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COMPARING THE EFFECTS OF UPPER THORACIC AND UPPER CERVICAL SPINE MOBILIZATION WITH NECK ISOMETRICS EXERCISES IN PATIENTS SUFFERING FROM NECK ACHE AND HAVING FORWARD HEAD POSTURE

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ABSTRACT: The objective of this study was to compare the effect of upper thoracic and upper cervical spine mobilization with neck isometrics exercises in patients suffering from neck ache and having forward head posture. It was a single blinded randomized controlled study. 40 patients were enrolled in the study with an age ranging from 25-45 years with forward head posture and neck pain. Data collected from Mayo Hospital Lahore, Physiotherapy Department. For allotment sample were randomized via computer generated method in two groups. In group A upper thoracic spinal mobilization and in group B upper cervical spine mobilization was applied, while conventional treatment includes hot pack and neck isometrics exercises. Each technique was applied five times per session for 3 days in a week. Reading was recorded pre and post treatment. After 4 weeks' patients were re-evaluated for pain and disability. NPRS and NDI scale were used for assessing pain and disability. Results showed that there was significant difference within the group. Although difference between 2 groups, upper thoracic spinal mobilization shows more significant outcome as compared to upper cervical mobilization. P-value was < 0.001 for reducing the intensity of pain and disability. It is concluded that upper thoracic and upper cervical mobilization both were good for managing the individual of neck pain for reducing intensity of pain also disability, nevertheless upper thoracic mobilization shows more effective result as compared to upper cervical mobilization.

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INTRODUCTION

Neck ache affects many people in today's world. Furthermore, as the usage of cell phones has grown, so has the prevalence of neck discomfort has also been increased(1). As cervical extensor is recruited and stress upon erector spinae muscle rises to correct the position of neck while using a smart phone, neck discomfort might arise(2).Tapping mobile screen or utilizing a smart phone for an extended period without maintaining the arm position appropriate promotes neck and shoulder strain, as well as increasing the stress on the cervical spine(3). The constant pressure on cervical region of spine causes irregularities in its curvature, causing in joint degeneration, a forward head position (FHP) and straight cervical spine, this condition can deteriorate and lead to cervical intervertebral disc herniation (4). FHP is described as increased extension in upper vertebra of cervical region and flexion in lower vertebra of cervical spine and thoracic spine of upper region, with a deviation forward from the gravity line in the sagittal plane(5).The stresses on the muscles surrounding the shoulder and neck in the FHP posture are 3.6 times higher than in the typical position(6). FHP promotes aberrant activation of extensor and flexor of cervical spine by shortening scalenus anterior, sternocleidomastoid, trapezius muscles of upper fiber, as well as lengthening the levator scapulae and semispinalis capitis

muscles(7). FHP was shown to be present in 60% of individual suffering from neck and shoulder ache, which result into asymmetrical activation of spine muscle, limited functional activity and deviation in spine curvature, and pelvis lateral tilt according to previous investigations. Upper cervical as well as thoracic spine hypo mobility and lower cervical spine hyper mobility lead to instability in cervical(8). The resultant alteration in spinal structures reduces the shielding action of movement along with the response force. As a result, most medical professionals assess the thoracic region in individual with neck discomfort. cervical lower vertebras dysfunction as well as articular disc lesions can induce discomfort in the upper region of thoracic vertebra, whereas dysfunction of the upper thoracic spine inhibits cervical spine mobility and generates pain(9).Such biomechanical relationships between the cervical and thoracic spines linked to movement also can contribute to neck discomfort. According to certain research, implementing manual treatment to the thoracic and cervical spine of individuals suffering with neck ache enhanced their range of motion which led to improvement in their mobility. Physical therapists commonly employ a variety of modalities, therapeutic exercises, mobilization, and manipulation in their clinical practice to help patients with neck pain and FHP(10).Recent research including manual treatment and exercises in acute or chronic cervical pathology were highlighted in literature reviews. It's claimed that mixture of manual management with therapeutic exercise is useful in treating mechanical neck discomfort. Joint mobilization and manipulation are two methods of manual treatment. Previous research has found that undesirable effects such local pain, dizziness, headache, and malaise were less common in mobilization than in manipulation. According to some studies mobilization and manipulation therapies were equally effective(11).Despite numerous research on individual suffering with neck pain, there is inadequate data to support the usefulness of an amalgamation of mobilization with therapeutic exercise in people suffering with FHPAs a result, goal of this research was to see how effective a mixture of mobilization and exercises was in enhancing mobility as well as decreasing pain intensity in people with forward head posture. Furthermore, even if most prior research centered on cervical region, the goal of this study was to see how intervention affected the upper thoracic spine also.

MATERIALS AND METHODOLOGY

This design was a single blinded randomized control trial research that employed the Non-Probability Purposive Sampling approach. King Edward Medical University's ethical institutional board approved this research. Data was obtained using the consort guidelines from Mayo Hospital's OPD physiotherapy department in Lahore. The research lasted six months, from January to July 2018.Sample size comprise of 40 patients, 90% power of test, 5% level of significance, where σ^2= variance 1.21, Z1-α= confidence level 95%=1.96, Z1-β= power of test 90%, μo= Population means 1(upper thoracic mobilization), μα= population mean 2 (upper cervical spine mobilization), utilizing the formula $n = 2\sigma^2 (Z1-\alpha+Z1-\beta)\ ^2/(\mu o-\mu\alpha)\ ^2$40 patients were randomly allocated in two categories, one is group A (upper thoracic mobilization) and other is group B (cervical spine mobilization) via computer generated method, 20 in every group. Inclusion conditions include age 25 to 40 years old, neck pain with no related mechanical dysfunction, restricted cervical ROM, not receiving pharmacological treatment, Willingness to adhere to treatment and measurement regimens.

participants were not considering in study if they were having non muscular etiology, History of whiplash injury, spinal stenosis, Prolapsed disc, fracture of vertebra, were included in exclusion criteria. Whether they agreed to participate or not, informed consent was obtained in writing. The standard treatment was given to both groups, and it remained the same throughout the trial. The conventional therapy includes hot pack for 10 minutes and isometrics neck exercises. Participants of A group were managed with upper thoracic mobilization while in B group participants were treated with cervical spine mobilization. Reading was recorded pare and post treatment. Three sessions per week was conducted. Total duration consists of 4 weeks. Numeric pain scale and neck disability index tool was used as a data collection tool. Numeric Pain Rating Scale is used to assess the intensity of pain(12). Neck disability index is also a quantitative scale to assess the functional limitation activities; it's a valid and reliable tool. The entire member who came to physiotherapy department was considered and screened for forward head posture with neck pain. SPSS version 23 was used to analyze the data. Statistical significance α was set at 5%. Frequency tables, pie charts, bar charts and line graphs were used. Man, Whitney u test (nonparametric data) was used to analyze the difference between groups. Wilcoxon sign test (nonparametric) was used to analyze the difference within the group.

RESULTS

Means and standard deviation of ages in both groups revealed that subject in group A having 35.86±6.22 and group B having 37.52±7.00 mean and standard deviation.

Table 01 show pain intensity and NDI in both groups prior to and following management in both groups. As P<0.001 which was less than p=0.05 which shows that upper thoracic mobilization result was more significant statistically and clinically as compared to upper cervical mobilization, so it's concluded that null hypothesis was rejected, and research hypothesis was accepted.

DISCUSSION

Despite numerous research on individual suffering with neck pain, there is inadequate data to support the usefulness of an amalgamation of mobilization with therapeutic exercise in people suffering with FHP. As a result, goal of this research was to see how effective a mixture of mobilization and exercises was in enhancing mobility as well as decreasing pain intensity in people with forward head posture. Furthermore, even if most prior research centered on cervical region, the goal of this study was to see how intervention affected the upper thoracic spine also. In 2017 Juchul Cho et.al, conducted a randomized control trial study. Objective of their work was to compare the effects of upper thoracic spine and mobility exercises versus upper cervical spine mobilization and stabilization exercise in individual with forward head posture. 32 patients were randomly allocated into 2 group either cervical or thoracic mobilization. NPRS and NDI tool was used for pain and functional limitation assessment. It was concluded in their study that thoracic spine mobilization with mobility exercises as compared to cervical mobilization and stabilization exercises in forward head posture(13).This study result was backed by above mentioned study. In this study group A having 35.86±6.22 and group B having 37.52±7.00 mean and standard deviation of ages. In group A pain intensity prior to treatment was 7.18±.512and following the treatment it was 1.45±.596. While in group B mean and

standard deviation of pain before treatment was 7.50±.853and after the treatment it was 3.45±.596. NDI mean and standard deviation pretreatment it was 44.30±2.24 in group A and post treatment it was 13.00±2.45. While in group Bit was pretreatment was 44.36±2.27 and post treatment it was 21.17±3.54. With p-value 0.00 which was <0.05 which shows that both techniques were effective in reducing pain and improving mobility, but group A was more effective as compared to group B. Our study result was also supported by a randomized control trial, which was conducted by Keun-Su lee and Joon Hee Lee in 2017.Aim of their work was to analyses the effects of joint mobilization and therapeutic exercises at cervical vertebra and thoracic region for functional impairment in individual of neck ache. It was concluded in this study that cervical and thoracic spinal mobilization with therapeutic exercises having significant result for managing pain and functional limitation in neck pathology(14).

CONCLUSION

It was concluded that both techniques were effective for managing patients suffering from neck pain but thoracic mobilization with mobility exercises were more effective as compared to upper cervical mobilization with stability exercises in forward head posture patient suffering from neck pain.

REFERENCES

1. Ghamkhar L, Kahlaee AH. Is forward head posture relevant to cervical muscles performance and neck pain? A case–control study. Brazilian Journal of Physical Therapy. 2018;23(4):346-54.
2. Pacheco J, Raimundo J, Santos F, Ferreira M, Lopes T, Ramos L, et al. Forward head posture is associated with pressure pain threshold and neck pain duration in university students with subclinical neck pain. Somatosensory & motor research. 2018;35(2):103-8.
3. Kim G-C, HwangBo P-N. Effects of cervical stabilization exercise using pressure biofeedback on neck pain, forward head posture and acoustic characteristics of chronic neck pain patients with forward head posture. Journal of the Korean Society of Physical Medicine. 2018;14(1):121-9.
4. Cho J, Lee E, Lee S. Upper thoracic spine mobilization and mobility exercise versus upper cervical spine mobilization and stabilization exercise in individuals with forward head posture: a randomized clinical trial. BMC musculoskeletal disorders. 2017; 18(1):1-0.
5. Verma SL, Shaikh J, Mahato RK, Sheth MS. Prevalence of forward head posture among 12-16 year old school going students: A cross sectional study. Applied Medical Research. 2018;4(2):18-21.
6. Rahnama L, Abdollahi I, Karimi N, Akhavan N, Arab-Khazaeli Z, Bagherzadeh M. Cervical position sense in forward head posture versus chronic neck pain: a comparative study. Journal of Clinical Physiotherapy Research. 2017;2(1):39-42.
7. Sheikhhoseini R, Shahrbanian S, Sayyadi P, O'Sullivan K. Effectiveness of therapeutic exercise on forward head posture: a systematic review and meta-analysis. Journal of manipulative and physiological therapeutics.2018;41(6):530-9..
8. Lee J, Kim D, Yu K, Cho Y, You JH. Comparison of isometric cervical flexor and isometric cervical extensor system exercises on patients with neuromuscular imbalance and cervical crossed syndrome associated forward head posture. Bio-medical materials and engineering. 2018;29(3):289-98.
9. Strunce JB, Walker MJ, Boyles RE,

Young BA. The immediate effects of thoracic spine and rib manipulation on subjects with primary complaints of shoulder pain. Journal of Manual & Manipulative Therapy. 2009 Dec 1;17(4):230-6.

10. Slipman CW, Isaac Z, Patel R, Everett CR, Lenrow DA, Ostrowski J. Chronic neck pain: various disorders require different approaches to diagnosis and management. The Journal of Musculoskeletal Medicine. 2003 Jan 1;20(1):24-31.
11. Salehi S, Akbari M, Jamshidi AA. Effect of Exercise Therapy on Head, Neck Range of Motion, and Craniovertebral Angle in Subjects with Forward Head Posture. The Scientific Journal of Rehabilitation Medicine. 2017;6(2):180-7.
12. Ferreira-Valente MA, Pais-Ribeiro JL, Jensen MP. Validity of four pain intensity rating scales. Pain®. 2011;152(10):2399-404.
13. Cho J, Lee E, Lee S. Upper thoracic spine mobilization and mobility exercise versus upper cervical spine mobilization and stabilization exercise in individuals with forward head posture: a randomized clinical trial. BMC musculoskeletaldisorders.2017;18(1):1-10.
14. Lee K-S, Lee J-H. Effect of Maitland mobilization in cervical and thoracic spine and therapeutic exercise on functional impairment in individuals with chronic neck pain. Journal of physical therapy science. 2017;29(3):531-5.

Table 1: Comparison of pain and NDI in both groups

Variables	Treatment Group	Mean ± Standard Deviation	P-value
pain before	Group A	7.18±.512	>0.05
	Group B	7.50±.853	
pain after	Group A	1.45±.596	<0.001
	Group B	3.45±.596	
NDI Before	Group A	44.30±2.24	>0.05
	Group B	44.36±2.27	
NDI After	Group A	13.00±2.45	<0.01