

EFFECTIVENESS OF STRENGTHENING AND STRETCHING EXERCISE TO REDUCE WORK RELATED MUSCULOSKELETAL DISORDERS AMONG LOCAL MARKET WORKERS

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Abstract-

BACKGROUND: To assess the effectiveness of strengthening and stretching exercise to reduce work related musculoskeletal disorders among local market workers. In worldwide, injuries to the muscles are the reason for employees' discomfort, impairment, and declining job quality. Due to their extended workdays, hard lifting, and insufficient job rotation among the employees, load men are more susceptible to MSD. The use of passive stretch interventions is more common, which is thought to elongate shortened muscle. Some exercises like Pilates, stretching, aerobics and strengthening exercises were found to be used among elderly individuals with low back pain.

OBJECTIVE: To find out the effectiveness of strengthening and stretching exercise to reduce work related musculoskeletal disorders among local market workers.

MATERIAL&METHOD: 103 male local market workers volunteered for the study and 66 were screened based on inclusion criteria. Nordic musculoskeletal questionnaire was used. 40 patients were chosen based on discomfort in the cervical and lower back regions, and they were then separated into two groups of 20, each with 20 participants based on inclusion and exclusion criteria. They were explained the process and given their informed permission. Using NPRS, the pre- and post-test values were calculated. Isometric neck flexion, extension, lateral rotation, lateral flexion, and cervical retraction exercises were provided to the strengthening group and for low back pelvic bridging, planks were been given. Stretching Group were given stretching exercises, like knee to chest stretches, kneeling back stretch, cat cow, piriformis stretches for low back and for neck upper trapezius stretch, levator scapulae, deep anterior neck flexor stretches. The therapy was given five days a week for four weeks; the frequency of treatment is 20 minutes 15 repetitions. In the same way that the pre-test results were calculated, so were the post-test results. Statistics were applied to the values after tabulation.

RESULT: It demonstrates how stretching exercises may significantly improve the neck and low back.

CONCLUSION: For addressing neck and lower back pain concerns among local market workers, stretching is far more beneficial and effective than strengthening activities.

Keywords: Stretching, Neck pain, Strengthening exercise, local market workers, low back pain.

1.INTRODUCTION:

In worldwide, injuries to the muscles are the reason for employees' discomfort, impairment, and declining job quality. [1]. Complaint of muscles, skeleton and related tissue which have been seen or suspected to have been caused by work place activity definition of work-related musculoskeletal disorders which was given by occupational health safety association. The joint, muscles tendons and nerves are affected due to repetitive stress on them for longer duration which is known as cumulative trauma disorder or repetitive strain injuries [2,3]. Ergonomics is the science which deals with evaluating an individual efficiency in a working environment and also concentrate on placing right person in a right job [4,5]. Based on the recent global estimation given by the world health organization (WHO), the prevalence rate for work related musculoskeletal disorders varies between 30 -60% [6]. According to certain studies carried out in industrialised nations like the United States, the Netherlands, and the United Kingdom, where musculoskeletal problems are a large concern and cause loss of work time as well as noteworthy impairment [7,8], they are a major problem.

Musculoskeletal disorders are a worldwide burden illness that account for 35% to 45% of cases. They were linked to occupational risk factors such hazardous working conditions, prolonged workdays, repetitively hard labour, and poor body mechanics. ^[9,10,11,12]

The broadened hours spent at work, hard lifting, as well as insufficient shift switching among individual who work makes load men more vulnerable to musculoskeletal diseases.^[1] In India, work stress in any occupation is unavoidable and work-related musculoskeletal disorders are the primary cause of work-related disorders among load men and there are no sufficient policies and measures to ensure the safety and health of occupational workers due to their socioeconomic conditions. ^[13]

Stretching:

Physical therapy interventions are often used to reduce or restore normal mobility and the therapist use wide variety of techniques such as passive range of motion, stretching either by the therapist or by the patient, splinting and serial casting. ^[14] The use of passive stretch intervention is more common, which is thought to elongate shortened muscle. These interventions, often in combination with an exercise program, are claimed to lead a sustained increase in range of motion. ^[14]

Range of Motion and Viscoelastic Modifications in the Muscle Tendon Unit:

When a muscular tendon is believed to have flexible properties, it means that it can extend and then retract to its normal size. Alterations in the elasticity of muscular connective tissue units caused by stretching may underlie rom increases. ^[15]

Strengthening exercise:

At some period of time many individuals experience low back pain and it's a major musculoskeletal problem. Low back pain mostly occurs for elderly individuals with association of functional limitations and disabilities. To improve the individuals with lowback pain like their physical functions and quality of life, to reduce burden to their families, societies and countries effective treatments have been investigated for low backpain^[20].

Some exercises like Pilates, stretching, aerobics and strengthening exercises were found to be used among elderly individuals with low back pain. Though strengthening exercise have been shown major concern among clinicians and researchers because this type of exercise has been included in their exercise program because it improves the muscle strength of the elderly with Low back pain. Shnayderman and Katz-leurerrevealed that strengthening exercise is more effective than aerobic exercise for chronic Low back pain^[21].

2. Methodology

2.1 Participants and selection criteria:

According to the inclusion and exclusion criteria for this experimental investigation, the individuals were chosen at random. Saveetha Physiotherapy OPD, Saveetha Medical College and Hospital, Thandalam, Chennai, is the location of the study. Our physiotherapy section treated male market labourers who were experiencing cervical and low back discomfort. The questionnaire is made available before the intervention and filled out. Before starting treatment, the patient was informed about the procedure and given the opportunity to provide their informed permission.

2.2 Procedure:

103 male local market workers volunteered for the study and 66 were screened based on inclusion criteria. Nordic musculoskeletal questionnaire was used .40 subjects were selected based on pain in cervical and lower back region further they were divided into 2 groups, 20 each according to inclusion and exclusion criteria. The subjects were selected based on combined musculoskeletal disorders. They were explained about the safety and simplicity of the procedure and informed consent form was obtained. The questions were been asked and filled by the researcher. The questionnaire form contains regarding neck, shoulder, elbow, wrist, upper back, lower back, hip, knee, ankle which had questions like how long pain has been for past 12 months and also during the last 7 days. Whether they have been prevented from carrying out any activities like doing their job, home activities etc. .Pre and post-test values were been measured using Numerical pain rating scale. In pre -test patients were been initially evaluated using Numerical pain rating scale. Strengthening Group were been treated with strengthening exercise and Stretching Group were been treated with stretching. Strengthening Group were given strengthening exercise like Isometric flexion, extension, lateral rotation, lateral flexion, cervical retraction exercises for neck, and for low back pelvic bridging, planks were been given. Stretching Group were given stretching exercises, like knee to chest stretches, kneeling back stretch, cat and cow, piriformis stretch for low back and for neck upper trapezius stretch, levator scapulae, deep anterior neck flexor stretches. The treatment was been given 5 days in a week and continued for 4 weeks; The frequency of treatment is for 20 minutes 15 repetition. The post- test was been measured in the same manner as the pre- test measurement were taken. To find out the effectiveness of strengthening exercise and stretching to reduce work related musculoskeletal disorders among local market workers.

STATISTICAL ANALYSIS:

The information gathered is taken into account and examined. The parameters are the mean as well as the standard deviation (SD). Using an unpaired t-test, significant variations between pre-test values were evaluated. The difference between the stretching exercise group and the one that did strengthening exercise group was determined using the paired t-test. lower than 0.001 p-value.

TABLE 1: SOCIODEMOGRAPHIC DATA

SL.NO	GROUP	AGE	HEIGHT(CM)	WEIGHT(KG)	BMI

1.	MALE LOCAL MARKET WORKERS	40±5 years	171±6cm	70±8kg	24.9±2
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TABLE 2: PREVALENCE OF PAIN WITH RESPECT TO BODYPARTS(CMDQ) AMONG 66 MALE LOCAL MARKET WORKERS:

SL.NO	REGION	MALE LOCAL MARKET WORKERS (PAIN%)
1.	NECK	68.3%
2	SHOULDER	45%
3.	UPPER BACK	15%
4.	ELBOW	11.7%
5.	WRIST	13.3%
6.	LOWER BACK	63.3%
7.	HIP/THIGHS	1.7%
8	KNEES	13.3%
9.	ANKLE	3.3%

TABLE 3 : NECK AND LOWER BACK PAIN AMONG 66 MALE LOCAL MARKET WORKERS:

SL.NO	NECK PAIN	LOW BACK PAIN	COMBINED NECK AND LOW BACK PAIN AMONG MALE LOCAL MARKET WORKERS
1.	11	15	40

TABLE 4: COMPARISON OF PRE- TEST AND POST -TEST VALUES IN STRENGTHENING EXERCISE GROUP:

STRENGTHENING GROUP	MEAN	STANDARD DEVIATION	T VALUE	P VALUE

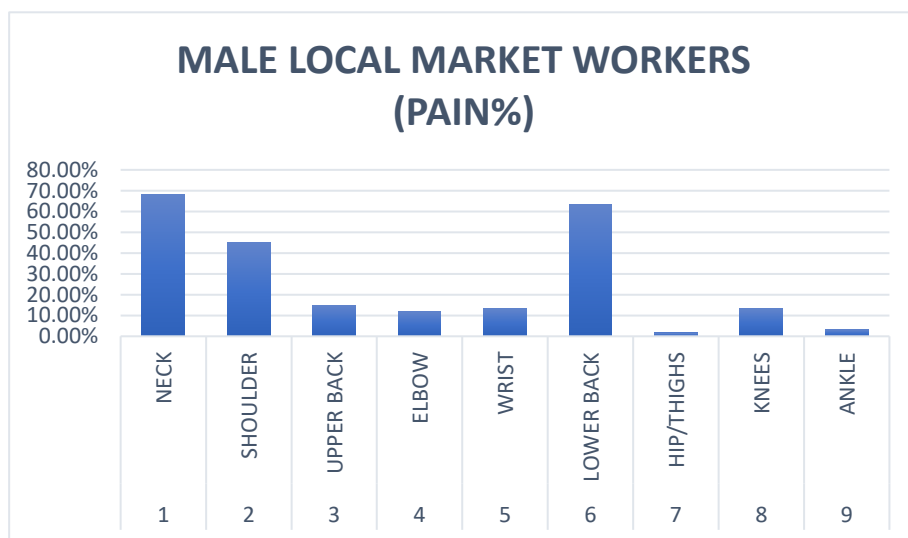
NPRS	PRE- TEST	5.20	0.52	7.5860	<0.0001
	POST-TEST	3.15	1.09		

TABLE 5: COMPARISON OF PRE-TEST AND POST-TEST VALUES INSTRETCHING GROUP:

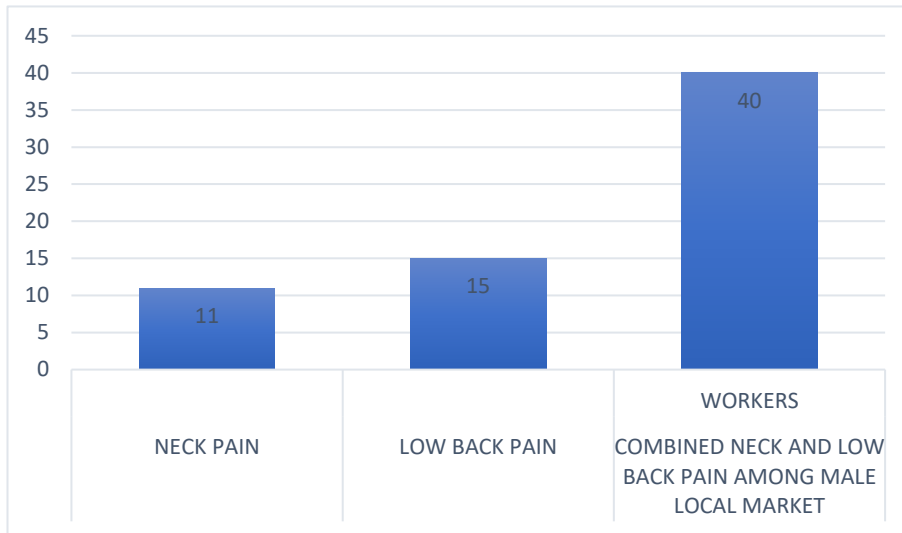
STRETCHING GROUP		MEAN	STANDARD DEVIATION	T VALUE	P VALUE
NPRS	PRE-TEST	5.10	0.31	15.6681	0.0001
	POST-TEST	1.85	0.88		

TABLE 6: COMPARISON OF POST-TEST VALUES IN STRENGTHENINGEXERCISE GROUP AND STRETCHING GROUP:

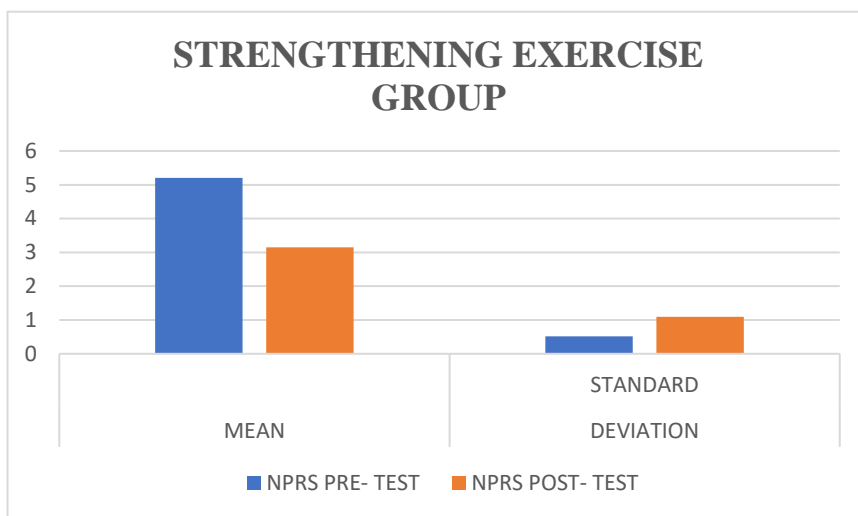
Strengthening exercise group and stretching Group		Mean	Standard deviation	SEM	T value	P value
NPRS	Strengthening exercise group	3.15	1.09	1.09	4.3333	<0.0001
	Stretching Group	1.85	1.00	0.88		



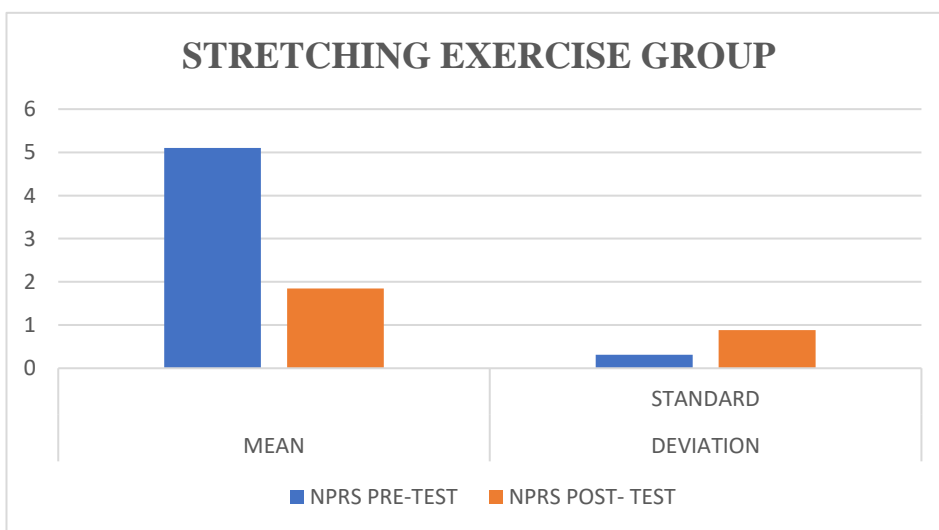
GRAPH 1: PREVALENCE OF PAIN WITH RESPECT TO BODY PARTS(CMDQ) AMONG 66 MALE LOCAL MARKET WORKERS



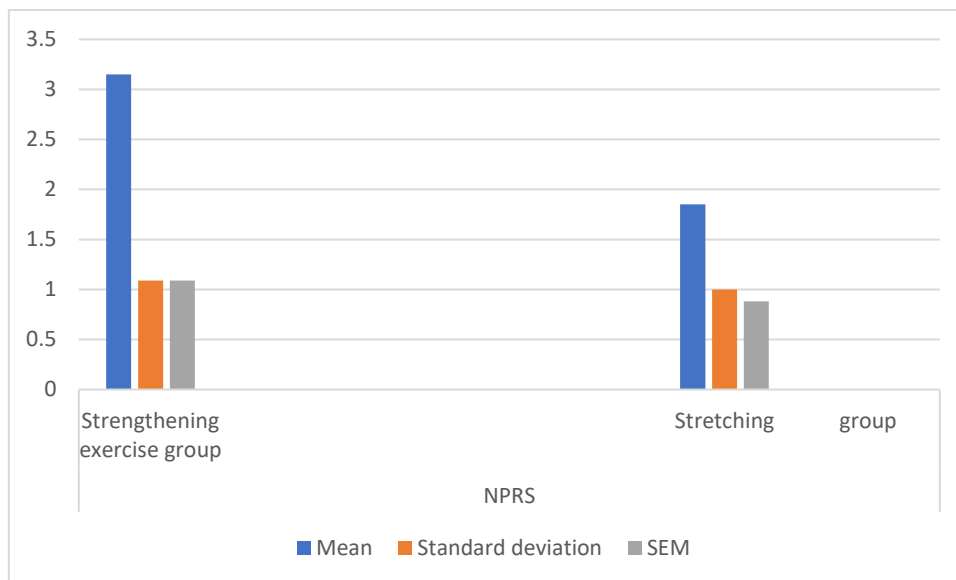
GRAPH 2: NECK AND LOWER BACK PAIN AMONG 66 MALE LOCAL MARKET WORKERS:



GRAPH 3: COMPARISON OF PRE -TEST AND POST-TEST OF NPRS SCALE IN STRENGTHENING EXERCISE GROUP USING UNPAIRED T-TEST



GRAPH 4: COMPARISON OF PRE -TEST AND POST-TEST OF NPRS SCALE IN STRETCHING EXERCISE GROUP USING UNPAIRED T-TEST.



GRAPH5: COMPARISON OF POST-TEST VALUES OF NPRS SCALE IN STRENGTHENING EXERCISE GROUP AND STRETCHING GROUP USING PAIRED T-TEST.

3. RESULT:

A comparison of statistics between the Stretching Group and the Strengthening Group, as well as within each group, was done using the quantitative data. Graph 1 : shows the prevalence of pain with respect to body parts (CMDQ) among 66 male local market workers that neck pain is 68.3% and lower back shows 63.3%. Graph 2: Neck and Lower back pain among 66 male local market workers shows that neck pain was for 11, lower back pain was for 15, and combined neck and lower back pain was for 40 male local market workers. Graph 3: Comparison of pre-test and post-test of NPRS scale in stretching group using unpaired t-test shows that, Mean for pre-test was 5.20 post-test was 3.15 and Sd for pre-test was 0.52 post-test was 1.09. Graph 4: Comparison of pre-test and post-test for stretching exercise using unpaired t-test shows that, Mean for pre-test was 5.10 post-test was 1.85 and Sd for pre-test was 0.31 post-test was 0.88. Graph 7: Comparison of Post-test values of NPRS scale in Strengthening exercise group and stretching group using paired t-test shows that, mean for strengthening exercise group was 3.15, stretching Group was 1.85, Sd for Strengthening Exercise Group was 1.09, Stretching Group was 1.00 and SEM for Strengthening Exercise Group was 1.09, Stretching Group was 0.88.

According to the study's findings (Table 4), the Strengthening Group's mean NPRS score at pre-test was 5.20, and at post-test it was 3.15. In Table 4, the mean pre-test score for the NPRS was 8.20, whereas the mean post-test score for the Stretching Group was 2.95. The post-mean NPRS value in the strengthening group was 3.15, whereas the post-mean value in the stretching group was 1.85, indicating a continuous decrease in pain with a statistically significant p value of 0.0001. The post-mean NPRS value in the strengthening group was 3.15, whereas the post-mean value in the stretching group was 1.85, indicating a significant reduction in pain with a p value of 0.0001 statistically noteworthy.

4. DISCUSSION:

This study is carried out among local market workers especially male workers with musculoskeletal disorders. The data collected using NMQ. Out of 66 subjects, 40 subjects were taken for intervention and segregated into two groups in that most commonly affected musculoskeletal areas are neck and low back and that too in same person with 2 same neck and low back pain. The data were analysed statistically. The main objective of this study is to find the effectiveness of strengthening and stretching program on neck and low back pain. From graph 7 and 8 study shows that significant reduction in pain and improvement in muscle strength of local market (male) workers in Stretching exercise group than Strengthening exercise group.

The high percentage of musculoskeletal complaints associated with local market workers may be due to carrying heavy loads of sacs heavier than their weight, as well as repetitive knee bending to load the sacs and carriage of heavy loads in awkward postures adopted by the workers and due to carrying heavy loads of sac it may cause compression of lumbar spine. Because the application of force is required for the handling of loads and the force requirements vary depending on the work posture. Awkward body posture also makes work more difficult, and the physiological costs in non-erect postures are higher than in erect postures. Handling loads requires a lot of muscular effort in awkward positions, which leads to musculoskeletal strains.

According to Edgar Ramos Vieira et al in a 2008 study explores effort of stretching to reduce work related musculoskeletal disorders, this study provided mixed findings but it shows some beneficial stretching in preventing work related musculoskeletal disorders. this showed that physiological effects of stretches may contribute to reduce discomfort and pain [25]

In 2017 Hae-In Bae concluded that, static stretching using a load on tensor fascialata affected the pain relief and flexibility have been increased in patients with low back pain and its positive effects for return to daily life were been identified. [26]

In 2020 Fontana Carvalho concluded that the effects of lumbar stabilization and muscular stretching on pain, disabilities, postural control and muscle activation in pregnant women with low back pain showed that both modalities were effective in pain reduction, improving balance and increasing one trunk activity muscle after 6 weeks of intervention in pregnant women with low back pain.

[27]

In 2007 Arja Hakkinen concluded 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. However, it showed that these treatments alone are not effective in improving muscle strength^[28] This study was done in a short time period with a small number of subjects.

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