ORIGINAL RESEARCH PAPER

Physical Education

The effects of Home Therapeutic Exercise on pain and disability of women with back pain

KEY WORDS: disability, low back pain, exercise therapy protocols, exercise therapy, SPSS

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ABSTRACT

A series of inhibiting factors has led women with back pain to be usually recommended staying in bed rest and be banned especially from sport activities. The aim of this study is to evaluate the effectiveness of a home therapeutic exercise protocol on pain and disability of women with low back pain. The training program included 2 weeks of practical work and training. Then, with phone supervision and guidance for six weeks and using training CD, patients continued exercises at home. Preliminary tests were repeated every two weeks until the end of the program. Test used included visual analog scale of pain (VAS scale), Oswestry scale for LBP. Statistical analysis was done through ANOVA for repeated measures by SPSS software. Statistical analysis showed that for 2 factors of pain and disability there is a significant interaction in favor of the experimental group. According to the results obtained, it can be concluded that home therapeutic exercise with the protocol presented in this study has been effective on improvement of pain and disability. In total, according to the physical benefits of therapeutic intervention used, this approach can be introduced as a valuable therapeutic way to improve back pain patients.

1. Introduction

Back pain is a pain that is felt in upper back and lower layers of muscle between the ribs and hip and may be associated with foot pain or not (9).

Prevalence and economic costs: Back pain is one of the most common musculoskeletal problems in developed countries and about 80 percent of the people are infected at least once during their lives (10). Each year, about 15 to 37% of clients referring to specialized treatment centers of musculoskeletal problems are patients with back pain (11).

The population characteristics and complications of the disease: back pain is one of the most common causes of disability and functional limitations of lots of people between the ages of 20 to 45 years (1). Back pain however occurs deprives the normal motion and function of the patient. It is why among musculoskeletal disorders, back pain causes the greatest limitation in the workplace and is the second cause of absence from work (12). If severe pressure is not applied to the waist, 90% of back pains are treated spontaneously during a period of three months (13, 14). Common treatments: different treatments are recommended for back pain that include a wide range of methods from modern medicine (drug therapy, surgery) to various methods of complementary alternative therapies (such as acupuncture, chiropractic, and osteopathy) and physical treatments. Therapeutic effects of this technique are still not well-understood (15). Various treatment methods focus on relieving pain, reducing disability, and returning patients to activities of daily living (16, 17, 18 and 19).

Potential benefits of exercise therapy for the target population: Many studies have shown that people who exercise regularly are less likely to suffer lower back pain (20 and 21). In addition, exercise therapy is one of the most common procedures used widely to treat back pain (21).

Exercise therapy is prescribed alone or in combination with other treatments. Clinical guidelines of exercise therapy for chronic low back pain are varied, but their ultimate goal of all pain is pain relief and improvement of functions of the patients (22, 23 and 24).

Patients with chronic low back pain have weak trunk muscles compared to healthy individuals (25). Positive results of exercise therapy on Chronic Lower Back Pain (CLBP), especially for those who have a weak trunk muscles are proven (26, 27 and 28). The weakness exists in muscle strength, endurance, and flexibility (29). In the study by Farahpour et al. (2002), reduction of pain and improvement of lumbar flexor isometric forces were seen after 12 sessions of exercise therapy (5). In a study of Banigel et al. (2008), decreases in pain and lumbar stabilization were observed after Pilates exercises for six weeks (4).

In the study by Kiani Dehkordi et al., pain reduction and increase in range of motion in the hip joint angle of 56 female patients with low back pain for one year that had gone through twelve sessions of Pilates training session was observed (6). In the study by Bakhtiyari et al. (2004) a significant increase in trunk flexion range, increase in the angle (SLR), and rapid performance of everyday activities (functional improvement of patients) was observed after 4 weeks of exercise protocol in sixty patients with disc herniation (7). In the study by Ghiasi et al (2006), reduction in pain and disability was observed in 34 patients with chronic low back pain after 14 sessions of Williams and stabilization exercises (8).

In the study by Samadi Pour et al. (2008), the effects of three different ways of exercise therapy were studied on pain and disability in patients with chronic mechanical low back pain. The results showed that exercises done in all three groups, with emphasis on muscle strengthening exercises of spine could be effective in reducing pain of the patients. Nevertheless, Williams and McKenzie exercises are always performed in static conditions and strengthen a specific muscle group. However, in stabilization exercise in addition to strengthening muscles in static conditions, their strengthening is done in dynamic conditions as well (9).

In the study of article (2005), reducing pain and disability was observed in the endurance training, coordinator training and the combination of the two methods in patients with chronic low back pain (2).

2. Research Methodology

Regarding the results, this study is applied. In terms of the structure, it is quasi-experimental and prospective. In this study, the effect of the independent variable (8-week home exercise therapy) on 6 dependent variables of physical fitness (general static strength of flexors of the trunk, hip flexors endurance, endurance of the lumbar extensors, general dynamic strength of flexors of the trunk, back and hamstring flexibility, and general endurance) of women with back pain is evaluated. The population was female

patients who referred to the orthopedic department of Mehr Yazd hospital of Isfahan with age range of (30-50 years) and back pain for more than three months. Of the patients, the ones willing to participate in pre- and post-test or those naturally not showing high commitment to the program were used as controls, and thus exercise therapy group and exercise therapy groups were formed. Two-week exercise program (three sessions per week) was practical training, then patients with a guide disc corresponding movements in three-phase continued training exercise for two months.

Physical exams were repeated until the end of the program every two weeks, so that based on that feedback is given to patients considering their improvements and refinements related to overload.

The study stages in the control group included 1) pre-test, 2) period of two months after the test, 3) and post-test. In the experimental group, we had eight weeks of treatment and three tests. The stages included, 1) Pre-test, 2) two weeks of exercise therapy with the help of trainer, 3) mid-test one, 4) two weeks of exercise therapy with the help of educational CD, 5) mid-test two, 6) two weeks of exercise therapy with the help of educational CD, 7) mid-test three, 8) two weeks of exercise therapy with the help of educational CD, and 9) post-test.

In exercise protocol, the experimental group did exercise for eight weeks, three sessions per week, 30-45 minutes each session. The first two weeks was with the training of the researcher training and following six weeks with the help of CD at home. Training was done in three phases 1, 2 and 3 in three separate CDs given to patients. Performance enhancement was done from a supine position to sitting and standing was in three phases. In designing the selected training of this project, several features had been considered: 1) the main objective is overcoming the hamstring weakness, waist, back, quadriceps, and weak short abs, hamstrings, and calves. 2) in choosing movements, attention is paid to eliminate the root of the problem (depreciation of vertebrae) and the individual is prepared for sleeping, sitting, standing, and walking, 3) engaging deep muscles with fine spin-on, clicking movements, and fine movement, 4) attention to the chain integration of joints and action on joints farther from the center of pain in the early phases, 5) start with open chain and gradual approaching of closed chain (progressive overload), 6) course of objectives : increased range of motion, endurance, strength, balance, and power from a supine position to standing, 7) attention to the high level of ability of the individual and that chronic pain should be tolerated and its definite cure is out of reach, and 8) in this research, on the one hand, by calculating compliance coefficient, the practicality of the exercise programs designed for is specified. On the other hand, it is specified that over a period of two months how much of progress this sport program creates in physical fitness. In case of success of the exercise program, patients could be recommended consider it in their lifestyle.

VAS scale was used to assess pain. This scale is in the form of a horizontal bar with a length of 100 mm or 10 cm whose one end, zero, means no pain and the other end shows the most severe pain as possible. The patients were asked in addition to looking at the continuum above, determine the amount of pain they felt at that moment (30).

Oswestry functional disability questionnaires was applied to assess the severity of functional disability in the subjects. The questionnaire consisted of ten six option sections; the 10 sections contain the subjects' performance of everyday activities. Each section ranks the disability in performance ranged from zero (optimal performance without pain) to ten (inability to exercise due to severe pain). Thus, a higher score means more inability in performance. Option A has zero points and the rest of the options have two points.

The total score of each section is ten and disability index value will be held between zeros to one hundred. On how to interpret the results of the scale there are two methods. (A) The total scores is considered as the amount of disability. (B) Percentile ranking is as follows: Zero to twenty percent means mild disability, twenty to forty percent means moderate disability, forty to sixty percent is severe disability, and and sixty to eighty percent is very severe disability and eighty percent to one hundred percent shows patients crippled or malingering (31).

Results and findings

In this study, there are two factors for pain and inability and we have studied the influence of a period of home treatment training on them. Intra-group factor consisted of two tests (before and after training). Intra-group factor consisted of two tests (before and after training). Inter-group factor included grouping based on participation and non-participation in training courses during 8 weeks of practice. Accordingly, research has one experimental group (n = 14), and one control group (n = 15), respectively. For each of the socio-psychological variables, one analysis of variance for repeated measures was performed.

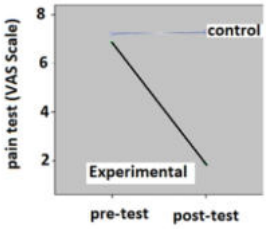

Figure 4-7. Line chart of changes in pain level test in 2 turns

Description of Figure 4-7: The amount of pain test in experimental and control groups were 6.85 and 7.21 in the pre-test. In post-test, the amount of pain in in experimental and control groups were 1.89 and 7.28, respectively. In the analysis of variance for repeated data, the most important measure is to compare the interactive changes (slope of the change lanes of research groups). If this comparison is significant there is no need to carry any comparative study.

In the Figure 4-7 it is observed that the line slope of the experimental group is quite different from the control group. This difference is statistically significant (p = 000/0 and F (27 and 1) = 230.8). **The result:** the training period, the experimental group showed an advancement of 262%, while the control group has not progressed. The general conclusion is that treatment exercise causes progress in pain test.

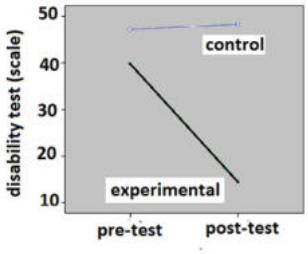

Figure 4-8. Oswestry changes linear chart in 2 sets of tests.

Description of Figure 4-8: Oswestry test amounts in in experimental and control groups were 39.9 and 47.2 respectively in the pre-test. In the post-test _ the amount of Oswestry test in experimental and control groups were 14.7 and 48.2, respectively. According to the comparison of interact changes (slope of the change lanes of research groups) were of significant difference, there is no is no need to carry any further comparisons. In Figure 4-8 it can be observed that the slope of the experimental group is quite different from the control group. This difference is statistically significant (p=000/0 and F (27 and 1) =138.1). **The result**: during training, the experimental group showed 171% progress in Oswestry test, While the control group dropped by 2 percent. The general conclusion is that treatment exercise leads to improvements in the Oswestry.

Summary of inferential analysis:

In this section, the summary of 2 comparisons carried out using ANOVA for repeated data is provided. The results are summarized in Table 4-8. Overall, in each of the two psychosocial factor there was a significant interaction in favor of the experimental group. In other words, the experimental group had progressed during training, while the control group did not improve.

Table 4-8. The summary of duplicate data analysis in Chapter 4

F and P coefficients and differences			differences	post-test	pre-test	group	factor
Intra-group df (1and27)	Interaction df (1and27)	Inter-group df (1and27)		SD±average	SD±average		
217.4 (0.000)	230.8 (0.000)	52.5 (0.000)	4.96	0.79 ± 1.89	1.78±6.57	Experimental	pain (scale10)
			- 0.08	1.3 ± 7.28	1.27 ± 7.2	control	
116.9 (0.000)	138.1 (0.000)	22.7 (0.000)	25.2	7.6 ± 14.7	10.4 ± 39.9	experiment	Oswestry (scale100)
			-1.05	13.7 ± 48.2	14.3 ± 47.2	control	

SD = standard deviation, df = degrees of freedom

Discussion and conclusion

In this part of the research findings on the effect of home treatment exercise on psychosocial factors in patients with low back pain is discussed. Psychosocial factors studied were two factors including: pain and disability. These factors have a major role in determining the mental health community. Then, two psychosocial factor studied will be discussed separately and at the end the of research the findings on the two factors will be summarized.

Pain, is the most common consequences of back pain (3). Most backaches are mechanical in nature, and its symptoms can include limited range of motion, or an inability to stand straight. Sometimes the pain spreads to other parts of the body. People often get severe pain when bending to lift heavy objects (32). In this study, pain was measured by VAS scale. The results of this study showed that pain in the experimental group was significantly reduced in post-training period, However, a significant decrease was not observed in the control group.

This finding confirms the effectiveness of home treatment exercise used based on the psychological factor. The results of this study is in line with the results of Kokanen and Malika (2000), Sertepoyraz et al (2009), Snouck (1988), Anderson (2005), Gladwell (2006), Magnien (1999), Van der Royer (2008), Marshall and Murphy (2008), Van Todler (2005), Oliver (2008), Takymasa (1995), Rasmussen bar (2003), Tasayo et al (2009), Martin Deskaros (2002), Chatzitdor and et al. (2007), Demolin et al (2006). All the above studies reported improvement in pain after the training period. The results obtained do not match to that of Magnien (2001). Magnien, in a research, examined the increase in muscle strength after treatment in patients with chronic low back pain. The results showed no changes in pain and disability (33).

Since the waist is the center of the human body, every move on the organs distal pressure on the lower back. The pain must be associated with disability in limbs and trunk. Low back pain is one of the most common causes for disability and loss of working days reported in many countries. In the United States, the most common cause of disability in musculoskeletal disorders and almost half of disability are a result of chronic low back pain. The research studies in many industrialized countries, introduced chronic low back pain the most common cause of disability for work (34). Thus, the decline in disability reported by patients, can be the most important predictor of successful treatment of chronic low back pain. Many studies have shown that in patients with low back pain, treatment exercise can cure pain and disability (35). In this study, the degree of disability by back pain was measured by the Oswestry questionnaire. Physical disability is a physical factor. But since this factor is measured indirectly, we classify it in the section of psychological factors. In other words, we have not directly measured physical disability, but the person was asked about his disability. The results of this study showed that the degree of disability in the period after training in the experimental group significantly decreased. However, a significant decrease was not observed in the control group. This finding confirms the effectiveness of home treatment exercise used based on the psychological factor. The results of this study is in line with the results of Kokanen and Malika (2000), Sertepoyraz et al (2009), Snouck (1988), Anderson (2005), Gladwell (2006), Magnien (1999), Van der Royer (2008), Marshall and Murphy (2008), Van Todler (2005), Oliver (2008), Takymasa (1995), Rasmussen bar (2003), Tasayo et al (2009), Martin Deskaros (2002), Chatzitdor and et al. (2007), Demolin et al (2006). All the above studies reported improvement in pain after the training period. The results obtained do not match to that of Magnien (2001). Magnien, in a research, examined the increase in muscle strength after treatment in patients with chronic low back pain. The results showed no changes in pain and disability (33).

In the psychosocial factors analysis, it was shown that how home exercises could control the pain and disability feelings. Logical analysis conducted on each psychosocial factor showed that how the improvement of physical fitness affects psychosocial factors.

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