey to find the connection between neck and shoulder pain and trapezius muscle tenderness in office workers. Their study draws the results that 59% of female office workers faced some or slight pain, and 23% of female participants faced severe pain. On the other side, gender-based data showed that only 7% of male experienced severe pain in their neck and shoulder area. During our research, it was confirmed that there is a strong connection between functional limitation and a decrease in motion due to trapezius myalgia in school teachers.

Our study verifies the prospective research of Kaj Bo Veiersted and Rolf H. Wastgaard, which shows that work-related trapezius myalgia features non-chronic symptoms in a light manual work environment and demonstrates a one-year cumulative incidence. We found that teachers are used to flexing their necks slightly in their daily activities. Poor posture, prolonged repetitive movement, and stress increase the risk of trapezius myalgia among school teachers. Therefore, our study supports the results and the fact that functional limitations and ADLs among teachers are the results of occupational stress.

Conclusion

The results of our research highlight the Neck Disability Index (NDI) with a score of 23 shows the moderation in disability. Also, it is vital to notice the increasing prevalence of trapezius myalgia in school teachers in Lahore. This condition can show its symptoms in some forms, like;

1. Neck pain

2. Stiffness and pain in the shoulder
3. Reduce movement or ROM in the neck and shoulder

Limitations

1. Geographical Limitation: This study included only specific areas in Lahore, excluding international regions. Therefore, the data collected by researchers may be geographically biased and limited, and the results may not apply to teachers in other regions or countries.
2. Study Constraints: The researchers needed to follow a specific time frame due to degree requirements under particular circumstances. Several other factors could be applied to study this condition more deeply and widely. Like the impact of more intelligent ways of teaching or the influence of modern teaching methodology on teachers' health and lifestyle
3. Sample Size: The participants and sample size were limited, as were research resources and time. It can affect the results, which may affect their reliability and generalizability.

Recommendations

1. Counselling to maintain proper posture: Teachers need to maintain a correct posture and try to understand the cons of muscle imbalance. It can help to reduce the risk of trapezius myalgia. They should attend regular counselling sessions.
2. Regular Exercise: Providing school teachers with exercise guidance can help them overcome trapezius myalgia and prevent this condition. They should focus on exercises that improve muscle activity, flexibility, and strength.
3. Educate teachers about their activities: Health workshops should be organized to share the harmful effects of poor posture and the benefits of good posture. Regular and good movement of neck and shoulder muscles can reduce the risk of trapezius myalgia.
4. Strategy to recover: Teachers experiencing the trapezius myalgia issue should consult their physicians to review their daily activities. Teachers should know the methods to recover from trapezius myalgia's damage and functional limitations. In this way, they can effectively mitigate the symptoms of this condition.

Taking measures to prevent this condition:
Prevention is better than cure shows prevention's importance. The curative approach can lead to disability of trapezius muscles. Awareness of body mechanics, the importance of maintaining good posture, ergonomic adjustments, and regular physical activities are some factors in preventing trapezius myalgia.

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Tables

Table 1
Prevalence of Neck Pain according to NDI Questionnaire

Severity of Neck Pain	Percentage
Very Severe	7%
Severe	42%
Moderate	26%
Mild	13%
No Pain	10%