A Comparative Study of McKenzie Back Program and Conventional Physiotherapy in Relieving Backache due to Lumbar Disc Prolapse.

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ABSTRACT

Objective: To compare McKenzie back program and conventional physiotherapy in reducing pain and functional disability in patients with backache due to lumbar disc prolapse.

Methods: This randomized controlled trial was conducted in Orthopedic Department Pir Abdul Qadir Jeelani Institute of Medical Sciences, Gambat Khairpur Sindh. The duration of this study extended from 2nd March 2019 to 2nd February 2021. All patients with backache due to lumbar disc prolapse fulfilling the inclusion criteria were randomly divided into two equal groups: Group A (McKenzie back program) and group B (Conventional physiotherapy). Pre-intervention pain assessment was done with Visual Analogue Scale (VAS), spine mobility with Fingertip-to-Floor distance (FTF) measured in centimeter and disability with Oswestry Disability Index (ODI) questionnaire in both groups and compared with post-intervention values at 4th, 6th and 8th week. *P* value was calculated with Chi-square test. *P* value< 0.05 was considered significant.

Results: The total number of patients analyzed were 120.Both group A and B had 60 patients each. The mean age of group A patients was 46.4±5.3 years and group B 45.8±6.4 years. Male patients were 36 (60%) and female 24 (40%) in group A. In group B male patients were 33 (55%) and female 27 (45%). Statistically significant improvement was noted in FTF in group A at 2nd and 4th week (P < 0.05) post-intervention. At 8th week post-intervention VAS, FTF and ODI significantly improved in group A (P< 0.05) than in group B.

Conclusion: McKenzie back program is more effective in reducing pain, increasing lumbar spine mobility and decreasing disability than conventional physiotherapy and stretching exercises in patients with backache due to lumbar disc prolapse.

Keywords: Backache, Disc, Lumbar, McKenzie, Prolapse, Oswestry Disability Index, Visual analogue scale.

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INTRODUCTION

Low backache due to lumbar disc prolapse usually involves pain in the lower lumbar spine with or without radiation to one or both lower limbs.[1] It can be acute or chronic.[2] It is the most common cause of functional disability and absence from job globally.[3] Long term functional disability can cause impaired cardiovascular function.[4] Prolapsed or herniated disc is the commonest cause of low back pain.[5,6] The global prevalence of low back pain is 49 to 80%. [7] Localize disruption and displacement of disc material ahead of the margins of intervertebral disc space causes pain with or without radiculopathy.[8,9] Prolapsed disc is a multidimensional problem depending upon various factors such as physical activity, life style, psycho-social factors and the severity of displaced disc dictates treatment.[10]

To relieve symptoms of prolapsed lumber disc various non pharmacological modalities like yoga, flexibility and stretching exercises, walking, cycling, and McKenzie back program(Mechanical Diagnosis and Therapy-MDT) are used with variable success.[11] McKenzie back program is the most commonly recommended exercise program for patients with lumbar disc prolapse.[11,12] This method of physical therapy was introduced by Robin McKenize who was a physical therapist in New Zealand. This program is a combination of repetitive manipulative therapy by the clinician and home based exercises by the patient.[13] Many studies have confirmed the reliability of McKenzie back program and reported that McKenzie program is cost effective and reduces pain and disability in short term and long term in patients with lumbar disc prolapse.[13, 14]

McKenzie proposed a classification of low backache based upon the type of response of the patient to pain during assessment. He observed that the most important response of patients with low backache is the centralization response.[15] In "Centralization" referred pain of the spine is reduced and shift to central position when some specifically directed movements are performed(Directional Preferences).The McKenzie back program should not be equated for flexion or extension exercises but rather directional preferences should dictates the type of exercise.[16]

The objective of our study was to compare McKenzie back program and conventional physiotherapy in reducing pain and functional disability in patients with backache due to lumbar disc prolapse. Our hypothesis was that McKenzie back program is better than conventional stretching exercises in relieving pain, improving spine mobility and reducing disability in patients with low backache due to lumbar disc prolapse.

METHODS

We conducted this randomized controlled trial in Orthopedic Department Pir Abdul Qadir Jeelani Institute of Medical Sciences, Gambat Khairpur Sindh. The duration of this study was extended from 2nd March 2019 to 2nd February 2021. The criteria for inclusion in our research work was adult patients of either gender and age with low backache due to prolapse of single or multiple discs diagnosed by MRI (Magnetic Resonance Imaging) and with positive Lasegue sign or cross Lasegue sign and presented within 6 weeks of symptoms to our OPD. The criteria for exclusion was patients with previous epidural injection, history of surgery for lumber disc prolapse, spine fracture, limb fractures, endocrine diseases and neurological diseases. The study was approved by the Ethical Committee of our hospital and informed written consent was obtained from all the patients. In the included patients complete history, physical examination and relevant investigations(MRI) were examined. The patients were randomly divided into two equal groups through computer generated random numbers. Group A patients were designated for McKenzie back program and group B for Conventional stretching physiotherapy under the supervision of two qualified physiotherapist one for each group. No analgesics other than paracetamol was allowed to patients during the study period. Baseline pain assessment was done with Visual Analogue Scale (VAS), spine mobility with Fingertip-to-Floor distance (FTF) was measured in centimeter and disability was determined with Oswestry Disability Index (ODI) questionnaire in both groups. The assessment was recorded in a proforma by two senior Orthopaedic surgeons who were not part of the study.

In group A all the patients were assessed, classified, treated and prevention advised as per McKenzie back program(Mechanical Diagnosis and Therapy-MDT).The physical therapist demonstrated a series of progressive positions to each patient as advised by McKenzie.[15] These positions were lying prone on stomach, lying prone resting on elbows, prone push ups, standing extension, standing flexion, lying flexion and sitting flexion. These exercises were done twice in 6 to 10 repetitions four times a day. The aim was to" Centralize" the pain from extremities to spine and then treat the source of pain rather than the symptoms. No other modalities like ultrasound, heat or cold was used in McKenzie back program.

The conventional physiotherapy consisted of back extension exercises, pelvic tilt, pelvic bridging, lion exercise, static abdominal exercises, cat-camel stretch, curl-up exercise and knee to chest exercise.[17] Each exercise was repeated 10 times with the frequency of four times per day.

Patients in both groups were assessed for functional disability using Oswestry Disability Index(ODI)[18] questionnaire and graded as Minimal disability(score 0-20%),Moderate disability(score 21-40%),Sever Disability(score 41-60%), Crippled(score 61-80%) and Bed bound(score 81-100%)

In both groups fingertip-to-floor(FTF) distance was measured in centimeter as a vertical distance between index finger tip and floor with patient trunk in forward flexion.[19] Patients who reached the distance of less than 10 cm were classified as normal spine

mobility or flexibility while those with more than 10 cm were classified as reduced mobility.

Pre-intervention pain on walking measured with Visual Analogue Scale (VAS), Fingertip-to-Floor distance(FTF) and Oswestry Disability Index(ODI) in both groups were compared with post-intervention values at 4th, 6th and 8th week. The data was analyzed with SPSS version 22. Descriptive statistics were used for calculating mean and standard deviation for quantitative variables and frequency and percentage for qualitative variables. Inferential statistics were used for comparison of both groups and calculation of *P* value with Chi-square test. (P value 0.05 was considered significant). Data was presented in table and flow chart where appropriate. We conducted and reported our study as per CONSORT guidelines for randomized controlled trials.[20]

RESULTS

We assessed 155 patients of low backache due to prolapsed lumbar disc for eligibility in our trial. After fulfilling the inclusion criteria, compliance with study protocols and complete follow up 120 patients were included in the final analysis (Fig. I) Group A (McKenzie back program) had 60 patients and group B(Conventional physiotherapy) had 60 patients.The mean age of group A patients was 46.4±5.3 years and group B 45.8±6.4 years. Male patients were 36 (60%) and female 24 (40%) in group A. In group B male patients were 33 (55%) and female 27 (45%).Majority of patients in both groups(group A (n=48,80%) and group B(n=52,86.6%) had single level disc prolapse at L5 S1 level. The baseline VAS,FTF and ODI in both groups were identical with P value > 0.05.(Table I). As per ODI score group A patients had minimal disability at 8th week while group B had moderate disability. FTF interpretation at 8th week revealed normal spine mobility in group A and reduced spine mobility in group B. Statistically significant improvement was noted in FTF in group A at 2nd and 4th week post-intervention.(*P* <0.05).At 8th week post-intervention VAS,FTF and ODI significantly improved in group A(*P* < 0.05).No significant difference was noted in outcome when data was stratified for gender, age, site of prolapse and pain radiation.(P > 0.05)

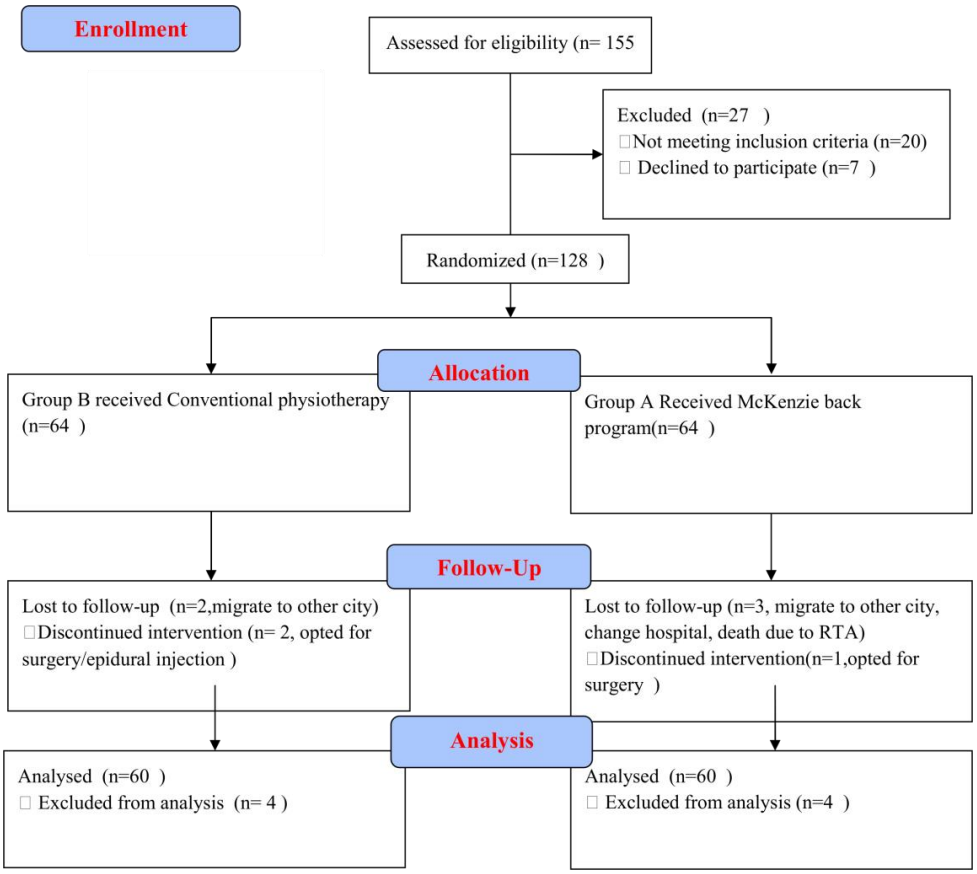

Fig. I: CONSORT flow diagram for assessing eligibility and analysis of our study participants.

Table I: Comparison of pre-intervention and post-intervention VAS, FTF and ODI in group A (McKenzie back program) and group B (Conventional physiotherapy)

Outcome	Pre-intervention			Post-intervention 2nd Week			Post-intervention 4th week			Post-intervention 8th Week		
	Group A	Group B	*P*	Group A	Group B	*P*	Group A	Group B	*P*	Group A	Group B	*P*
Visual Analogue Scale (VAS)	5.9±3.1	6.1±1	0.07	3.5±1.2	4.9±1.5	0.5	2.80±0.6	4.60±1.6	0.7	1.80±0.9	3.9±1.7	0.04
Fingertip-to-Floor distance (FTF)	37.8±8.4	37.3±6.9	0.08	20.5±6.2	32.1±8.4	0.04	14.2±4.6	31.5±5.9	0.01	8.2±5.9	28.5±9.4	0.001
Oswestry Disability Index (ODI)	37.5±10.2	37.2±8.5	0.06	30.2±9.5	32.8±10.12	0.6	24.4±6.5	31.9±5.5	0.06	18.5±8.0	28.1±11.5	0.02

DISCUSSION

In our study patients with McKenzie exercise group were pain free and had minimal disability and normal spine mobility at 8th week while patients with conventional physiotherapy had moderate pain, moderate disability and reduced spine mobility at 8th week. In a randomized trial Hossain[21] treated 31 patients of lumbar disc prolapse with Maitland mobilization and stretching exercises and 30 with McKenzie back program for four weeks. They found Mackenzie superior than conventional physiotherapy in reducing pain and disability and the effects lasted for 6 months. Machado[16] in a systematic review demonstrated that McKenzie back program was more effective than conventional physical therapy in relieving backache. However the use of McKenzie in chronic backache could not verified.

In a systematic review by Clare[22] it was found that patients with McKenzie back program resulted in significant reduction of disability and pain than other standard treatments. However this superiority of McKenzie was of short term and they advocated further studies to determine the effectiveness of this technique in relieving backache symptoms. Namnaqani[14] was of the opinion that McKenzie method relieved pain in short term and disability in long term in patients with chronic low backache when compared with manual therapy. Lam[23] had shown that McKenzie method was not superior to other rehabilitation methods in relieving pain and disability of acute low backache patients while in chronic low backache McKenzie was superior. Busanich24 compared McKenzie method with strength training, educational booklet, massage, spinal mobilization, back care advice and NSAIDs and found that McKenzie method was better than other methods in relieving pain and decreasing disability in short term (< 3 months). Petersen[25] had found that McKenzie method was more successful in patients with backache of more than 6 weeks old when combined with information and advice than McKenzie alone. Contrary to the above studies Karlsson[26] and colleagues could not found any evidence of superiority of McKenzie method over other exercises in relieving acute low backache in their systematic review.

The sample size of our study was small. Our follow up period was short. Further studies are recommended to confirm our results.

CONCLUSION

McKenzie back program is more effective in reducing pain, increasing lumbar spine mobility and decreasing disability than conventional physiotherapy and stretching exercises in patients with backache due to lumbar disc prolapse.

Conflict of Interest: None
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