Original Article

Correlation of Myofascial Trigger Points with Shoulder Pain and Function in Post-Stroke Patients with Painful Shoulder

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ABSTRACT

Objective: To find out the correlation of shoulder pain and disability with myofascial trigger points (MTrPs) in post stroke patients having shoulder pain.

Study Design: A cross-sectional survey was conducted with non-probability convenient sampling

Place and Duration of Study: This study was conducted at the Riphah Rehabilitation Center, Riphah International University, Lahore from January 2019 to June 2019.

Materials and Methods: Patients were recruited with six months or older stroke history and having post stroke shoulder pain. Upper Trapezius, Supraspinatus, Infraspinatus and Teres Minor muscles were targeted. MTrPs were diagnosed by using the palpation method described by Simons, and Travell. Shoulder disability was measured by using the DASH (Disability of Arm, Shoulder and Hand) score and pain was recorded through NPRS (Numeric Pain Rating Scale). Data analysis was done by IBM SPSS Statistics 21.

Results: Total 70 stroke patients participated. Males were 41.4%. Mean age was 55.53±14.98 years. MTrPs were moderately correlated with shoulder disability for supraspinatus, upper trapezius and infraspinatus (r= 0.53, r= 0.49 and r=0.54 respectively. All have p<0.001). Moderate correlation was found between MTrPs and pain for supraspinatus, upper trapezius and infraspinatus (r= 0.50, r= 0.47 and r= 0.47 & all have p<0.001 respectively).

Conclusion: MTrPs in the upper trapezius, supraspinatus and infraspinatus were moderately correlated with shoulder pain and disability in stroke patients.

Key Words: myofascial trigger points, post-stroke, shoulder disability, shoulder pain, stroke

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INTRODUCTION

Stroke is caused by a sudden loss of oxygen supply to brain cells resulting in the death of some brain cells. Globally stroke is the 2nd leading cause of death and third leading cause of disabilities[1]. Types of stroke are Ischemic Stroke (IS), Primary Intracerebral Hemorrhagic Stroke (ICH), and Subarachnoid Hemorrhage (SAH)[2]. 34% stroke cases are hemorrhagic in middle and low income countries and 84% of patients die within 3 years of diagnosis[3] . Hemiplegic shoulder pain (HSP) can be a chief issue in neurological patients[4]. Incidence of HSP is 16% to 84% [5]. The most important of these muscles are rotator cuff muscles: Supraspinatus, Infraspinatus, Teres Minor, and Subscapularis.

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Studies have shown that there is a link between shoulder pain and activity limitation[6],[4]. Shoulder pain after stroke can be due to many reasons, and MTrPs are[7,8]. A myofascial trigger point is a localized hyperirritable spot[9] in a taut band of muscles[10].

According to one study, the Prevalence of trigger points is around 30% in patients with shoulder pain[11]. Another study in 2019 shows a high Prevalence of MTrPs in stroke patients. Functional damage occurs in about 40% of stroke patients[12]. HSP is a hindrance in the progression of rehabilitation program, it increases the duration of hospital stays, it increases the depression and decreases the activities of daily living and quality of life[13].

A study about prevalence and anatomical localization of referred muscle pain due to active MTrPs showed that the referred pain provoked from active MTrPs shared similar pain patterns as spontaneous tension headache in adults and children[14]. According to a systematic review in 2018, few studies have been conducted so far regarding the Prevalence of MTrPs. There are some studies about the Prevalence of stroke in different ages, but very few studies are present regarding the correlation of MTrPs with function and pain in patients presenting with stroke.[15] This study investigated the correlation of MTrPs with shoulder pain and function. This study aimed to help

physiotherapists to plan evidence-based treatment for shoulder disability and pain in post-stroke patients.

MATERIALS AND METHODS

It was a Cross-Sectional study and the data was collected from Riphah Rehabilitation Center, Lahore from January 2019 to June 2019. Chronic stroke patients with six months or older history of stroke were included. Both male and female stroke patients between the ages of 25 to 85 years who had hemiplegic shoulder pain for six months and more were included. Both ambulatory and non-ambulatory stroke patients participated in the study. To keep the spasticity factor at the same level for every patient, only those who had a score of ≤ 2 on the modified Ashworth scale were included in the study. Clinically unstable patients like comatose patients, diabetic patients, patients with sensory loss, cognitive impairments or with communication issues were excluded from the study.

The recruitment of participants was through the Non-Probability Convenient Sampling Technique based on predefined criteria through consensus of 3 researchers for recruitment of every subject that reduced any subjective judgment bias. The researchers conducted a detailed review of the participant's medical history and demographic data. Riphah Ethical Review Committee approved the study. All participants were asked for their written informed consent before they participated in the study.

The questionnaires were distributed as hand-outs in Riphah Rehabilitation Clinic. Data was collected in-person/ through representatives appointed in the selected clinic. Infraspinatus, supraspinatus, teres minor and upper trapezius were screened for MTrPs by doing perpendicular palpation to the fibres' direction. Once a trigger point was recognized, a compression test was done for 30 seconds for categorizing the trigger point into a latent or active trigger point.

The criteria recommended by Simons, Travell, and Simons [16] [17] were used to diagnose (MTrPs) considering four points criteria: (1) Presence of a taut band (TB) (2) Presence of a palpable nodule (PN) (3) Presence of a hypersensitive point (HP) (4) Presence of referred pain (RP). The level of pain was recorded using NPRS, Level of dysfunction of the shoulder was assessed using a standardized questionnaire named DASH score and demographic information including the age of the patient, gender, stroke type, hemiplegic side, and characteristics of shoulder pain. Analysis of data was done by using IBM SPSS Statistics 25. Spearman Correlation test was used for data analysis.

RESULTS

Total 70 stroke patients were recruited in the age range of 25 to 81 years with mean age =55.3 (Table 1).

Table No. 1: Clinical and demographics stats of Patients

Variable n(%)	
Male	29(41.4%)
Female	41(58.6%)
Age (years)	55.3(14.98%)
Ischemic Stroke	45(64.29%)
Hemorrhagic Stroke	25(35.71%)
Right Hemiplegic Side	36(51.4%)
Left Hemiplegic Side	34(48.6%)
DASH score	60.451(20.78%)
NPRS score	5.014(2.12%)

Dash: Disability of arm, shoulder and hand score;

NPRS: Numeric Pain Rating Score

Table 2 shows correlation between MTrPs and shoulder disability was strongly significant with r=0.72; the correlation between active MTrPs and shoulder disability was moderately significant with r=0.44; the correlation between latent MTrPs and shoulder was strongly significant with r=0.60. A strong correlation was there among MTrPs and pain with r =0.68; moreover, moderate correlations were observed in the cases of active MTrPs and latent MTrPs with pain. All were with p<0.001. When individually main muscles of the shoulder were observed, results showed a moderate correlation between MTrPs and shoulder disability for upper trapezius, supraspinatus and infraspinatus; whereas, no significant correlation was found among MTrPs found in teres minor muscle and shoulder disability. The correlation was moderate between MTrPs and shoulder pain for supraspinatus, upper trapezius and infraspinatus. Contrary to the above, no correlation was found between MTrPs in teres minor and pain. No MTrPs were found in 19 participants.

Table No.2: Muscle wise correlation of myofascial trigger points with Pain & Disability

Muscle wise MTrPs*	DASH* (r)	NPRS* (r)
Upper trapezius Myofascial Trigger Points	0.485[a]	0.469[a]
Supraspinatus Myofascial Trigger Points	0.528[a]	0.500[a]
Infraspinatus Myofascial Trigger Points	0.541[a]	0.473[a]
Teres Minor Myofascial Trigger Points	0.041[b]	0.068[b]
a= Significant correlation (p<0.05); b= not significant correlation (p>0.05). *Dash: Disability of arm, shoulder and hand score; NPRS: Numeric Pain Rating Score; r: correlation coefficient		

Table No.3: Muscle wise percentage of myofascial trigger points

Muscle	Active trigger points (percent) (TB+PN+HP +RP)	Latent Trigger points (percent) (TB+PN+ HP)	Total Trigger Points (percent) (active+la tent MTrPs)
Upper trapezius	27.14%	18.57%	45.71%
Supraspin atus	30.00%	11.43%	41.43%
Infraspinat us	8.57%	18.57%	27.14%
Teres Minor	2.86%	8.57%	11.43%
TB=taut band, PN= palpable nodule, HP=hypersensitive point, RP=referred pain.			

Table 4 shows that with the increasing total number of MTrPs, the correlation becomes strongly significant with with r=0.682 in case of pain and r=0.720 in case of disability & with p<0.01.

Table No.4: Correlation of number of Myofascial Trigger Points with Pain/Disability

Total MTrPs	NPRS (r)	Dash (r)
	0.682[a]	0.720[a]
a= significant correlation with p<0.05		
MTrPs: Myofascial Trigger Points; Dash: Disability of arm, shoulder and hand score; NPRS: Numeric Pain Rating Score; r= correlation coefficient		

DISCUSSION

The current study's primary findings showed a strongly significant correlation of MTrPs with shoulder disability and pain. These MTrPs should be examined and explicitly treated on a priority basis for better prognosis and speedy recovery in a population with hemiplegic shoulder pain because of correlation.

In 2019, J.H Villafane et al. found a moderate correlation of shoulder dysfunction with latent MTrPs in infraspinatus and active myofascial trigger points in supraspinatus [(18)]. In contrast to this study, the present study found that shoulder disability is moderately significant with myofascial trigger points found in supraspinatus and infraspinatus.

The mean Dash score of the current study was similar to that previous study conducted in 2019 by J.H Villanfane et al. (60.45 versus 73.9). This research found that MTrPs present in the upper trapezius are moderately correlated with shoulder disability, whereas that previous study by J.H Villafane et al. found no correlation. However, similar to this study, the present investigation found no correlation of teres minor MTrPs with shoulder pain and disability. Like the study conducted about the high presence of MTrPs in shoulder girdle in patients with shoulder pain by Bron et al. [(13)] , this study also found few active MTrPs in infraspinatus.

Another study conducted by Hidalgo-Lozano et al. about the Prevalence of MTrPs in unilateral shoulder impingement also found a similar finding with the current study that the highest percentage of active MTrPs exists in supraspinatus [(19)].

A study by Casteldo et al. about correlation of MTrPs with pain intensity in patients with whiplash injuries showed that the current pain intensity (visual analogue scale) of the patients was significantly correlated with the number of active MTrPs[(20)]. This study found the similar findings to the current investigation.

The current study and others indicate a dire need to resolve myofascial trigger points, specifically in supraspinatus, infraspinatus, and upper trapezius, to manage pain and disability of the shoulder, specifically in people with stroke who have already been living a low quality of life due to impaired shoulder functions.

CONCLUSION

In conclusion, MTrPs in the upper trapezius, supraspinatus and infraspinatus were moderately correlated with shoulder pain and dysfunction in stroke patients. Furthermore, MTrPs in teres minor showed no correlation with pain and disability.

Recommendations: Future researchers are suggested to conduct studies with different patient populations, sample sizes, muscle groups, and interventional studies focusing MTrPs concerning pain and disability.

Author's Contribution:

Concept & Design of Study:	Mahnoor Asif, Yasha Sajjad, Saima Riaz, Fizza Nasir, Humaira Azam
Drafting:	Mahnoor, Yasha, Humaira Azam
Data Analysis:	Saima Riaz
Revisiting Critically:	Saima Riaz
Final Approval of version:	Mahnoor Asif, Yasha Sajjad, Saima Riaz

Conflict of Interest: The study has no conflict of interest to declare by any author.

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