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Effectiveness of Soft Tissue Mobilization & Trigger Point Release Versus Stretching on Tension Type Headache Among University Students; A Randomized Control Trial

Madeeha Shafiq [1], Salman Mukhtiar [2], Mehrab Naseer [3], Esha Khan [4], Marium Khalid [5], Yasmin Chaudhary [6]

[1]Lecturer University of Lahore, Islamabad Campus, Pakistan
[2,3,6] Student Bashir Institute Of Health Sciences, Pakistan
[4]Lecturer Shifa Tamer E Millat University Islamabad, Pakistan
[5]Lecturer Ibadat International University Islamabad, Pakistan
[6]Student Bashir Institute of Health Sciences, Pakistan

Author`s Contribution

[1-3]Conception and design, Collection and assembly of data, [2-6]Analysis and interpretation of the data, [3-5]Critical revision of the article for important intellectual content, Statistical expertise [1-6]Final approval and guarantor of the article..

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Address of Correspondence

Madeeha Shafiq
madiha.shafiq@uipt.iiui.edu.pk
ORCID : 0000-0003-0873-2401

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A B S T R A C T

Objective: To determine the effects of soft tissue mobilization and trigger point release verses stretching in tension type headache among university students.

Methodology: A randomized control study was conducted reg.no NCT05305703 at Bashir Institute of Health sciences (BIHS) from March 2019 to August 2019. Subjects were selected through a non-probability convenient sampling technique then, randomly allocated to (Group A= Soft tissue mobilization & Trigger points release group and Group B= Stretching group) through toss and coin method. Both male and female students, age range from 18-25 years and trigger points in neck muscles included in the study.

30 participants included in the study. In group A (n=15), patients were given a combination therapy of soft tissue mobilization & trigger point release therapy after the application of hot-pack while group B (n=15) received stretching of cervical muscles after hot-pack application. The study outcomes were measured at baseline and at the end of sessions through visual analogue scale and goniometer. Data was entered and analysed on SPSS v 22.0.

Results: Out of 30 subjects enrolled in the study, 19 (63%) were females and 11 (37%) were males. The mean ± SD of age (in years) in group A was 20.27± 1.53 and in group B was 21.27± 1.79. Independent T test was applied between group analysis. Significant improvement was observed within 3 weeks training protocol of combination therapy. Between the group comparisons of VAS, statistically significant results were observed with P value <0.005 in group A. In terms of cervical ROMs there was no statistically significant difference between both groups.

Conclusion: This study concluded that combination of soft tissue mobilization & trigger point release therapy to patients with tension-type headache provides better outcomes than stretching.

Keywords: Soft Tissue Mobilization, Stretching, Tension-Type Headache, Trigger Point Release.

Introduction

Headache disorders are a standout amongst the most well-known issues found in medical practice. Among them numerous kinds of headaches, Tension-type headache (TTH) is the most common in adults. [1,2] The worldwide prevalence is approximately 40%. The prevalence varies with respect to gender and age as it is more common among females (female-to-male ratio 5:4) and peak prevalence age is 30 to 39 years. [3]

TTH is characterized by bilateral, dull and constricting pain, sensation of band like tightness around the entire head, pain not aggravating with physical activity and increased tenderness of neck muscles on palpation with the absence of

typical migraine features (vomiting, photophobia, phonophobia).[6]

The prevalence of Tension-type headache in university students has shown massive increase during the last decade due to the usage of gadgets such as Tablets, Mobile Phones & Laptops involved in higher studies. The frequent use of these gadgets contributes to poor postural habits that lead to muscles spasm commonly in the neck and low back region, and the formation of taut bands in the neck region in the form of trigger points. Trigger point is an area of hyperirritability located in a taut band of muscle described as nodular or crepitate area within the muscle which is painful on applying pressure and refers pain, and autonomic response to distant area. [7, 8]

As tension type headache is a major health problem in the young students, it is the need of the hour to find out the best possible treatment intervention for the diagnosed cases of TTH.

Physical therapy is one of the cornerstone treatments for managing TTH.There are many manual therapy treatments used in physiotherapy for treating TTH. In the past few years, several systematic reviews addressing manual therapy for TTH have been published. [9]

Manual pressure release (MPR) or Trigger point release is performed by applying painful, persistent manual pressure which is in limits of patient tolerance. Pressure is applied usually with the thumb or fingertip, against the tissue barrier.[1] Evidence suggests the palpable trigger point bands and nodules as a result of localized shortening of sarcomeres in muscle fibres to produce contraction knots. The pressure is sustained until the researcher feels a release of the involved tissues, usually within 60 seconds. [11]

Soft tissue mobilization is a generalized term used to describe different forms of massage therapy to relax muscles, promote healing and breakdown of scar tissue. It increases skin temperature of that area. provide relaxation and reduce tension of the muscle.(2).The application of soft tissue mobilization to the patients of TTH induce significant changes on VAS and the characteristics of pain. [13]

Stretching is the therapeutic procedure applied to the shortened muscles. It lengthens the muscles and enhances the muscle extensibility and flexibility by breaking adhesions. Stretching shows the effect in sense of diminishing neck pain and improving range of motion, recommended for both acute and chronic pain. [14]

A review article was performed in 2017 to assess soft tissue mobilization as treatment for TTH(3). Manual therapy treatments which include cervical exercises, relaxation and postural exercises, vertebral mobilization and stretching are supported by evidence as effective treatment in treating TTH. [16]

Cristina Rincon et al. (2014) stated that muscle trigger point therapy (sustained pressure applied by thumb also called ischemic compression), targeting to trigger points release were effective for the treatment of tension type headache.[4]

Previous studies investigate the isolated and combined effect of different physical and manual therapy techniques. However, to our knowledge, no studies to date have included this type of intervention in the management of TTH. Based on these arguments, the present study aimed to determine the effects of a protocol involving soft tissue mobilization combined with trigger point release therapy as compared to stretching in the management of patients with tension-type headache.

Methodology

An RCT was carried out after the approval from the Ethical Committee for Clinical Research BIHS (Letter No: BI-14) at department of physical therapy of Bashir Institute of Health Sciences Islamabad, for the duration of 6 months from March 2019 to August 2019. In this study total 52 subjects were screened for headache but only 30 participants met the inclusion criteria. 22 participants were excluded from the study because of the presence of other types of headache. The subjects were randomly assigned into 2 groups (Group A= Soft tissue mobilization & Trigger points release group and Group B= Stretching group) through toss and coin method using non-probability convenient sampling technique. The sample size was calculated by using Open-epi tool with 95% confidence level, power of 80% and estimated mean of population. 15 patients were randomly allocated to each group, as in Group A (n=15) and Group B (n=15). Both male and female students, age range from 18-25 years and trigger points in neck muscles included in the study. Subjects taking pharmacological drugs, presence of malignancy, trauma in cervical region and other types of headache were excluded from the study.

Before the start of intervention, students were informed of the objectives and characteristics of the study and provided with an informed consent.

According to International Classification of Headache Disorders (ICHD) screening questionnaire was used for baseline and final assessment. Outcomes include cervical range of emotions were measured by Goniometer and Visual analogue scale (VAS) for pain used at baseline and at the final session. After the screening was completed, patients were informed about the schedule of training sessions. Exercise

training was performed 3 times a week on alternating days for duration of 3 weeks, which made a total 9 sessions for each patient.

Group A received heating therapy for 10 minutes with soft tissue mobilization for 8 minutes and trigger point release of sub-occiptal muscles with 5 repetitions each while group B was treated with heating therapy for 10 minutes and stretching of neck muscles including Sub-occipital muscles (rectus capitus posterior major and minor muscle, obliguus superior and inferior muscle), upper fibres of trapezius and Sternocleidomastoid muscle with 10 reps each.

The data was analysed by using IBM SPSS-22. Kolmogorov test was used to check the normality of the data. Within group analysis Paired t test was applied which showed significant result that is <0.01in both groups that is Group A and Group B. Independent-T test was used between groups analysis.

Results

A total 52 subjects were screened with headache but only 30 (58%) who completed the 3 weeks training protocol. Gender-wise distribution included 11 (37%) males and 19 (63%) females. Out of 30 patients 10 (67%) were females and 5 (33%) were males in group A while 9 (60%) females and 6 (40%) males were included in the group B (Table I). The mean ± SD of age (in years) in group A was 20.27± 1.53 and in group B was 21.27± 1.79. Independent t-test was applied on the baseline to compare the mean values of both groups (A: STM+TrPs release) and group (B: Stretching). The VAS for denoting intensity of pain with mean ± SD for group A was 2.53 ± 0.51 and for group B 2.53 ± 0.51 with P-value 0.38 at baseline. After 3 weeks' treatment protocol the intensity had nearly diminished on VAS from moderate to mild or no pain with (P- value= 0.001) showed statistically significant results in group A.

Table I: Shows the demographic data of group A and group B

Variables	Group A (STM+TrPs release)	Group B (Stretching)
1. Age	Mean ± SD: 20.27± 1.53	Mean ±SD: 21.27± 1.79
2. Gender	Male: 5 (33%) Female: 10 (67%)	Male: 6 (40%) Female: 9 (60%)

In terms of headache parameter, headache frequency had been reduced significantly from more than 5 per weeks to l per week or no complaint of headache in group A as compared to group B after 3 weeks' treatment protocol. (Figure 1)

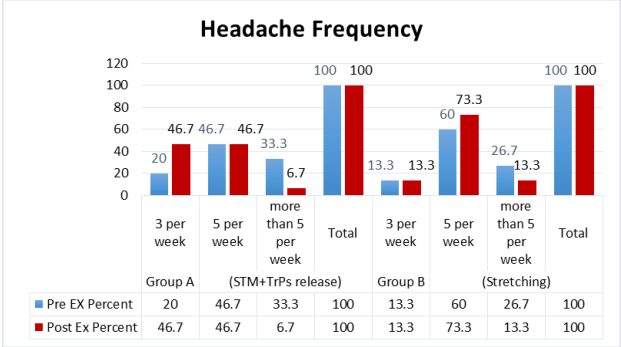

Figure 1. Bar graph shows comparison of Pre and Post headache frequency between Group A and Group B.

After 9 session's treatment, duration of headache was reduced significantly from days to less than 30 minutes or no headache complain in group A as compared to group B.

In respect to cervical range of motions, there was no statistical difference between both groups in cervical flexion and extension (P-value=<0.01) whereas, cervical side-bending and rotation showed statistically significant results in group A with P-value < 0.05 as compared to group B. (Table II)

Table II: Independent T-test for Cervical ROMs between Group A and Group B.

Cervical ROMs		Group A (STM+TrPs release) Mean ± SD	Group B (Stretching) Mean ± SD	P-Value
Cervical Flexion	**PreEx**	48.00 ±5.278	42.00 ± 4.140	0.002
	PostEx	58.00 ±3.162	51.00 ± 3.873	<0.01
Cervical Extension	**Pre Ex**	56.67 ±5.563	46.00 ± 5.071	<0.01
	PostEx	71.67 ± 4.499	57.67 ± 4.952	<0.01
Cervical Side-bending Right	**PreEx**	32.67 ± 4.577	31.00 ± 3.873	0.291
	PostEx	45.00 ± 2.535	40.00 ± 3.086	0.002
Cervical Side-bending left	**PreEx**	30.00 ± 5.606	32.00 ± 4.706	0.124
	PostEx	45.00 ± 2.582	40.00 ±3.200	0.009
Cervical Rotation right	**PreEx**	55.00 ± 7.188	60.20 ± 4.309	0.57
	PostEx	78.33 ±3.519	70.33 ±3.994	0.004
Cervical Rotation left	**PreEx**	59.00 ±5.412	62.33 ± 3.716	0.59
	PostEx	80.00 ± 3.200	72.00 ± 2.535	0.004

Discussion

The main findings of present study were after 3 weeks of treatment sessions, Group A showed marked reduction in the VAS, frequency and duration of headache which received a combination therapy of soft tissue mobilization with trigger point release without significant changes in the outcomes of Group B that received passive stretching protocol. However, both techniques were effective in improving cervical range of motions in both groups. Results showed that combined treatment protocol (STM+TrPs release) was more effective in the management of TTH.

A pain model proposed by Fernandez et al, on myofascial trigger points (MTrPs) and sensitization in TTH. This model suggests that MTrPs responsible for peripheral mechanisms resulting in sensitization of nociceptive nerve endings. Therefore, mechanical stimulation of neuro-musculoskeletal tissues, which includes TrP release therapy and soft tissue mobilization, could decrease sending the nociceptive input to CNS.[5] In present study similar mechanism was observed like treatment with soft tissue mobilization and trigger point release therapy may have contributed to reduce headache frequency and duration among participants of the present study.

The current study support the work of S. Berggreen et al. (2012) in which trigger point therapy showed significant reduction in morning pain and other headache parameters.[6] In another study done on subjects diagnosed with TTH by Stulpnagel et al. found significant differences with reduction in headache frequency, intensity and duration by 67.7%, 74.3% and 77.3% respectively, in response to trigger point release therapy.[7] The findings of present study showed statistical significant results (P = 0.05) which are consistent with the previous study.

According to the data extracted from study conducted on university students by Alvarez Malcon et al, (2016)in which patients with TTH receiving TrP release therapy seems to have favourable outcomes.[8] In addition, findings of present study consistent with previous studies which conclude that combination therapy is more effective in improving pain parameters of patients with TTH.

F. Kamali et al. (2019) compare dry needling with friction massage which is technique of soft tissue mobilization in group of patients (n=44) with TTH. Results showed significant reduction in headache frequency and intensity and increase in cervical range of motion in response to friction massage.[9] The study supports the work of present manuscript, as same results are obtained from trigger point release therapy and soft tissue mobilization.

In present study one of the parameter that is headache intensity measured by Visual analogue pain scale showed the statistical significant results (P = 0.001) in group A. The findings of study are supported by a study done on CTTH patients by Doraisamy MA et al, found that myofascial release therapy on trigger points has a positive effect in decreasing pain intensity on VAS and frequency in CTTH sufferer.[10]

In current study, group B received passive stretching treatment protocol which increases extensibility and flexibility of muscles. Group B showed increase in cervical range of motion but there was no significant reduction in frequency and duration of attacks in headache. These findings were homogenous with study conducted on nurses diagnosed with primary headaches done by Lin et al in 2015. The result of this study showed that reduction in headache intensity as a result of cervical muscles stretching protocol.[11] The defined study compares the stretching exercises with usual methods of managing headaches. There is an immediate and significant reduction in headache intensity in group receiving stretching exercises.

Conclusion

This study concluded that combination therapy i.e. soft tissue mobilization with trigger point release (STM+TrPs release) was more effective in reducing frequency and duration of headache when compared to passive stretching but both the techniques were effective in increasing cervical range of motion.

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