ORIGINAL ARTICLE

Effectiveness of manual therapy to the cervical spine with and without manual therapy to the upper thoracic spine in the management of non-specific neck pain; a randomized controlled trial

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Abstract

Objective: To compare the effectiveness of manual therapy to the cervical spine with and without manual therapy to the upper thoracic spine in the management of non-specific neck pain.

Methods: The randomized controlled trial was conducted at 3 different hospitals in Peshawar, Pakistan, from October 2016 to January 2017, and comprised patients suffering from non-specific neck pain aged 25-60 years. The control group received cervical manual therapy alone while the experimental group received cervical along with thoracic manual therapy for 2 weeks. Data was analysed using SPSS 20.

Results: Of the 37 subjects, 20(54%) were cases and 17(46%) were controls.The overall mean age was 35.9±9.6 years. There was no significant difference between the groups at baseline in terms of the levels of pain (p=0.125) and disability (p=0.392). The experimental group showed greater reduction in pain (p=0.02) and disability (p=0.03) compared to the control group.

Conclusion: Cervical along with thoracic manual therapy reduced neck pain and associated neck disability more effectively than cervical manual therapy alone.

Keywords: Cervical, Manual therapy, Neck pain, Thoracic (JPMA 70: 399; 2020).

https://doi.org/10.5455/JPMA.300523

Introduction

Neck pain is associated with incredible financial cost and human sufferings. Approximately, 330 million individuals suffer from some type of neck pain worldwide.[1]The total cost of neck pain is estimated to be about 1.3% of total healthcare expenditure.[2] Globally, lifetime prevalence of neck pain ranges from 14.3% to 71.1%.[2] Due to reports of high prevalence of neck pain in the general population in recent years, physical therapy (PT) treatment of neck pain has received much attention.[3] The use of a variety of PT modalities for treating patients with neck pain has been reported in literature, but high-quality randmsied controlled trials (RCTs) and systematic reviews support the effectiveness of cervical manual therapy (CMT) techniques in neck pain patients.[4] Moreover, lack of screening of patients prior to CMT can result in serious complications, including vertebrobasilar insufficiency that can lead to infarction of brain stem and cerebellum.[5] It has been reported that the use of thoracic manual therapy (TMT) can decrease the risks associated with CMTand attain therapeutic goals as achieved with CMT.[6] Cleland et al. reported that the high risks associated with applying CMT in neck pain often compels a clinician to avoid it and use some alternative techniques. TMT might be regarded a reasonable alternative to CMT in neck pain patients, especially those with a risk for vertebrobasilar insufficiency. Moreover, TMT in neck pain patients act as supplement to therapeutic modalities applied to cervical spine.[5]

Despite the lack of robust evidence regarding the use of TMT in the management of neck pain, it has been reported that some physical therapists are applying manual therapy techniques to the upper thoracic region in the management of neck pain.[7,8] The close anatomical and biomechanical relationship of cervical and thoracic region and neural connections between cervical and thoracic spine might be some of the reasons for this practice.[9] It is noteworthy that despite the lack of large-scale clinical trials on the effectiveness of using TMT for treating neck pain, TMT still has shown promising results in preliminary

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studies for the management of neck pain.[5,10-13]

The current study was planned to compare the effectiveness of manual therapy with and without involving thoracic spine in the management of non-specific neck pain. For the latter purpose, it was hypothesizsed that the outcomes of neck pain patients who receive manual therapy to the thoracic and cervical spine compared to patients who receive manual therapy to cervical spine alone will have differences.

Patients and Methods

The randomized controlled trial was conducted in PT departments of 3 different hospitals of Peshawar, Pakistan, from October 2016 to January 2017. Approval was obtained from the ethics committee of Khyber Medical University, Peshawar (DIR/KMU-EB/EC/000320). Those included were non-specific neck pain patients of either gender aged 25-60 years. Those who had acute trauma to cervical or thoracic regions, fractures of cervical or thoracic regions, surgery of cervical or thoracic regions, history of neoplasm or malignancy and cervical radiculopathy were excluded.

An online calculator was used to calculate the sample size to achieve 80% power (1 - beta or % chance of detecting) in the trial.[14] Data was collected through numeric pain rating scale (NPRS) and neck disability index (NDI). The NPRS is an 11-point numeric scale ranging from 0 (no pain) to 10 (pain as bad as you can imagine).[15] The NDI is a condition-specific functional status questionnaire with 10 items, including pain, personal care, lifting, reading, headaches, concentration, work, driving, sleeping and recreation. Each section is scored on a 0-5 rating scale. A higher score indicates more patient-rated disability.[16]

All patients were assessed at the baseline and then post-treatment to evaluate the levels of pain and disability. The initial phase of sampling technique for this study was purposive where all patients meeting the inclusion criteria were enrolled. Information sheet were given to all participants and those who were unable to read were explained the whole process. Envelopes containing equal number of experimental group A and control group B labels were placed in the container and the patients were asked to pick one from it. These labelled papers were folded in such a manner that the labelling was not visible to the participants and the physiotherapist. The patients in the control group received manual therapy techniques to cervical spine which included spinal mobilisation, myofascial release, stretches and neural tissue mobilisation directed at cervical spine alone. Treatments strategies were modified for each individual patient depending on age, disability and functional level, yet all patients in this group received all the treatment techniques. The patients in experimental group received manual therapy techniques to cervical and thoracic spine which included all manual techniques received by the patients in the control group. In addition, the patients received these techniques at the thoracic region. Patients in both the groups attended physiotherapy clinics for six sessions during the two-week treatment. Patients in both groups were assessed twice; at baseline and after two weeks of intervention.

Data was analysed using SPSS 20. Interventions were labelled as 'independent exposure variables' while pain and neck disability were taken as 'dependent outcome variables'. Chi-Square test was used to compare demographic information, age and gender distribution between the groups. Independent-sample t-test was used to analyse pain and disability between the groups. $P<0.05$ was considered significant.

Results

Of the 58 patients contacted, 46(79.3%) met the inclusion criteria. Of them, 9(19.6%) refused to volunteer, and the final sample stood at 37(80.4%); 20(54%) cases and 17(46%) controls. The overall mean age was 35.9±9.6 years. There were 28 (75.7%) males and 9 (24.3%) females. Age and gender were not significantly different in the two groups ($p>0.05$) (Table).

The mean value for pain on NPRS was 5.41±1.37 (range: 3-8) for the control group and 5.55±1.19 (range: 4-8) for the cases ($p=0.125$). The mean score on NDI was 23.8±9.40 (range: 7-39) for the controls and 20.4±7.78 (range: 8-32) for the cases ($p=0.392$).

Table: Comparison of the demographic data for patients in control and experimental group.

Variable	CG (n= 17)	EG (n= 20)	*p*-value
Mean age in years	36.8 ± 11.6	35.2 ± 7.8	0.494
Gender			0.383
Male	14 (82.4%)	14 (70.0%)	
Female	3 (17.6%)	6 (30.0%)	
Occupation			0.360
Labourer	10 (58.8%)	6 (30.0%)	
House wife	2 (11.8%)	5 (25.0%)	
Teacher	1 (5.9%)	2 (10.0%)	
Others	4 (23.5%)	7 (35.0%)	

CG:Controlgroup, EG:Experimentalgroup, SD: Standard deviation

After 2 weeks of treatment, the mean NPRS score for the controls was 2.35±1.61 and for the cases 1.30±0.97 (p=0.02). The mean NDI scores for the controls was 12.4±7.05 and for the cases 7.50±5.52 (p=0.03).

Discussion

Neck pain is associated with incredible human sufferings and financial cost, PT is the treatment of choice for managing the neck pain.[17] A number of physiotherapy modalities are used for the management of neck pain, but manual therapy is the most commonly used technique in clinical practice.[4,18,19] Effectiveness of CMT in the management of neck pain is reported by previous studies, but literature regarding TMT in the management of neck pain is scarce.[3,4,20] The objective of the current study was to compare the effectiveness of manual therapy to the cervical spine with and without manual therapy to the upper thoracic spine in the management of non-specific neck pain.

Previous studies suggested that the younger population was at high risk of developing neck pain.[21,22] The population included in this study falls in the similar age group and the mean age was <40 years. Prolonged working in awkward postures has been reported to be one of the reasons for developing neck pain in the younger population.[23]The use of manual therapy for the management of non-specific neck pain remains one of the favourite treatment choices for the clinicians.[23,24] It was one of the reasons we used manual therapy in this trial and both groups were subjected to manual therapy apart from other techniques used for the treatment of non-specific neck pain.

In contrast to other studies which reported a higher prevalence of neck pain in females compared to males,[21,22,25] majority of the patients (75.7%) in the current study were males. This might be explained by the fact that all patients included in our study were assessed and treated by male physiotherapists. A female physiotherapist was available only for a limited timeframe and, therefore, she was not able to assess and treat majority of the patients. Moreover, the current study was conducted in a male-dominant society where female patients have limited access to physiotherapy services in the province. Although the overall number of males was high compared to the females, both the groups showed similarity in terms of gender distribution.

Pain reduction after CMT in patients is supported by previous studies.[21,26] In accordance with the results of the current study, previous studies reported effectiveness of TMT in the management of neck pain.[5,10] Comparison of post-treatment neck pain scores between the groups showed superior results achieved by the patients in the experimental group compared to the control group. A limited number of studies may be found on the effectiveness of CMT along with TMT in the management of neck pain.[5,9,10,27-31] In a research project on comparison of manual therapy to cervical and thoracic spine, the patients who received manual therapy to both cervical and thoracic spine showed superior outcomes compared to the patients who received CMT alone.[10] Similarly, findings of a randomised controlled trial (RCT) reported immediate reduction in neck pain after TMT.[5] In contrast to the findings of the current study, Parkin et al. reported non-significant differences amongst the patients who received either of the therapy; manual therapy to cervical region versus manual therapy to both cervical and thoracic regions. Nevertheless, it was reported in the latter trial, that massage was applied to some of the patients. It is not mentioned in the latter trial whether massage was given to either or both groups of patients.[32] This might be one of the reasons which would have affected the findings of the trial.

Findings of the current study suggested effectiveness of applying manual therapy to both cervical and thoracic regions for neck pain. TMT lowers mechanical stresses of cervical spine and improves normal distribution of joint forces, resulting into the restoration of normal biomechanics of cervical spine.[5,11]

Neck pain is one of the leading musculoskeletal problems that causes disability and significant function loss in the general population.[33,34] Results of the current study showed that disability associated with neck pain was significantly reduced after treatment in both groups with the patients in the experimental groups showing superior outcomes compared to the patients in control group. In clinical trials where different techniques were compared with the effects of manual therapy for neck pain, manual therapy had shown superior outcomes in terms of reducing NDI scores associated with neck pain.[5,9,27,29,30]

Puentedura et al. compared effectiveness of TMT and CMT in the treatment of neck pain and showed significant reduction of disability in patients who received cervical spine manipulation.[30] These results are in contrast to the findings of the current study. In the current trial, manual

therapy to cervical region was applied to patients in both groups with the addition of applying manual therapy to thoracic region to the patients in the experimental group, while in the study carried out by Puentedura et al. one group of the patients was not subjected to manual therapy of neck. It is obvious from literature that TMT in neck pain acts as supplement to therapeutic modalities applied to cervical spine and, therefore, applying manual therapy alone to the thoracic region may not have effective outcomes for neck pain.[5] González-Iglesias et al. reported that addition of TMT into physiotherapy protocol had effective outcomes in terms of reducing disability associated with neck.[29] Similar results were reported in other trials where patients with neck pain were treated with TMT along with conventional physiotherapy.[5,9,27]

The current study was an educational project and due to time limitation, data of a small sample size was analysed. It is, therefore, recommended that the same study might be conducted on a larger scale. Moreover, blinding of physiotherapist to the treatment was not feasible and, therefore, the physiotherapists who worked and assessed the patients for this trial were aware of patients' group allocation. Besides, the RCT was not registered with any registration authority and, therefore, does not have a trial number. Nevertheless ethical approval certificate was obtained from ethics committee of Khyber Medical University before commencement of the study. Regardless of these limitations, the current study does provide evidence regarding the use of TMT in the management of neck pain and clinicians may consider applying it while treating patient with neck pain.

Conclusions

Both cervical and cervical with thoracic manual therapy can be used for treating neck pain. However, cervical along with thoracic manual therapy produced better outcomes for patients with neck pain.

Disclaimer: The text is based on an MS thesis submitted to Khyber Medical University, Peshawar, Pakistan.
Conflict of Interest: None.
Source of Funding: None.

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