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Subjective assessment of kinesitherapy as an element of comprehensive rehabilitation process of subjects with lower spine pain

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Abstract

Background. Spinal pain has triggered interest in many fields of medicine, such as orthopedics, neurology, rheumatology, and rehabilitation. Despite ongoing development of surgery techniques, a major role is played by fitness improvement treatments, which need to be promoted. The aim of the research was a subjective assessment of kinesitherapy as an element of comprehensive rehabilitation process of subjects with lower spine pain.

Material/Methods. This paper has an empirical character. The research was conducted amongst a randomly selected group of 60 patients of Independent Public Health Care Unit in Choszczno, Poland (rehabilitation at an outpatients' clinic), aged 20-51. All of them were subjected to a series of 10 kinesitherapy treatments. The research used diagnostic polling method and the following techniques: survey and implicit interview.

Results. The research proved that after completion of 10 treatments, the subjects noticed a significant improvement of their health. Kinesitherapy helped return to an active professional life for those who were forced to resign or suspend their work. Subjects reported that 10 kinesitherapy treatments were enough to notice their effectiveness in lumbar spine pain reduction. Kinesitherapy treatments resulted in a reduced usage of painkillers.

Conclusions. There is evidence of positive impact of physical exercise on treatment results and beneficial effects in patients with spinal pain. Proper education aimed at changing bad habits and advising how to care for spine may be a powerful way to fight for health.

Keywords: spine, pain syndromes, lumbar spine, kinesitherapy, curative exercises, improving fitness.

Introduction

Spinal pain has triggered interest in many fields of medicine, such as: orthopaedics, neurology, rheumatology and rehabilitation. As a result of modern lifestyle changes, the human body has been deprived of the natural need for movement. Reduced physical activity along with sedentary lifestyle lead to overloads in the motor system [1] and are the main cause of back pain caused by modern lifestyle, type of work and ignorance in terms of ergonomics of strain [2].

Back pain syndromes are one of the most common afflictions related to the motor system of individuals in economically productive and post-productive age. It is estimated that at some point, 85% of society suffers from low back pain. In majority of these cases (90%), pain subsides within three months, but almost 50% of population suffers recurring symptoms. Low back pain is the most common cause for determining disability in persons below 45 years of age; and costs of treating patients aged 20-50 are the highest amongst all other diseases [3]. The commonness of the problem means it has become a medical, economic and social issue.

Latest research highlights the need to consider quality of life in the rehabilitation process. By measuring the quality of life, one may obtain in-depth information about people suffering from low back pain, their attitude towards their condition, as well as towards the rehabilitation process [4]. Problems with every-day tasks and decreased quality of life in people suffering from lumbosacral pains often lead to mood disorders, and even depression [5].

The only solution to this problem is an effective therapy which focuses on causes of pain. Only a precise diagnosis can help establish the most effective course of treatment. There is no single therapy suitable for all instances of low back pain [3]. Literature describes many treatment methods [6, 7], but the best effects are achieved by using a comprehensive therapy [8], which is also called multi-disciplinary model of low back pain treatment [9].

Despite ongoing development of surgical techniques, functionality improvement treatment plays a significant role and must be adequately appreciated. There are reasons to believe that physical exercise which improves fitness also increases well-being and reduces pain (through release of endorphins) [10]. Physical exercise treatment plays an important role in therapy, as it may help stabilize lower spine. The aim of therapy is not only to reduce pain and improve functionality of the affected area, but also to prevent recurrence.

Low back pain is characterized by impaired central stabilization and delayed activation of the transverse abdominal muscle [3], but actually all muscles from the ‘stabilization center’ partake in ensuring optimal stabilization and functionality [11]. Scientific research has proved that lack of knowledge of proper use of spine stabilizing muscles predisposes individuals to low back pain [3]. Recent research highlights importance of thoracolumbar fascia in generating low back pain, as it plays a role of natural belt of the spine, is not a passive structure, is innervated, and may contract. It may play a greater role than muscles in generating pain sensation in low back [12, 13]. During muscle contraction, thoracolumbar fascia becomes an active nervous and muscle proprioceptor; it serves as a track that conveys feedback during lifting heavy objects [14]. Active motor learning is the quickest and most effective method of learning for the nervous system [15]. Importantly, exercises for central stabilizing muscles not only strengthen torso muscles; in persons with low back pain, motor re-education of deactivated muscles may be more important than strengthening exercises [14]. The aim of the research was a subjective assessment of kinesiotherapy as an element of comprehensive rehabilitation process of subjects with low back pain.

Material and methods

This paper is empirical. The research used diagnostic poll method and the following techniques: survey and implicit interview.

The research was conducted in 2014 in an independent public healthcare institution in Choszczno (treatment at an outpatients’ clinic). There were 60 subjects (34 men and 26 women) aged 20-51 with diagnosed low back pain. The subjects were treated with kinesiotherapy: a series of exercises used in a functional rehabilitation program, carried out in a hospital environment and aimed at improving functionality of the spine, which had been reduced by lumbosacral pain.

The exercise program presented to the patients had been based on stabilization exercise programs available in the literature [16, 17]. The program included precise and specialist kinesiotherapeutic exercises, coordination exercises, joint range improvement exercises, spinal muscles endurance exercises, hip joint mobilizing exercising, thoraco-lumbar spine joints mobilizing exercises, stabilization exercise program and abdominal muscle strengthening exercises. It also employed gym exercises, stretching, aerobic (such as fitness) exercises, as well as ergonomic and relaxation exercises. Patients worked in their pain-free range of movement and their loads were individually adjusted. At the beginning, the loads were low, giving priority to teaching proper coordination and awareness to better control

lumbar spine. It needs to be noted that spine exercises should not be done within the first hour after waking up in the morning due to higher hydrostatic pressure of the intervertebral disc [18]. At the same time, occupational therapy was conducted; it included motor exercises focused on functional tasks, which stimulated and intensified occupational activity.

Before patients joined the therapeutic program carried out in a hospital environment, they were examined by a physician and qualified to have individual kinesiotherapy therapy. To assess results of low back pain treatments, patients were subjected to pre- and post-treatment examinations according to a protocol.

The obtained data was analyzed, and calculations were made in Excel 2013. Quantitative variables were characterized by basic descriptive measurements. Qualitative variables were expressed in percentage (%). Normality of quantitative variables was tested with normality test by Shapiro-Wilk. To compare results before and after treatment (quantitative variables), Student's t-distribution test was used.

Results

Table 1 presents demographic and social aspects of subjects, duration of their illness, and type of work.

Subjects who completed higher education constituted the biggest group (35%). 30% of subjects had incomplete higher education, 3.3% completed primary education, and 11.7 – secondary vocational school.

In terms of work, the biggest proportion of subjects performed sedentary work (58.3%), 21,7% had moderately strenuous physical work, while 11.7% of them performed strenuous physical work. Work hours analysis revealed that 50% of subjects worked over 40 hours per week. Only 20% of subjects worked fewer than 40 hours weekly.

As for the duration of lumbar disc disease, 3.0% indicated a +20-year period, 15% of subjects suffered from back pain for over 11 years, and the most numerous group were those who suffered from back pain between 1 and 10 years (81.7%).

Table 1. Subjects' profile

	Variable	(%) Descriptive Measure
Sex	F	56.7
	M	43.3
Age [years]	20-30	16.7
	31-40	25.0
	41-50	45.0
	51+	13.3
Education	Primary	3.3
	Vocational secondary	11.7
	Higher	20.0
	Incompleted higher	30.0
	Completed	35.0
Type of work	Sedentary	58.3
	Physical with moderate intensity	21.7
	Physical with high intensity	11.7
	Other	8.3
Working hours	Fewer than 40h/week	20.0
	40h/week	30.0
	Over /week40h	50.0
Duration of illness [years]	0-10	81.7
	11-20	15.0
	20+	3.3

Source: own work.

Before the kinesiotherapy treatment, all subjects experienced pain (Table 2), which differed in terms of intensity: from light (10%), medium (38.3%), to very intense (51.7%).

Fig. 1 presents types of pain experienced by the subjects.

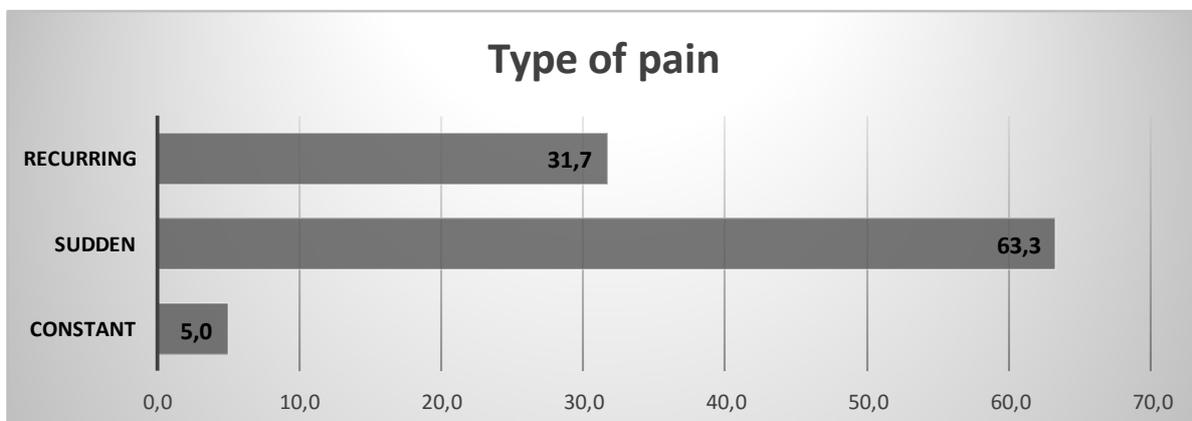


Fig. 1. Types of pain experienced by the subjects

Source: own work.

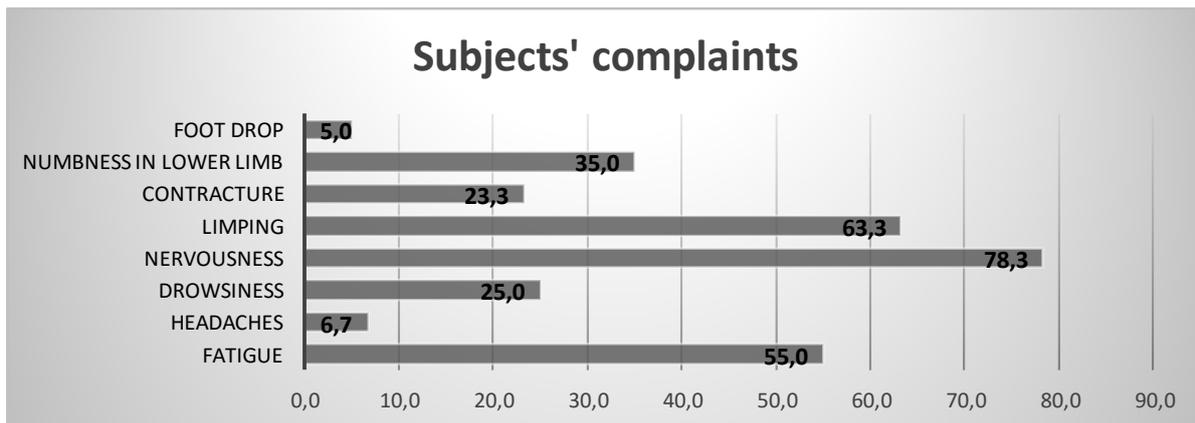
Table 2 illustrates the evaluation of patients' health before and after kinesiotherapy. A statistically significant ($p \leq 0.001$) improvement was noted for pain reduction, physical fitness improvement, general health and life quality.

Table 2. Comparison of subjects' health before and after treatment

Variable	Descriptive	Before treatment (%)	After treatment (%)	Level of signification
Pain	Very intense	51.7	3.3	++
	Moderately intense	38.3	10.0	
	Light	10.0	80.1	
	No pain	0.0	6.6	
Physical fitness	Very good	0.0	3.3	++
	Good	16.7	76.7	
	Quite bad	53.3	16.7	
	Bad	30.0	3.3	
General health	Very good	0.0	1.7	++
	Good	5.0	78.3	
	Quite bad	41.7	8.3	
	Bad	53.3	11.7	
Quality of life	Very good	0.0	1.7	++
	Good	1.7	76.7	
	Quite bad	83.3	20.0	
	Bad	15.0	3.3	

Source: own work.

Fig. 2 present various complaints made by patients. The biggest problem for patients was nervousness (78,3%). Many subjects indicated limping (63.3%), fatigue (55.0%) and numbness in lower limbs (35.0%). They also experienced contractures (23.3%), drowsiness (25.0%), headache (6.7%) and foot drop (5.0%).



*Results do not sum up to 100%, as patients could choose more than 1 answer.

Fig. 2 Complaints related to disc disease of lumbar spine

Source: own work.

Fig. 3 presents effectiveness of comprehensive treatment of low back pain in subjective assessment of patients. Almost 62% of them felt much better after the series of specialized kinesiotherapeutic exercises; 20.0% of subjects noted a slight improvement, while 13.3% experienced significant improvement and regained their fitness. 5.0% of subjects did not experience any improvement after completed hospital treatment.

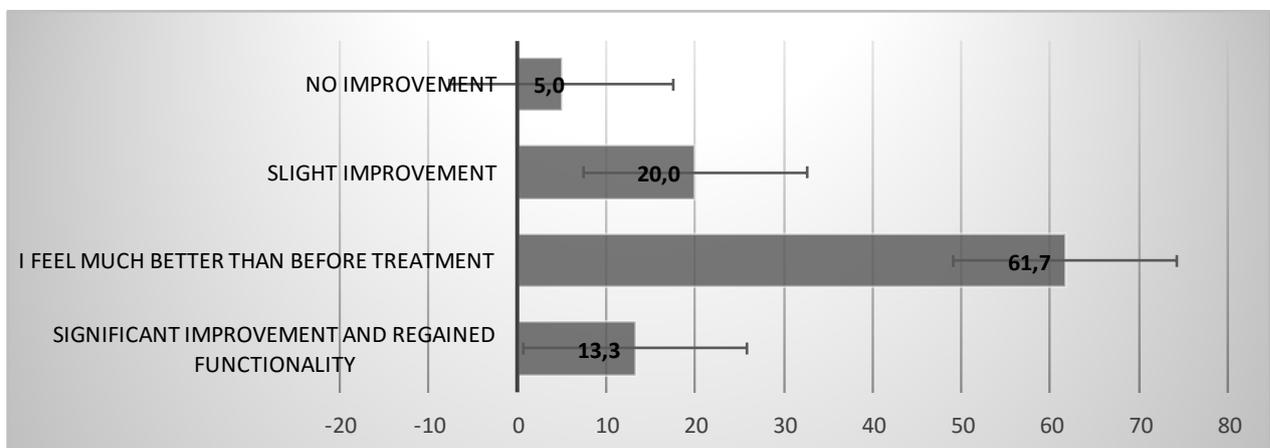


Fig. 3. Assessment of effectiveness of the therapeutic program carried out in a hospital environment

Source: Own work.

Fig. 4 presents effects of comprehensive rehabilitation program in terms of their return to occupational and social activity. Over 86% of subjects returned to work; 13% were still unable to work and did not resume professional activity.

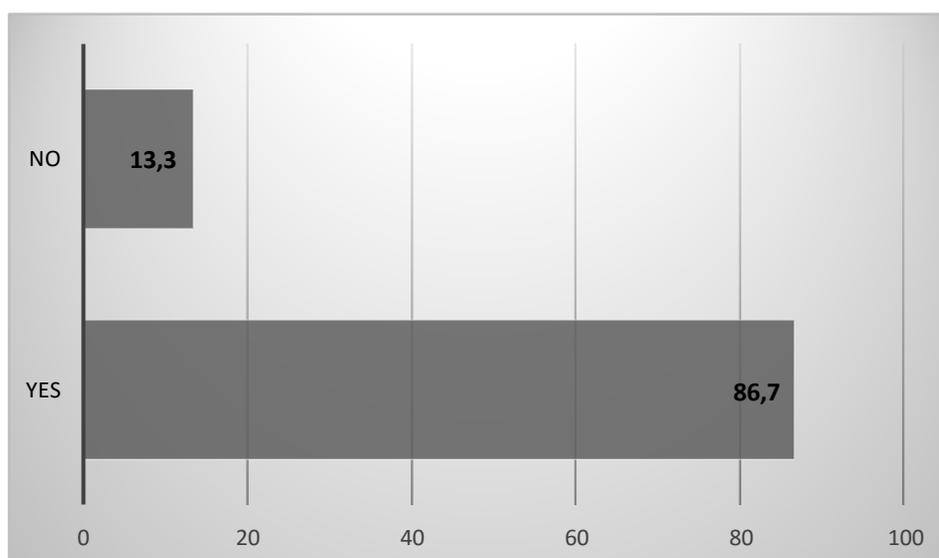


Fig. 4 Proportion of subjects who resumed their professional activity after the therapeutic program

Source: own work.

Discussion

Therapeutic exercise program carried out in a hospital environment and based on central stabilization concept plays a significant role in low back pain therapy. It allows for rehabilitation that encompasses fitness and stabilization exercises for lumbar spine with a gradually increased level of difficulty to obtain therapeutic results. Isolating patients from their day-to-day environments helped eliminate factors which contributed to their disease, e.g. work or chores at home. The treatment was aimed at improvement of health, mental and physical fitness, as well as resuming functions in the society.

The research proved that the model of treating low back pain with central stabilization exercises brought satisfactory results.

Most of participants experienced positive changes. Improvement was noted in all aspects (with statistically significant differences). Subjects noticed significant health improvement after completion of series of exercises. Having completed the treatment, only 20% of participants evaluated their health as ‘bad’ or ‘quite bad’, while before treatments the proportion was a staggering 95%. Subjects also reported improved quality of life. After the treatment, over 78% of subjects assessed their life quality as ‘good’ and ‘very good’, while before the treatment only 2% had such a positive outlook. In terms of physical fitness before and after treatment, it improved according to 63% of subjects. This improvement was undoubtedly related to increased physical activity, individual and group exercise, as well as a modified lifestyle.

Kinesiotherapy helped return to an active professional life for those who were forced to resign or suspend their work. After treatment, over 86% of participants resumed their work activities.

The biggest impact of kinesiotherapy was visible in terms of pain intensity assessment. Patients reported effectiveness of kinesiotherapy in reduction of lumbar spine pain. Over 80% of subjects claimed that after treatment their pain significantly eased up, and 6% of participants reported total disappearance of pain. Before treatment, almost 52% of patients rated their pain as 'very intense', while 38% considered it 'moderately intense'. After treatment, only 3% of patients experienced 'very intense' pain.

Kinesiotherapy should become an inseparable part of treatment for patients with lumbar disc disease [19]. In literature, much consideration is given to physical activity. Physical activity plays a key role in primary and secondary prevention, as well as in relieving low back pain. Research conducted by Murtezani et al.'s team [20] showed that kinesiotherapy was helpful in reducing back pain in lumbar spine. Patients with chronic back pain who did regular aerobic exercises, displayed reduction of pain, fear and disability. Łukaszewska and Lewandowski [21] carried out a research amongst 2,676 students aged 13-19 and concluded that frequent physical activity does not prevent adolescents from back pain, but it may reduce its negative functional consequences and speed up the recovery process. Physical activity may be perceived as an important element of psycho-motor recovery, which reduces pain, improves functions, ensures rest and leads to improved mood and happiness [22].

Chan et al.'s team [23] did not observe positive results of aerobic exercises combined with traditional kinesiotherapy. Having studied two groups in 8-week and 12-month cycles, he did not observe significant differences between subjects rehabilitated with traditional kinesiotherapy treatment and those whose exercise program was enriched with aerobic exercises. It is, however, worth noting that in both groups improvement of health was reported. It may be, therefore, stated that treatment is influenced by uniqueness of human body behaviors. Benefits of kinesiotherapy treatments were experienced by subjects in Friedrich et al. teams' research [24]. 93 patients were divided into 2 groups with identical kinesiotherapy exercise program and were advised to exercise at home as well. What differentiated these groups was the fact that one of them participated in five motivation sessions which encouraged them to exercise. These subjects were more willing to exercise, compared to the other group, which was not subjected to the sessions. Nevertheless, both groups experienced reduced pain and general improvement of fitness. Many subjects were able to resume their occupational activity.

Hubley-Kozey et al. [25] and van Middelkoop et al. [26] analyzed literature dedicated to exercises used in chronic back pain. Having analyzed the literature and obtained results, they unanimously agreed that majority of research reported improvement in patients' functionality and reduced pain as a result of kinesiotherapy. Despite these results, authors suggested further research to analyze in-depth physiological and biomechanical parameters. These aspects are improved with properly selected exercises, which leads to satisfactory results.

According to results obtained by authors of this paper, kinesiotherapy did reduce low back pain related to disc disease. Majority of subjects stated that kinesiotherapy significantly improved their health. Kinesiotherapy is effective regardless of sex, age, home address or social background, which makes it a universal method. The research revealed that over 61% of subjects reported improved well-being after kinesiotherapy treatments. 20% of individuals claimed that treatment brought only slight improvement. A significant improvement was noticed by 13%, while only 5% did not report any improvement. These results prove that subjects thought highly of effectiveness of kinesiotherapy treatments which were aimed at pain reduction in lumbar spine.

Despite ongoing development of surgical techniques, functionality improvement treatment plays a significant role and must be adequately appreciated. Prevention is therefore very important. It is believed that one of the most important preventive measures is promoting physical activity as part of the *health-related fitness (H-RF)* program. Increasingly often physical activity is seen as health indicator, which is an important element of health, along with mental and social fitness [27]. These elements are believed to be directly linked with higher quality of life and play a key role in preventing many health problems. According to World Health Organization (WHO), factors related to sedentary lifestyle will be responsible for 70% of diseases in 2020 [27]. Proper education aimed at changing bad habits and showing how to use the spine correctly may be a powerful resource in the fight for health. This was emphasized by Bendíková & Kostencka [28], who highlighted the fact that there was insufficient primary and secondary prevention and diagnostics; they also noted functional negligence and morphologic changes in musculoskeletal system which often lead to disorders in adults, resulting in other functional and structural problems.

Conclusions

1. There are reasons to believe that physical exercises impact effectiveness of treatment and positive treatment effects in patients with low back pain.

2. Proper education aimed at changing bad habits and showing how to use the spine correctly may be a powerful resource in the fight for health.

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