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Research Article

Efficacy of Flexion and Extension Exercises in Management of Low Back Pain

Abdul malek Ahmed Al maliki[1]

Director of Physical Therapy and Rehabilitation Service at Prince Mansour Military Hospital, Taif, KSA

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Abstract: Objectives: Low back pain is a condition that continues to place a great deal of stress on the healthcare system. Globally one out of three people suffer from low back pain. Lifetime prevalence of low back pain is estimated to be at least 60-70%. Low back pain (LBP) is a major health problem because of its high prevalence worldwide. **Design:** Interventional longitudinal studies. **Methodology:** A total of 50 patients were included as per pre define inclusion and exclusion criteria and assigned into two groups each having 25 patients. Group A was given Flexion exercises, Back Flexion exercises while Group B was given Extension exercises, additionally both the group given NSAID and deep heat (Short Wave Diathermy). The patient's outcome measures were assessed by visual analog scale. **Results:** Follow up showed that all 25 patients who did extension exercise could walk independently. Both treatments are found to be statistically significant in improving walking score of patients (p-value= 0.000). In group comparison, extension exercise is statistically better in improving patient's walking ability than flexion exercise (p-value= 0.025). **Conclusion:** Although both treatment were equally effective but back extension exercises was seemed to be more effective in the management of LBP as compare to Lumbar flexion exercises.
Keywords: Back pain, Exercise, SWD.

Introduction

Low-back pain (LBP) continues to be one of the main problems for which sufferers seek treatment in primary care[1] and is considered worldwide to be associated with enormous costs, both in terms of direct health-care costs and losses in relation to work and disability.[2] While the natural history of low-back pain is often considered to be good, many patients get recurrent episodes with consequences for well-being as well as for quality of life.[3] For most patients in primary care LBP is considered to run a recurrent course, not acute or chronic in the usual sense of these terms. Pain is often expressed by the individual as the main reason for seeking care, [4]even if the goal of the treatment is more often to reduce functional limitations caused by the pain. To date there is no "cure" for LBP, although an active physical approach has been advocated.[5]

According to recent guidelines, an active approach, resuming normal activities and restoring function is the primary goal in LBP rehabilitation.[6] However, there is no clear consensus as to what type of exercise or active program should be prescribed.[7] Recommendations for self-care in LBP and teaching the patient life-long habits might significantly control future episodes.[8]

Recently, there has been focus on exercises aiming to optimize the control of segmental motion and stabilization of the lumbar spine. These exercises differs from general exercises and endurance training by being graded, more body-specific and requiring from the patient more attention and precision of movement control.[9]

Such a graded intervention may also affect psychosocial factors, importantly related to the persistency and recurrence of disability and pain.

In the interaction between the physiotherapist and the patient with LBP, clinical judgment and expertise should be used *together* with current evidence, hereby choosing a treatment strategy that provides good function in the musculoskeletal system. Such a treatment strategy might prevent future recurrences of disabling pain and thus maintain the patient's current work status, considered important for health.[10]

Lumbars' flexion exercises have been a cornerstone in the management of LBP patient for many years.[11] However, these exercises were somewhat discredited when Nachemson showed that they significantly raised the intra-discal pressure. [12] Instead, isometric exercises were advocated. Later, extension exercises gained popularity; especially after McKenzie showed that they had a beneficial effect on recurrent low back pain.[13, 14] However, other studies have not found any effect of isometric or dynamic back exercises compared with placebo ultrasound or short-wave diathermy.[15, 16]Dr. Paul Lumbars first published his exercise program in 1937 for patients with chronic low back pain in response to his clinical observation that the majority of patients who experienced low back pain had degenerative vertebrae secondary to degenerative disk disease. These exercises were developed for men under 50 and women under 40 years of age who had exaggerated lumbar lordosis, whose x-ray films showed decreased disc space between lumbar spine segments (L1-S1), and whose symptoms were chronic but low grade. The goals of performing these exercises were to reduce pain and provide lower trunk stability by actively developing the "abdominal, gluteus maximus, and hamstring muscles as well as passively stretching the hip flexors and lower back (sacrospinalis) muscles. Lumbars said: "The exercises outlined will accomplish a proper balance between the flexor and the extensor groups of postural muscles". Mackenzie's also believes that the disc is the primary cause of back pain but that flexion, not extension, is the culprit. According to Mackenzie prolonged sitting in flexed positions and lack of extension are the two factors predisposing to back pain. The accumulation of flexion forces causes early dysfunction in the posterior elements of disc. [14, 15]

There exists a difference in school of thoughts. The aim of the present work is to investigate the effectiveness of lumber flexion exercises and extension exercise to relieve low back pain.

Methodology

The study was designed as Interventional longitudinal studies and has two groups Group A was given Flexion exercises, Back Flexion exercises were performed in 10 sessions for 15 minutes on alternative days. Group B was given Extension exercises and these exercises were performed in 10 sessions for 15 minutes on alternative days. Both groups are also given NSAID and Deep heat (Short Wave Diathermy). A total of 50 patients were included as per inclusion criteria. Patient was assignment into two groups A and B with 25 patients in each group. Baseline assessment using Visual analog Scale (VAS). The sample size was calculated by taking 20% prevalence, 90% confidence level and 9% precession. Each patient was called on weekly basis for follow up and revaluation for 8weeks. A well-designed and detailed Questionnaire/Pro-forma was used to collect the relevant information from the patients.

Inclusion Criteria

- ✓ All the patients having age group between 20 to 50 years.
- ✓ Patients dealing with heavy mechanical work.
- ✓ Patients having chronic low backache i.e. more than 1 month.
- ✓ Patients suffering from chronic low backache not responding.
- ✓ To Pharmaceutical therapy for pain management.

Exclusion Criteria

- ✓ Patients having age group less than 20 and more than 50 years.

- ✓ Those with suffering from traumatic low backache.
- ✓ Patients dealing with light mechanical work.

Data Analysis

All data was entered into SPSS 12 and was analyzed by using same software. All qualitative data was presented in form of frequency and percentages. The quantitative data was presented in form of mean ± S.D along its range (min-max).

The Chi-Square test was used to see the significance between qualitative data. Repeated measurement ANOVA was used to compare the quantitative data between 2 and more than 2 groups. A p-value less than 0.05 were considered as significant.

Results

The total subjects enrolled in this study were 50 equally divided in both categories (25 each). Group-A comprised of those 25 randomly selected patients who underwent Flexion exercise treatment for 8 consecutive weeks. Rest of the 50% (25) patients constituted those, to whom extension exercise treatment was given. The mean age of both groups was almost same i.e. 35 years. Individually mean age was observed to be 34.88±7.97 for Group A, whereas 35.16±9.14 for Group B. The mean age, overall was 35 years i.e. 35.02±8.49. The youngest subject in Group A was found to be of 20 years of age, while in that of Group B, the minimum age was observed to be 15 years. The maximum age in Group A as well as in Group B was found to be 48 years. There was no statistical difference found in mean ages of both groups i.e. p-value= 0.909 (Table 1).

Among 25 subjects who were given flexion exercise treatment, 14 (56%) were males while 11 (44%) were females. Whereas among those patients who were in Group-B (undergoing extension exercise), a majority 17 (68%) were males while only (8) 32% were females. However overall, 50% male and 50% female patients participated in this study with random distribution in each study group. Among 50 patients as a whole, 39 (78%) were married. In Group-A, 19 (76%) while in Group-B, 20(80%) were married. Only 6 (24%) patients in Group-A, whereas 5 (20%) in Group-B were unmarried. Overall, 11 (22%) patients were unmarried.

When patients were assessed with regard to their BMI (Body Mass Index), it was found that most of them (28) 56% were having normal weight. While the second most recurring category was of overweight subjects overall comprising of (14) 28% patients. Being specific, it was seen that in Group-A, 16 (68%) patients were normal weighted, 9 (36%) were overweight whereas only 4 (16%) were obese. Not a single subject was underweight in Group-A as compared to only 2 (8%) in Group-B. The leading BMI category in Group-B was also patients with normal weight (12) 48% followed by overweight group having (9) 36%. The rest of 8% (2) patients lied in obese category. Overall, 12% patients were obese in total 50 participants. Out of total 50 patients, 48 (96%) did not have any previous family history of lower back pain while only 2 (4%) had a family history of this disease.

The evaluation for working hours of the participants was also made in order to find difference among both groups in this context, if any. It was seen that mean working hours taken as a whole, were 7.88±1.76 hours for all study participants. In Group-A, average working hours were 7.40±1.47 while in Group-B this average was slightly greater with a figure of 8.36±1.93. The minimum working hours as a whole and for each study group too, were 6 hours a day. Moreover, the maximum working hours were also same for the both study groups as to be 12 hours a day. Both study groups were statistically same with reference to working hours (p-value= 0.055) (Table 2).

The average loss of working hours, after diagnosis of Lower Back Pain (LBP), for the entire collection of 50 subjects was found to be of 7.88±1.77 hours. For Group-A, the mean working time loss was of 7.40±1.47 hours per day, whereas for Group-B, the average loss for working hours was of 8.36±1.93 hours per day. The minimum loss of working hours for each study group was 6 hours per day while maximum loss was also same in both groups with 12 hours per day. No significant difference in loss of working hours, among both study groups was observed after diagnosis of this problem (p-value= 0.055) (Table 3).

The level of pain at the beginning of study was recorded to be above 6 in all patients enrolled. This score is considered to be even beyond "Dreadful" level according to visual analogue scale of pain. The level of pain started to decrease gradually and at 1st follow up after 2 weeks of exercise it reached below 5 score of pain scale, which shows the pain intensity to be quite uncomfortable for patients. The pain level of patients in Group-B, doing extension exercise, was slightly lower than that of Group-A i.e. doing flexion exercise. At the time of 2nd Follow up, the pain level of both study groups decreased to somewhat same level of less than 3 score. This score demonstrates pain to be moderately annoying but not uncomfortable. At the final follow up, after 6 weeks of exercise, the pain intensity in both study groups declined closer to 1 score of pain scale. This level is considered to be immense success in reducing pain effectively as it lessens to its minimum levels. Hence, both exercises contributed almost equally to reduce the pain levels from above 6 to 1 score of pain scale.

Before starting the treatment, 30 (60%) of total patients could sit with difficulty, 17 (34%) could sit with assistance while 3 (6%) could not sit at all. Among patients of Group-A, 13 (53%) could sit with difficulty, 11 (44%) could sit with some assistance merely while one patient could not sit at all. After doing exercise for two weeks, 5 (20%) patients in Group-A were independently able to perform sitting, 19 (76%) could sit with some assistance while in place of 13, only 1 (4%) patient was able to sit with difficulty. In the follow up conducted in 4th week, 72% of the patients in Group-A could perform sitting independently while only 7 (28%) patients could perform this activity with some assistance. While at the final follow up of the study in 6th week of performing flexion exercise, all 25 patients were successfully able to perform sitting activity themselves, without any difficulty or assistance. In Group-B, initially no participant could sit independently, 17 (68%) could sit with difficulty, 6 (24%) could sit with some assistance while 2 (8%) patients could not sit at all. First follow up, done in 2nd week of conducting extension exercise, showed that 2 (8%) patients became able to sit without any help, 21 (84%) patients could do it with assistance while only 2 (8%) patients could do it with very much difficulty, who were previously 17 (68%). The 2nd follow up done in 4th week showed that 80% (20) of patients were capable enough to sit independently whereas only 5 (20%) needed little assistance to do so. The final follow up in 6th week showed that all 25 (100%) patients in Group-B were able to sit by themselves. The exercise treatment in general, showed a statistically significant effectiveness in curing the sitting problem in patients with Lower Back Pain (LBP) (p-value= 0.000). Both type of exercises were proved to be equally effectual to reduce the pain and help the patients to perform proper sitting (p-value= 0.068) (Table 4).

Before starting either treatment, 3 (6%) patients could not stand at all, while majority of them (32; 64%) found it very difficult to stand. Rest of 15 (30%) patients needed some assistance to do the task. In Group-A, before treatment 1 (4%) patient could not stand in any way, 13 (52%) patients could do it with difficulty, whereas 11 (44%) patients needed support to do the task. First follow up showed that after 2 weeks 19 (76%) subjects in Group-A could stand with difficulty and 4 (16%) could stand with some aid. Condition of one more patient worsened and thus 2 (8%) were completely unable to stand in Group-B. The scenario improved in 4th week as 8 (32%) patients could stand with difficulty while rest of 17 (68%) patients in Group-A were able to stand with little support. In final follow up, all 25 patients in Group-A could stand, but with some assistance. In Group-B, 2 (8%) patients were not able to perform standing activity at all before starting the treatment. whilst 19 (76%) patients could do it with difficulty and only 4 (16%) patients could do it readily with assistance. Doing extension exercise for two weeks, resulted 80% (20) patients to stand with difficulty, 2 (8%) patients were not able to stand where 3 (12%) were able to walk with some ease if provided assistance. In 4th week 7 (28%) patients could stand with difficulty and rest of 18 (72%) could do it with assistance. Final follow up improved the condition in that all 25 patients could stand with little assistance. Overall, these treatments are statistically significant in improving the standing score of the patients (p-value= 0.000). Whilst individually, extension exercise is statistically better than flexion exercise in improving the standing score of patients (p-value= 0.047) (Table 5).

Before starting the treatments, among all 50 patients, 7 (14%) patients were not able to walk, 28 (56%) could walk with difficulty while 15 (30%) were able to walk with assistance. In Group-A, before starting flexion exercise 3 (12%) patients were unable to walk, 11 (44%) could walk with difficulty while the same number (11; 44%) could walk with assistance. In 2nd week of exercise, 3 (12%) patients became able to walk independently, 17 (68%) needed assistance to walk and 5 (20%) found it difficult to walk. Continuing follow up in 4th week showed that 16 (64%) patients could walk independently and only 9 (patients) needed aid to walk. Final follow up in sixth week resulted in 23 (92%) patients enabled to walk independently and only two (8%) acquiring support in walking. In Group-B, initially, 4 (16%) patients could not walk at all, 17 (68%) walked with difficulty and 4 (16%) needed assistance to walk. After two weeks of extension exercise, 4 (16%) could walk with difficulty, 20 (80%) could easily walk with little support and 1 (4%) patient was completely able to walk on his own. 2nd follow up in 4th week reported 17 (68%) patients to walk independently while only 8 (32%) patients needed assistance to walk. Final follow up showed that all 25 patients who did extension exercise could walk independently. Both treatments are found to be statistically significant in improving walking score of patients (p-value= 0.000). In group comparison, extension exercise is statistically better in improving patient's walking ability than flexion exercise (p-value= 0.025) (Table 6).

At the outset of study, 7 (14%) patients among 50 could not offer prayer, 26 (52%) could pray with difficulty and 5 (20%) patients could offer prayer with assistance. In Group-A, 3 (12%) patients could perform prayer with difficulty, 16 (64%) could perform it with assistance and rest of 6 (24%) could perform prayer independently. In 4th week of flexion exercise the condition of patients improved further and 17 (68%) patients were able to pray by themselves and 8 (32%) subjects could perform prayer with assistance. 24 (96%) patients were able to perform prayer themselves while only 1 (4%) needed support to do so. In Group-B, initially, 4 (16%) patients could not offer prayer at all, 16 (64%) could do it with difficulty and 5 (20%) needed assistance to do it. First follow up showed that after two weeks of extension exercise 5 (20%) subjects could offer prayer with difficulty, 16 (64%) needed assistance and 4 (16%) subjects could do it independently. After 4 weeks, 17 (68%) subjects were able to offer prayer all by themselves and only 8 (32%) patients needed assistance to do so. Final follow up resulted in all 25 patients doing extension exercise able enough to offer prayers independently. Generally the two treatments were statistically effective in improving physical condition to enhance praying status of patients (p-value=0.000). Specifically, extension exercise (Treatment-B) is significantly better than flexion exercise (Treatment-A) in order to improve praying score of patients (p-value= 0.046) (Table 7).

Before the start of treatment, 31 (62%) of total patients could sit with difficulty, 16 (32%) could sit with assistance while 3 (6%) could not sit at all. Amongst the patients of Group-A, 13 (53%) could sit with difficulty, 11 (44%) could sit with assistance only while one patient could not sit at all. After doing exercise for two weeks, 20 (80%) patients in Group-A could sit with some assistance while only in place of 13, only 1 (4%) patient was able to sit with difficulty and 4 (16%) could do it all by themselves. In the follow up conducted in 4th week, 72% of the patients in Group-A could perform sitting independently while only 7 (28%) patients could perform this activity with some assistance. Whereas at the conclusive follow up of the study in 6th week of performing flexion exercise, all 25 patients were successfully able to perform sitting activity themselves, without any difficulty. In Group-B, at the start, no subject could sit independently, 18 (72%) could --- with difficulty, 5 (20%) could sit with some assistance while 2 (8%) patients could not -- at all. In first follow up done in 2nd week of conducting extension exercise, it was seen that 4 (16%) patients became able to sit without any assistance, 19 (76%) patients could do it with aid while only 1 (4%) patients could do it with very difficulty, who were previously 18 (72%). In 4th week 19 (76%) of patients were able enough to sit independently while only 5 (20%) needed little assistance to do so. The final follow up in 6th week showed that 24 (96%) patients in Group-B were able to sit by themselves leaving one requiring assistance for this. The exercise treatment overall, showed a statistically significant efficacy in reducing the Lower Back Pain (LBP) problem for sitting (p-value= 0.000). Both types of exercises were found to be equally effectual to reduce the pain and help the patients to perform sitting activities (p-value= 0.111) (Table 8).

Initially 3 (6%) subjects could not sit to stand at all, 29 (58%) could do the mentioned task with difficulty while 18 (36%) needed assistance to do it. The "sit to stand" activity could not be done at all by one patient before starting flexion exercise i.e. Group-A. It was difficult to do for 11 (52%) patients while 13 (44%) needed assistance for it. First follow up in 2nd week reported that 4 (16%) subjects were able to do this activity of "sit to stand" independently, whilst 20 (80%) subjects needed assistance to do it and only one subject found it difficult to do. In 4th week, 19 (76%) patients could do this activity alone and 6 (24%) patients were able to do this task with some assistance. Final follow up showed that after six weeks 24 (96%) patients could do it themselves and only one needed little aid. In Group-B, initially 2 (8%) students could not do 'sit to stand" activity, 18 (72%) felt it difficult to do and 5 (20%) acquired assistance for this. In 2nd week of extension exercise, 1 (4%) patient found it difficult to do, 20 (80%) could do it with some assistance and 3 (12%) could do this activity independently. In 4th week, 1 (4%) still felt difficult to do it, 4 (16%) needed assistance while 20 (80%) patients among Group-B were able to do it independently. At the conclusive follow up, 24 (96%) of patients in Group-B could do "sit to stand" activity themselves without any help and only one required little support for doing it. Generally, these exercises were significantly progressive to make patients do "sit to stand" activity in enhanced manner (p-value=0.000). Exclusively group wise comparison shows that extension exercise is more efficient for sit to stand activity than flexion exercise (p-value= 0.021) (Table 9). Prior to start the treatments, 8 (16%) patients were not able to do stand to walk activity, 22 (44%) could do it with difficulty while 20 (40%) needed assistance for it. In Group-A, before starting flexion exercise 3 (12%) patients were unable to perform the task, 8 (32%) could do it with difficulty while the rest (14; 56%) could do it with assistance. In 2nd week of exercise, 5 (20%) patients became able to do "sit to walk" commotion independently, 17 (68%) needed assistance to walk and 3 (12%) found it difficult to do. Ongoing follow up in 4th week demonstrated that 18 (72%) patients could perform this independently and only 7 (28%) patients needed aid to do so. Last follow up in sixth week showed 24 (96%) patients could do it independently and only one (4%) needed support to do it. In Group-B, at beginning, 5 (20%) patients could not do "stand to walk" activity at all, 14 (56%) did it with difficulty and 6 (24%) needed assistance for it. After two weeks of extension exercise, 5 (20%) could do it with difficulty, 19 (76%) could easily do this task with little support and 1 (4%) patient was completely able to stand to walk on his own. 2nd follow up in 4th week reported 18 (72%) patients did it independently while only 7 (28%) patients needed assistance for it. Final follow reported that 24 (96%) patients who did extension exercise could do the task independently leaving one behind who needed support for it. Both exercises are found to be statistically significant in improving stand to walk activity in patients (p-value= 0.000). In group comparison, extension exercise is statistically better in improving patient's stand to walk ability than flexion exercise (p-value= 0.017) (Table 10).

Table 1. Descriptive Statistics of Age (years)

	Age of the Patients (years)		
	Group A	**Group B**	**Total**
N	25	25	50
Mean	34.88	35.16	35.02
Std. Deviation	7.97	9.14	8.49
Std. Error	1.59	1.829	1.20
Minimum	20.00	15.00	15.00
Maximum	48.00	48.00	48.00
p-value	0.909		

Table 2. Descriptive Statistics of Working Hour

	Working hours		
	Group A	Group B	Total
N	25	25	50
Mean	7.40	8.36	7.88
Std. Deviation	1.47	1.93	1.76
Std. Error	0.29	0.38	0.25
Minimum	6.00	6.00	6.00
Maximum	12.00	12.00	12.00
p-value	0.055		

Table 3. Descriptive Statistics Working Hour loss after diagnosis

	Working Hours loss after diagnosis LBP		
	Group A	Group B	Total
N	25	25	50
Mean	7.40	8.36	7.88
Std. Deviation	1.47	1.93	1.77
Std. Error	0.29	0.38	0.25
Minimum	6.00	6.00	6.00
Maximum	12.00	12.00	12.00
p-value	0.055		

Table 4. Comparison of Sitting Score at different Follow-Ups in Both Study Groups

Sitting score (0-3)		Study Group: Group A (n=25)	Study Group: Group B (n=25)	Total (n=50)
Before treatment	Unable to perform	1 (4%)	2 (8%)	3 (6%)
	Perform with difficulty	13 (52%)	17 (68%)	30 (60%)
	Perform with Assistance	11 (44%)	6 (24%)	17 (34%)
2nd week	Perform with difficulty	1 (4%)	2 (8%)	3 (6%)
	Perform with Assistance	19 (76%)	21 (84%)	40 (80%)
	Independently Perform	5 (20%)	2 (8%)	7 (14%)
4th week	Perform with Assistance	7 (28%)	5 (20%)	12 (24%)
	Independently Perform	18 (72%)	20 (80%)	38 (76%)
6th week	Independently Perform	25 (100%)	25 (100%)	50 (100%)
Overall p-value = 0.000 (Significant increment in sitting score). Within groups comparison p-value = 0.068 (both treatments are equally effective)				

Table 5. Comparison of Standing Score at different Follow-Ups in Both Study Groups

Standing score (0-3)		Study Group: Group A (n=25)	Study Group: Group B (n=25)	Total (n=50)
Before treatment	Unable to perform	1 (4%)	2 (8%)	3 (6%)
	Perform with difficulty	13 (52%)	19 (76%)	32 (64%)
	Perform with Assistance	11 (44%)	4 (16%)	15 (30%)
2nd week	Unable to perform	2 (8%)	2 (8%)	4 (8%)
	Perform with difficulty	19 (76%)	20 (80%)	39 (78%)
	Perform with Assistance	4 (16%)	3 (12%)	7 (14%)
4th week	Perform with difficulty	8 (32%)	7 (28%)	15 (30%)
	Perform with Assistance	17 (68%)	18 (72%)	35 (70%)
6th week	Perform with Assistance	25 (100%)	25 (100%)	50 (100%)
Overall p-value = 0.000 (Significant increment in standing score). Within groups comparison p-value = 0.047 (Treatment B is better as compare to treatment A)				

Table 6. Comparison of Walking Score at different Follow-Ups in Both Study Groups

Walking score (0-3)		Study Group: Group A (n=25)	Study Group: Group B (n=25)	Total (n=50)
Before treatment	Unable to perform	3 (12%)	4 (16%)	7 (14%)
	Perform with difficulty	11(44%)	17 (68%)	28 (56%)
	Perform with Assistance	11 (44%)	4 (16%)	15 (30%)
2nd week	Perform with difficulty	5 (20%)	4 (16%)	9 (18%)
	Perform with Assistance	17 (68%)	20 (80%)	37 (74%)
	Independently Perform	3 (12%)	1 (4%)	4 (8%)
4th week	Perform with Assistance	9 (36%)	8 (32%)	17 (34%)
	Independently Perform	16 (64%)	17 (68%)	33 (66%)
6th week	Perform with Assistance	2 (8%)	0 (0%)	2 (4%)
	Independently Perform	23 (92%)	25 (100%)	48 (96%)
Overall p-value = 0.000 (Significant increment in walking score). Within groups comparison p-value = 0.025 (Treatment B is better as compare to Treatment A)				

Table 7. Comparison of Praying Score at different Follow-Ups in Both Study Groups

Praying score (0-3)		Study Group: Group A (n=25)	Study Group: Group B (n=25)	Total (n=50)
Before treatment	Unable to perform	3 (12%)	4 (16%)	7 (14%)
	Perform with difficulty	10 (40%)	16 (64%)	26 (52%)
	Perform with Assistance	12 (48%)	5 (20%)	17 (34%)
2nd week	Perform with difficulty	3 (12%)	5 (20%)	8 (16%)
	Perform with Assistance	16 (64%)	16 (64%)	32 (64%)
	Independently Perform	6 (24%)	4 (16%)	10 (20%)
4th week	Perform with Assistance	8 (32%)	8 (32%)	16 (32%)
	Independently Perform	17 (68%)	17 (68%)	34 (68%)
6th week	Perform with Assistance	1 (4%)	0 (0%)	1 (2%)
	Independently Perform	24 (96%)	25 (100%)	49 (98%)
Overall p-value = 0.000 (Significant increment in praying score). Within groups comparison p-value = 0.046 (Treatment B is better as compare to Treatment A)				

Table 8. Comparison of Laying Score at different Follow-Ups in Both Study Groups

Laying score (0-3)		Study Group: Group A (n=25)	Study Group: Group B (n=25)	Total (n=50)
Before treatment	Unable to perform	1 (4%)	2 (8%)	3 (6%)
	Perform with difficulty	13 (52%)	18 (72%)	31 (62%)
	Perform with Assistance	11 (44%)	5 (20%)	16 (32%)
2nd week	Perform with difficulty	1 (4%)	1(4%)	2 (4%)
	Perform with Assistance	20 (80%)	19 (76%)	39 (78%)
	Independently performed	4 (16%)	4 (16%)	8 (16%)
4th week	Perform with Assistance	7 (28%)	5 (20%)	12 (24%)
	Independently performed	18 (72%)	19 (76%)	37 (74%)
6th week	Independently Perform	25 (100%)	25 (100%)	50 (100%)
Overall p-value = 0.000 (Significant increment in laying score). Within groups comparison p-value = 0.111 (Both treatment are equally effective)				

Table 9. Comparison of Sit to stand Score at different Follow-Ups in Both Study Groups

Sit to stand score (0-3)		Study Group: Group A (n=25)	Study Group: Group B (n=25)	Total (n=50)
Before treatment	Unable to perform	1 (4%)	2 (8%)	3 (6%)
	Perform with difficulty	11 (44%)	18 (72%)	29 (58%)
	Perform with Assistance	13 (52%)	5 (20%)	18 (36%)
2nd week	Perform with difficulty	1 (4%)	1(4%)	2 (4%)
	Perform with Assistance	20 (80%)	20 (80%)	40 (80%)
	Independently performed	4 (16%)	3 (12%)	7 (14%)
4th week	Perform with difficulty	0 (0%)	1 (4%)	1 (2%)
	Perform with Assistance	6 (24%)	4 (16%)	10 (20%)
	Independently performed	19 (76%)	20 (80%)	39 (78%)
6th week	Perform with Assistance	1 (4%)	1 (4%)	2 (4%)
	Independently Perform	25 (100%)	25 (100%)	50 (100%)
Overall p-value = 0.000 (Significant increment in sit to stand score). Within groups comparison p-value = 0.021 (Treatment B is better as compare to Treatment A)				

Table 10. Comparison of Stand to Walk Score at different Follow-Ups in Both Study Groups

Stand to Walk score (0-3)		Study Group: Group A (n=25)	Study Group: Group B (n=25)	Total (n=50)
Before treatment	Unable to perform	3 (12%)	5 (20%)	8 (16%)
	Perform with difficulty	8 (32%)	14 (56%)	22 (44%)
	Perform with Assistance	14 (56%)	6 (24%)	20 (40%)
2nd week	Perform with difficulty	3 (12%)	5(20%)	8 (16%)
	Perform with Assistance	17 (68%)	19 (76%)	36 (72%)
	Independently performed	5 (20%)	1 (4%)	6 (12%)
4th week	Perform with Assistance	7 (28%)	7 (28%)	14 (28%)
	Independently performed	18 (72%)	18 (72%)	36 (72%)
6th week	Perform with Assistance	1 (4%)	1 (4%)	2 (4%)
	Independently Perform	24 (96%)	24 (96%)	48 (96%)
Overall p-value = 0.000 (Significant increment in stand to walk score).Within groups comparison p-value = 0.021 (Treatment B is better as compare to Treatment A)				

Discussion

Low back pain is very common among adults and is often caused by overuse and muscle strain or injury. Acute low back pain is certainly one of the most common reasons for consulting a primary care physician in the industrialized countries. The direct cost of medical care and the indirect costs to society of absenteeism from work due to backache are huge. Appropriate treatment, if availed in time, can help patients suffering from LBP, stay as active as possible, and it can help them understand that some continued or repeated back pain is not surprising or dangerous[16]. One of the most painful and disabling back problems is sciatica. This is a pinched nerve in one's lower back that causes buttock, thigh, lower leg and even foot numbness, pain, and sometimes even weakness. Usually, the leg pain is worse than the back pain. Patient's spine may feel locked so you cannot straighten up fully and simple activities like bending, getting up from a chair or out of bed or even walking can be impaired[17]. Low back pain and spinal disorders are the predominant reason for disability in the workforce. It is estimated that chronic low back pain accounts for nearly 80% of the annual cost of low back disorders even though this classification represents only 10% of all spinal disorders[18]. Lack of lumbar strength has been associated with the development of low back pain and dysfunction. Highland et al. reported increased lumbar strength and decreased low back pain following eight weeks of isolated lumbar extension exercise in subjects with chronic low back pain[19].

Risch et al. examined the effect of 10 weeks of lumbar extension exercise on patients with chronic low back pain and reported decreased low back pain, physical and psychosocial dysfunction. The results also showed a significant improvement in lumbar extension strength[20]. Nelson et al. examined the effect of isolated lumbar extension exercise on 895 chronic low back pain patients who had failed an average of six other treatment modalities prior to enrolling in the study. The patients performed lumbar extension and torso rotation exercise for 10 weeks. The results showed that most of the patients increased low back strength, decreased low back and leg pain, and improved their ability to perform daily activities. Seventy-two percent were able to return to work. Some evidence is also available suggesting that improving low back strength is effective in reducing the incidence of low back dysfunction in the work place[21].

Mooney et al. reported that the prevalence of low back injuries was reduced at a coal mine following a program of 20 weeks of lumbar extension exercise[22]. Physicians commonly prescribe bed rest for acute low back pain, although only a few controlled trials have assessed its effectiveness. Among military recruits with acute low back pain, bed rest led to more rapid recovery than remaining on foot. Though this practice had been widely recommended in past but most of the studies did not produce enough evidence to demonstrate its effectiveness to cure Chronic Lower Back Pain (CLBP). In contrast, specific movement practices and exercise therapy has proved to be more effective to reduce LBP and continue healthy life style[23]. Specific exercises are a powerful tool for acute pain relief. These exercises are specific for sciatica or discogenic low back pain, and can help almost any acute lower back pain. Different exercises have many purposes, including increasing strength and flexibility and improving posture, but the focus should be on exercises that are safe and useful for acute pain relief. Many of the patients may be afraid to exercise when they are in pain, or they may have hurt themselves while exercising. Pain-relief exercise has to be very specific and be done properly; it also has to be the proper exercise[24].

Over the last few decades, exercise has been promoted with increasing enthusiasm for the treatment of back pain. This has prompted a systematic review of the evidence concerning the effectiveness of exercise, with the conclusion that exercise may be helpful for patients with chronic low back pain in terms of return to normal activities and work[25]. Several epidemiological studies have examined the prevalence of back pain related to fitness.

Suni et al. evaluated 498 adults and found that low levels of back fitness were associated with back dysfunction and pain, and high fitness related to positive back health. A 25-year prospective observational study of physical exercise among 640 school children found those who exercised at least 3 hours per week had significantly lower lifetime risk for back pain[26]. Croft et al. prospectively followed 2,715 adults with no low back pain and found that greater leisure time physical activity does not increase the 1-year risk of low back pain and that poor physical health increases the risk of new low back pain episodes[27].

Videman et al. found that low back pain occurred less commonly and that sciatica occurred with equal frequency among former elite athletes compared with controls. For sciatic symptoms, one study comparing over 2,000 workers without sciatic pain to 327 workers with sciatic pain for 1 year found that exercise and most sports activities had no effect on sciatic pain. In summary, these studies suggest that for the general population, exercise does not increase the risk of back pain or sciatica and may actually have a slight protective effect against back pain[28,29].

Our study is based on same theology that exercises have definitely no negative and most likely a protective impact for reducing Lower Back Pain. Thus, a comparative study on 50 patients suffering from this disease was conducted for evaluation of overall as well as individual efficacy of exercise treatments. Two most widely used given therapies are Lumbars' Flexion Exercises and McKenzie's Extension Protocol, shortly discussed as Flexion and Extension exercise simply. Extension exercises stretch tissues along the front of the spine, strengthen the back muscles, and may reduce pain caused by a herniated disc. These are generally a good choice for people whose back pain is eased by standing and walking. Flexion exercises are those which strengthen stomach and other muscles, and stretch the muscles and ligaments in the back. These are generally a good choice for people whose back pain is eased by sitting down. In general, extension exercises may cause further damage in people with spondylolysis, spondylolisthesis and facet joint dysfunction, not to mention the possibility of crushing the interspinous ligament. While flexion exercises should be avoided in persons with acute disc herniation [30,31]. Both these exercises have been proven useful with some individual priorities and lag backs. The comparative usefulness of these exercises was tested by making two categories of 50 subjects who were randomly assigned to each group constituting 50% subjects each i.e. 25 practicing Flexion Exercises whereas 25 doing Extension Exercises.

The mean age of both groups was almost same i.e. 35 years. Individually mean age was observed to be 34.88±7.97 for Group A and 35.16±9.14 for Group B. The youngest subject in Group A was found to be of 20 years of age, while in that of Group B, the minimum age was observed to be 15 years. The maximum age in Group A as well as in Group B was found to be 48 years. These results match with a number of international studies indicating that working adults of middle age are highly prone to LBP due to prolonged working hours and increased physical activities. These adults were checked for any improvement in reducing LBP and getting back to work obtaining highly favorable results. Obesity and sedentary life style that involve long sitting hours contribute significantly to occurrence of many chronic diseases including LBP. A study in US shows that increasing physical activity and participation in an aerobic endurance exercise program have been shown to decrease the risk of chronic diseases (e.g., coronary heart disease (CHD), stroke, osteoporosis, diabetes, obesity/weight control), which have become the leading causes of morbidity and mortality in the United States[32]. Thus the Body Mass Index of patients in both study groups was also done in our study. It was found that overall most of them (28; 56%) were having normal weight. While the second most recurring category was of overweight subjects overall comprising of 14 (28%) patients. In Group-A, 16 (68%) patients were normal weighted, 9 (36%) were overweight whereas only 4 (16%) were obese. Not a single subject was underweight in Group-A as compared to only 2 (8%) in Group-B. The leading BMI category in Group-B was also patients with normal weight (12; 48%) followed by overweight group having 9 (36%). The rest of 8% (2) patients lied in obese category. Overall, 12% patients were obese in total 50 participants. Family history contributes to a number of leading chronic diseases and foremost diseases prevailing frequently have significant relation with family history of respective diseases. As, Lower Back Pain is only second to Chronic Heart Disease, the significance of family history in this regard cannot be ignored. Many studies have shown it to be somewhat relevant to disease occurrence[33]. Contrary to these facts in our study out of total 50 patients, 48 (96%) did not have any previous family history of lower back pain while only 2 (4%) had a family history of this disease.

Working hours have an obvious and direct influence in inducing the disease of LBP. Most of the studies show a direct proportion of work load with intensity of LBP. Increased working hours and low job support and/or satisfaction levels are found to be having evident risk of LBP in various studies. A similar systematic review looking at whether psychosocial factors at work and in private life are risk factors for the occurrence of low back pain found strong evidence for low social support in the workplace and low job satisfaction as risk factors for low back pain. In our study it was seen that as a whole, the working hours were 7.88±1.76 hours for all study participants. In Group-A, average working hours were 7.40±1.47, while in Group-B this average was slightly greater with a figure of 8.36±1.93. The minimum working hours as a whole and for each study group too, were 6 hours a day. Moreover, the maximum working hours were also same for the both study groups as to be 12 hours a day. The severity of disease made a great loss on working hours by decreasing work ability of the patients. The average loss of working hours, after diagnosis of Lower Back Pain (LBP), for the entire collection of 50 subjects was found to be of 7.88±1.77 hours. For Group-A, the mean working time loss was of 7.40±1.47 hours per day, whereas for Group-B, the average loss for working hours was of 8.36±1.93 hours per day. The minimum loss of working hours for each study group was 6 hours per day while maximum loss was also same in both groups with 12 hours per day. After starting the both exercises, comparison of both types of exercises was done. Various scales and dimensions to measure these comparisons were chosen including pain intensity, sitting score, standing score, walking score, sit to stand and stand to walk score. Uphill now different studies have shown variant results regarding both types of exercises highlighting strong and weak points of each. Adams, et al. found that "extension can reduce stresses in the posterior annulus of those discs that are most protected by the neural arch. This protection may be related to disc height loss, to the morphology of the neural arch, or both. In one of the more carefully conducted randomized trials of nonsurgical back pain treatments undertaken in recent years, researchers conclude that McKenzie back exercises provide slightly greater pain relief than a placebo-- the control group received a patient education booklet on low back pain.

Similarly, Nachemson arguably discredited Lumbars's flexion back exercises when his study showed that these exercises may significantly increase the pressure within intervertebral discs of the lumbar spine[12]. Though in our study, most of the dimensions proved both the Flexion as well as Extension exercises to be equally effective, yet in some, extension exercise was better in relieving than flexion exercises. Extension exercise proved to be much better than Flexion exercise in praying, walking, sit to stand as well as in stand to walk score. Though both types have their specific usage and may be appropriate in specific circumstances, though having identical conditions for all patients extension exercise may help better than flexion.

The fundamental standard for which so ever pain-relief exercise is implemented lies in the belief that the patient should feel better after he or she has finished the exercise. It may be somewhat difficult or slightly painful to do the exercise, but that is tolerable if the patient feels better afterward. An appropriate exercise may not merely reduce the pain and get the patient back to normal life but it also helps address the depression and helplessness that accompanies severe pain.

Conclusion

Although both treatment were equally effective but back extension exercises was seemed to be more effective in the management of LBP as compare to Lumbar flexion exercises.

Conflicts of interest: Author declares no conflict of interest.

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