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ORIGINAL ARTICLE

Prevalence of Myofascial Trigger Points in Patients with Non-Traumatic Unilateral Shoulder Pain

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ABSTRACT

Background: Shoulder pain is becoming problematic disorder with symptoms of mild to severe pain, restricted ranges and stiffness. Trigger points are knots in muscle fibers that show high response to pressure with symptoms of referred pain. Shoulder pain may be linked to trigger points and can target the impact of quality of life. However, there are limited studies that explore frequency of trigger points in non-traumatic unilateral shoulder pain. This research aims to find how many patients of non-traumatic origin of shoulder pain have trigger points.

Objective: To measure the frequency of myofascial trigger points in patients with non-traumatic unilateral shoulder pain.

Methodology: This observation based cross sectional study was held over a duration of four months, following the approval of the synopsis by the research ethics committee of the University of Lahore. In this study data was collected from 273 patients of non-traumatic unilateral shoulder pain in Aziz Bhatti Shaheed Hospital Gujrat and were analyzed using SPSS version 23.0. Frequency tables, Bar charts, and Mean ± SD were used for descriptive analysis. The Chi-square test was used to determine the p- value for the relation between categorical variables.

Results: 273 patients of age 18 to 35 were examined for the presence of Myofascial trigger points out of which 67.4% patients were positive for one or more trigger points of these 50.18% were female patients and 47(17.22%) female patients that had score of <9 on myofascial pain scale were marked negative. Meanwhile in male patients 42(15.38%) had no trigger points on myofascial pain scale scoring <9 and 47(17.22%) scored ≥9. Female of age between 34 and 35 were highly prevalent (21.61%) in developing trigger points. We found significant association between shoulder pain and trigger points with p-value of (<.001*).

Conclusion: Myofascial trigger points are highly prevalent in patients of non-traumatic unilateral shoulder pain. Of all the muscles examined, Infraspinatus muscle is most likely to develop trigger points. While looking for risk factors, female is more likely to develop myofascial pain.

Keywords	*Address of Correspondence	Article info.
Myofascial Pain Syndrome, Myofascial Trigger Points, Musculoskeletal Pain, Referred Pain, U/L Shoulder Pain, MTrPs, MPS.	*gulraizpt@gmail.com*	*Received: July 24, 2022* *Accepted: January 11, 2023*

Cite this article: *Shahid J, Enderyas G, Islam F, Raza A. Prevalence of Myofascial Trigger Points in Patients with Non-Traumatic Unilateral Shoulder Pain. RADS J Biol Res Appl Sci. 2023; 14(1):48-55.*

INTRODUCTION

Shoulder pain is a prevalent musculoskeletal disorder that can be persistent or recurrent and imposes burden on affected person exhibiting symptoms of mild to severe pain, restricted ranges and stiffness.[1] Recent reviews have claimed 4.6 to 46.7% per year prevalence for shoulder pain[2]. In general population prevalence of shoulder

disorders have been reported to be 36%. Nearly half of the Canadian citizens has minimum one episode of shoulder pain per year.[3] Etiological mechanisms underlying shoulder pain are rarely recognized. Myofascial trigger points may provide a different view for the pathophysiological mechanism that causes shoulder pain. The phrase myofascial pain was first invented by Travell who described it as the Trigger points cause a slew of sensory motor and autonomic problems.[4] MTrPs are sensitized, tender areas that can produce regional and referred pain to surrounding areas with mechanical stimulus.[5,6] MTrPs may be linked to neck and shoulder disorders, which can significantly impact a ADLs, quality of life and ability to work.[7,8] Of two types of TrPs, Active MTrPs are one with clinical pain and constant tenderness. When compressed shows a local twitch response and rise in pain.[9] Latent MTrPs are pain free neuromuscular lesions and are only painful when palpated, basically a tender area with a palpable taut band of muscle that has a pressure-pain threshold.[1] The frequency of MTrPs in patients with chronic shoulder pain is high, based on a systematic review and an observational study. The systematic review found that MTrPs were examined in all presented with neck or shoulder disorders, with a median number of six active MTrPs and four latent MTrPs per subject.[10] the most common sight of MTrPs in shoulder region are infraspinatus and deltoid muscles. Referral pain pattern for infraspinatus is given in Figure **1**, which demonstrates the pain goes in the shoulder and upper arm. It can sometimes radiate down to the elbow both anteriorly and posteriorly. While pain pattern of deltoid muscle can be felt as a deep ache in shoulder as shown in Figure **2**.

The observational study reported that 100% of patients with chronic shoulder pain had commonly one MTrP in the shoulder girdle muscles, and the most prevalent muscles with active MTrPs were infraspinatus (77%) and the upper trapezius (58%).[11] Earlier researches have claimed that MTrPs were found in 1727(86.4%) subjects and absent in 273(13.7%) in university students.[10,12] Post stroke patients are also at risk of TrPs formation that can be quite painful and can lead to a range of complications if not properly managed[13] with 68% prevalence rate for supraspinatus muscle, 92% for infraspinatus muscle, 40% for teres minor and 62% for upper trapezius muscle. While for active MTrPs prevalence rate was 34%, 50%, 12% and 20% respectively.[5] Yearly incidence of MPS is estimated to be 30%-40% in America.[14]

Figure 1. Referred pain pattern from infraspinatus muscle. Picture used with person's consent.

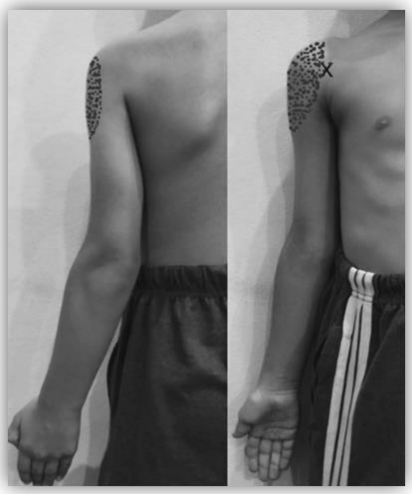

Figure 2. Referred pain pattern from deltoid muscle, Picture used with person's consent.

However, the evidence supporting the high prevalence of MTrPs in patients with shoulder pain is limited by the low methodological quality, small sample sizes and lack of control groups and blinding in the included studies. Earlier research couldn't find the exact number of patients having MTrPs in non-traumatic shoulder pain and its association with BMI and was carried out on small population. This research aimed to provide the knowledge of the role of MTrPs in patients of non-traumatic shoulder pain and to find prevalence of MTrPs in patients with non-traumatic unilateral shoulder pain.

MATERIALS AND METHODS

This is a population based observational cross-sectional study approved from Institutional Review Board of University of Lahore. Data was collected from 273 patients of non-traumatic unilateral shoulder pain in District Health Quarter (DHQ) Hospital Gujrat. Study was completed within 4 months after approval of Synopsis. Study included people of age between 18 and 35 years[15], patients reported with non-traumatic shoulder pain[16] and who were willing to participate and we exclude if there were diagnosed patients of neurological disease, organ pain, cervical radiculopathy or psychiatric disorders[12], had any systemic disease, shoulder instability or acute trauma.

After signing consent form demographic data including Age, Gender, occupation, height, weight and duration of shoulder pain were recorded. Subsequently noting the demographics patients were asked to give a number from 1 to 10 according to their current shoulder pain intensity and were noted in VAS. MTrPs were diagnosed using Myofascial Diagnostic Scale. Using the scale patients were asked about the location of pain and then palpated for tenderness that is muscle is too stiff or soreness is feel on touch. This includes 5 grades, 0 grade indicates absence of tenderness, grade 1 is when on palpation there is tenderness but no grimace or flinch, grade 2 is marked positive if on palpating patient shows a quick response of flinch or made painful expressions, for grade 3 patient withdraws his/her head due to pain while in grade 4 tenderness only superficial or gentle palpation made patient withdraw or made a quick sound that is also called jump sign. After tenderness patient was palpated for local twitch response that is defined by travelled as when group of muscle fibers contacting trigger point shows short-time contraction or jerk upon palpation. In case of presence of LTR it was marked 4. 3rd sign was taut band of muscle fiber containing TrP, it was marked 4 when on palpation there were rope like tensed muscle fibers or knots or nodules found that extend to the insertion of muscle fibers. Lastly patient was asked about any referred pain upon palpation, this happens when put pressure upon trigger point for 30sec until therapist's nail turn to yellow, and in case of any referred pain it was marked 5. Total score for this scale was calculated at the end that is out of 17, score ≥9 indicates the presence of MTrP.

All the data were analyzed by SPSS version 23.0. Frequency tables, Bar charts, and Mean ± SD were used for descriptive analysis. We used descriptive statistics to summarize the baseline characteristics of participants and to check for any imbalance or missing data that is given in Table **1**. We used the significance level at 0.05 and reported 95% confidence intervals for all estimates. We used chi square tests to find any association between variables.

RESULTS

Mean and standard deviation values of all variables for 273 participants are given in Table **1**. Chi square test was applied to find out the association between variables. We found significant association between shoulder pain and trigger points with p-value (<0.001), also we found strong association between BMI and trigger points with p-value (0.001).

Table 1. Descriptive analysis of all variables.

Statistics	Mean	Std. Deviation
Age (Years)	29.2088	4.68379
BMI(kg/m²)	24.8964	3.60801
Duration of complaint	1.6667	0.81499
Soft tissue tenderness	2.5055	1.33152
Snapping palpation of trigger point evokes a LTR	0.8645	1.64940
Trigger point found in palpable taut band	2.3004	1.98095
Referred pain	3.2784	2.38010
Total score	8.9304	4.72465
Visual Analogue Scale	6.2051	0.86711

Table 2. Demographic characteristics of participants.

Variables	Categories	N%
Gender	Female	184(67.4%)
	Male	89(32.6%)
Age	18-21	23(8.4%)
	22-25	45(16.5%)
	26-29	53(19.4%)
	30-33	79(28.9%)
	34-35	73(26.7%)
Job Title	Labors	45(16.5%)
	House wife	94(34.4%)
	Office workers	39(14.3%)
	Students	34(12.5%)
	Medical staff	30(11.0%)
	Teachers	31(11.4%)
Body Mass Index categories	<18.5 underweight	59(21.6%)
	18.5-24.9 normal	115(42.1%)
	25-29.9 overweight	58(21.2%)
	30-34.9 obese	41(15.0%)

Table 3. Myofascial diagnostic scale scoring.

Variables	Categories	N %
Soft tissue tenderness	Absence of tenderness	34(12.5%)
	Tenderness upon palpation with no grimace or flinch	30(11.0%)
	Tenderness upon palpation with presence of grimace or flinch	48(17.6%)
	Jump sign	86(31.5%)
	Abolition to non-noxious stimuli	75(27.5%)
Local Twitch Response	Present	59(21.6%)
	Absent	214(78.4%)
TrP found in taut band	Present	157(57.4%)
	Absent	116(42.5%)
Referred pain	Present	179(65.6%)
	Absent	94(34.4%)

Table **2** shows the baseline characteristics of participants. The data provides a comprehensive overview of the demographic and physical characteristics of study's participants. As shown in Table **2**, the majority of participants were female (67.4%), with the largest age group being 30-33 years old (28.9%). The most common job title was 'Housewife' (34.4%), and most participants had a normal Body Mass Index (42.1%).

Table **3** insights into the distribution of trigger points. In terms of soft tissue tenderness, the 'jump sign' was the most common response (31.5%). Most participants did not exhibit a local twitch response (78.4%), but a significant number had a TrP found in a taut band (57.4%) and experienced referred pain (65.6%)."

Using myofascial diagnostic scale total score of ≥9 is considered as active trigger point. Figure **3** illustrates that overall, 67.4% patients were positive for one or more

trigger points and 32.6% were presented with shoulder pain having no trigger point, of which 47(17.22%) were female patients that had MPS score of <9 and were marked negative while 137(50.18%) females scored for ≥9. Meanwhile in male patients 42(15.38%) had no trigger points by MPS scoring <9 and 47(17.22%) scored ≥9.

Figure **4** shows that the prevalence of MPS (Myofascial Pain Syndrome) varied across different age groups. With age group 34-35 having the highest prevalence of MPS, with 21.61% of patients scoring ≥9, while only 5.13% in this group scored <9.

Figure **5** shows percentage of patients falling in VAS categories that are 11(4%) patients were presented with mild pain, 251(92%) with moderate and 11 with severe pain during data collection.

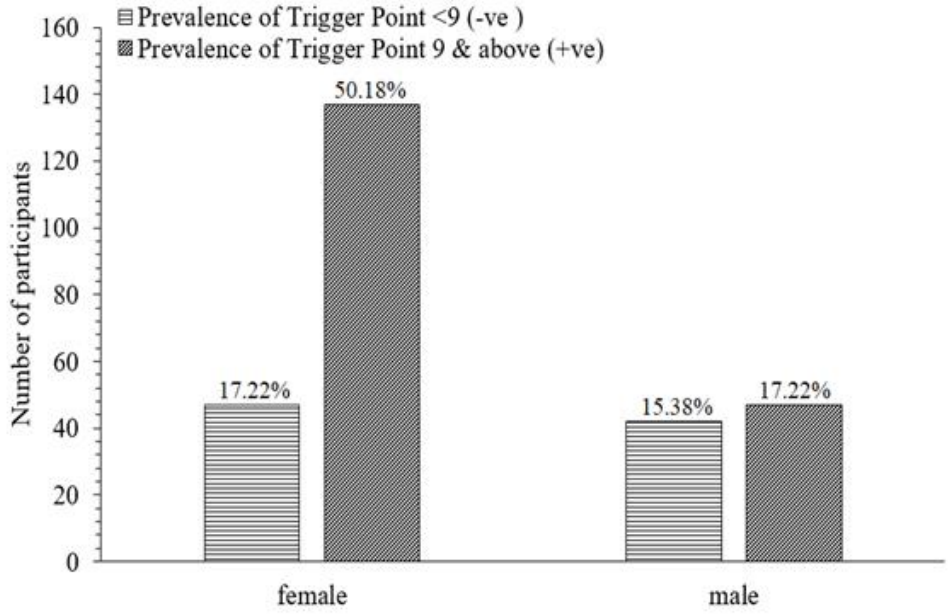

Figure 3. Distribution of prevalence of trigger points in genders.

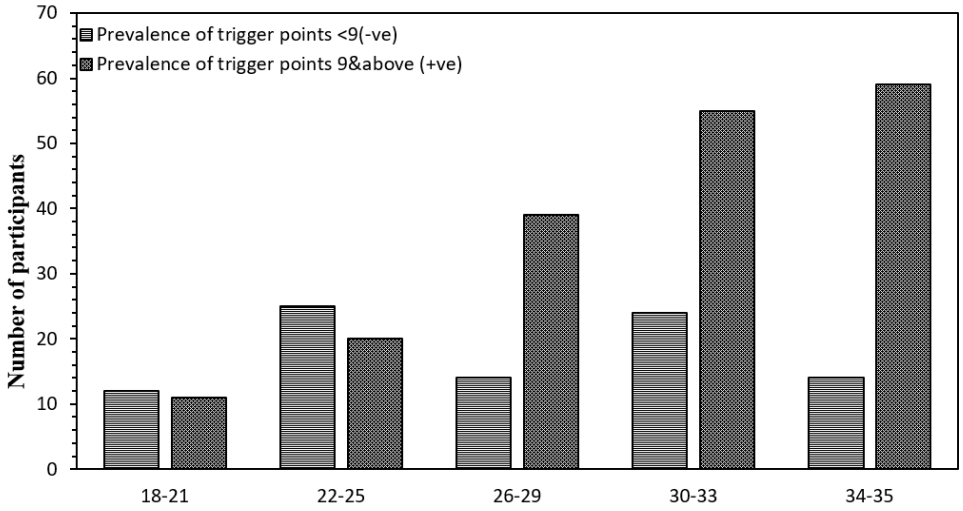

Figure 4. Prevalence of TrPs in different age groups.

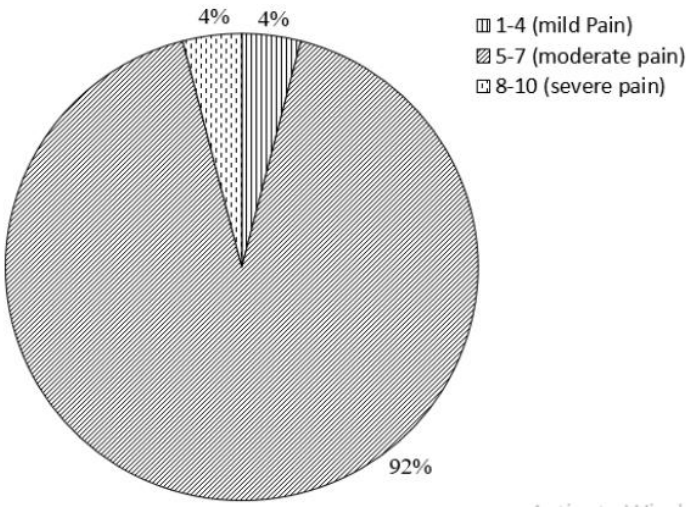

Figure 5. Frequency of patients falling in VAS categories.

DISCUSSION

In this study, we investigated the prevalence of trigger points in patients with non-traumatic shoulder pain. Our study population consisted of 273 patients, of which 184 (67.4%) were female and 89 (32.6%) were male. The age of the patients was divided into five groups: 18-21 years (8.4%), 22-25 years (16.5%), 26-29 years (19.4%), 30-33 years (28.9%), and 34-35 years (26.7%). The patients' job characteristics were also divided into six groups: laborers (16.5%), housewives (34.4%), office workers (14.3%), students (12.5%), medical staff (11.0%), and teachers (11.4%) as given in Table **2**.

Overall, 67.4% of the patients were positive for one or more trigger points, while 32.6% presented with shoulder pain but had no trigger points. This prevalence aligns with earlier researches.[17, 11] Of the female patients, 47 (17.22%) had an MPS score of <9 and were marked negative, while 137 (50.18%) scored ≥9 and were considered positive for MPS. Among the male patients, 42 (15.38%) had no trigger points with an MPS score of <9, while 47 (17.22%) scored ≥9. These results are consistent with previous researches.[11,18]

When looking at the results by age group, we found that in the first group (18-21 years), there were 12 patients (4.4%) with an MPS score of <9 and 11 patients with a score of ≥9, considered positive for MPS. In the second group (22-25 years), there were 25 patients (9.16%) with no trigger points and 30 patients with active trigger points. In the third group (26-29 years), there were 14 patients (5.13%) with an MPS score of <9 and 39 patients (14.29%) with a score of ≥9. In the fourth group (30-33 years), there were 24 patients (8.79%) with an MPS score of <9 and 55 patients (20.15%) with a score of ≥9. In the last group (34-35 years), there was the highest prevalence of MPS, with 59 patients (21.61%) scoring ≥9, while only 14 patients (5.13%) scored <9.

We found no significant association between age and the formation of trigger points in our study population. While there is a strong association between shoulder pain and trigger points with significant (p-value <0.001).

The prevalence of tenderness in the infraspinatus and deltoid muscles was investigated using the MPS scale. The infraspinatus muscle had a higher prevalence of one or multiple trigger points in 115 patients. The results showed that 34 patients had no tenderness, while 30 patients (10.99%) had grade 1 tenderness, 48 patients (17.58%) were in grade 2, 86 patients (31.50%) had grade 3 tenderness, and 75 patients (27.47%) had grade 4 tenderness.

The local twitch response (LTR) was found in only 59 (21.6%) patients, which is consistent with previous studies that have claimed that LTR is not a common symptom. Taut bands were found in 157 (57.4%) patients, while 116 (42.5%) did not have taut bands. Referred pain was found in 65.6% of patients, while 34.4% had no referred pain pattern for shoulder muscles.[15]

The presence of trigger points was found to be correlated with age, gender, BMI, occupation, and VAS categories.

Overweight individuals, laborers, and housewives were found to be at a higher risk of developing trigger points due to poor posture and muscle overuse.

This is an observational based study so does not provide any precautionary measures to patients about how to prevent from trigger points, posture correction or harmful effects of overuse of muscles. More rigorous research is needed to confirm the role of MTrPs in shoulder pain. Additionally, the effectiveness of different treatments for MTrPs in patients with shoulder pain is unclear. MTrP prevalence was a reasonable predictor of myofascial shoulder pain, despite the fact that our cross-sectional investigation was unable to establish a cause-and-effect relationship between MTrPs and shoulder pain. Our results imply that palpation is helpful in identifying MTrPs in patients with shoulder pain, the requirement that the pain be "referred pain familiar to the patient" should be reexamined when deciding if MTrPs are active. We faced limitations during the study as supervisor was not cooperative, patients from different backgrounds were assessed for TrPs where we faced difficulty in delivering the details of the study and get assigned consent and also some patients refused for palpation method.

CONCLUSION

We concluded a high prevalence of MTrPs in patients of non-traumatic U/L shoulder pain. Gender and MPS are strongly related, with females being at higher risk. TrPs is similarly impacted by BMI. More trigger sites were detected in overweight people than in normal-weight or underweight persons. This study demonstrated a significant connection between trigger points and non-traumatic shoulder pain.

ETHICAL APPROVAL

Approval for research was granted by the research ethics committee of University of Lahore.

CONFLICT OF INTEREST

None.

FUNDING SOURCE

None.

ACKNOWLEDGEMENT

None.

LIST OF ABBREVIATIONS

ATrPs	Active trigger point
B/L	Bilateral
BMI	Body Mass Index
CVA	Cerebrovascular Accident
LTrPs	Latent trigger point
LTR	Local Twitch Response
MD	Myofascial dysfunction
MTrPs	Myofascial trigger points
MPR	Myofascial Pressure Release
MPS	Myofascial pain scale
SIS	Shoulder Impingement Syndrome
U/L	Unilateral
VAS	Visual Analogue Scale

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