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Effect of Activity (ADL) Modification on Reduction of Pain in Patients with Chronic Non-Specific Low Back Pain

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Abstract

Introduction & Objective: *: Low back pain is the commonest cause of activity limitations and absence of work in developing country like Bangladesh. The aim of this study was to chalk out the association between ADL modification with chronic low back pain.* ***Materials & Methods:*** *: This Randomized Clinical Trial was performed in the Department of Physical Medicine and Rehabilitation, JRRMCH, Sylhet. Eighty patients of 30 to 60 years old, fulfilling the selection criteria were included in this study. Patients were divided into two groups after randomization by lottery method. Patients of Group-A were treated with NSAID, Anti-ulcerant & Activity (ADL) Modification while patients of Group-B were treated with NSAID and Anti-ulcerant only. Patients of both groups were treated for six weeks. Main outcome measures were Subjective Pain Intensity Score, VAS, Tenderness Index, Disability due to pain, Spinal Mobility Index and Oswestry Disability Index.* ***Results:*** *Majority of the patients of both groups were 30 to 40 years old (52.5% in Group-A and 47.5% in Group-B). Males were predominant in both groups. While majority belongs to middle socio-economic class, occupationally farmers were majority in both groups (22.5% in Group-A and 20% in Group-B). VAS was better in patients who received instructions about activity (ADL) modification than those who did not receive them. Subjective Pain Intensity Score and Tenderness Index improved in both groups but their difference was not statistically significant. Disability due to Pain and Spinal Mobility Index, both the variables improved at the end of 3rd week and their difference was statistically significant (P<0.05).* ***Conclusion:*** *From the study it can be concluded that Activity (ADL) Modification helps to reduce pain in patients with chronic non-specific low back pain.*

Key words: *ADL, Low Back Pain.*

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Introduction:

Low back pain (LBP) is one of the commonest and most troublesome of complaints, causes are many and an exact diagnosis is often difficult. The disability with which it is usually associated is often severe & prolonged; therapy is sometimes ineffective[1]. Back pain affects 60-80% of people at some time in their lives and about 8 to 10% of adults experience LBP daily[2]. It has a significant economic impact on society, reported in the last thirty years[3]. LBP is more common in heavy manual workers, particularly those who are in occupations requiring heavy lifting & twisting[4]. **Chronic Low Back Pain (CLBP)** is defined as low back pain persisting for more than 12 weeks while **Non-specific** low back pain is pain not attributed to a recognizable pathology (e.g. infection, inflammation, tumour, fracture, osteoporosis etc.). Risk factors include heavy physical work in awkward postures, frequent bending & twisting with/without lifting and prolonged static postures. Individual and workplace factors have also been reported to be associated with the transition to chronic low back pain[5]. Diagnosis depends on the history and physical examination in which the pain is reproduced. X-ray studies may reveal disc degeneration and facet arthritis, but the diagnosis is clinical[6]. Chronic LBP is often resistant to solitary drug treatment. Many models and therapies have been postulated and applied. Physical therapy such as thermotherapy like short wave diathermy, electrical nerve stimulation, pelvic traction and exercise therapy have been undertaken to reduce the problem[7]. But the first & foremost step in managing Chronic Low Back Pain is to avoid activities that increase intra-discal pressure and thus making pain symptoms worse by putting extra strain to the back muscles. Studies show that modification of the activities like limiting prolonged unsupported sitting, avoiding bending or twisting the back during lifting, avoiding heavy weight lifting helps to provide long-term symptom relief and decreases the chance of recurrence of LBP[8]. For the purpose of this study, activity modification instructions will be- to avoid prolonged sitting and standing, to lie down in supine position using a plain firm bed, to be cautious while getting out of bed by following a sequential position like first flex the knees then lie on

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one side then hang the legs out of bed then get up using both hands and then start walking, to use high commode, to avoid stooping, to use long handled cleaner during sweeping, to avoid high heeled shoes, to keep back straight during forward bending activities, to avoid twisting, to avoid weight lifting or to lift with caution, and to drive in a comfortable position with adequate height keeping back straight. This study will help to find out the effect of modification of these activities of daily living in reducing pain of patients with chronic non-specific low back pain. Bangladesh is a poor country burdened with huge population and limited resources. It is very difficult to manage such a huge number of patients with chronic non specific low back pain with the existing resources and management system. Diagnostic approaches and therapeutic options are diverse and often inconsistent, resulting in rising costs and variability in the management of CLBP. Hence, Data are needed to find out an effective, inexpensive and easy-to-do procedure in the treatment of chronic non-specific low back pain which can impact on their final outcome quite positively in the long run.

Objectives

To determine the role of activity (ADL) modification on reduction of pain in chronic non-specific low back pain.To assess the disability of patients and the outcome of chronic non-specific low back pain with or without activity (ADL) modification.Low back pain is a symptom complex which affects the area between lower rib cage and gluteal folds. When it persists for more than three months (twelve weeks) is called **chronic low back pain**[9]. Chronic low back pain remains poorly understood and inadequately treated due to the heterogeneity of the patients population and the lack of a simple and useful system[10]. Chronic low back pain is one of the most common causes of chronic disability and most prevalent medical disorder among industrialized societies[11]. The type of low-back pain most commonly confronting the physiatrist is of benign mechanical origin. Benign mechanical causes are divided into static (postural) and kinetic (faulty biomechanical) types. Of the static causes, the most prevalent is excessive lordosis in which there is exorbitant facet weight-bearing and foraminal closure. Alternatively, prolonged daily flexed postures may cause posterior migration of the disc, resulting in low back pain and probably sciatic radiculopathy[12]. Nachemson has shown that the positions like sitting, lifting from a standing position with extended knees, leaning forward while seated in a chair etc. increase ligamentous stress and intradiscal pressures most[13]. Holding these positions for a prolonged period of time will stress the supporting ligaments and muscles of the spine, increasing the likelihood of low back pain. Again in a prospective cohort study undertaken from 1993 to 2007 researchers showed long-term associations between physical load in daily activities (such as awkward posture etc.) and chronic low back pain (CLBP) in general population[14]. So, Activity (ADL) Modification can play a cost-effective and efficient role for reducing pain and disability of chronic non-specific low back pain.

Materials and Methods:

Study design was Randomized Controlled Clinical Trial. **Place of study was** Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet, Bangladesh. **Period of study was** 6 (six) months (23-09-13 to 22-03-14). Study population was selected from the Department of Physical Medicine and Rehabilitation, Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet. **Eighty** patients of CLBP as sample size who met the selection criteria. **Sampling Method:** Subjects were selected purposively according to the availability of the patients who fulfill the inclusion criteria and then randomly allocated in two groups by lottery method. **Inclusion criteria** was Patients of both sexes from 30 to 60 years having low back pain for more than 3 months with no known underlying pathology and those who were able to complete a questionnaire. Exclusion criteria were Patients having LBP due to pregnancy, trauma or surgery, infective cause such as TB spine, Cauda-equina syndrome, malignancy, concomitant PUD, renal impairment or any other contraindication to take NSAIDs. **Activity Modification:** Modification of activities that increase intradiscal pressure and/or put extra strain to the back muscles, such as:

- To avoid prolonged sitting.
- To avoid prolonged standing.
- To lie down in supine position using plain firm bed.
- To be cautious while getting out of bed by following a sequential position like first flex the knees then lie on one side then hang the legs out of bed then get up using both hands and then start walking.
- To avoid stooping.
- To avoid twisting.
- To keep back straight during forward bending activities.
- To use long handled cleaner during sweeping.
- To avoid weight lifting or to lift with caution.
- To avoid high heeled shoes.
- To use high commode.
- To drive in a comfortable position with adequate height keeping back straight. **Study Procedure:** Patients with chronic low back pain for at least 3 months' duration having attended the Physical Medicine and Rehabilitation department of Jalalabad Ragib-Rabeya Medical College Hospital were selected according to the inclusion & exclusion criteria. After that, patients selected for the study were divided into two groups (Group-A and Group-B) through randomization by lottery method. Patients of Group-A were treated with NSAID (Aceclofenac 100 mg twice daily orally) along with an anti-ulcerant (Omeprazole 20 mg) and instruction about Activity (ADL) Modification to be followed during performing daily activities for 6 weeks (42 days). Patients of Group-B were treated only with NSAID (Aceclofenac 100 mg) and anti-ulcerant (Omeprazole 20 mg) for the same duration. **Procedure of Data Analysis:** Data will be processed and analyzed by computer software SPSS (Statistical Package for Social Science). Test statistics to be used were descriptive statistics, Chi-square (X^2) and F-test

(Analysis of variance). Level of significance was set at 0.05 so that, P<0.05 was considered to be significant.

Ethical Implications: Study subjects were informed verbally about the study design, purpose of the study and their right to withdraw them from the project at any time, for any reason, whatsoever. Subjects who have given informed written consent to participate in the study were included as the study sample.

Results:

Table I shows majority 21 (52.5%) and 19 (47.5%) age belong to 30 - 40 years in Group-A and Group-B respectively. The mean age found in Group-A is 41.5 ± 2.1 and 39.2 ± 1.13 in Group-B.

Table I: Age distribution of the study subjects.

Age	GroupA (n=40)	Group B (n= 40)
30 – 40	21 (52.5%)	19 (47.5%)
40 – 50	14 (35%)	15 (37.5%)
50 – 60	5 (12.5%)	6 (15%)
Mean ± SD	41.5 ± 2.1	39.2 ± 1.13

Table II shows majority in both groups are farmers which is 22.5% in Group-A and 20% in Group-B

Table II: Distribution of the occupation of the study subjects

Occupation	GroupA (n=40)	GroupB (n=40)
Businessman	5 (12.5%)	6 (15%)
Service-holder	8 (20%)	7 (17.5%)
Housewife	4 (10%)	3(7.5%)
Driver	1 (2.5%)	1 (2.5%)
Teacher	2 (5%)	3 (7.5%)
Farmer	9 (22.5%)	8 (20%)
Day Laborer	6 (15%)	5 (12.5%)
Health worker	1 (2.5%)	2 (5%)
Others	4 (10%)	5 (12.5%)

Table III shows significant improvement in Subjective Pain Intensity, Tenderness Index and Oswestry Disability Index after 3 and 6 wks of treatment. Whereas in VAS significant improvement occurs only after week 3 and Spinal Mobility Index significantly improves after week 6.

Table III: Outcome variables in Group-A.

	ANOVA F	Significance
(a) Subjective Pain Intensity		
W_0 to W_3	5.807	0.002 (S)
W_0 to W_6	7.615	0.001 (S)
(b) Pain Scale (VAS)		
W_0 to W_3	9.110	0.010 (S)
W_0 to W_6	6.845	0.053 (NS)
(c) Tenderness Index		
W_0 to W_3	13.348	0.001 (S)
W_0 to W_6	12.554	0.002 (S)
(d) Disability due to pain		
W_0 to W_3	3.315	0.070 (NS)
W_0 to W_6	1.347	0.233 (NS)
(e) Spinal Mobility Index		
W_0 to W_3	3.542	0.061 (NS)
W_0 to W_6	2.214	0.001 (S)
(f) Oswestry Disability Index		
W_0 to W_3	10.486	0.013 (S)
W_0 to W_6	7.672	0.002 (S)

Table IV shows significant improvement in Tenderness Index and Oswestry Disability Index after 3 and 6 weeks of treatment. In case of Subjective Pain Intensity and VAS significant improvement occurs only after week 3.

Table IV: Outcome variables in Group-B.

	ANOVA F	Significance
(a) Subjective Pain Intensity		
W_0 to W_3	3.653	0.030 (S)
W_0 to W_6	6.201	0.064 (NS)
(b) Pain Scale (VAS)		
W_0 to W_3	8.345	0.001 (S)
W_0 to W_6	0.089	0.960 (NS)
(c) Tenderness Index		
W_0 to W_3	10.041	0.015 (S)
W_0 to W_6	10.246	0.021 (S)
(d) Disability due to pain		
W_0 to W_3	5.964	0.078 (NS)
W_0 to W_6	2.131	0.153 (NS)
(e) Spinal mobility Index		
W_0 to W_3	5.130	0.056 (NS)
W_0 to W_6	5.100	0.098 (NS)
(f) Oswestry Disability Index		
W_0 to W_3	17.312	0.001 (S)
W_0 to W_6	11.106	0.002 (S)

Table V shows that Subjective Pain Intensity and Tenderness Index improved in both groups but their difference were not statistically significant. Disability due to Pain and

Spinal Mobility Index, both the variables improved at the end of week 3 and their difference was statistically significant, though this significance abolishes at the end of wk 6. No statistically significant difference was found between the groups regarding Oswestry Disability Index.

Table V: Comparison of outcome variables in Group-A and Group-B.

	Group - A Mean ± SD	Group - B Mean ± SD	Probability (P)
(a) Subjective Pain Intensity			
Pretreatment, W_0	2.16 ± 0.57	2.12 ± 2.17	0.171 (NS)
At the end of W_3	1.45 ± 0.53	1.51 ± 1.42	0.185 (NS)
At the end of W_6	1.04 ± 0.68	1.06 ± 1.15	0.325 (NS)
(b) Pain Score (VAS)			
Pretreatment, W_0	8.07 ± 0.61	7.72 ± 7.02	0.949 (NS)
At the end of W_3	5.45 ± 0.71	5.52 ± 5.56	0.625 (NS)
At the end of W_6	3.86 ± 0.73	4.03 ± 3.95	0.149 (NS)
(c) Tenderness Index			
Pretreatment, W_0	1.42 ± 0.59	1.32 ± 1.41	0.110 (NS)
At the end of W_3	0.76 ± 0.43	0.85 ± 0.96	0.615 (NS)
At the end of W_6	0.67 ± 0.57	0.58 ± 0.78	0.216 (NS)
(d) Disability due to pain			
Pretreatment, W_0	0.84 ± 0.25	0.82 ± 0.90	0.162 (NS)
At the end of W_3	0.42 ± 0.50	0.54 ± 0.44	0.012 (S)
At the end of W_6	0.23 ± 0.44	0.31 ± 0.25	0.115 (NS)
(e) Spinal Mobility Index			
Pretreatment, W_0	6.05 ± 0.31	6.03 ± 6.21	0.503 (NS)
At the end of W_3	6.54 ± 0.48	6.43 ± 6.66	0.031 (S)
At the end of W_6	6.63 ± 0.44	6.73 ± 6.75	0.362 (NS)
(f) Oswestry Disability Index			
Pretreatment, W_0	29.74 ± 3.3	28.96 ± 29.64	0.543 (NS)
At the end of W_3	25.36 ± 3.72	24.33 ± 26.16	0.155 (NS)
At the end of W_6	22.54 ± 3.97	21.60 ± 23.55	0.062 (NS)

Discussion:

Age of the patients:

In this study mean age is 41.5 ± 2.1 in Group-A and 39.2 ±1.13 in Group-B. Mean age difference is almost similar between the groups. In a study conducted by Shakoor et al.16 comprising 102 patients of chronic low back pain mean age was found to be 42.8± 10.5 years in Group-A and 38.5 ± 8.4 years in Group-B and overall mean age was 42.22 ± 8.07 years. Findings of the current study are similar with those of the above study.

Sex of the patients:

In the present study it was observed that male were predominant in both groups, which was 55% in Group-A and 57.5% in Group-B. Difference was not significant (P>0.05) in between the groups. In study Borman, Keskin and Bodur[15] found male to female ratio was 1=1.6 and 1=2.5 in Group-A and Group-B respectively. But, in large epidemiological studies no statistically significant difference exists between male and female. These findings are consistent with the findings of current study.

Socio-economic condition:

In the study, it was observed that majority of the patients came from middle class followed by low class poor family. Poor people of our country have to do heavy manual works which include repetitive twisting, bending, heavy weight-lifting etc. In addition, they do not have enough money to have an adequate management option to procure at the early stage of the disease which in turn increases the likelihood of chronic illness. Shakoor et al.[16] in a study of patients with chronic low back pain also found that most of their patients came from middle socio-economic group. So, their findings are consistent with that of the present study.

Occupation:

In this study it was observed that patients were mostly farmers (22.5% and 20%), service-holders (20% and 17.5%) and day laborers (15% and 12.5%) in Group-A and Group-B respectively. In a study Borman, Keskin and Bodur[15] showed 38.1% and 61.9% patients were employed in Group-A and Group-B respectively. Moyeenuzzaman et al.[17] found 15 % housewives, 24% students, 19% service holders, 13% farmers and 11% workers in a study conducted in BSMMU.

Duration of pain:

In this study, mean duration of pain was 21.1 ± 2.34 months in Group-A and 23.3 ± 1.50 months in Group-B, their difference was not statistically significant (P>0.05). Borman, Keskin and Bodur[15] found mean duration of low back pain was 34.09 ± 14.1 months and 27 ± 19.5 months in Group-A and Group-B respectively. Almost similar observation was found by Shimada et al.[19] Emery et al.[20] and Kraamer[21].

Outcome variables:

In the study it was observed that all variables individually improved in Group-A and Group-B but they were not statistically significant. VAS was better in patients who received instructions about activity (ADL) modification than those who did not have them but the difference was not statistically significant. Subjective pain intensity and tenderness index improved in both groups though their difference was not statistically significant. These scores are in accordance with observation by Deyo et al.[18] Disability due to pain and spinal mobility index, both the variables improved at the end of third week and their difference was statistically significant (P<0.05) but at the end of sixth week statistical significance abolishes (P>0.05). Deyo et al[18] showed almost similar observation. No statistically significant (P>0.05) difference was found between the groups regarding Oswestry disability index.

Conclusion:

Because LBP presents such a large public health problem, potential impact of eliminating the unhealthy effect of physical load by modification of activities (ADL) is substantial. But as the sample size was small and there were some limitations in the trial, no firm conclusion could

be drawn. Information found here need verification by larger long-term follow up studies. Considering the data collected from this study it can be concluded that Activity (ADL) Modification helps reduce pain in patients with chronic non-specific low back pain.

Conflict of Interest: None.

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