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EFFECTIVENESS OF STRETCHING AND MOBILIZATION TECHNIQUE TO REDUCE PAIN AND IMPROVE FUNCTIONAL STATUS IN NON SPECIFIC NECK PAIN

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ABSTRACT

Neck pain is most common in general population and is mostly due to poor posture which may become worse as it becomes chronic. Manipulation, education to correct posture and exercise regime are effective to treat pain. There is insufficient evidence regarding the effectiveness of stretching compared to sustain natural apophyseal glide technique (SNAGs) in nonspecific neck pain. Thus aim of the present is to compare the effectiveness of sustained stretching with SNAGs to reduce pain, improve cervical ranges and functional status in patients of nonspecific neck pain. **Methods:** Quasi experimental study design was used to compare the outcomes. 40 patients were recruited through sample of convenience from Fatima memorial hospital, Lahore. Patients were taken their consent to participate in study and were invited for treatment at Physiotherapy Department. Subjects with non-specific neck pain meeting the predetermined inclusion & exclusion criteria were divided into two groups using computer generated random number table method. Pre assessment was done using VAS & NDI as subjective measurements and cervical AROM as objective measurements. Subjects in one group were treated with stretching of cervical muscles and the other were treated with sustained natural apophyseal glide (SNAGs). Each subject were received a total 06 treatment sessions, with 02 treatment sessions per week. Post treatment readings for VAS, NDI and cervical AROM will be recorded after the end of 2nd, 4th and 6th treatment session. Recorded values were analyzed for any change using SPSS version 23. **Results:** The comparison of VAS score in the stretching group shows the mean difference from the pretreatment value to final value at session VI was 5.05 (P value < 0.05),and in the mobilization group was 4.75(P value < 0.05), showing that both mobilization and stretching are effective in reducing pain. Comparison of NDI score in the stretching group shows that the mean difference from the pretreatment value to final value at session VI was 20.05 (P value < 0.05), and in mobilization group it was 37.50(P value < 0.05), showing that mobilization is more effective in improving the functional status. The mean difference from the pretreatment value to final value at session VI for cervical ranges shows that stretching is statistically effective in improving all ranges of cervical spine but significantly not the cervical rotation, while mobilization is statistically significant in improving all ranges of cervical spine. **Conclusion:** Hence the results of this study conclude that both stretching and mobilization are significantly effective (p <0.05) in reducing the pain, mobilization is more effective in improving functional status and cervical ranges as compare to stretching in nonspecific neck pain.

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INTRODUCTION

Neck pain is most common problem in general population and it is extra financial burden due to expensive treatment.[1] There are many cause of neck pain and computer users or office workers are more prone to have non-specific neck pain

due to prolonged sitting hours and there are musculoskeletal problems which are associated with ergonomic equipment. The condition may get worse with time and may become chronic and may involve shoulder also.[2] Nonspecific neck pain is common in clinical practice which leads to disability and restrictions of movement.[3] 30 % to 50 % of the general population may affect neck pain especially of middle age.[4]

It is suggested that manual therapy is very effective in treating the neck and backache if combined with patient education in correcting posture and exercise program.[1] There is also psychological risk factor due to chronic pain which lead to depression. A physiotherapist should also consider bio-psychosocial approach.[3] It is important to understand the structures which are producing pain and discomfort to improve quality of life and functional status in patients with neck pain.[4] In order to treat nonspecific neck pain both manual mobilization technique and stretching exercises are effective, study done in 2007 with the aim of to compare the effect of manual therapy and stretching exercises in neck pain shows that mobilization is more effective than stretching exercises, osteopathic type mobilization technique were used in the study.[5] Stretching is alternative treatment combined with strengthening exercises and stability exercises in nonspecific neck pain.[1]

There are many studies to show the effectiveness of physiotherapy techniques to treat the disability and pain in the neck such as mobilization, manipulation and therapeutic exercises. Combination of these maneuvers show better results but there is lack evidence regarding effectiveness, if applied alone.[3] Spinal stabilization exercises may activate deep muscles and decrease the over activity of superficial muscles.[4] There are multiple manual therapy techniques that can used in nonspecific neck pain and sustained natural apophyseal glide is one of effective technique[6] but there is insufficient evidence regarding the effectiveness of stretch-ing compared to sustain natural apophyseal glide technique (SNAGs) in nonspecific neck pain. Thus aim of the present is to compare the effectiveness of sustained stretching with SNAGs to reduce pain, improve cervical ranges and functional status in patients of nonspecific neck pain.

HYPOTHESIS

Alternative Hypothesis H_1

There is difference in post treatment VAS, cervical range of motion and neck disability index score with the use of stretching versus SNAGs in treatment of nonspecific neck pain.

Null Hypothesis H_0

There is no difference in post treatment VAS, cervical range of motion and neck disability index score with the use of stretching versus SNAGs in treatment of nonspecific neck pain.

MATERIAL AND METHOD

STUDY DESIGN

This study was a quasi-experimental study.

SETTING

The study was conducted in the Outpatient Department of Physical Therapy Fatima Memorial Hospital, Lahore.

DURATION OF THE STUDY

The study was completed within the time 6 months of duration after the approval of synopsis.

SAMPLE SIZE

A sample size of 40 patients was taken in this study by expecting a mean pain change using 90% power of study and 5% level of significance.

SAMPLING TECHNIQUE

Non-probability purposive sampling technique was used to collect the data.

SAMPLE SELECTION

Inclusion Criteria

The patients meeting the following criteria were included in the study.

1. Patients aged 25 –50 year, both genders
2. Nonspecific neck pain of more than 3 months
3. Pain without radicular symptoms.
4. Pain perceived anywhere in the region of cervical spine, from superior nuchal line to the first thoracic spinous process.
5. Limitation of Cervical Spine Range of Motion.

Exclusion Criteria

Patients with following features were excluded from the study:

1. Infectious or metabolic diseases of spine
2. Patients presented with whiplash
3. History of cervical injury or trauma
4. Cervical myelopathy
5. Inflammatory arthritis involving Cervical spine
6. Tumour or infection involving C-spine
7. Vertebrobasilar artery insufficiency
8. Neurologic disease (eg, multiple sclerosis, CVA, Parkinson's disease, syringomyelia)
9. Congenital anomalies involving the C-spine
10. Systemic disease (eg, diabetes mellitus

DATA COLLECTION TOOL

1. Visual analogue Scale
2. Neck disability index
3. Cervical goniometry

RANDOMIZATION

Once the above mentioned inclusion and exclusion criteria were taken into account, potential participants were considered. They were requested to participate in the study. Written informed consent was taken. Each participant were randomly allocated according to computer generated random number table in to Group A (stretching) and B (mobilization).

TREATMENT APPROACH

The first visit involved the following:

a. The researcher complete a through case history, full physical examination and cervical spine regional assessment.
b. The participant complete Visual analogue scale & Neck Disability Index as subjective measurement.
c. The researcher then measure the cervical spine range of motion of each participant with a cervical goniometer.
d. Treatment then continues according to the allocated groups.

The follow up visit will involve:

a. The researcher reassesses the patient.
b. After treatment on 2^{nd}, 4^{th} and 6^{th} visit the patient complete a visual analogue scale and Neck Disability Index gain as a part of subjective assessment.
c. The researcher measures the cervical range of motion with cervical goniometer after 2^{nd}, 4^{th} and 6^{th} treatment session as a part of objective assessment

All forty participants receive a total of 06 treatment sessions over a three week period, which consisted of 02 treatment sessions per week.

Group A: Stretching of cervical muscles with conventional physiotherapy

Passive stretching techniques for 30 seconds hold with 3 repetitions on each side were applied on the scalene, upper part of trapezius, interspinous muscles and ligamentumnuchae.

To stretch the scalene patient was in sitting position with chest up forward, therapist stabilize the one shoulder to keep rib cage depress and with other hand side bend head to the opposite side with slight extension and rotation of the head towards the stabilizing hand until patient feel stretch on anterolateral side of the neck. Hold this position for 30 seconds.

To stretch the upper part of trapezius patient was sitting up straight, with his/her feet flat on the floor, then therapist slowly tilt head sideways to either side opposite to the side which is supposed to stretch, until patient feel a gentle stretch along the side of neck and shoulder. Hold this position for 30 seconds.

To stretch the interspinous muscles and ligamentumnuchae patient was in upright sitting position and therapist passively flexes the neck until patient feels stretch on posterior side of neck. Hold this position for 30 seconds.

Group B: mobilization with conventional physiotherapy

SNAGS - Sustained Natural Apophyseal Glides was performed by practitioners on patient's cervical facet joint. Simultaneous application of both therapist applied accessory apophyseal joint gliding in the direction of facet (obliquely, towards eye ball) on affected segment and end range active physiological movement of c- spine is performed by patient.

If this approach was successful, on subsequent visits, as the patient improves, assistant applies over pressure, provided there is no discomfort. Furthermore it was be also advocated that on the patient's first visit, this technique should be performed only three times (rule of three) as a precaution against any latent exacerbation. On subsequent days three sets of six repetitions was applied.

Conventional physiotherapy

Conventional physiotherapy was given in both the groups, It included moist hot pack (28×46 cm) which were kept under the temperature of 71-74°C was given for 15 minutes, supervised neck strengthening exercise program consisting of cervical isometrics in sitting position and pain free all cervical range of motion with 2 set of 10 repetitions of each, 3 times a week for three weeks and progress the exercise routine according to the symptoms. Precautions and ergonomic advice was also explained to all patients of both the groups.

DATA COLLECTION PROCEDURE

As this study was approved by ethical committee, male and female patients with nonspecific neck pain for more than 3 months without any symptom of radiculopathy were recruited from OPD of Physiotherapy clinic, Fatimah Memorial Hospital, Lahore. Patients were explained about the purpose, methodology and the possible risks involved in the study. All patients gave written informed consent prior to participation in the study.

Patients were selected on the basis of inclusion and exclusion criteria and randomly divided into two groups, group A and group B. Patients in Group A was treated with stretching of cervical muscles in addition to conventional physiotherapy and Group B patients was treated with mulligan sustain natural apophyseal Glides (SNAGs) in addition to conventional physiotherapy. Patients in both the two different groups were treated two days a week for three weeks. Outcome measure for possible improvement in pain and functional ability were measured by VAS, NDI and cervical goniometry.

DATA ANALYSIS PROCEDURE

Statistical Package for Social Sciences (SPSS 23) was used to analyze data. Descriptive statistics including frequencies and percentages were extracted for demographics. Histogram with normal curve was drawn for continuous variables. Independent T test and paired T-test was use to compare the intra and inter group pre and post treatment analysis.

RESULTS

Independent sample Test

	Groups	N	Mean	Std. Deviation	Sig. (2-tailed)
VAS. Pre-treatment	Stretching	20	6.9500	1.23438	.022 .023
	Mobilization	20	7.7500	.85070	
VAS. Post Treat. 2nd session	Stretching	20	5.1500	1.18210	.000 .000
	Mobilization	20	6.9500	1.23438	
VAS. post treatment. 4th session	Stretching	20	3.4000	1.27321	.001 .001
	Mobilization	20	4.8500	1.22582	
VAS. posttreatemnt. 6th session	Stretching	20	1.9000	1.25237	.015 .015
	Mobilization	20	2.9500	1.35627	

Figure 1 comparison of VAS score in both groups

Independent sample Test

	Groups	N	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Pre Treat NDI	Stretching	20	30.6500	4.00362	.89524	.000
	Mobilization	20	52.1500	5.08118	1.13619	.000
Post Treat NDI. 2nd session	Stretching	20	21.5500	5.56753	1.24494	.000
	Mobilization	20	30.6500	3.88350	.86838	.000
NDI. posttreat. 4th session	Stretching	20	15.3500	6.02866	1.34805	.000
	Mobilization	20	22.1000	3.85118	.86115	.000
NDI. posttreat 6th session	Stretching	20	10.6000	5.87053	1.31269	.013
	Mobilization	20	14.6500	3.67459	.82166	.014

Figure 2 comparison of NDI score in both groups

Paired Samples Statistics

		Mean	Mean difference	N	Std. Deviation	Std. Error Mean
Pair 1	PRE TREATMENT CERVICAL FLEXION	55.600	10.15	20	5.6045	1.2532
	POST 6 TREATMENT CERVICAL FLEXION	65.7500		20	5.22015	1.16726
Pair 2	PRE TREATMENT CERVICAL EXTENSION	45.150	8.95	20	5.6594	1.2655
	POST 6 TREATMENT CERVICAL EXTENSION	54.1000		20	6.64039	1.48484
Pair 3	PRE TREATMENT CERVICAL RIGHT SIDE BENDING	30.9000	10.25	20	6.38172	1.42700
	POST 6 TREATMENT CERVICAL RIGHT SIDE BENDING	41.1500		20	6.97571	1.55982
Pair 4	PRE TREATMENT CERVICAL LEFT SIDE BENDING	31.9000	9.20	20	6.86639	1.53537
	POST 6 TREATMENT CERVICAL LEFT SIDE BENDING	41.1000		20	6.17209	1.38012
Pair 5	PRE TREATMENT CERVICAL RIGHT ROTATION	42.4500	9.55	20	7.03731	1.57359
	POST 6 TREATMENT CERVICAL RIGHT ROTATION	52.0000		20	4.95241	1.10739
Pair 6	PRE TREATMENT CERVICAL LEFT ROTATION	41.3500	11.05	20	6.91509	1.54626
	POST 6 TREATMENT CERVICAL LEFT ROTATION	52.4000		20	5.03043	1.12484

Figure 3 pre and post treatment comparison of cervical range of motion in stretching group

Paired Samples Statistics

		Mean	Mean difference	N	Std. Deviation	Std. Error Mean
Pair 1	MOBILIZATION PRE TREATMENT CERVICAL FLEXION	55.0500	10.05	20	6.03041	1.34844
	MOBILIZATION POST 6 TREATMENT CERVICAL FLEXION	65.1000		20	5.71148	1.27713
Pair 2	MOBILIZATION PRE TREATMENT CERVICAL EXTENSION	44.9000	9.40	20	5.99912	1.34144
	MOBILIZATION POST 6 TREATMENT CERVICAL EXTENSION	54.3000		20	6.55423	1.46557
Pair 3	MOBILIZATION PRE TREATMENT CERVICAL RIGHT SIDE BENDING	31.2500	10.40	20	6.23129	1.39336
	MOBILIZATION POST 6 TREATMENT CERVICAL RIGHT SIDE BENDING	41.6500		20	6.92269	1.54796
Pair 4	MOBILIZATION PRE TREATMENT CERVICAL LEFT SIDE BENDING	32.3000	9.05	20	6.67359	1.49226
	MOBILIZATION POST 6 TREATMENT CERVICAL LEFT SIDE BENDING	41.3500		20	6.49109	1.45145
Pair 5	MOBILIZATION PRE TREATMENT CERVICAL RIGHT ROTATION	42.3000	10.00	20	7.16791	1.60279
	MOBILIZATION POST 6 TREATMENT CERVICAL RIGHT ROTATION	52.3000		20	4.85690	1.08604
Pair 6	MOBILIZATION PRE TREATMENT CERVICAL LEFT ROTATION	41.0000	11.15	20	7.26201	1.62384
	MOBILIZATION POST 6 TREATMENT CERVICAL LEFT ROTATION	52.1500		20	5.08118	1.13619

Figure 4 pre and post treatment comparison of cervical range of motion in mobilization group

All 40 participants of nonspecific neck pain in both group receive 2 sessions per weeks for 3 weeks. Patients in group A receives stretching of cervical muscles along with conventional treatment and Group B had sustained natural apophyesal glides (SNAGs) along with conventional treatment. The mean age of participants in stretching group was 39 ± 7.46 years as compare to 38.60 ± 7.49 years in mobilization group. The pain and disability score were same in both groups on baseline. Comparison of VAS score in the two treatment group shows that the mean difference from the pretreatment value to final value at session II was 5.150 (P value < 0.05) and at session VI was 1.90 (P value < 0.05) in stretching treatment group compared to 6.95(P value < 0.05) at session II and 2.95(P value < 0.05) at session VI in mobilization group, showing that both are effective to reduce the pain but stretching is more effective in pain relief. Results of the pair wise comparison of NDI score in the two treatment groups shows that the mean difference from the pretreatment value to final value at session II was 21.55 (P value < 0.05) and at session VI was 10.60 (P value < 0.05) in stretching treatment group compared to 30.65 (P value < 0.05) at session II and 14.65(P value < 0.05) at session VI in mobilization group, showing that both are effective to improve the functional status but comparison of NDI score in the stretching group shows that the mean difference from the pretreatment value to final value at session VI was 20.05 (P value < 0.05), and in mobilization group it was 37.50(P value < 0.05), showing that mobilization is more effective in improving the functional.

Comparison of cervical range of motion in stretching group shows that the mean difference from the pretreatment value to final value at session VI for cervical flexion was 10.15 degrees, for cervical extension was 8.95, cervical right side flexion was 10.25, cervical left side flexion was 9.20 with p value = 0.000 in all ranges but mean difference for right cervical rotation was 9.55 and for left rotation was 11.05 with p value = 0.052 and 0.86 respectively, showing that stretching is statistically effective in improving all ranges of cervical spine but significantly not the cervical rotation. The comparison of cervical range of motion in mobilization group shows that the mean difference from the pretreatment value to final value at session VI for cervical flexion was 10.05 degrees, for cervical extension was 9.40, cervical right side flexion was 10.40, cervical left side flexion was 9.05,for right cervical rotation was 10.00 and for left rotation was 11.15 with p value < 0.05for all ranges, showing that mobilization is statistically significant in improving all ranges of cervical spine.

DISCUSSION

Pain in neck region is very serious issue in our families, society and in the world. Cervical or neck pain is even so much common that almost 10% of our population is affected by neck pain. Pain sensitive structures are present in our neck which is compressed by some conditions due to which neck pain occurs. During the period of 1970-80, neck pain was much common that 7% men and 9.4% women were affected by neck pain, that report was reported by the National center for health statistics of United States. Neck pain is more serious issue in women than men[7] but the distribution of gender across the two treatment groups in present study showed that 70 percent (n=14) were males in stretching group and 60% (n=12) males in mobilization group, one reason for male dominancy in both groups could be the ethical issues as in our society females normally do not prefer to take treatment from the opposite gender.

Persons who have neck pain and cured properly, at least half of them will report neck pain again almost 1 to 1.5 years later. Work related injuries which were reported in Sweden, half of them also have problems of muscles and joints. Neck pain is treated by many methods. There are many conservative management used to treat neck pain. Most common methods used are the manual therapy techniques that employ

stretching and mobilization at cervical spine.

A study done in 2017 also showed that the joint mobilization and therapeutic exercise for functional impairments caused by chronic neck pain had a significant effect on several types of functional impairment.[8] which correlated with present study as the result showed that cervical facet joint mobilization have significant effect on VAS score, NDI score and cervical ranges of motion with $P < 0.05$ for all variables. Comparison of VAS score in the both treatment groups showed mean difference from the pretreatment value to final value at session II was 5.150 (P value < 0.05) and at session VI was 1.90 (P value < 0.05) in stretching treatment group compared to 6.95 (P value < 0.05) at session II and 2.95 (P value < 0.05) at session VI in mobilization group, showing that both are effective to reduce the pain.

A study of 2007 on the effect of manual therapy and stretching on neck function in women with chronic neck pain has showed that both manual therapy and stretching were effective short-term treatments for reducing both spontaneous and strain-evoked pain in patients with chronic neck pain. It is possible that the decrease in pain reduced inhibition of the motor system and in part improved neck function.[9] In present study comparison of cervical range of motion in stretching group showed that stretching is statistically effective in improving all ranges of cervical spine $p = 0.00$ but significantly not the cervical rotation $p > 0.05$, while mobilization is effective in improving all ranges of cervical spine $p < 0.05$.

CONCLUSION

Hence the results of this study conclude that both stretching and mobilization are significantly effective ($p < 0.05$) in reducing the pain, mobilization is more effective in improving functional status and cervical ranges as compare to stretching in nonspecific neck pain.

Limitations and recommendations

1. The major limitation was less resources in terms of time and money
2. There was no control group
3. All participants were residents in one area of Lahore with subsequent similarity at s socioeconomic scale and cultural level, making it difficult to generalize the results to other populations that differ from that group.
4. Further studies can be done to determine the effect of different forms of stretching and their comparison with different grades and techniques of mobilization for nonspecific neck pain.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Muhammad Asif	Contribution to conception and design, drafting the article, collecting of data,	
2	Amna Zia	Statistical analysis and interpretation of the data.	
3	Dr. Farhia Shah	Final approval of the article through critical revision for intellectual content	
4	Muhammad Usman Riaz	collection of data, statistical analysis of data	