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Efficacy of Dynamic Muscular Stabilization Techniques (DMST) on Non-Specific Low Back Pain, Disability and Quality of Life in Elderly Individual

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ABSTRACT:

Low back pain is major health and socioeconomic problem in modern society, the prevalence has been found to range between6.2% to 92.To find the effectiveness of dynamic mucular stabilization exercise for pain, disability and quality of life in elderly individuals. A group of 62 subjects were selected for the study and randomly divided into two equal groups of 31 each. All subjects were selected between the age group of 65-75 years. The group A subjects were asked to perform dynamic muscular stabilization exercise program me along with conventional exercise program me and group B performed conventional exercise program me. Pain, disability and QOL were compared and assessed Pre and Post intervention using NPRS, ODI and WHOQOL BREEF respectively. The statistical analysis was done between groups as well as within groups. The result of within groups shows significant difference between pre and post score for all outcome measures. The result of between groups also shows significant difference for the post test score of group A and group B. The dynamic muscular stabilization exercise showed statistically significant improvement in reducing back pain, disability and improves quality of life in elderly individuals, when compared to the conventional exercise programme among elderly subjects having low back pain.

KEYWORDS: Dynamic muscular stabilization techniques, Low Back Pain, elderly individuals, Disability Quality of life.

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INTRODUCTION:

India as the second most populous country in the world has 76.6 million people at or over the age of 60, constituting above 7.7% of total population. The problems faced by this segment of the population are numerous owing to the social and cultural changes that are taking place within the Indian society[1].

Back pain ranks as the second most common reason for physician visits and the third most common reason for surgery for elderlies. As many as 90% of elderly people in the India will have back pain [2]. Back pain is usually a benign, self-limiting disorder resulting from strains and over-use, but can include more serious problems such as degenerative changes[3]

Many elderlies are currently disabled due to chronic back pain (CBP); approximately 80% of people diagnosed with back pain remain symptomatic after one year [4]. This leads to health care provider's view that caring for elderlies with low back pain and to improve their QOL[5].

The World Health Organization (WHO) has defined QOL as a person's perception of his or her life position in the value system and the culture in which they live, and in addition, it is related to one's life goals, expectations, standards and concerns. QOL of older adults has become an important issue, because of physiological changes resulting from the ageing of the population[6].

An increasingly common approach used within the physical therapy management of LBP has been low load, high repetition training of the abdominal and trunk muscles[7] developed partially in response to evidence indicating specific neuromuscular alterations in the control and activation of the back and abdominal muscles in the presence of back pain[8] .

In such cases Dynamic muscular stablization techniques were found to be effective[8]. Specific trunk stabilizing exercises with co-contraction of deep abdominal and lumbar multifidus muscles enhance the spinal segmental support and control[9]. Though stabilization techniques were found suitable for the low back pain in adults, but the effectiveness of this form of treatment among elderlies of LBP is not reported till date[11] . However, till date less prospective studies are found making the comparison between the effectiveness of DMST and Conventional Training program for low back pain , disability and QOL in the elderly population .The purpose of the study was to design DMST for elderly individual that can be implemented for low back pain .

So specific aim and objective of our study was to compare the effect of conventional therapy and DMST with conventional therapy on low back pain , disability and QOL in elderly individual. So the alternate hypothesis of our study was set as DMST may show effectiveness on low back pain , disability and QOL in elderly individuals.

METHODOLOGY:

Study design: Pre and post test experimental study
Population: Elderly individual of 65 to 75 years of age
Sampling technique: Purposive sampling
Study duration: 12 months

Sample size: 62

For the study the sample size was calculated in G Power 3.1.9.2 with effect size 0.80 and α =0.05. Sample size calculated was 52, with a drop out chances of 20% the total sample size was 62 samples and 31 subjects in each group.

Study Setting: Senior citizen organization committee, Surat

Volunteers of 65 -75 years of age ,Willingness to do physical exercise , Able to do daily activities by themselves and walk at least 30 feet with or without an assistive device, having low back pain history since 6 months and having medium to moderate score (0 to 40%)on ODI were included in the study. Patients having radiating pain to the legs, history of fracture, abdominal surgery in last 6 months, or constitutional symptoms like fever, malaise, etc indicating infection, any inflammatory conditions of spine, osteoporosis, bony abnormalities, scoliotic or kyphotic spine ,pregnancy, sensory impairments, vascular causes of radiating pain or neoplasms were excluded.

PROCEDURE:

Ethical clearance was taken from institutional ethical committee. The confidentiality of the patients were maintained. Subjects was preliminary screened based on the inclusion and exclusion criteria .They were allocated in to two groups using Quasi randomization .

Group A: DMST with Conventional exercises training

Group B: Conventional exercise training

On the first day of first week, pre test measurements of pain was taken on NPRS , disability was measured on ODI and QOL was measured on WHOQOL BREF . In group A Conventional training programme, was done for 25 mins and DMST component was done for 15 minutes . A rest period of 5 minutes was given between both components and lasted for about 45 minutes. All subjects undergone this treatment session for 5 days per week for total 5 weeks**.**

GROUP A: DMST with Conventional therapy

DMST COMPONENT:

1st week

(a) Abdominal bracing Patient lying in crook lying position and is instructed to draw the navel up and in towards the spine or feeling the muscle tighten at the waist. From the beginning patient learns to breathe normally while activating or holding the muscular contraction.

(b) Abdominal Hollowing: Patient is in supine hook lying position and is instructed to perform abdominal hollowing by making the lower abdomen cave in with both arms elevated. (Fig. 1 (a) & 1 (b))

2nd week

2. Training of trunk stabilization under static conditions of increased load:

Maintaining the above position and concentration pattern the patient is instructed to hold the position while load is added via the weight of lower limbs being moved passively into loaded positions like:-

(a) One leg with knee extended. (Images 2 (a))
(b) Both legs with knees flexed. (Images 2 (b))

3rd week

3. Development of trunk stabilization during slow controlled movement of the lumbar spine:

Once the stability is trained through static procedure, the movement of the trunk with appropriate activation of the supporting muscles. The first step is to produce and explore lumbo-pelvic movements and learn abdominal hollowing or bracing in quadruped position and second step is controlled loading by

(a) Movement of trunk with one lower limb elevation.(Images 3 (a))
(b) Movement of trunk with elevation of one upper limb with the diagonal lower limb.
(Images 3 (b))

4th and 5th week :

- Repeat all lumbar stabilization exercises with high speed and skilled movement **.**


Figure 1(a)&(b)Illustrates abdominal bracing and hollowing


Figure2(a)&(b) Illustrates training of trunk stabilization


Figure 3(a)&(b)Illustrates development of trunk stabilization

GROUP B : CONVENTIONAL TRAINING PROGRAMME

Conventional physiotherapy includes trunk stretching exercises ie., unilateral knee to chest in supine lying and lateral trunk bending exercises in standing . It was continued for 10 mins with 10 sec hold in each repititions. Immediately hot pack was placed for 15 mins .The procedure was continued for 5 weeks for both groups. Data of all subjects was taken on first and last day .

STATISTICAL ANALYSIS

Analysis was done using SPSS-16. Descriptive analysis was used to calculate mean and standard deviation . Paired t test was used for inter group analysis. Independent t test was used for intra group analysis for all the three dependent variables. The level of significance was set at 95%.

RESULTS:

Pre and post intervention within group was done using paired t test which shows highly significant difference in both groups in all the outcome scores. Comparison between groups was done using independent t test which shows significant differences in both groups for all variables .

INTER GROUP ANALYSES FOR ALL THE OUTCOME MEASURES:

Table 1(a) illustrates pre and post comparison of pain in group 1

NPRS Group-1

	Mean	N	Std. Deviation	Mean difference	P-value
Pre	5.2258	31	.80456	1.258	P<0.0001
Post	3.9677	31	.65746		

Table 1(b)illustrates pre and post comparison of pain in group 2

NPRS Group-2

		Mean	N	Std. Deviation	Mean difference	P-value
Pair 1	Pre	5.0968	31	.83086	0.87097	P<0.0001
	Post	4.2258	31	.80456		

Table 2 (a) illustrates pre and post comparison of ODI Score In group 1

ODI Group -1

		Mean	N	Std. Deviation	Mean difference	P-value
Pair 1	Pre	26.4194	31	4.55539	3.5483	P<0.0001
	Post	22.8710	31	4.91082		

Table 2(b) illustrates pre and post comparison of ODI score in group 2

ODI Group -2

		Mean	N	Std. Deviation	Mean difference	P-value
Pair 1	pre	24.6290	31	4.36075	2.7580	P<0.0001
	post	21.8710	31	4.19318		

Table 3 (a) illustrates pre and post comparison of WHOQOL BREF SCORE in group 1

WHOQOL BREEF :GROUP 1

		Mean	N	Std. Deviation	Mean difference	P-value
Pair 1	pre	77.9516	31	11.34452	7.0580	P<0.0001
	post	70.8935	31	11.57177		

Table 3(b) illustrates pre and post comparison of WHOQOL BREF SCORE

in group 2

WHOQOL BREEF :GROUP 2

		Mean	N	Std. Deviation	Mean difference	P-value
Pair 1	pre	78.9323	31	9.13297	3.676	P<0.001
	post	75.2565	31	12.03508		

TABLE 4(1)shows intragroup comparison analyses for NPRS Score

NPRS SCORE	GROUP	N	Mean	Std. Deviation	Mean difference	P- value
	Group 1	31	3.9677	.65746	-0.25806	0.172
	Group 2	31	4.2258	.80456		

TABLE 4(2) shows intragroup comparison analyses for ODI Score

ODI SCORE		N	Mean	Std. Deviation	Mean difference	P- value
	Group 1	31	22.8710	4.91082	1.000	0.392
	Group 2	31	21.8710	4.19318		

TABLE 4(3s) shows intragroup comparison analyses for WHQOL Score

WHOQOL BREEF SCORE		N	Mean	Std. Deviation	Mean difference	P- value
	Group 1	31	70.8935	11.57177	-4.3629	0.151

WHOQOL BREEF SCORE		N	Mean	Std. Deviation	Mean difference	P- value
	Group 1	31	70.8935	11.57177	-4.3629	0.151
	Group 2	31	75.2565	12.03508		

DISCUSSION :

This study showed that DMST using patients improved significantly on all outcome measures in elderly individuals . In the conventional group, although improvements were seen on all subscales, they were less than those in DMST group .

A recent study on the topic has found that the health related quality of life of patients with low back pain depends on functional status and psychological factors more than simple physical impairment.

Thus, in this respect it seems that DMST is a very relevant regimen to improve both patients' physical and psychological status. DMST was more effective as it emphasizes specifically on muscle strengthening and spinal stabilization component which once gained leads to relief from physical and thus mental symptoms .In DMST the more improvement may be due to restoration of muscle strength in combination with balance, posture and coordination due to presence of pain and functional disability[12].

The study has certain limitations too. As it was done only on small sample size, the results could not be generalized to the entire elderly population. More over it was not possible to blind participants to the intervention, so there may be chance of bias . There was also practical difficulty while delivering the interventions to elderly individual which may not be feasible in a non-research set- up. The total study duration was short. Follow up of the interventions was not taken.

CONCLUSION

Data analysis shows that Dynamic Muscular Stabilization Technique (DMST) is more effective in improving QOL in Low Back Pain patients, than conventional exercises**.** Conventional training exercises had also shown improvement for low back pain ,disability and QOL in elderly individuals. DMST showed significant difference for all the outcome measures .

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