ORIGINAL ARTICLE

FREQUENCY OF THORACIC SPINE STIFFNESS AND ITS ASSOCIATION WITH MUSCULOSKELETAL PAINS AT REHMAN MEDICAL INSTITUTE PESHAWAR: A CROSS-SECTIONAL STUDY

Bilal Khan[1], Madiha Anees[2], Memoona Bibi[3], Abdul Haseeb Sahibzada[4], Mariyam Kifayat[5], Rehana Nayab[6]

Author's Affiliation
[1-6] Rehman College of Rehabilitation Sciences, Rehman Medical Institute Peshawar

Corresponding Author
Mariyam Kifayat
Rehman College of Rehabilitation Sciences, Rehman Medical Institute Peshawar
Email:mariyam.kifayat@rmi.edu.pk

ABSTRACT

Objective: To determine the frequency of thoracic spine stiffness and its association with musculoskeletal pains.

Material & Methods: A cross-sectional study was conducted on patients with musculoskeletal disorders visiting the physical therapy department of the Rehman Medical Institute for the period of August to December 2023. 73 participants were recruited through convenience sampling techniques. The participants were assessed through physical examination test, Nordic questionnaire and Numeric Pain Rating Scale. SPSS version 22 was used for analysis.

Results: Most of the participants (42.5%) were in the age group of 26-40 years from which 58.9% of participants were male and 58.9% participants had a healthy BMI. Majority of them were office workers and 47.9% of them had back pain. Neck pain was experienced by 20.5% of the participants, lower limb pain by 17.8% and upper limb pain by 13.7% of the participants. Majority of the participants had rounded shoulders 46.6%, and 58.9% presented back dysfunction. Most of the participants had upper thoracic spine stiffness (38.4%).

Conclusion: The current study concludes that there is no association between thoracic Spine stiffness and musculoskeletal disorders. However, there was a high frequency of Thoracic Spine stiffness in individuals with Musculoskeletal disorders.

Key Words: Musculoskeletal, Pain, Posture, Stiffness, Thoracic Spine.

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INTRODUCTION

Thoracic spine stiffness is a significant occupational health problem with high social and economic implications.[1] Thoracic spine stiffness is experienced on the posterior aspect of the trunk in the upper or mid-back region between the T1-T12 vertebrae.[2] Recent studies suggest that it is a prevalent problem among the general population, especially adults and the elderly.[3] The reasons of thoracic spine stiffness can be summarized as sedentary lifestyle or physical inactivity,[4] increased thoracic kyphosis,[5] postural changes due to aging,[6] ribcage deformity,[7] chronic neck pain,[8] shoulder impingement syndrome,[9] lumbar instability,[10] lateral elbow pain,[11] ergonomics factors,[1] psychosocial factors,[12] presence of any pathological condition such as ankylosing spondylitis, osteoporosis, and osteoarthritis.[2] Musculoskeletal dysfunction which occurs due to thoracic spine stiffness impose a significant burden on the community.[13] Thoracic stiffness is associated with concomitant musculoskeletal symptoms and is considered as one of the most common causes of functional limitations and reduced work productivity among the individual's.[14]

A systematic review was carried out in year 2019 to determine how postural changes and increased kyphosis in the Parkinson's disease patients contribute to the development of shoulder pathology. This study suggested that humeroacromial impingement syndrome and capsulitis can occur from an increased thoracic kyphosis and decreased trunk mobility which can cause bursa inflammation, shoulder pain and limited movement.[13] A comprehensive review of the literature was conducted in 2019 in India to explore the occurrence of thoracic spine dysfunction among individuals with cervical pain. The findings indicated that diminished segmental mobility in the upper thoracic spine may serve as a predictor for the development of neck and shoulder pain.[14] In 2017, a study was conducted in Turkey to explore the sagittal curvature and mobility of the thoracic spine in individuals with chronic neck pain (CNP) compared to those without it. The findings indicated that patients with CNP exhibited reduced mobility in the thoracic region, and there was a correlation between this reduced mobility and the intensity of their pain.[15] According to another study it was found that Thoracic Spine stiffness had a notable association with various forms of concurrent musculoskeletal pain, physical growth factors, lifestyle and social aspects, backpack utilization, postural influences, psychological elements, and environmental conditions. The study also indicated that Thoracic Spine Pain and associated dysfunction were linked to medical conditions such as osteoporosis, vertebral fractures, hyperkyphosis, ankylosing spondylitis, osteoarthritis, and Scheuermann's disease.[16] Another study found that doing strength exercises at work three times a week for 20 minutes at an intensity of 70–85% of RM can help minimize thoracic spine musculoskeletal discomfort.[17] According to a study, mobilization glides can be used as a treatment to increase the upper cervical spine's flexion and the upper thoracic spine's extension.[18]

This research aims to explore the association between thoracic spine stiffness and musculoskeletal disorders (MSDs), addressing a significant knowledge gap in the field. By uncovering the biomechanical connections between thoracic spine stiffness and the occurrence of MSDs, this study will provide valuable insights into the underlying mechanisms and guide the development of targeted interventions. Identifying risk factors and early indicators of MSD.

MATERIAL AND METHODS

A Prospective Analytical Observational Study design was used for the collection of data. Patients with musculoskeletal disorders who satisfied the inclusion criteria were included in the study. The study comprised a cohort of patients with musculoskeletal problems of both sexes. This study was carried out at the Rehman Medical Institute (RMI) from August 2023 to December 2023. Convenient sampling technique was used. Our sample size, as determined by the (EPI Info) sample size calculator, was 270 (CI 95%). The duration of study was five months which include data collection and article writing.

Musculoskeletal pain experienced in the last six months was an inclusion criterion for study participation. The study excluded participants with acromegaly, pregnant women, and those with documented cases of rheumatoid arthritis. Data collection was started with the approval of RCRS graduate study committee and permission from the head of the physical therapy department. Informed consent was obtained prior to the study. The Springing test was performed for the diagnosis of thoracic spine stiffness. After the physical test, the participants filled in the NORDIC questionnaire and pain numeric rating scale questionnaire. Using SPSS version 20, tables were created to examine several characteristics, including demographics, region involved in musculoskeletal disorders, duration since the musculoskeletal disorder has been present, and the pain numeric scale.

RESULTS

Majority of the participants (42.5%) were between the age of 26-40 years. 58.9% of participants were male and 58.9% participants had a healthy BMI. Majority (47.9%) of participants had back pain. Neck pain was experienced by 20.5% of the participants, lower limb pain by 17.8% and upper limb pain by 13.7% of the participants. Majority of the participants had rounded shoulders, and 58.9% presented with back dysfunction. **(Table 1)**

Among participants, 71.1% have thoracic spine stiffness among patients with musculoskeletal disorders out of which majority of the participants (38.4%, n=28) had upper thoracic spine stiffness. Those who reported no stiffness at all accounted for 30.1% (n=22) of the sample. **(Table 2)** However, no significant association was found among thoracic spine stiffness with musculoskeletal disorders (p value=0.225). **(Table 3)**

Table 1: Demographics of the participants

Age	<25 years:	41.1%
	26-40:	42.5%
	41-60:	15.1%
	61 and above:	1.4%
Gender	Male	58.9%
	Female	41.1%
BMI	<18 (underweight)	5.5%
	18.5-24.9 (healthy)	58.9%
	25-29.9 (overweight)	28.8%
	>30 (obese)	6.8%
Occupation	Labors	4.1%
	Office workers	80.8%
	House bound	9.6%
	Sports Person	5.5%
Chief Complain	Neck Pain	20.5%
	Back Pain	47.9%
	Upper Limb	13.7%
	Lower Limb	17.8%
Posture	Forward head	12.3%
	Rounded shoulders	46.6%
	Straightening of spine	20.5%
	Flat feet	2.7%
	Others	17.8%
Diagnosis	Back dysfunction	58.9%
	Neck dysfunction	19.2%
	Upper limb pain	9.6%
	Lower limb pain	12.3%

Table 2: Thoracic Spine Stiffness of the participants

Stiffness	**Frequency**	**Percent**
Upper Thoracic Spine Stiffness	28	38.4
Mid Thoracic Spine Stiffness	2	2.7
Whole Thoracic Spine Stiffness	9	12.3
Upper and Mid Thoracic Spine Stiffness	12	16.4
No Stiffness	22	30.1
Total	73	100.0

Table 3: Association of thoracic spine stiffness with different variables

Variables	**P- Value**
Age	0.290
Gender	2.276
BMI	0.008
Occupation	0.001
Diagnosis	0.422
Posture	4.032

DISCUSSION

The aim of the current study was to find out the association of thoracic spine stiffness with musculoskeletal disorders.

Among participants of our study most of them had upper thoracic spine stiffness (38.4%), followed by upper & mid thoracic spine stiffness (16.4%), then whole thoracic spine stiffness (12.3%) and mid thoracic sine stiffness (2.7%), while others have no stiffness (30.1%). Majority of the participants had rounded shoulders (46.6%) followed by straightened soine (20.5%) then forward head posture (12.3%) and flat feet (2.7%), and (58.9%) presented with back dysfunction, followed by neck dysfuction (19.2%) then lowe limb pain (12.3%) and upper limb pain (9.6%).

Most of our participants had postural dysfunction with thoracic spine stiffness. a study in turkey was carried out to find association of chronic neck pain with that of greater thoracic curvature which showed that greater thoracic curvature or postural dysfunction had significant association with chroic neck pain

Our study also explored that Thoracic spine stiffness was not significantly associated with musculoskeletal disorders (p=0.225). A systematic review was carried out in turkey in year 2017 the results of which showed that there is significant negative correlation of chronic neck pain with thoracic spine stiffness[15]. Another systematic review was carried out in year 2019 which also suggested that humeroacromial impingement syndrome and capsulitis can occur from an increased thoracic kyphosis and decreased trunk mobility which can cause bursa inflammation, shoulder pain and limited movement.[13] The findings of another comprehensive literature search in the year 2019 indicated that diminished segmental mobility in the upper thoracic spine may serve as a predictor for the development of neck and shoulder pain. [14]

CONCLUSION

The current study concludes that there is no association between thoracic Spine stiffness and musculoskeletal disorders. However, there was a high frequency of Thoracic Spine stiffness in individuals with Musculoskeletal disorders and the most common site of stiffness was upper thoracic spine.

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