Comparative Efficacy of Isometric Exercises and Active Range Of Motion Exercises in Mechanical Neck Pain of Female Sewing Machine Operators

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ABSTRACT

OBJECTIVE: To assess the comparison of isometric exercises and active range of motion in neck pain of female sewing machine operators.

STUDY DESIGN: A Randomized controlled trial.

PLACE AND DURATION: At Physiotherapy Department of The University of Faisalabad from 1st March till 30th August 2017.

METHODOLOGY: Data was collected from all the female sewing machine operators that were currently working over there. Patients were divided into two groups i.e. control group and treatment group. Stretching exercises given to both groups. Control group received Active range of motion exercises and Treatment group received isometric exercises for four weeks at alternate days. Data was gathered from thirty workers using Northwick Park neck pain Questionnaire, Numeric rating scale for pain and goniometer for ranges by getting signed consent form earlier.

RESULTS: By comparing outcomes of Isomeric exercises and Active range of motion exercises, Isometric exercises were more effective as compared to Active range of motion exercises in improving pain, percentage disability and ranges of motion as p Value <0.05 at the end of treatment session.

CONCLUSION: Isometric exercises were more effective than active range of motion exercises of neck related to sewing machine operators as compared to active range of motion exercises.

KEYWORDS: Neck Pain, Isometric Exercises, General Exercises, AROM Exercises, Numeric Rating Pain Scale, Neck Disability Index.

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INTRODUCTION

Mechanical neck ache characterizes neck ache as pain feel any region in the C-spine, from the superior nuchal line till the thoracic spinous process. Neck ache and its related issue describes neck ache as pain situated in the anatomical region of the cervical with or without referred to the trunk, head, and upper limbs.[1]

During the past decades musculoskeletal disorders have been progressively common throughout the world. It is the one of the most common work related complication in working individual.[2] Due to inactive and tiring lifestyle, there is a constant increase in severity, frequency and intensity of pain in neck that may cause stiffness and tension on areas of neck.[3]

Musculoskeletal complaints regarding neck region are extensively present in sewing machine workers. As this profession involves highly monotonous, repetitive work in sitting position with bent neck and upper part of back curved on the sewing machine for longer duration. This kind of effort requires greater concentration and precision.[4]

Occupation related musculoskeletal system disorders are highly prevalent in the persons associated with the profession of stitching. Prolonged working extent, working with bend neck, these are all the risk factors causing neck ache in workers.[5] Neck

ache is related to awareness of distress in the neck area. Over 5000 years back, the Egyptian doctor represented injuries in the area of neck. Neck wounds could be the cause of loss of motion that are perceived by Hypocrisy. They additionally built up the neck exercises approach for the problems related to neck ache.[6] Division of cords of spine at various levels of C-spine and evaluation of following motor and neurological impacts was described by Galen.[7]

Psychological factors are also related like emotional stress and anxiety, headache, neck bending, cervical lordosis causes neck pain[8]. Female seamstress are exposed to greater continued static burden on neck and shoulder muscles on both left and right sides[9]. In the event that neck pain includes nerves for instance important muscle fit squeezing on a nerve or a slipping of disc (squeezing a nerve), you may experience dullness, shivering or shortcoming in your arm, hand or elsewhere.

A typical reason for neck ache is muscle injury in their study elaborates that the muscles related with neck hurt in the back are basically of two types, one related with muscle stiffness and the other with muscle injury[10]. Some studies recommended that the side effects of cervical spondylosis may show up in those as youthful age as 30 years and all the more ordinarily in those matured 40-60years [11]. This study recommended that strength practices may be a viable intends to strengthen the neck and lessening chance of damage.[12]

Reason behind conducting this study was to find out that how much effective was the treatment which was given to both groups after session of 8 weeks. Not enough data available on neck pain present in sewing machine operators as this was neglected population. The aim of the study is to compare the effectiveness of Isometric exercise and Active range of motion exercises in mechanical neck pains, neck range of motion and activity of daily livings in female sewing machine operators and there contribution towards evidence based treatment to female's sewing machine operators. Therefore, the objective is to assess the comparison of isometric exercises and active range of motion in neck pain of female sewing machine operators.

METHODOLOGY

This Randomized control trial was conducted from 1st March till 30th August, 2017. The sampling area was "Ethnic by Outfitters", a garment factory, located in Lahore, a city of Punjab. According to Eligibility Criteria, population which included were all the females indulged in sewing profession, age of between 20-40 years, those female sewing machine operators who consented to take part in this study, pain ranges from 3 and above 3 on Numeric Rating Pain Scale and Range Of Motion was limited at end range. According to exclusion criteria, Population which excluded were helpers of sewing machine operators, females with history of head trauma, females with history of neck trauma, females with any systemic disease like Diabetes mellitius and Hypertension, females with any congenital deformity, any previous history of surgery for cervical region, all the pregnant females, females who were absent at the time of data collection and other Factors such as neuropathies.

Total thirty six female sewing machine operators of "Ethnic by Outfitters" garment industry of Lahore were present out of which thirty participants fulfills the inclusion criteria. It was census study as the data was collected from all the female sewing machine operators that were currently working over there so no sampling technique is required.

The study included collection of the important data and information from the participants. Consent was taken from the HR office and owner of the factory. Consent form was marked by every member before filling the questionnaire. Every member was then met and questionnaire was filled by researcher while disclosing each question to the member as they didn't comprehend English language. Northwick neck pain survey was used to measure neck disability index. Pain intensity was assessed by Numeric rating pain scale (NRPS). Goniometer was utilized to measure the range of motion.

Participants were randomly allocated into two groups by using lottery method. Base line treatment given to both groups was passive stretching. In 1st group (control group) active range of motion exercises were performed in female sewing machine operators. And in 2ndgroup (Treatment group), Isometric exercises were performed in female sewing machine operators. Isometric and Active Range of Motion exercises treatment protocols with frequency of 10-15 repetitions, intensity of pain free range in intermittent mode in duration of 4 weeks. Stretching exercises each of which was held for 30 seconds and performed three times each for a total of 10 minutes.

Numeric rating pain scale was used to evaluate the pain and Northwick park neck pain questionnaire was used to evaluate neck disability level. Intensity of the pain was measured prior to treatment (baseline), after two session (follow up I session) and at the end of session (follow up II session) after four weeks. Level of disability was measured prior to the treatment (baseline), two week (follow up I session) and then at the end of treatment session (follow up II session).

Data Analysis: Data analysis was done by SPSS version 20. Tables for frequencies whereas the bar graphs and tables were utilized for the count of quantitative variables. For the understanding relationship between the factors of hypothesis, Independent t tests were applied and p-Value was figured as needs to be. Information gathered from thirty surveys was entered.

RESULTS

A total of 30 participants were assured. Table-I shows that 30 females were divided into two groups. Control group received active range of motion exercises and treatment group received isometric exercises. The significant value was ($p<0.05$). The p value of above mentioned variables after two sessions i.e. (after two weeks and after four weeks) was 0.000 that is highly significant. So isometric exercises were more effectiveness than active range of motion exercises to increase cervical range of motion in all planes.

Fig - 1 illustrates that 30 females were divided into two groups. Control group received active range of motion exercises and treatment group received isometric exercises. The percentage of NPRS after two session's i.e. after two weeks was 14.87% and

after four weeks was 3.08% that shows there was significant decrease in neck pain.

Fig – 2 illustrates that 30 females were divided into two groups. Control group received active range of motion exercises and treatment group received isometric exercises. The percentage disability after two session's was 12.41%and after four weeks was 0.00% that shows there was significant decrease in neck disability.

Table-I: Independent t test for neck range of motion between two groups (N=30)

Variables	Time Points	GROUP I (n=15) (Mean+SD)	GROUP II (n=15) (Mean+SD)	Mean difference	p-Value
Flexion	Baseline	33.07 ±2.15	32.93±1.87	.133	0.85
	Follow up I	38.73 ±2.12	35.80±2.07	-2.98	0.001
	Follow up II	44.46 ±2.47	40.53±2.09	-3.93	0.000
Extension	Base Line	52.53 ±2.10	52.6±2.02	.133	0.861
	Follow up I	59.13 ±1.68	56.13±2.38	-133	0.000
	Follow up II	65.40 ±1.84	62.8±3.76	-3.00	0.0023
Right lateral flexion	Baseline	30.67 ±2.16	30.53±1.84	-.133	0.857
	Follow up I	36.0±1.64	33.60±1.95	-2.20	0.001
	Follow up II	44.7 ±0.45	40.0±1.03	-4.66	0.000
Left lateral flexion	Baseline	30.80±1.89	31.07±1.98	.267	0.709
	Follow up I	36.0±1.49	34.60±1.68	-2.06	0.001
	Follow up II	44.4±0.91	40.3±0.72	-4.13	0.000
Right rotation	Baseline	58.67±1.95	58.3±2.19	-.33	0.664
	Follow up I	67.66±3.37	64.73±1.86	-2.93	0.006
	Follow up II	74.46±2.32	70.2±2.05	-4.20	0.000
Left rotation	Baseline	57.6±2.02	57.6±2.13	-000	1.000
	Follow up I	67.40±1.35	64.4±2.29	-3.00	0.000
	Follow up II	73.0±2.05	70.2±1.61	-2.86	0.000

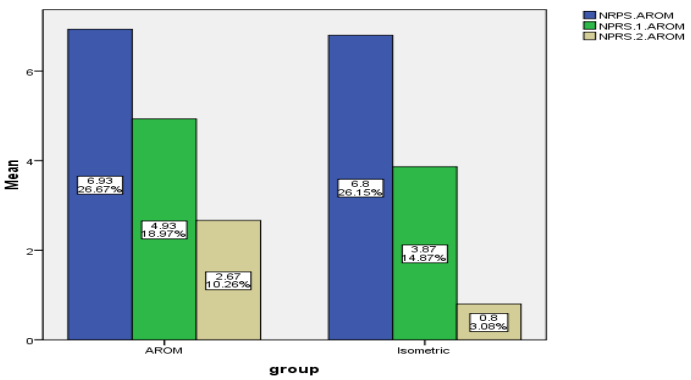

Fig - 1: Independent t test for numeric pain rating scale between two groups (N=30)

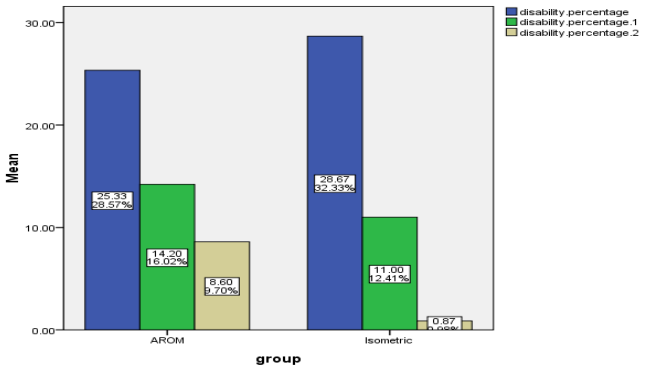

Fig - 2: Independent t test for neck disability index between two groups (N=30)

DISCUSSION

To the authors knowledge this is the first study evaluated the effects of isometric and general neck exercises in the treatment of neck ache in Pakistan. Both interventions significantly decreased pain in neck, improved neck limitation and improved neck range of movements after 12 weeks of intervention. In the study of Pedersen the subjects were followed for only 12 weeks, previously reported results suggest that 16 weeks of training program and 10-15 repetition of exercises is adequate to Attain neuromuscular and physiological changes related to decrease in muscle pain.[9]

The positive findings of present study supports the findings of Waling that compared the effects of strengthening, endurance, coordination and control groups in chronic neck pain patients. Both of these studies were almost similar in terms of duration and frequency of exercises 10 weeks and 12 weeks in present study. However, Waling found no difference in all groups over 8, 17 months and 3 years follow up whereas in present study we did not follow up participants beyond 3 months and it is not possible to establish whether gains in pain, range of movement and functional abilities will carry over for a longer period.[7]

The different parameters of the study are neck pain disability index, pain and range of motion. In our study the outcomes of measuring pain level at Baseline, follow up 1 and follow up 2 are .852, .116 and .000 respectively, which shows isometric exercises are more effective as compared to active range of motion exercises. These findings are similar to current study that isometric exercises were more effective as compared to active range of motion exercises to reduce pain[13] Study of wailing describes that both groups experienced decrease in pain but isometric exercises was more effective in reducing pain as compared to active range of motion. Regarding neck disability index, the outcomes of measuring neck disability index at Baseline, follow up 1, follow up 2 are .647, .355 and .000 respectively. There is no significant difference between both interventions. Both of the treatments are equally effective at baseline. At follow up 1 and 2, isometric exercises are more effective as compared to Active range of motion exercises[14]. In our study participants only performed isometric and general exercises for neck in the supervision of physical therapist therefore one could assume that the improvements could only be due to the specific intervention[15] In another study by Waling

et al that included female patients still at work with less pain on NPRS scale. Whereas in present study base line pain score was high on NPRS scale hence more chance for improvements. Both groups showed reduction in pain but mean improvements in pain was better in Isometric neck exercise group[16]

These findings are in accordance with study of Yeung in which randomized controlled trial conducted and concludes that isometric exercises were are effective in decreased neck pain [17]

These findings are in support with Ylinen, et al randomized controlled trial suggest that endurance and strength training significantly reduced neck pains at the 12-month follow-up. The exercise groups also performed strengthening exercises for the trunk and leg muscles. These extra exercises could have influenced the results of this study and no further explanation was given why these exercises were included in training programs[18]. A comparative study by Ylien and colleagues demonstrated that, isometric exercises were more effective as compared to active range of motion exercises for diminishing the pain and disability in ladies with neck ache [19]

The outcomes of measuring neck range of motion at Baseline, follow up 1 and follow up 2 are significant as ($p<0.05$) which shows isometric exercises are more effective3 than active range of motion exercises. The study by Mann demonstrated the beneficial effects of isometric exercises in neck pain as compared to active range of motion exercises[6]

CONCLUSION

Isometric exercises are more effective in treating the pain, range of motion and disability index of neck related to sewing machine operators as compared to active range of motion exercises.

RECOMMENDATIONS

This study can be performed on a larger sample size. It can be performed on homogenous population. The duration of the study can be longer. The age group used for the study can be restricted. Some other techniques or interventions can also be added.

CONTRIBUTION OF AUTHORS

Tariq M: Conceived idea, Literature search, Data collection, Literature review, Designed research methodology, Manuscript writing

Sarfraz N: Statistical analysis, Manuscript final reading And Approval

Hamna M: Data interpretation, Manuscript writing

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