

EFFICACY OF MCKENZIE PROTOCOL ON NON-SPECIFIC NECK PAIN

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ABSTRACT

Background: Neck pain is the most common and painful musculoskeletal condition which has a great socioeconomic burden on both patients and society. McKenzie protocol results in significant decrease in pain and increase range of motion and functional ability in spinal conditions but there are insufficient data available to determine the efficacy of the McKenzie protocol on non specific neck pain patient's further research which addresses these issues is required.

Purpose: This study was conducted to evaluate the effect of McKenzie protocol on cervical range of motion (CROM), intensity of pain, and neck functional activity level in the management of non specific neck pain patients.

Materials and Methods: Thirty patients with non specific neck pain, 30-50 years of age was assigned in two groups (study and control) each group contained fifteen patients, all patients received traditional treatment for six weeks 3times/week and additionally study group received McKenzie protocol. CROM, pain, and functional activity level were measured pre-treatment and post six weeks of treatment using myrin goniometer, visual analog scale (VAS), and Copenhagen neck functional disability scale.

Results: There was a significant increase in CROM of study group where flexion ($p=0.002$), extension ($p=0.0001$), lateral flexion ($p=0.02$) and rotation ($p=0.0001$), also significant decreases in pain ($p=0.0001$) and decrease in functional disability level ($p=0.0001$).

Conclusion: McKenzie protocol of treatment additionally to traditional treatment is effective in increase CROM, decrease pain and increase functional activity in non specific neck pain patients.

KEY WORDS: Non specific neck pain, McKenzie protocol.

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INTRODUCTION

Neck pain is a typical excruciating condition, with rates of movement constraining activity of 1.7% to 11.5%. Persons with neck pain report persevering or intermittent neck problems. Neck pain is the main fourth reason for incapacity worldwide and it is the second driving explanation behind utilization of reciprocal and option medication [1,2].

Nonspecific neck pain is neck pain with no particular precise illness being identified as the hidden reason for the objections. It characterized as mechanical pain found anyplace between the occiput and upper thoracic spine and encompassing muscles with no particular etiology. Various structures in the neck and close-by districts might be the wellsprings of nonspecific neck pain, for example, muscles,

joint structures, ligaments, intervertebral plates, and neural structures [3].

The administration of neck pain is a typical clinical issue for by far most of individuals. It can be dealt with conservatively and the normal medicines could incorporate prescription, body mechanics preparing and exercise based recuperation [4]. Physical therapy modalities may incorporate manual procedures, traction, stretching, massage, electrotherapies, thermal agent, ultrasound, instruction and General exercises [5].

General exercises is a typical type of physiotherapy treatment in essential look after patients with musculoskeletal disorders , for example, neck pain, and it is acknowledged as one standard type of practice. Additionally, randomized trials have demonstrated that dynamic activity positively affects neck pain and has been observed to be gainful for nonspecific neck pain. Physical therapists perform exercise treatment in change incredibly in substance and technique for conveyance [6,7].

The McKenzie method uses approach including postural awareness and repetitive movement with the fundamental thought that a converse power can diminish pain and return functions [8]. The McKenzie intervention approach is a thorough technique for consideration utilized by physical therapists that stress self-treatment, and improve mindfulness of pain in connection to stance and spinal development. McKenzie directional directional exercises that are performed for the duration of the day may give another possibility of mechanical, cognitive and sensory perception of pain that modify pain expectation and related fear beliefs and ultimately to the correction of functional disabilities [9].

The impact of McKenzie approach on pain and functional Disability in patients with lumber disc indicated noteworthy decrease in pain and useful inability post treatment [10,11].

The McKenzie technique is broadly thought to be highly effective program for patients with nonspecific spinal pain [12,13] and decreases pain and inability among subjects with chronic LBP [14].

The McKenzie protocol, which has been

commonly utilized in back conditions, may also be employed in the treatment of neck pain but There are insufficient data available to determine the efficacy of the McKenzie protocol on non-specific neck pain patients since 2004. So Further research which addresses these issues is required [13].

Accordingly, this study was conducted to evaluate the effect of McKenzie protocol on non-specific neck pain.

MATERIALS AND METHODS

Participants: we conducted a non equivalent per-test-post-test control group design. Thirty patients with non-specific neck pain were randomly assigned in two groups.(Intervention group=15) had received traditional treatment (ultrasound and strengthening exercise) additionally to McKenzie protocol (control group=15) had received traditional treatment (ultrasound and strengthening exercise) only both groups (3 times/ week) for 6weeks.their age ranged from (30-50) years old with mean age (40.26±7.78), their height ranged from (152-182) cm in the mean height (164.66±11.142),and their weight ranged from (55-90) kg in the mean weight (68.23±12.781) a writer informed consent was obtained from all participants before the beginning of the study. Patients were included if they had a localized chronic neck pain without any current arm pain or discomfort were included. Patients were excluded if they had a history of Spinal cord lesion, tumor, spinal infection, spinal fracture, radiculopathy.

Instruments: Types of instruments used in this study. Instruments for measurement to measure cervical range of motion (myrin goniometer). Instruments used for treatment (ultrasound device).

Myrin goniometer was found to be reliable when used to evaluate active neck motions across several days by multiple testers. It could be used to assess gross limitation of motion of an individual suspected of having cervical dysfunction and for objectively monitoring the success of a therapeutic program [15].

Ultrasonic device (uniphy-phycation 190i) SN 27552-2000-06-made in newzeland.(1Mhz frequency with transducer having an affective

radiating area of 5.0 cm² Intensity up to 1.5w/cm² in continuous mode and not exceed 3w/cm². Gel was used as coupling media).

Procedures: initially each patient was given an orientation session about nature of the study and its aim. The measurement procedures involve myrin goniometer, pain intensity level and neck function disability level, measured before and after treatment.

The neck mobility was assessed with the patients in relaxed seated position on a chair with back support. For this purpose all patients were asked to sit comfortably on the chair with both feet flat on the floor, hips knees positioned at 90° angles, and buttocks positioned against the back of the chair. Then the myrin device was mounted over the patients head secured by Velcro strap. The patients were instructed to move the head to the end point of active range of motion for each of six movement of cervical spine. Flexion and extension occur in the sagittal plane, right and left lateral flexion occur in frontal plane, while right and left rotation occur in the transverse plane [16].

For assessment of pain, visual analogue scale (VAS) was utilized previously, then after the fact treatment. VAS is normally an even line, 100 mm length, moored by word descriptors at every end. The patient's imprints on hold at the point that they feel speaks to their view of their present state. The VAS score is controlled by measuring in millimeters from the left hand end of the line to the point that the patients marks (Johansson, 1996). The VAS is by and large viewed as a legitimate and dependable device for agony estimation [17].

For evaluation of neck functional activity level, the Copenhagen neck capacity inability scale (CNFDS) was utilized before treatment and after fruition of the treatment. CNFDS is a self-controlled survey created to gauge the level of practical incapacities in patients with neck torment [18].

It has been produced for the individuals who have neck pain and incapacities because of the pain. The scale incorporates questions identifying with headache, capacity to rest and to think and exercises of everyday living. There are likewise inquiries of a psychosocial nature,

for example, social contact, passionate connections and states of mind toward what's to come. Every one of them are approved and appeared to be dependable [19].

The CNFDS is helpful for patients with neck complains treated by physiotherapy. The survey is accessible for patients from 20 to 75 years [20]. The CNFDS comprises of 15 things. These things are independently replied by either 'yes', "at times" or 'no'. For inquiries one till five, a "yes" demonstrates a decent capacity. For inquiries six till fifteen, a "no" demonstrates a decent capacity. A decent capacity gets a score of zero, a poor capacity gets a score of two and the answer "incidentally" dependably gets a score of one [18]. A while later, we include all the scores of the inquiries to frame the total score. This aggregate score ranges from 0 to 30. The aggregate score decides the level of utilitarian incapacity, in which higher numbers speak to a more elevated amount of inability. A score of 0 shows that there are no necks protests present though 30 demonstrate that the patient is greatly crippled as a consequence of the neck dissensions. Correlation between rehashed scores could be made between crude scores or as rate change from benchmark (unique) score [21].

Procedures of treatment: Procedure of treatment involved traditional treatment and McKenzie protocol. The traditional treatment was applied in the form of U.S and strengthening exercises program (isometric neck flexors, extensors and lateral flexion). Muscle strengthening exercises seem to effectively reduce intensity, discomfort, and duration of neck pain. An effective program should include strengthening neck muscles in the static mode and consist of 3 sets of 5 repetitions, once a day, 3 times a week over a period of 6 weeks [22,23].

McKenzie protocol of treatment: Fifteen Patients with non-specific neck pain had received McKenzie protocol additionally to the traditional treatment.

Direction selection: Dysfunction is classified by the direction that is limited and painful, repeating the painful movement consistently produces symptoms on every occasion at end-range. There

is no pain during the movement, but only when the restricted end range is achieved. Repeated movements in one direction have no effect on pain or range of the opposite movement [24].

Management of extension dysfunction: Lower cervical extension dysfunction was common in these study patients. Patients with limitation in extension due to restricted end range were received the following program.

Retraction: The patients were in a relaxed comfortable sitting position with good back support, the patients then instructed to draw their head as far back as possible, with the head remaining horizontal, facing forward, and not inclining up or down. This was repeated ten to fifteen times.

Retraction with patient overpressure: The patients returned to the neutral sitting position and instructed to apply overpressure by pressing the chin with their fingers at the end of range of the movement. This was repeated ten to fifteen times.

Retraction with therapist overpressure: The patients were in a relaxed comfortable sitting position with good back support and the therapist was standing at the side of the patients with the thumb; forefinger of one hand was applied against the patient's mandible and the heel of the other hand at the level of the first or second thoracic vertebrae. The therapist forearms was in parallel. The therapist hand on the mandible stabilizes the head at end range of retraction and the heel of the other hand applied posterior-anterior force on the spinous processes of the upper thoracic segments, repeated five or six time.

Retraction with extension: The patients were in a relaxed comfortable sitting position with good back support, The patients instructed to draw their heads as far back as possible, with the head remaining horizontal, facing forward, and then instructed to 'bend his head backwards as far as he can to look at the ceiling'. then returned to the neutral sitting position. The patients were instructed to repeat the movements ten to fifteen times. An increase in the range of extension a minimal rotary adjustment of the head position is repeated five to six time so that the nose was moved only

(1cm) to either side of the mid line during this process the patients gained maximum end range.

Management of rotation dysfunction: Loss of rotation was common in these study patients. Patients with limitation in rotation due to restricted end range were received the following program.

Rotation: The patients were in a relaxed comfortable sitting position with good back support, The patients instructed to retract their heads, but not fully, and then rotate the head towards the side of pain: 'Turn as far as you can as if looking over your right- left shoulder'. After a second in that position they were instructed to return to the neutral posture. The same movements were repeated rhythmically ten to fifteen times, returning to the neutral position each time.

Rotation with patient overpressure: The patients were instructed to repeat the same movements of some retraction followed by active rotation. Then instructed and shown the following if performing left rotation: 'Place your right hand behind your head with your fingers reaching to your left ear, and your left hand against your chin; apply extra pressure so your head is pushed further into rotation.' After a second in that position they were instructed to return to the neutral posture. The same movements were then repeated rhythmically ten to fifteen times, returning to the neutral position each time.

Rotation with therapist overpressure: The patients were in a relaxed comfortable sitting position with good back support with the head in a slightly retracted. The therapist stands behind the patients with his right hand resting lightly on the patient's right trapezius. The fingers should rest lightly over the clavicle and the tip of the thumb is placed firmly against the right side of spinous process at the level below that being mobilized. The therapist carried the patient's head with his left hand. The patient asked to rotate their heads to end of rang at which point the therapist produce a further rotation force using the lift arm to rotate the head and the right hand applies a counter - pressure against the spinous process at the

segment below. The position is maintained for one or two seconds and then the head is returned to the neutral position .The movement was repeated five or six times.

Management of lateral flexion dysfunction:

The patients less commonly notes this problem as the movement has less functional use than rotation. It coexists with rotation dysfunction.

Lateral flexion: The patients were in a relaxed comfortable sitting position with good back support. The patients instructed to retract the head and then lateral flex towards the side of pain: 'Take your right /left ear towards your shoulders. After a second in that position they were instructed to return to the neutral posture. The same movements were repeated rhythmically ten to fifteen times, returning to the neutral position each time.

Lateral flexion with patient overpressure: The patients were in a relaxed comfortable sitting position with good back support .The patients instructed to retraction followed by active lateral flexion. Then they were instructed and shown, if performing left lateral flexion, 'Place your left hand over your head with your fingers reaching to your right ear, and pull your head down to your shoulders. After a second in that position they were instructed to return to the upright posture. The same movements were repeated rhythmically ten to fifteen times, returning to the neutral position each time.

Lateral flexion therapist overpressure: The patients were in a relaxed comfortable sitting position with good back support, with the head in a slightly retracted position. The therapist stand behind the patients with the patient's head resting lightly on the therapist's chest. The

tip of the therapist's thumb rests on the left side of the spinous process of the upper thoracic level and the metatarsophalangeal junction of the index finger of the left hand rests against the lateral aspect of the cervical column at the appropriated level. The therapist right hand was placed against the right side of the patient's head with the elbow resting on the clavicle and the finger-tips on the patient head .the forearms of the therapist was positioned parallel to each other .the patients were asked to retract slightly and then to lateral flex his head to end range. At the end of the movement the therapist applied downward pressure on the side of the patients head with the right hand and a counter pressure with the thumb on the spinous process. The position held for one or two seconds then the patient returns the head to the upright position the movement is then repeated five to six time.

Statistical analysis: The data are represented as the mean and standard deviation (SD) values .the data were explored for normality by checking data distribution, calculation the mean, median and standard deviation (SD)values and finally by using shapiro-wilk test .SPSS (inc.Chicago,IL) version 20 was used for the statistical analysis. T-test for comparison of ROM between both groups, Paired t test for comparison between pre and post treatment mean values of ROM in each group , Mann–Whitney U test for comparison of VAS and NDI between both groups ,Wilcox on Signed Ranks Test for comparison of pre and post treatment median values of VAS and NDI in each group .The level of significance for all statistical tests was set at $p \leq 0.05$.

RESULTS

Table 1: Descriptive statistics and t-test for comparing the mean age, weight, height, and BMI, of both groups (study and control).

	Study group	Control group	MD	t- value	p- value	Sig
	$\bar{x} \pm SD$	$\bar{x} \pm SD$				
Age (years)	40.4 ± 7.58	40.13 ± 8.23	0.27	0.09	0.92	NS
Weight (kg)	69.73 ± 7.13	71.6 ± 6.63	-1.87	-0.74	0.46	NS
Height (cm)	168.2 ± 6.37	170.06 ± 5.22	-1.86	-0.87	0.38	NS
BMI (kg/m ²)	24.78 ± 3.35	24.8 ± 2.58	-0.02	-0.01	0.98	NS

\bar{x} : Mean SD: Standard deviation MD: Mean difference t value: Unpaired t value p value: Probability value
NS: Not significant

Table 2: Pre and post treatment mean values of flexion, extension, lateral right flexion, lateral left flexion of both groups (intervention and control group).

Variables	intervention group					control group				
	pre	post	Mean difference	Sig	% of improvement	Pre	post	Mean difference	Sig	% of improvement
Flexion	5.22± 0.95	6.66 ± 0.81	-1.44	s	27.58	5.16 ± 0.72	5.63 ± 0.81	-0.47	s	9.1
Extension	4.3± 0.99	6.69 ± 0.45	-2.38	s	55.22	4.43 ± 1.59	4.43 ± 1.59	-0.42	s	10.47
Lateral Rt flexion	2.9 ± 0.34	4.03 ± 0.58	-1.13	s	38.96	3± 0.67	3.4 ± 0.91	-0.4	s	13.33
Lateral Lt flexion	3.02 ± 0.47	4 ± 0.37	-0.98	s	32.45	2.93 ± 0.59	3.6 ± 0.5	-0.67	s	22.86

Table 3: Pre and post treatment mean values of right and left rotation of both groups (intervention and control group).

Variable	intervention group					control group				
	Pre	post	Mean difference	Sig	%of improvement	Pre	post	Mean difference	Sig	%of improvement
Right rotation	5.4± 1.45	7.3 ± 0.59	-1.9	s	35.18	5.2 ± 0.86	5.86 ± 0.83	-0.66	s	12.69
Left rotation	5.4± 1.12	7.1 ± 0.68	-1.7	s	31.48	5.3 ± 0.48	6.06 ± 0.59	-0.7	s	13.05

The raw data of cervical ROM, pain intensity level, and neck functional activity level were statistically treated to determine the mean and standard deviation of the measuring variable, for the two groups before and after treatment. Then t-test was applied to examine the significance of treatment procedures conducted in each group. no significance difference was observed when comparing the pre-treatment mean values of the two groups. Significant improvement was observed in the measuring variable of control group and the study group, when comparing their pre and post treatment mean values. Table 1 demonstrate the physical characteristics of patients in both groups.

DISCUSSION

The purpose of this study was to investigate the effect of McKenzie protocol on cervical ROM, pain, and function in patients with non specific neck pain.

According to the result of the current study, McKenzie protocol of treatment had significant improvement in cervical ROM, pain intensity level and neck functional activity level when compared to the control group which had only traditional treatment.

While there is no similar studies concerning the area of cervical region and investigate the efficacy of McKenzie protocol on non specific neck pain the significant improvement may be attributed to:

Mechanical change might be credited to; treatment of versatile shortening in the cervical spine which created constrained painful development and diminished spinal mobility requires the utilization of Movements that support the procedure of remodeling. Just with the utilization of such loading strategies as McKenzie method, normal tissue function was re-set up [25].

The McKenzie method additionally gave off an impression of being the more great technique for treatment in light of the fact that McKenzie method was basically performed by patients produced power utilizing repeated movement to end of range of motion in a direction that assuages the patient’s side effects [26].

The physical performances improved in McKenzie group as a result of marked modifications in the cognitive and sensory perception of pain. McKenzie directional preference exercises improved self-confidence and in turn, reduced anxiety created by anticipation of pain and related fear beliefs towards a given physical performance.

Introduction to painful movement through repeated McKenzie exercises might be considered as a type of pain encounter. So plainly certain exercises that were viewed as hard to perform enhanced essentially and remained fairly steady [9].

Concerning on the cervical region there were

studies which demonstrate the viability of McKenzie protocol on cervical radiculopathy and show concurrence with this study finding. For instance Abdulwahab et al. (2000) reported that performing of repetitive neck retractions in patients with cervical radiculopathy advanced cervical root decompression, diminished radiculopathy pain and advanced the resting neck stance by lower cervical area augmentation [11].

There is no similar studies investigated the efficacy of McKenzie protocol on non-specific neck pain while there is other studies sharing the same principal and pertaining to another area (lumber) region.

For instance Garcia et al., (2013) show concurrence with this study as he reported that McKenzie method was more viable than Back School method (stretching of the lower back, quadriceps, and hamstring muscles, stomach strong quality) for enhancing the practical capacity level in patients with endless low back agony at the age somewhere around 18 and 80 years [27].

Likewise, When McKenzie's method was contrasted with passive therapies, stabilization exercises and strengthening exercises, results were found that McKenzie is the favored in lessening pain and enhancing functional activity level in the treatment of chronic low back pain [28].

On accordance with these study discoveries Murtezani et al. (2015) reported that McKenzie treatment indicates significant change in spinal movement, functional activity level and pain lessening among patients with chronic LBP when contrasted and electro agents [14].

Long et al (2004) show concurrence with this study as he reported that with 2 weeks follow up the McKenzie method show significant change when contrasted and general mobilization and stretching exercises in treatment of non-specific low back pain patients [29]. What's more, with 6 months follow-up the McKenzie technique demonstrate the more noteworthy advantage when contrasted with lumbar strengthening exercises in treatment of non-specific low back pain patients [30].

On concurrence with the idea of this study

McKenzie protocol of treatment had significant change in lumber disc prolapsed patients. The impact of McKenzie approach on pain and practical Disability in patient with lumber disc prolapse demonstrated huge decrease in pain and utilitarian incapacity post treatment. The lumbar ROM had huge change in flexion, extension, influenced lateral flexion, unaffected lateral flexion, influenced rotation and unaffected rotation post treatment [10].

McKenzie's methods included not only exercises as a type of intervention, as well as access to information of wellbeing conduct that impact learning and how to manage the unfavorable wellbeing conditions, for example, neck pain, and how to adapt to its side effects [30].

CONCLUSION

From the analysis of results of the present study it was concluded that. The overall management strategy demonstrates greater benefit for the patients with non-specific neck pain incorporating the McKenzie protocol additionally to traditional treatment than traditional treatment alone in increasing cervical ROM, pain relief and functional activities improvement after treatment.

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