RJNMSR
Review Journal of Neurological & Medical Sciences Review

Volume 4, Issue 3, 2026

ASSOCIATION OF SCAPULAR BIOMECHANICAL DYSFUNCTION WITH TENSION-TYPE HEADACHE

Hira Rehman[*1], Tehreem Mukhtar[2], Muhammad Aleem Sabir Khan[3], Taimoor Hashmi[4], Mehronisa[5], Saira Akram Mughal[6], Muhammad Basit Khan[7]

[*1]*Clinical Physiotherapist Department of Physical Therapy and Rehabilitation Sciences Faculty of Allied Health Sciences The Superior University, Lahore*
[2]*Assistant Professor, Department of Physical Therapy and Rehabilitation Sciences Faculty of Allied Health Sciences The Superior University, Lahore*
[3]*Clinical Optometrist & Lecturer, Department of Optometry and Vision Sciences Faculty of Allied Health Sciences The Superior University, Lahore*
[4]*MBBS, MRCS-A (UK), BLS, RMP Medical Officer -ICU in University of Lahore Hospital (ULH)*
[5]*Clinical Optometrist Rural Health Center (RHC) Qaimpur*
[6]*Clinical Optometrist MS Biotechnology Faculty of Allied Health Sciences, Superior University Lahore*
[7]*Lecturer Obaid Noor institute of medical sciences, Mianwali, Pakistan*

[*1]drhirarehmanpt@gmail.com,[2]tehreemmukhtar01@gmail.com,[3]maleemsabirkhan@gmail.com, [5]drtaimoorhashmi@gmail.com,[5]drmehronisa@gmail.com,[6]sairaakrammughal@gmail.com, [7]mbasitkhan9836@gmail.com

[*1]ORCID:0009-0008-8416-6126,[2]ORCID:0000-0002-8213-7742,[3]ORCID:0009-0007-7161-9985, [4]ORCID:0009-0008-2909-9872, [5]ORCID: 0009-0005-0660-4109, [6]ORCID: 0009-0009-3030-2206, [7]ORCID: 0009-0000-7946-1878

Corresponding Author: *
Hira Rehman

DOI: https://doi.org/10.5281/zenodo.21699077

Received	Accepted	Published
01 January 2026	*17 March 2026*	*31 March 2026*

ABSTRACT

Background: *A tension type headache is generally a diffuse, mild to moderate pain in your head that's often described as feeling like a tight band around your head .Tension type headache may cause due to stress depression and anxiety. Tension headache is rooted in neck resulting from muscle tension and trigger points. Scapula muscle transmits force to neck, back to arm, and scapular dyskinesia must be evaluated in patients with headache stress, so that the connection between scapular function and neck pain is defined worldly through research.*

Objective(s): *the aim of the study was to evaluate the association of scapular dyskinesia in patients with tension headache*

Methodology: *a cross sectional study is perform using non- probability technique on sample size of a 313patients with Tension type headache that severe assessed by taking a informed consent form and a questionnaire to be filled. Lateral scapular slide test, Lennie test, scapular assistant test are performed.*

Results: *Results shows that young adults from Age 20-30 years are more involved in tension type headache (49.52%). Right side is more affected (59.11%) then left side(40.89%). 37.70% moderate*

pain intensity. 53.04% are Unmarried Workers are more prone 44.73%. Lennie test showed 30.03% positive results.SAT showed 40.89% positive results. LSST showed 42.49% positive results.

Conclusion(s): *In conclusion, there is low significance of association of scapular dyskinesia among the patients of tension type headache (42%). The significance of scapular dyskinesia among patients of tension type headache is poor which is not satisfactory because approximately half of patients of tension type headache are having scapular dyskinesia. In our final result we concluded that patients with age 20-30 are more prone to scapular dyskinesia.*

Key words: *scapular dyskinesia, mechanical neck pain, tension type headache*

INTRODUCTION

Tension headache is one of the most common type among all the types of headache. It is characterized by a tight band like feeling of pain around the forehead. In tension headache person complains of moderate or sevre pain in neck, head and behind the eyes. Overstress and muscle spasm can be the aggreviative factors for tension type headache. It is important to diagnose because it affects 30-78% of general population, that's why it needs to be diagnosed. Tension Type Headache incidence totalled 38.3% in historyIn both males (42,3 per cent) and females (46,9 per cent), prevalence peaked in the 30- to 39-year old group. Headache type tension is very common and can lead to discapacity. Various studies have shown the incidence of tension-like headache in males ranging between 1.3% and 65% and 2.7% to 86% in females. Nine distinct trials were used to detect tension-type headache epidemiology using the commonly accepted 1988 International Headache Society (IHS) criteria.(1)

Role of scapula in shoulder stabilization is of great importance.68% to 100% patients with shoulder injuries have False thoracoscapular movements.(2) Scapular Dyskinesia or scapular dysfunction are defined as the abnormal mobility or function of the scapula (shoulder blade).(3) although scapular dyskinesia is mostly diagnosed clinically but conventional MRI helps further more in diagnostic purpose for some conditions like collateral damages.(4) different studies have shown that scapular dyskinesia is responsible for causing different neck deformities and are diagnosed by the assessment of scapula in different positions like arm elevation and sitting with back straight. Evidences are also available that describe that scapular movements deviate from the normal ranges among individuals with neck pain.(5) The main responsibility for the scapular orientation is muscular structures that connect to the shoulder and axial skeleton. The only vibrant structure among the muscles attaching the girdle to the trunk is the sternoclavicular joint.(6)

Scapular Dyskinesia or scapular dysfunction defined as the abnormal mobility or function of the scapula. It is an abnormal movement which symbolizes the loss of control of the usual gesture, composition or mechanics. There are many types of scapular dyskinesia. Type 1 is Inferior Angle Prominence, Type 2 is Medial Border Prominence and Type 3 is Superior Border Prominence. Through clavicles over achromioclavicular (ac) and sternoclavicular joints, the scapula is connected to the axial skeleton. The back face of the ribcage with trapezius, rhomboids and Serratus anterior has muscular additions. Main strength is shifted by the glenohumeral articulation of the arm and hand, primarily through the muscle activation and osseous movement. The scapula has relatively insufficient ossic attachment and is therefore dependent for flexibility and stability on most muscular activation(7).

Nevertheless, motor disease and mechanical neck pain have developed our knowledge of the role of mechanical neck pain scapular dysfunction. Neck and scapula are biomechanically dependent on each other for pain in neck area. Research has still not effectively explained the importance of perceived scapular dysfunction in patients with neck pain. The surveys which examine the relation between scapular function and neck pain are worldwide (8).

Mild to moderate scapular cinematic differences are ordinary responses to the biggest contraction but this reaction is increased with scapular dyskinesia. Athletes with dyskinesia are less strong than sportspeople without dyskinesia in reaction

to manual muscle testing of reduced trapezius. During manual muscle testing, a reduced strength was also associated with a lack of upwards rotation in all athletes with reduced and previous trapezius and Serratus(9).

Episodic headaches are common in most individuals with tension headaches. The stress type headaches, episodic (eth) and chronic (ctth), have been split into two different types. The headache type ephemeral tension was further split, namely rare and common, into two more groups. All three kinds of headaches have prevalent clinical characteristics except for frequency.(10)

The considerable social loads related with tension-type headache (TTH) established were formerly disregarded as major public health issue. The TTH is primarily affected by up to 78% of the population and 3% by chronic TTH. myofiscial nociception may be essential for episodic TTH pathophysiology, whereas core nociceptive sensitisation appears responsible for adapting episodic TTH to chronic. Headache-related illness generally may occur in combination with non-pharmacological and pharmacological therapy by documentation of active variables, although efficient therapy methods are not available.

Specific and efficient therapy strategies can be be nefited from growth(11).

Methodology

This cross-sectional study was conducted at Major Aziz Bhatti Shaheed Teaching Hospital, Gujrat, and DHQ Civil Hospital, Gujranwala, over a period of four months following the approval of the synopsis. A total sample of 313 patients was calculated using the standard prevalence formula based on a reported prevalence of tension-type headache. A non-probability convenience sampling technique was employed to recruit eligible participants from the outpatient departments of both hospitals. Patients aged 20–60 years who had been diagnosed with tension-type headache by a general physician were included in the study. Patients with a history of upper limb fracture or dislocation within the previous three months, vascular or neurogenic disorders, or any inflammatory disease were excluded. The equipment used for data collection included a measuring tape, scoliometer, blue and red markers, an examination couch, and a structured questionnaire.

After obtaining informed written consent, eligible participants completed a structured questionnaire comprising demographic information, work-related details, the Sick Scapula Rating Scale, and the Visual Analogue Scale (VAS) to assess pain intensity. The diagnosis of tension-type headache was confirmed by a physician, while scapular dyskinesia was evaluated under the supervision of a junior physiotherapist using the Lateral Scapular Slide Test (LSST), Lennie Test, and Scapular Assistance Test (SAT). In the LSST, the distance between the inferior angle of the scapula and the thoracic spine (T7–T9) was measured bilaterally using a measuring tape in two arm positions: arms relaxed at 0° abduction and arms at 45° abduction with hands resting on the waist. In the Lennie Test, the superior angle, root, and inferior angle of the scapula were palpated, and their distances from the corresponding thoracic spinous processes were measured bilaterally and recorded in centimeters. During the Scapular Assistance Test, the examiner manually assisted the scapula during active arm elevation in the scapular plane; reduction in pain during the movement was considered a positive test. The collected data were recorded on a structured proforma and subsequently analyzed to determine the association between scapular dyskinesia and tension-type headache.

Results

The results have been obtained by analyzing the data collected from (313) Tension type headache individuals to assess the association between scapular dyskinesia and tension type headache.

Chart No 1 (Frequency graph of Age, Dominent Side, Pain Intensity)

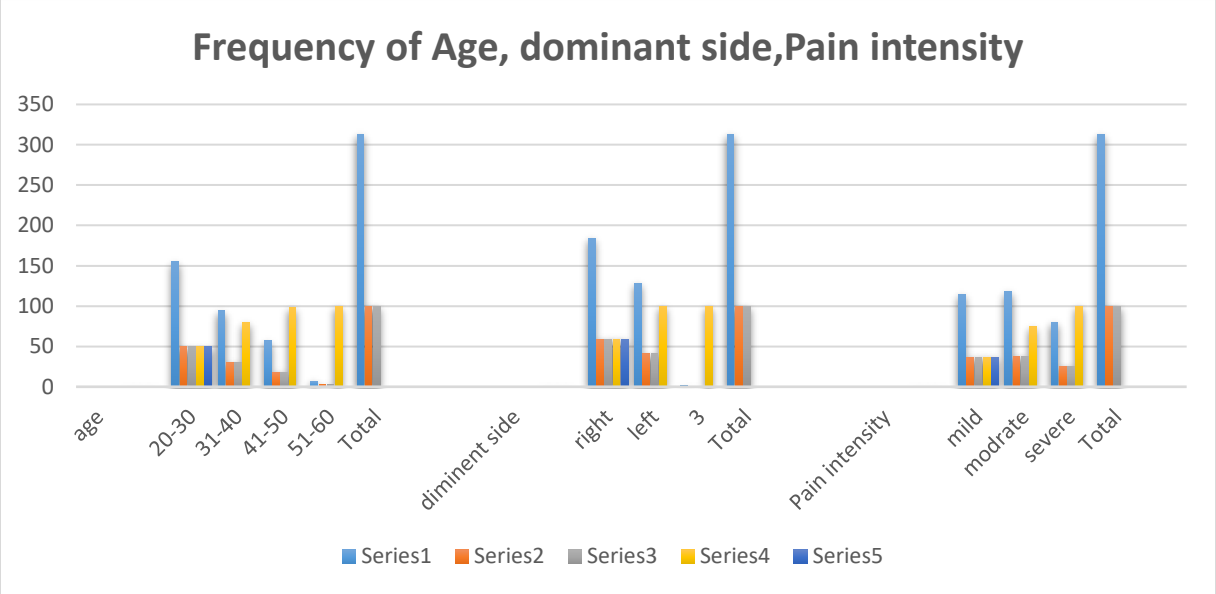


Figure 1:

Chart No 1(a): show the categorization of 4 age groups. Group no 1 Adults are more prone to tension type headache. Age 20-30 years old Young adults 49.52% involved in tension type headache. 51-60 years old are 2.236% having TTH. **(b):** show the categorization of two dominant side Right or Left side. Right side more affected 59.11%. Left side is 40.89%. **(c):** described pain intensity. Pain intensity categorized into three groups. 37.70% are having moderate Pain intensity. 36.74% are having mild pain intensity.25.56% are severe pain intensity

Chart No 2: Frequency graph of (a) Marital Status, (b) Occupational Status

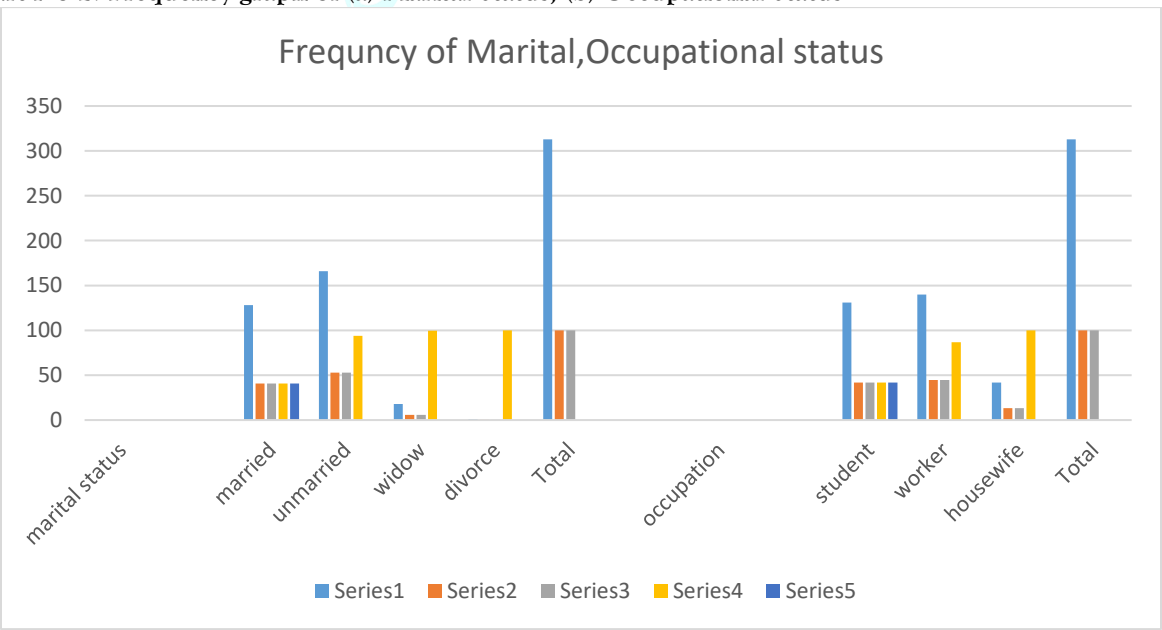


Chart No 2(a): described marital status and it is categorized into 4 groups. 53.04% are Unmarried. 40.89% are married. Widows are 5.751%. 0.319% are divorced. **(b):** show occupation and it is

categorized into 3 groups. Workers are more Prone 44.73%. Students are 41.85%. Housewives are 13.42%.

Chart No 3: Frequency of (a) Physical activity, (b) Lifting Weight, (c) Working Hours

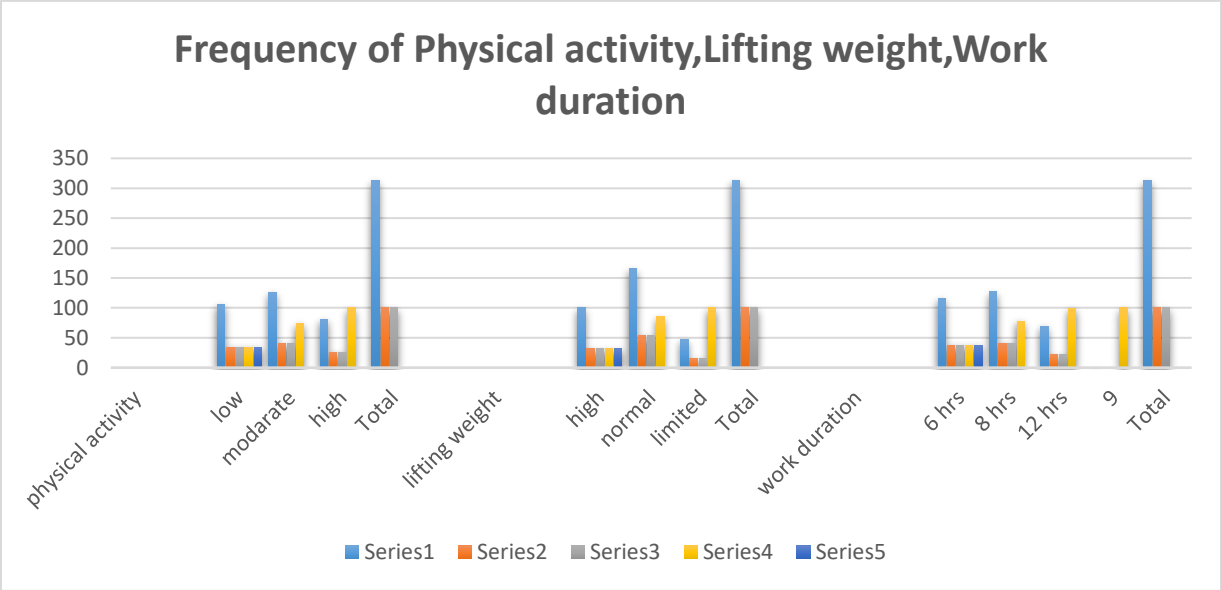


Chart No 3(a): show the physical activity and its three categories. Moderate physical activity is (40.26%), low (33.87%), high (25.88%). **(b):** described percentage of lifting weight. Group no: 1 high weight lifting 31.95%. Group no 2: normal weight lifting 53.04%, Limited weight lifting 15.02%. **(c):** show the working hours and its three categories, 40.89% those who working 8 hrs, 37.06% 6 hours working duration, 22.04% for 12 hours working duration.

Chart No 4: Frequency graph of (a) Lennie test, (b) SAT, (c)LSST

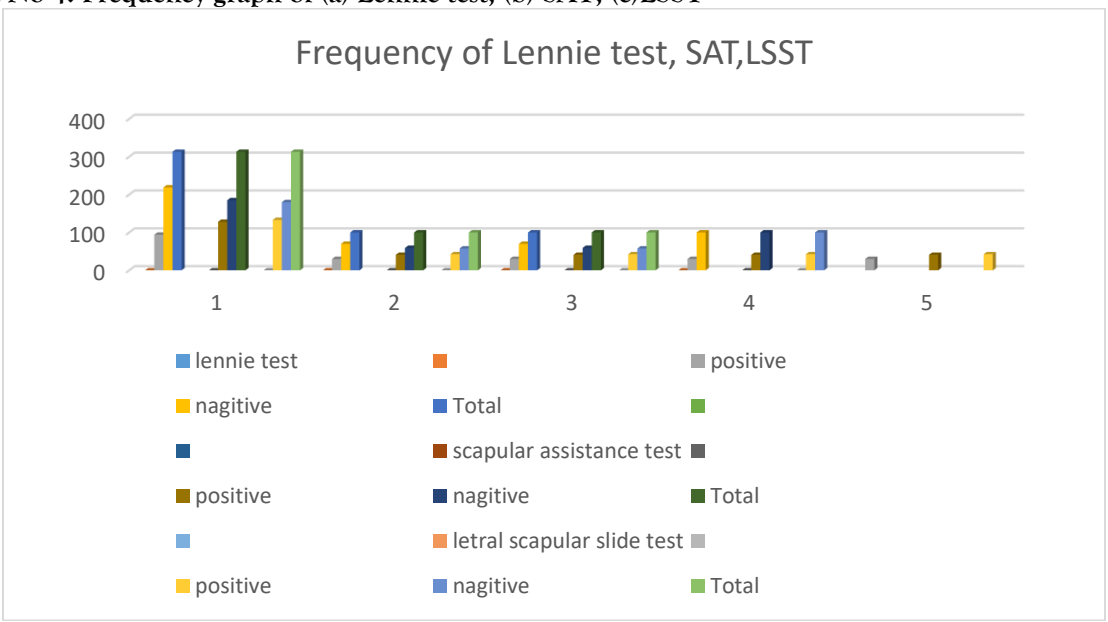
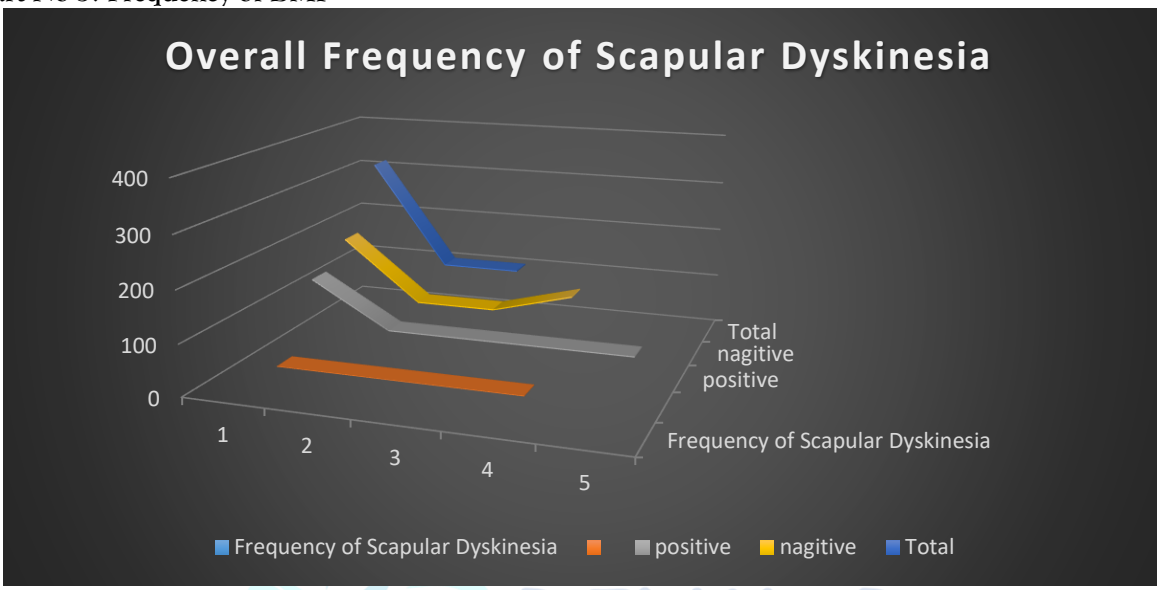


Chart No 4 (a) show the percentage of Lennie test. It has two categories. Lennie test is negative (69.97%), Positive (30.03%). **(a)** Show the scapular assistance test and its two categories. SAT is (negative 59.11%, Positive 40.89%). **(c)** Show the lateral scapular slide test and its two categories. LSST test negative 57.51% Positive 42.49%

Chart No 5: Frequency of BMI



Graph No 5: show the BMI and categorized into 4 groups. BMI group 1 (10.54% underweight) group 2 (42.17% normal) group 3 (24.60% overweight I) group 4 (22.68% overweight II)

TABLE NO 1

BMI	26.1776±7.18296
VAS	6.109±2.52
SSRS	10.3195±2.289
SD	1.5751±7.18

Table no 1: shows the mean value and std.deviation value. VAS mean value is 6.1% or std.deviation 2.5%. SSRS mean value 10.3% std.deviation 2.2%. Scapular dyskinesias mean value 1.5% and std.deviation .49%. BMI mean value 26.1% and std.deviation 7.1%

TABLE NO 2

Physical Tests	Variance	Present n (%)	Absent n (%)	Total n (%)	Pearson's Chi- square	
					Value	P Value
LSST	Positive	107(43.9)	26(37.7)	133(42.5)	0.838	0.360
	Negative	137(56.1)	43(62.3)	180(57.5)		
Lennie Test	Positive	85(90.4%)	9(9.6%)	94(30.0%)	12.157	0.00
	Negative	156(72.6%)	60(27.4%)	219(70.0%)		
Scapular Assistance test	Positive	106(82.8%)	22(17.2%)	128(40.9%)	2.973	.085
	Negative	138(74.6%)	47(25.4%)	185(59.1%)		

Lateral scapular slide test * tension type headache
Table No 2 describe that 133/313 having LSST test positive 107 (80.5%) having TTH and 180/313 are negative LSST. 137 (76.1%) having TTH. Total 244(78.0%) having TTH and 69 (22.0%) having no TTH.
The above result show that the relationship between Tension type headache and Scapular dyskinesia The significant value of correlation .838 and the p value is >0.05 which means there is no significance between them.

Lennie test * tension type headache
Table No 2 described that 94/313 having Lennie test positive 85 (90.4%) having TTH and 219/313 are Negative Lennie test. 159 (72.6%) having TTH. Total 244(78.0%) having TTH and 69 (22.0%) having no TTH. The above result show that the relationship between Tension type headache and Scapular dyskinesia The significant value of correlation 12.157[a] and the p value is <0.05 which means there is significance between them.

Scapular assistance test * tension type headache
Table No 2 described that 128/313 having SAT positive. 106 (82.8%) having TTH and 185/313 are negative SAT. 138 (74.6%) having TTH. Total 244(78.0%) having TTH and 69 (22.0%) having no TTH. The above results show that the

relationship between Tension type headache and Scapular dyskinesia The significant value of correlation 2.973[a] and the p value is >0.05 which means there is no significance between them.

DISCUSSION

To our knowledge, this is the first unselected population- based Cross Sectional Study of the association of Scapular Dyskinesia in patient with tension-type headache. Tension Type headache already diagnosed by the physicians or senior Physiotherapist. Quality of pain is assessed with Visual Analogue Scale and Scapular Dyskinesia is assessing with Sick Scapular Rating Scale. We confirmed that Scapular Dyskinesia is linked with Tension type headache.

Mean value of visual analogue scale is 6.1 and Std-deviation value is 2.5 Mean value of sick scapular rating scale is 10.3 and std-deviation value is 2.2 BMI value is 26.1 and std deviation value is 7.1

The results of the study partially support our hypothesis. We used Lennie test, the result of Lennie test is positive 94/313 individuals. (12)

Scapular assistant test to confirm the Scapular dyskinesia, the result of SAT is positive 128/313 individuals. We found that the incidence of scapular dyskinesis in tension type headache patients was 57% those individuals which do not have scapular dyskinesia but 42.49% are having. (13)

Final result we concluded that patient with age between 20-30 are more prone to scapular dyskinesia, the result lies within 49.52% and age between 51-60 is less prone to scapular dyskinesia that is 2.236%.Right side is more involved than left and final result in which right side is involved 59.11%.The intensity of pain lies in moderate stage. Tension headache is more common in unmarried persons that are 53.64%. Tension headache is more common in office workers that are 44.73%. In our final result we concluded that patient with age (20-30) are more prone to scapular dyskinesia, the result lies within 49.52% and age (51-60) is less prone to scapular dyskinesia that is 2.236%. (14)

The person who has moderate physical activity is most prone to tension headache that is 90.26 and who has less activity has low chance to have tension headache that is 25.88%. in our research we performed lenine test negative percentage of this result is 69.97% and positive results of this test is 30.03%. LSST test also performed in this research and negative result LSST is 57.51% and positive test is 42.49%. (15)

There is very less studies about scapular dyskinesia with tension type headache in the literature but we especially wanted to evaluate the association of scapular dyskinesia in patients with tension type headache. Musculoskeletal complaints about upper extremity among scapular dyskinesia are known to be associated with headache and positional disturbances. Scapula is a bridge between the shoulder complex and the cervical spine which plays an important role in ensuring both mobility and stability of the neck/shoulder region. The association between abnormal scapular positions, motions and problems related to tension type headache had not been well established in the literature, whereas studies investigating the incidence of scapular dysfunction in headache have not recently begun to emerge. %42.49 of the individuals were with scapular dyskinesia in our study. (16)

It was found to have problems in activity and function of the upper extremity. These problems can occur because of tension type headache and, earlier experience of psychological factors. The results show moderate activity level in the patients having association of scapular dyskinesia with tension type headache.44.73 % is involved to have scapular dyskinesia. Prolonged static position and enhanced muscle load direct to the development of symptoms in the upper extremity.

Right side (59.11%) of patients is more involved than left side. The intensity of pain of tension type headache lies in moderate stage. Tension headache is more common in unmarried persons (53.64%). Tension headache is more common in office workers (44.73%). In our research we performed Lennie Test on patients. The negative percentage of this result is 69.97% and positive percentage of the test is 30.03%. LSST test also performed in this research and negative result of LSST is 57.51% and positive result of test is 42.49%. (17)

CONCLUSION

In conclusion, there is low significance of association of scapular dyskinesia among the patients of tension type headache (42%). The significance of scapular dyskinesia among patients of tension type headache is poor which is not satisfactory because approximately half of patients of tension type headache are having scapular dyskinesia. In our final result we concluded that patients with age 20-30 are more prone to scapular dyskinesia.

REFRENCES

1. Schwartz BS, Stewart WF, Simon D, Lipton RB. Epidemiology of Tension-Type Headache. JAMA. 1998;279(5):381-3.
2. Crowe MM, Elhassan BT. Scapular and shoulder girdle muscular anatomy: its role in periscapular tendon transfers. The Journal of hand surgery. 2016;41(2):306-14.
3. Roche SJ, Funk L, Sciascia A, Kibler WB. Scapular dyskinesis: the surgeon's perspective. Shoulder & elbow. 2015;7(4):289-97.
4. Camuera E, Rodriguez LF, Hafeez I, Sharma R, Gómez J, Marin J, et al., editors. Scapular Dyskinesis: The role of MR Imaging2016: European Congress of Radiology 2016.
5. Cagnie B, Struyf F, Cools A, Castelein B, Danneels L, O'Leary S. The relevance of scapular dysfunction in neck pain: a brief commentary. journal of orthopaedic & sports physical therapy. 2014;44(6):435-9.
6. HelgadoTTir H, Kristjansson E, Mottram S, Karduna A, Jonsson Jr H. Altered scapular orientation during arm elevation in patients with insidious onset neck pain and whiplash-associated disorder. journal of orthopaedic & sports physical therapy. 2010;40(12):784-91.
7. Roche SJ, Funk L, Sciascia A, Kibler WB. Scapular dyskinesis: the surgeon's perspective. Shoulder & elbow. 2015;7(4):289-97.
8. Cagnie B, Struyf F, Cools A, Castelein B, Danneels L, O'Leary S. The relevance of scapular dysfunction in neck pain: a brief commentary. The Journal of orthopaedic and sports physical therapy. 2014;44(6):435-9.
9. Seitz AL, McClelland RI, Jones WJ, Jean RA, Kardouni JR. A comparison of change in 3d scapular kinematics with maximal contractions and force production with scapular muscle tests between asymptomatic overhead athletes with and without scapular dyskinesis. International journal of sports physical therapy. 2015;10(3):309-18.
10. Chowdhury D. Tension type headache. Ann Indian Acad Neurol. 2012;15(Suppl 1):S83-S8.
11. Bendtsen L, Jensen R. Tension-type headache. Neurologic clinics. 2009;27(2):525-35.
12. Jull G, Hall T. Cervical musculoskeletal dysfunction in headache: How should it be defined? Musculoskeletal science & practice. 2018;38:148-50.
13. Dabholkar A, Chandresh Vora D, Dabholkar T. Scapular Muscle strength in Computer users with Unilateral neck pain2015.
14. Sheard B, Elliott J, Cagnie B, O'Leary S. Evaluating serratus anterior muscle function in neck pain using muscle functional magnetic resonance imaging. Journal of manipulative and physiological therapeutics. 2012;35(8):629-35.
15. Wegner S, Jull G, O'Leary S, Johnston V. The effect of a scapular positional correction strategy on trapezius activity in patients with neck pain. Manual therapy. 2010;15(6):562-6.
16. Falla D, Bilenkij G, Jull G. Patients with chronic neck pain demonstrate altered patterns of muscle activation during performance of a functional upper limb task. Spine. 2004;29(13):1436-40.
17. Bansevicius D, Sjaastad O. Cervicogenic headache: the influence of mental load on pain level and EMG of shoulder-neck and facial muscles. Headache. 1996;36(6):372-8.