

Original Article

Effect of Body Mechanics Brief Education in the Clinical Setting on Pain Patients with Lumbar Disc Hernia: A Randomized Controlled Trial

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Abstract

Aim: The present study was conducted in order to evaluate the effect of brief education proper body mechanics on low-back pain of patients with Lumbar disc hernia (LDH).

Material and Methods: This paper describes and randomize control trial of back pain education in a Turkish secondary care setting. The study was completed with 90 voluntary patients who were admitted to physical therapy and rehabilitation clinic. Body mechanics education with routine care was given to intervention group (n=42) during discharge while control group [n=48] got only routine care. An information form and Visual Analogue Scale [VAS] was applied in both intervention and controls groups by the researches at the hospital and by telephone call 3 months later. Change in a visual analogue scale (VAS) is used as the primary outcome measure. Data were analysed with t test. $p < 0.05$ was set as statistically significant. A statistically significant reduction in mean VAS score of education group patients with LDH 3 months later was determined ($t=4.372$, $p < 0.001$).

Results: It was detected that a planned education including using proper body mechanics was effective for reducing the severity of pain of patients with LDH.

Conclusion: The planned brief education was significantly reduced the severity of pain of patients with LDH.

Implications for Practice: Education programs an effective method to decrease pain people with LDH.

Key words: Low back pain, body mechanic of brief education, lumbar disc hernia, randomized controlled trial

Introduction

Lumbar disc hernia is a common reason for acute, chronic or recurring back pain. The most important clinical complaint of patients is localized back pain (Driessen et al., 2011). It is pervasive, slow developing, stinging, twitchy with movement and decreasing with rest pain while spreading to legs accordingly with anatomical distribution of radicle. Prevalence of LDH in the world is 15-30% and these patients 5-15% lives chronic back pain (Driessen et al., 2011; Berker, 1998). Various psychological and social variables play a role in the development, maintenance and exacerbation of back pain problems, and to provide suitable and effective

treatment for each patient with low back pain remains a daily clinical challenge (Berker, 1998). Curling and twisting [bending] activities at work, heavy lifting frequently, hulky static stand and psychological stress are accepted to be causative factors (Kılıc Akca et al., 2013). Lumbar disc hernia induced by excessive mechanic strain connected with movements which are not suitable for body mechanics is also common. Body mechanics provide acting of muscles, joints, bones and nerves by their collaboration with other systems (Driessen et al., 2011; Driessen et al., 2010; Demirdag et al., 2011). Unsuitable and not relevant usage of body mechanics results in LDH in daily life and

significantly increases LDH complications (Geisser and Colwell, 2013).

In patients who report symptoms radiating into the leg [sciatica], clinicians evaluate the possible causes of radiculopathy [compression of the nerve root] through history and physical examination. One of the causes may be a herniated [protruded, extruded or sequestered] intervertebral disc exerting pressure on the nerve root. Lumbar disc hernia are common elements of low back and leg pain (Geisser and Colwell, 2013).

The aim of the treatment of LDH is to remove pain and inflammation, to increase functions, to provide early activity, to prevent recurrence, to inform the patient and to make the patient return his/her normal life. Therefore, it is crucial to apply multifactorial protective strategies in the treatment. Movement appropriate for body mechanics in daily life is very important to prevent LDH complications (Kılıc Akca et al., 2013; Donmez et al., 2010; Karadag and Aksoy, 2002).

Patients can minimise the symptoms like backache, decreased range of motion that can be caused by LDH by moving accordingly to their daily body activities. In this direction, patients can be educated to integrate the proper body motions to their daily activities.

The literature is body mechanics education about the effectiveness in managing low back and leg pain. Back school or brief education is based in part on the work of Nachemson [1981], who assessed differences in disk pressure among normal's during different functional tasks and found that the highest disk pressures took place while leaning forward or during forward flexion and rotation. Thus, brief education or back school in part emphasizes body mechanics during functional tasks that decrease disk pressure. A recent study found that low back pain patients who were prescribed light, normal activity, including bending, actually displayed better outcomes compared to a group of patients who received conservative medical treatment (Kılıc Akca et al., 2013; Brox et al., 2010).

Brox et al. "systematic review of back schools, brief education, and fear-avoidance training for chronic low back pain" in study they concluded brief education in the clinical setting is more effective than usual care in reducing pain-related

fear, pain, disability, and return to work (Brox et al., 2010).

Demoulin et al. in study, their education program provided a number of benefits in terms of pain, function, knowledge, movement behavior, and physical performance (Demoulin et al., 2008).

Studies which demonstrated similar results to ours showed that brief education in the clinical setting is reduced low back pain and disability (Karjalainen et al., 2003; Storheim et al., 2003).

The present study was conducted experimentally in order to evaluate the effect of brief education in the clinical setting regarding proper body mechanics on low-back pain with leg pain level of patients with LDH.

Patient and Methods

Design and Settings

The study was a randomized controlled double-blinded intervention trial with a three-month follow-up (Figure1). Patients selected only for the study had L₄-L₅ and/or L₅-S₁ 'disc degeneration' on X-ray and had been hospitalized. The data collection was conducted from September 2011-August 2012.

Participants and recruitment

Inclusion criteria were: Patients who have been diagnosed with LDH for at least 6 months, who did not have a communication problem, who had adequate cognition for understanding the education, aged 18-60 years, who had back pain due to LDH. Patients with prior history of surgery, who were bedbound and with a body mass index (BMI) >30 kg/m² where excluded because of possible influence on the findings. One hundred ten patients who were eligible for the inclusion criteria and who were hospitalized during one year period of the study were recruited. Half of 100 patients [n=50] were randomized to education group while other half (n=50) was assigned to control group. The study was completed with 90 voluntary patients (Figure 1).

Sample size

The desired sample size was estimated using power analysis with a significance level of 0.05, a moderate effect size (f = 0.25), correlations of 0.5 and a power of 80%. A sample size of 50 per group was required to analyse (Polit and Sherman, 1990).

Randomization

The study was used simple randomization method. Patients were given randomly generated treatment allocations within opaque envelopes when they were came in the hospital. Patients were approved to enter a trial an envelope is opened and the patient is then offered the allocated education.

Blinding

The health staff in clinic involved in the care of the patients were blinded to the study group allocation. The researchers didn't explained that to which group the patients so patients were blinded. Both groups received a telephone call from the research nurse after education was blinded.

Routine Health Care In Clinic

Intervention and control groups patients in the physical therapy and rehabilitation unit includes a 4-week standard physiotherapy and prescription of oral anti-inflammatory agents in case of severe pain. All patients in both groups took standard medical therapy during hospitalization but don't take body mechanics education.

Intervention

Intervention group: After the routine treatment of patients with LDH, patient information form and VAS were applied by the researcher prior to giving education. In the last week coming to discharge body mechanics education was given. Group intervention sessions were held for the intervention group including 5-6 patients in every group 5 days before the discharge by two researchers. Three months after the education, VAS was re-applied on telephone and severity of pain was assessed.

Control group: After the routine treatment of patients, patient information form and VAS was applied by the researcher prior to discharge. Three mounts after discharge VAS was re-applied on telephone and severity of pain was assessed.

Education Process: Education was given with oral presentation and demonstration techniques. The wrong and right body mechanics that are usually used on a daily life were demonstrated and patients were wanted to perform them individually. Content of the brief education was decided after literature review and with expert

views. It contains anatomy and functions of the spine, definition of LDH, how it develops, proper body movements, most commonly made mistakes in everyday life, correct posture at work and rest, back protection techniques.

Patients were given information about body mechanics and their questions were replied in the first phase of the education. Second phase included wrong body mechanics that are done on a daily life and accurate ones were applied and demonstrated by an implementer. In the third phase of the brief education, one day after the theoretical education, patients were wanted to perform correct body mechanics in groups of two and wrong applications were corrected. Every phase lasted for 20-30 minutes. Patients were told not to hesitate to contact with the researchers about applications. A brochure about correct body mechanics which was developed by the researchers from a literature review was given to the patients at the end of the brief education. Three months later, level of pain was re-evaluated by phone calls.

Measurements

Data were collected with a questionnaire form including questions about socio-demographic characteristics and disease and with VAS. A longer and more complex pain evaluation form was not used since the study group had low education level and monitoring was done by using phones.

Patient Information Form: Age, gender, education status, diagnosis, duration and symptoms of the disease, place of living, BMI [24.9< normal, 25-30 fat] and phase of the disease were included in the form. The verbal pain scale consists of grades defining the patient's pain, such as "slight pain," "severe pain," and "very severe pain" .

Visual Analogue Scale [VAS]: It is a vertical or horizontal ruler generally with a 10 cm length which starts with "No pain" and ends with "Unbearable [Intolerable] Pain". It may contain describing words on the ruler or marks with equal intervals whereas it is a plain line. The usage of VAS should be well taught. Patient shows his/her severity of pain on the VAS ruler. The point that patient shows is marked and measured in centimetres from the beginning [no pain point] point to the marked point. Patients with 3 and more VAS score are involved in the study. Initial

VAS scores are similar for the control and experimental group. ($p > 0.05$, Table 2)

We were given education on the use of VAS groups. It was announced that a second evaluation done by telephone them.

Data analysis

Data were analysed with SPSS (Statistical Package for Social Sciences) for Windows version 13.0. Data were shown and analysed in numbers (n), percentages (%), mean, standard deviation. Distribution of continuous variables was assessed using Shapiro–Wilk test and if the normality hypothesis was acknowledged parametric Student's t test was utilized. Categorical Results were assessed within 95% confidence interval and $p < 0.05$ was set as statistically significant.

Ethical considerations

The present study was conducted in accordance with the ethical principles of the Declaration of Helsinki (Revised October 2000). A written permission from the institution and oral and written consents from the patients by explaining the aim of the research were obtained prior to the study.

Results

It was determined that 76.6% of the intervention group patients were female, 85.7% were married, 71.4% were elementary school graduates, 73.8% were housewives and 73.9% were obese. Of controls, 75.0% were female, 79.2% were married, 52.1% were elementary school graduates, 66.7% were housewives and 68.8% were obese (Table 1). It was found out that 83.3% of the intervention group have had LDH for up to 10 years, all of them had low back pain that hits their legs, 50.0% defined a severe pain while 85.4% of controls have had LDH for up to 10 years, all had back pain hitting legs and 25.0% lived intense pain on back area (Table 2). The difference between pre- and post-education levels of pain in the intervention group was statistically significant ($p < 0.05$). No change was found in the VAS pain scores of the control group (Table 3). It was found that mean VAS score of intervention group decreased 3 months later while increased in the control group ($p > 0.05$, Table 3). Among feedbacks in the 3-month later follow-up about education and low back pain; patients told that they were applying the movements during housework in the post-education period, morning

stiffness and pain reduced, they could handle with pain without taking painkillers and that they were getting less tired. However, control group subjects expressed that they lived more intensified pain after discharge, they wanted to be re-admitted to the hospital and that they lived intensive pain while bending and standing.

Discussion

In the present study, which aimed to determine the effect of brief education in the clinical setting about body mechanics on pain level of patients with LDH, it was found that pain levels [by mean VAS score] of education group patients decreased 3 months later [follow-up] (Table 3). Studies which demonstrated similar results to ours showed that brief education in the clinical setting is reduced low back pain and disability (Karjalainen et al., 2003; Storheim et al., 2003). It is believed that giving planned education to patients will reduce pain, analgesic consumption, repetitive stays in hospital and the cost of treatment. Besides, the cost of labour loss may be decreased by encouraging people to work actively. It is known that these educations are given in back school form in some countries and they are effective (Geisser and Colwell, 2013; Brox et al., 2010).

Low Back pain is known to be resulted from and to get chronic due to frequently repeated body movements and functions [such as heavy lifting and downloading without bending on knees, pushing, pulling, hard standing for a long time, bending, reaching up or forward, holding, hugging/cuddling, returning suddenly] and when one does not have a rest between these movements or serially repeating the excessive movements (Driessen et al., 2011; Tulder et al., 2000; Kopec et al., 2003; Kookar and Uzun, 2007; Skay and Yakut, 2011). Primary aims of the body mechanics education are to reach appropriate anatomical posture, usage of correct body mechanics during daily life and working, to give information about back pain and coping strategies and to increase self-confidence and quality of life (Karadag and Aksoy, 2002). Kilic Akoa et al [2013] have found that as the level of knowledge about body mechanics decreased, severity of pain increased in patients with LDH (Nazan Kılıc Akca et al., 2013).

A meta-analysis on the comparison of exercise, manipulation and miofacial group with controls

in terms of efficiency of body mechanics education on recurrent or low back pain has shown a moderate evidence that educations about body mechanics, whether short or medium terms, were more effective on the decrease in pain levels, on returning to work and functional capacity (Heymans et al., 2011) . Another study however, expressed not that much effective result of body mechanics education alone and concluded that it should be monitored in order to turn into behaviours (Turner, 1996). Existing pain and its intensity influence patients' quality of life and functional status significantly. Mild intensity of pain is even the cause of high rate of loss of function and reduction in quality of life

(Kopec et al., 2003; Kromark et al., 2009; Darlow et al., 2012). In the present study, after the education was given, applications were shown on the first day with demonstrations, they were individually built on the second day and followed up whether turned into behaviours or not. Education group patients defined that they converted knowledge into behaviours and their quality of life increased due to decreased level of pain. The results of this study shows that pain can be reduced by educating patients about body mechanics and changing their behaviours by doing so. This result can be interpreted as that the education may reduce physical therapy and analgesic consumption.

Figure 1 Diagram of participant flow.

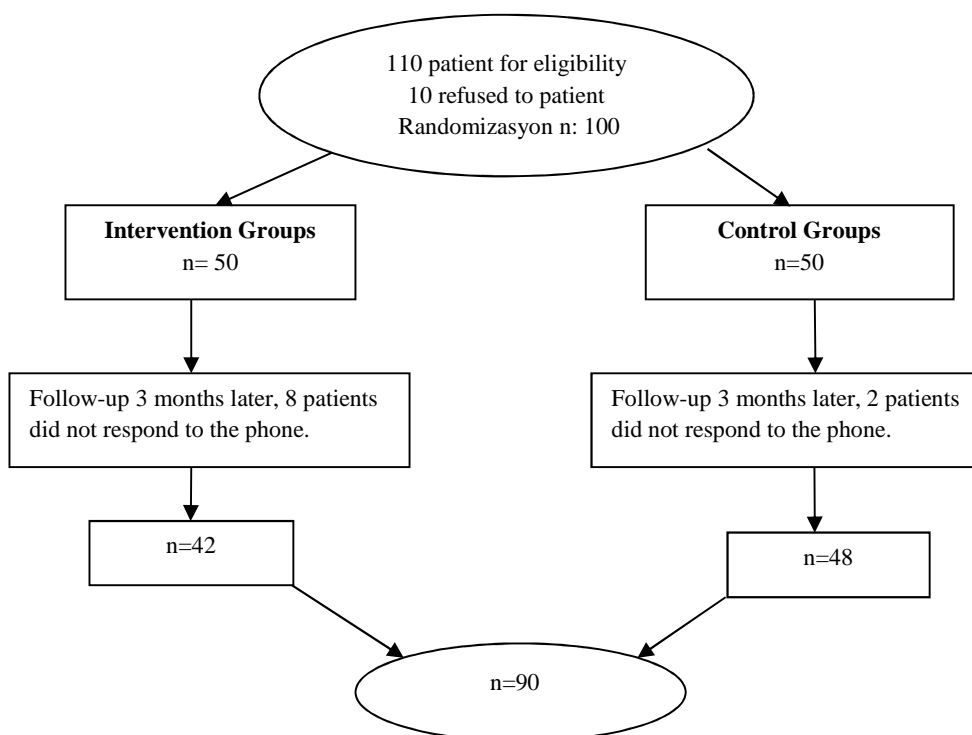


Table 1. Distribution of descriptive characteristics of individuals

Characteristics	Intervention Group		Control Group		P
	n	%	n	%	
The mean age	47.8±9.5(18-60)		45.6±10.6(19-60)		<i>p</i> >0.05
Sex					<i>p</i> >0.05
Female	32	76.2	36	75.0	
Male	10	23.8	12	25.0	
Marital status					<i>p</i> >0.05
Married	36	85.7	38	79.2	
Single	6	14.3	10	20.8	
Education status					<i>p</i> >0.05
Illiterate	9	21.4	12	25.0	
Primary education	30	71.4	25	52.1	
High school and higher	3	7.1	11	22.9	
Occupation					<i>p</i> >0.05
Housewife	31	73.8	32	66.7	
Worker	8	19.0	12	25.0	
Officer	3	7.1	4	8.3	
BMI					<i>p</i> >0.05
Normal	11	26.1	15	31.2	
Fat	31	73.9	33	68.8	

Table 2. Distribution of Symptoms in individuals

Characteristics	Intervention group		Control group		P
	n	%	n	%	
The average duration of Disease	6.1±5.4(1-20)		6.5±4.6(1-20)		<i>p</i> >0.05
Disease duration					<i>p</i> >0.05
0-10 year	35	83.3	41	85.4	
11-20 year	7	16.7	7	14.6	
Low back pain					<i>p</i> >0.05
Yes	42.0	100.0	48.0	100.0	
No	0.0	0.0	0.0	0.0	
Back and Leg pain					<i>p</i> >0.05
Yes	39	92.9	42	87.5	
No	3	7.1	6	12.5	
VAS pain score	6.9±2.1(3-10)		6.3±2.0(3-10)		<i>p</i> >0.05
Pain assessment of individuals					<i>p</i> >0.05
Slight pain	4	9.5	9	18.8	
Severe pain	17	40.5	27	56.2	
Very severe pain	21	50.0	21	25.0	

Table 3. Comparison of the Mean VAS Scores of the Individuals in the Intervention and Control Groups at Their Follow-up Weeks

Groups	Before intervention $\bar{X} \pm SD$	Follow-up three months later $\bar{X} \pm SD$	Intra-groups Test value* <i>p</i>
Intervention group	6.9±2.1(3-10)	4.5±3.2(0-10)	4.372 <i>p</i> <0.001
Control group	6.0±2.0(3-10)	6.3±2.7(0-10)	-.546 <i>p</i> >0.05
Inter-groups Test Value* <i>p</i>	-2.026 <i>p</i> >0.05	-2.594 <i>p</i> <0.05	

* t-test was conducted

Conclusions and Relevance to clinical practice

Body mechanics education was determined to be effective on decreasing severity of pain in patients with LDH. Aim of health education is to train patients to live a healthy life and thus to provide them try for protecting maximum health potential. Education programs about using body mechanics are in the scope of preventive/primary healthcare services but they should be organized by the nurses and physiotherapists in order to prevent complications, to increase quality of life of people diagnosed with LDH by treatment and rehabilitation services also.

Limitations

The results may only be generalized to this patient group and studies should be conducted on larger samples. Sample composed of 90 patients because of the inclusion criteria that required not to have had prior operations. Data collection tools [VAS] were kept short because patients were from rural areas, had low level of education status and due to follow-up with phone call. Future studies may evaluate a functional pain instrument and physical deterioration after education with home visits.

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