

Research Article

Effects of Progressive Physiotherapy Along with or Without Active Bed Rest at Hospital for the Management of Chronic Low Back Pain (LBP) Patients in Bangladesh

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Abstract

Background: Low Back Pain (LBP) is a significant health condition globally suffered by the middle and older aged population due to its impact on work disability, absenteeism and costs. Physiotherapy with active rest and therapeutic intervention, including mobilization, manipulation, exercise therapy and electrotherapy, is the choice of treatment as conservative management, whereas surgery is required in case of advanced neurological involvement. Specific level-induced spinal mobilization has a greater impact on correcting the faulty biomechanics of the spinal column if considered active rest at an early stage, whereas generalized spinal physiotherapy without rest is also effective for managing mechanical spinal pain.

Objective: To determine the effects of physiotherapy with or without active rest for chronic low back pain.

Method: Experimental research design with simple random sampling was used in this study to find out the effects of Progressive Physiotherapy along with or without active rest at the hospital for the management of patients with chronic Low Back Pain (LBP) in Bangladesh of 20-55 years of aged peoples with pre and posttest basis.

Results: The study showed that physiotherapy with or without active rest effectively reduces pain and back disability for low back pain patients, whereas physiotherapy with active rest is more effective than physiotherapy without active rest for back pain patients. Comparison of within-group and between-group results showed that the $P < 0.05$. The comorbidities were about 40% diabetic, 33% spinal deformity and 6.67% spinal and other surgical conditions which influence LBP. The experimental group reduced 64% pain and the control group reduced 24% pain.

Conclusion and Recommendations: Physiotherapy with active rest is more effective than physiotherapy without active rest for LBP patients, whereas both treatment groups are significantly effective individually. RCT study can proceed for further evaluation.

Keywords: Progressive Physiotherapy; Active Rest at the Hospital; Chronic Low Back Pain

Introduction

One study found that about 40% of 20 and 40-year-old global people have low back pain at some point in their lives, whereas pain lasts at least one day and limiting their activities is very common. Besides this, 80% of global low back pain patients live in the developed world [1]. Another study found that at least 9-12% of 40-80 years of aged developing country people have been suffering from low back pain, where 23.2% report recurrence in a month. It is not clear what the male-female ratio of low back pain [2]. One study found that female is more susceptible to suffering low back pain for the usual posture, fitness, osteoporosis, menstruation and pregnancy-related issues. Current adolescent smokers are more susceptible to lower back pain than former smokers, whereas former smokers are more likely to have low back pain than those who have never smoked [3]. Chronic high levels of lower back pain from specific disc problems could be diagnosed by Lumbar provocative discography, whereas some other procedures like nerve blocks, facet joint injections, transforaminal epidural injections and sacroiliac injections as diagnostic tests may be used for finding the source of pain [4]. Physical examinations to evaluate the scoliosis, muscle weakness or wasting and impaired reflexes may be minimal. The medical history and manual physical examination mostly discover the problems, whereas the physicians usually may not advise imaging tests such as X-rays, CT scans and MRIs. however, the patients want to do such tests, which may not be necessary until or unless red flags are present [5]. Physiotherapist-guided therapeutic exercises are effective in decreasing pain and improving function for low back pain who are suffering chronically; they help to reduce the rate of recurrence for as long as six months or more after finishing the pain management, which would help for long-term function [2]. So, the study's objective was to find out the effects of progressive physiotherapy and active bed rest (3 Weeks) at the hospital for chronic low back pain.

Methods

This was a quasi-experimental research design of 30 (15 in the experimental group: progressive physiotherapy with active bed rest at the hospital for three weeks and 15 in the control group: treatment at outdoor basis therapy) respondents' group with chronic nonspecific chronic Low Back Pain. The study area was at the Physiotherapy Center, BRB Hospitals Ltd. and SP Hospitals Ltd.'s physiotherapy Unit. The study period was from July 2022 to December 2022. Simple Random Sampling was used to select the sample for both groups. Respondents of age between 20-55 years of both sexes with a minimum pain score of 3 on a numeric pain rating scale in the 0-10 range at the time of assessment with chronic mechanical LBP who are seeking physiotherapy and lasts for more than 12 weeks, including in the sample and others excluded. This study used a formal data collection form including demographic information, a numeric pain rating scale, Roland-Morris Disability Questionnaire and other information. Lumbar flexion mobilization and flexion rotation mobilization, specific belt mobilization or lumbar extension mobilization, vertebral mobilization at L1-L5 level, myofascial release at lumbar spinal muscles, lumbar muscle stretching and strengthening exercises and moist heat were used with active rest and outdoor control group for 3 weeks daily one session.

Results

The age group of the participants was the experimental group, 44.2±9.18 and the control group, 43.8±8.87 years.

The baseline pain score in the experimental group NPRS was 6.64±1.19 and the control group was 7.4±0.90. There were about 33% of LBP patients developed spinal deformities like scoliosis, hyperlordosis and kyphosis (Fig. 1,2 and Table 1).

Variables	Control Group	Experimental Group
	Control Group (C)	Experimental Group (E)
Age (Years)	43.8 (8.87)	44.2 (9.18)
Gender		
Male	14(93.33%)	12 (80%)
Female	01(7.7%)	03 (20%)
Duration of Symptoms (Month)	11.06 (8.28)	13.80 (11.95)
Weight(kg)	71.53 (7.83)	75.46 (10.16)

Height (meter)	1.64 (0.10)	1.65 (0.04)
BMI (kg/m ²)	26.66 (1.26)	27.53 (1.47)
Living Area		
Urban	14 (93.33%)	15 (100%)
Rural	01 (6.67%)	00 (00%)
Educational Level		
Post Graduate Level	07 (46.67%)	08 (53.33%)
Graduate Level	07(46.67%)	06 (40%)
H.S.C Level	01(6.67%)	01 (6.67%)
Diabetes	11 (73.33%)	06 (40%)
Surgery	00 (00%)	01(6.67%)
Spinal Deformity	05 (33.33%)	05 (33.33%)
Pain intensity (NPRS, 0-10)	7.4 (0.90)	6.64 (1.19)
Disability (RMDQ, 0-24)	16.20 (3.82)	14.06 (5.39)

Table 1: Baseline demographic characteristics of the participants.

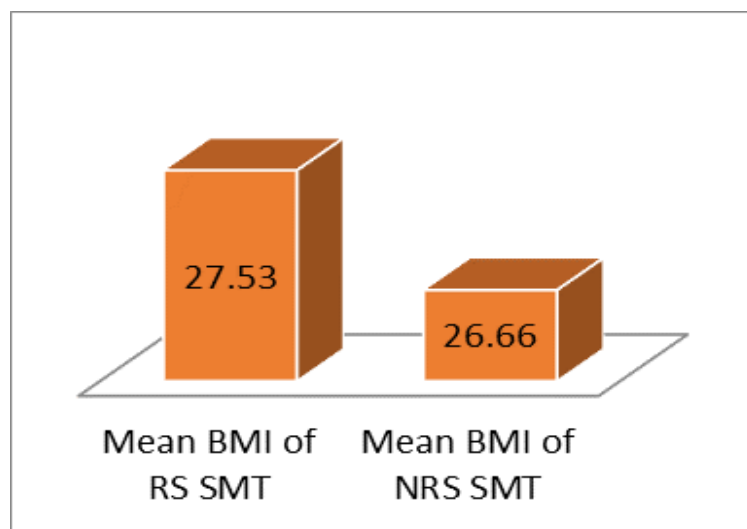


Figure 1: Mean BMI (kg/m²) of both group participants.

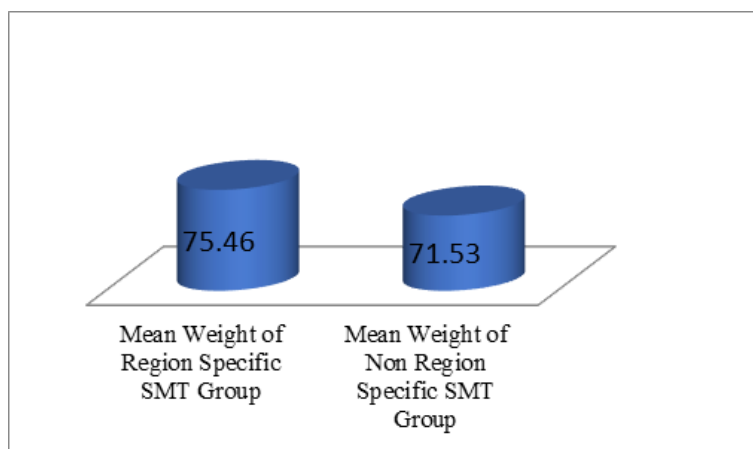


Figure 2: Mean weight (kg) of both group participants.

There are some medical and surgical conditions which influence lower back pain and that can continue chronically if the management is not provided properly. Regarding this study, there were about 40% diabetic, 33.33% spinal deformity and 6.67%

spinal and other surgical condition participants, which may influence initiating low back pain and confounding the intervention results. However, about 73.33% of diabetic and 33.33% of spinal deformities were in the experimental group, whereas no surgical patients were present in this group (Table 2).

Conditions	Experimental Group	Control Group
Diabetes	06 (40%)	11 (73.33%)
Surgery	01(6.67%)	00 (00%)
Spinal Deformity	05 (33.33%)	05 (33.33%)
N.B: Categorical variables are expressed as numbers (%)		

Table 2: Medical and surgical conditions of the participants.

The total pretest Pain Score (NPRS) of the experimental group was 97 and the post-test pain score was 20, whereas the pretest pain score of the control group was 111, but the post-test score was 63, which showed that trial group participants got more improvement than the control group (Table 3).

	Pre-Test Pain Intensity	Post-Test Pain Intensity
Experimental Group	6.64 (1.19)	1.42 (1.08)
Control Group	7.4 (0.90)	4.5 (0.75)

Table 3: Pre and post-test combine sample pain intensity.

The experimental group's mean pretest pain score and standard deviation was 6.64 (1.19), whereas the post-test score was 1.42 (1.08). However, the control group's pretest pain score and standard deviation were 7.4 ± 0.90 , but the post-test score was 4.5 ± 0.75 . The experimental group's mean pain score in the pie chart showed about (82%-18%) 64% pain reduction during pre and post-test measurement, but the control group's pre and post-test pain scores showed in the pie chart expressed (62%-38%) 24% pain reduction. This descriptive analysis showed that experimental treatment is more effective than the controlled intervention for chronic low back pain patients (Fig. 3,4).

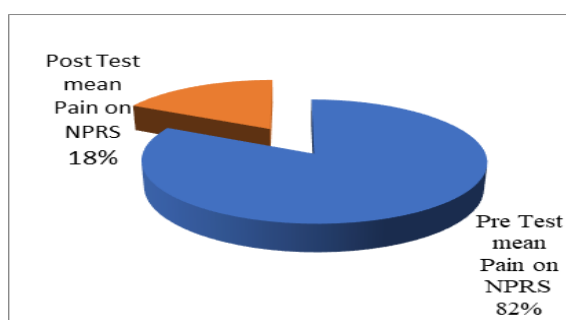


Figure 3: Experimental group mean pain on NPRS.

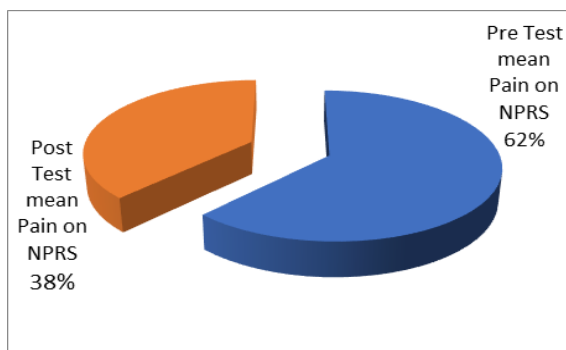


Figure 4: Control group mean pain on NPRS.

The mean pretest disability score and standard deviation of the experimental group was 14.06 (5.39), whereas the post-test score was 3.14 (1.29). However, the pretest disability score and standard deviation of the control group was 16.20 (3.82), but the post-test score was 8.14 (1.95). The experimental group's mean disability score in the pie chart showed about (82%-18%) 64% disability reduction during pre and post-test measurement, but the control group's pre and post-test disability scores showed in the pie chart expressed (67%-33%) 34% disability reduction. This descriptive analysis also showed that progressive physiotherapy with active bed rest was more effective than outdoor progressive physiotherapy for chronic low back pain patients (Fig. 5,6 and Table 4).

	Pre-Test Disability	Post -Test Disability
Experimental Group	14.06 (5.39)	3.14 (1.29)
Control Group	16.20 (3.82)	8.14 (1.95)
N.B: Continuous variables are expressed as mean (SD) as RMDQ (Roland-Morris et al.)		

Table 4: Pre and post-test combine sample disability score.

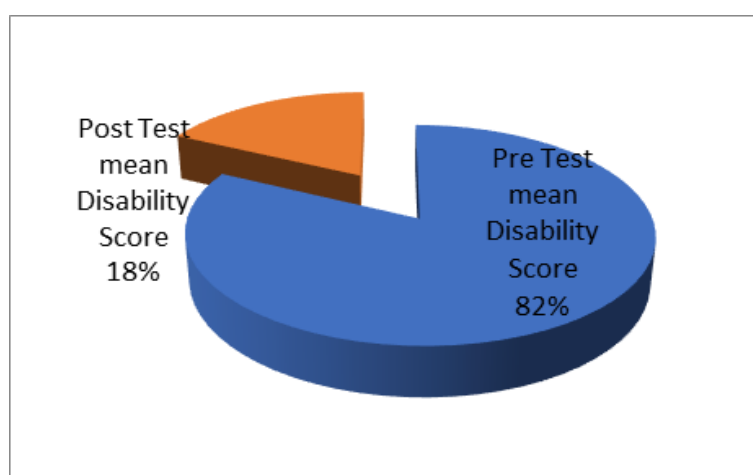


Figure 5: Experimental Group mean disability score.

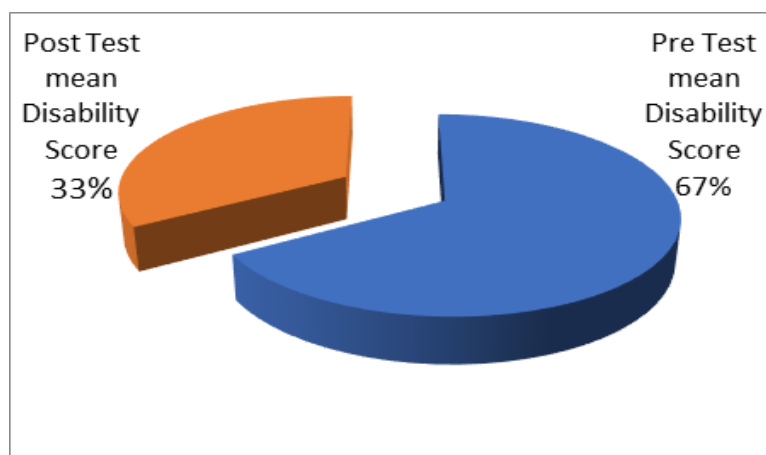


Figure 6: Control Group mean disability score.

At 23df, the height obtainable value of 't' at a 5% significance level is 2.069, as found in the 't' table (appendix). This experiment's 't' value is calculated at 8.65, much higher than the height of 2.069 obtainable by chance. Thus, the probability of occurrence (P) of the value obtained (8.65) by chance is much less than 0.05, the critical or 5% significance level. 'P' comes to <0.05 regarding the 't' table. It can occur less than five times in 100, which means very rarely by chance. So, it showed that progressive physiotherapy with active bed rest was significantly more effective than only outdoor progressive physiotherapy for decreasing pain intensity for patients with chronic low back pain. So, this experiment establishes the hypothesis and rejects the null hypothesis.

	Experimental Group Posttest Pain	Control Group Posttest Pain
Data	1,3,2,1,0,1,2,1,2,3,0,1,0,3	5,5,4,4,4,5,6,3,5,4,5,4,4,5
Mean	1.4286	4.5
Variance	1.1868	0.5769
Standard Deviation (SD)	1.0894	0.7595
Number (n)	14	14
't'	-8.6543	
degrees of freedom	23	
Critical value	2.069	
P-value	Less than 0.05	

Table 5: Pre and post-test pain score.

The absolute value of the calculated 't' exceeds the critical value ($7.9808 > 2.069$), so the means are significantly different, which also means that the 'p' value is less than 0.05 concerning the 23rd degree of freedom. This calculation showed that progressive physiotherapy with active bed rest was significantly more effective than outdoor progressive physiotherapy for patients with chronic low back pain in pain intensity and disability reduction. However, it also proved that both intervention groups were effective, though experimental group interventions were more effective than the control group (Table 6).

	Experimental Group Posttest Disability Score	Control Group Posttest Disability Score
Data	2,5,5,4,3,3,3,2,3,5,1,2,2,4	9,12,8,4,6,7,11,8,7,9,9,8,8,8
Mean	3.1429	8.1429
Variance	1.6703	3.8242
Standard Deviation (SD)	1.2924	1.9556
Number (n)	14	14
't'	-7.9808	
degrees of freedom	23	
Critical value	2.069	
P-value	Less than 0.05	

Table 6: Posttest disability score.

Discussion

This study aimed to test the Effects of progressive physiotherapy with or without active rest at the hospital in patients with chronic nonspecific low back pain in the sense of pain intensity and disability score. Here, progressive Physiotherapy means physiotherapy at outdoor service but ensures the same required physiotherapy appropriately and active rest means additionally ensuring rest at the hospital for getting active rest. Individually, both groups of patients benefited from the intervention and there was a significant difference between groups in the sense of pain and disability due to chronic low back pain. Besides this, it showed that physiotherapy with active rest is more effective than only outdoor physiotherapy without active rest. The use of physiotherapy with active rest in treating patients with chronic low back pain has high-quality methodological evidence to support it. Spinal manual therapy is strongly recommended by clinical practice guidelines for the treatment of low back pain and other musculoskeletal disorders that are directly and indirectly related or involved with the spine [6]. Regarding this study, the experimental group of participants got a pain reduction of about 64% and the control group got a pain reduction of 24% after treatment. The result of the study required a thorough and detailed assessment advocated in the specialized manual therapy area of musculoskeletal pain, where the goal is pain relief; however, physiotherapy with rest was significantly more effective than physiotherapy without active rest [7]. Consequently, the result of the study counter that the biomechanical approach would explain the pain reduction in the sense of intensity that the study participants experienced. However, increasing follow-up visits to 15-20 sessions with a placebo or non-treatment group are required to determine the relevance of these results. Spinal manual therapy has a strong biomechanical strategy that helps reduce pain intensity primarily at the level of manipulation; however, it

is important to use it properly at the specific spinal level and consider neural distribution and involvement. It happens due to the effects of combined mechanisms of SMT application, which also depends on the hand of the application. For example, SMT may mechanistically decrease the sensitivity of the muscle spindles and the various segmental sites of a reflex pathway that helps decrease pain [8]. Regarding this study, spinal manual therapy was applied by a senior physiotherapist who has specialized manual therapy training and practices manual therapy in his daily practice. Spinal Manual Therapy could have a regional effect as it is still at the spinal level of the manipulative input. Some authors suggest an effect on the dorsal horn of the spinal cord or the periaqueductal grey area of the central nervous system [9]. SMT is also thought to affect reflex neural outputs to both muscle and visceral organs by affecting paraspinal muscle reflexes and motor neuron excitability [10,11]. The study investigations proved that Regional SMT has stronger efficacy than global SMT, whereas the global SMT also has some effectiveness, but that is not significant, which may take more time to relieve pain so it may be an economic waste. SMT reduces the potential for central sensitization by inhibiting TSS ("second pain"), which is one of the independent, coordinated actions of the central nervous system [12,13]. One mechanism underlying the effects of SMT may be the ability to manipulate central sensory processing by deleting sub-threshold mechanical or chemical stimulation from paraspinal tissues so that the effect comes immediately [10]. The study proved that SMT has an immediate effect, whereas it only used manipulation. Without tissue support and integrity, it is impossible to get a longer effect. This investigation proved that the combined use of joint and soft tissue mobilization and manipulation can have a sustainable effect on minimizing the pain intensity and disability reduction of chronic low back pain patients. This study shows that the mean duration of pain and other symptoms is about 13.8 (months) and Standard Deviation (SD) is 11.95 in the experimental group and about 11.06 (months) and Standard Deviation (SD) is about 8.28 in the control group which means all participants are chronically suffering from low back pain and mean duration of both groups is close in range. However, Oliveira, et al., stated in their study of spinal manipulative therapy in patients with chronic low back pain as baseline information which showed a mean age of 103.82 months in the control group, whereas 112.47 months (mean age) in the experimental group. Regarding this study, both groups of participants showed that is usually vulnerable to any mechanical pain as well as low back pain. This study showed that the mean body weight of the experimental group was 75.46 kg and Standard Deviation (SD) was 10.16, whereas the mean weight of the control group was 71.53 kg and Standard Deviation (SD) was 7.83. Another study of chronic low back pain showed that the mean body weight of the experimental group was 75.45 kg and the Standard Deviation (SD) was 16.42, whereas the mean weight of the control group was 74.84 kg and the Standard Deviation (SD) was 13.94. This study showed that the experimental group participants were mostly overweight as the mean BMI was 27.53 kg/ms² and Standard Deviation (SD) was 1.47 and the control group BMI was 26.66 kg/ms² and Standard Deviation (SD) was 1.26, which is also showed overweight. High BMI is one of the risk factors for chronic pain, whereas increased BMI is also a predisposing factor for chronic low back pain. Increased BMI in adolescents leads to decreased body fitness, power, strength and endurance, which stimulate different injuries and chronic pain, including back pain, neck pain, ankle sprain, knee pain, etc [14,15]. Regarding this study, most of the experimental and control group participants were highly educated. They were post-graduated and masters and PhD levels. This education level showed the participants' consciousness level about their symptoms, which helped motivate them to continue the treatment follow-up and that enhanced the level of improvement. Higher education leads the persons to be self-conscious that enhances the family and social level consciousness. For managing low back pain, it is important to educate the patients about the condition, treatment, prognosis and prevention, which help to manage the patients properly [5,16].

Conclusion

Low back pain is one of the common musculoskeletal problems that is usually treated by physiotherapy, including manual therapy and electrotherapy with or without analgesics and conservative medication and sometimes, it may require surgical intervention for patients with sequestered discs. There is a lot of physiotherapy intervention used for low back pain management where spinal manual therapy is the choice of treatment suggested by different research studies. Specialized manual physiotherapists usually use manual therapy, which can be done with or without following the active rest. If it would get more beneficial results with physiotherapy with active rest, then treatment time and costs would decrease, increasing the treatment's authenticity. This study showed that both groups of intervention are effective for managing chronic lower back pain, whereas physiotherapy with active rest is significantly more effective for managing lower back pain than Physiotherapy without active rest. Regarding this study, pre and post-test pain intensity and disability due to chronic low back pain showed that both pain and disability have decreased significantly. A further longitudinal study with or without a placebo group and multicentered RCT is required for the strong validity of the long-term effects of this treatment.

Conflict of Interest

The authors have no conflict of interest to declare.

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