# EFFECTIVENESS OF MANUAL YUMEIHO THERAPY AND EXERCISE ON DEPRESSION AND NEUROPATHIC PAIN IN PATIENTS SUFFERING FROM CHRONIC NONSPECIFIC LOW BACK PAIN

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## ABSTRACT

*Introduction*: Chronic low back pain is the leading cause of disability, which reduces quality of life and increases the healthcare costs. Psychosocial factors (depression, kinesiophobia and somatization) may also have an important role in the appearance and duration of chronic nonspecific low back pain. Depression may predispose low back pain, while the chronicity of pain affects the degree of disability, which is also related to mental health. Many studies suggest the association between depression and low back pain by explaining a significant physiological link. Different types of manual therapy are used in the treatment of chronic low back pain, but recent studies suggest that a rehabilitation models which combine manual therapy and exercise, provide better results compared to individual (separate) applications. The aim of this research was to examine the effects of the rehabilitation program, which includes manual yumeiho therapy and exercise, on depression in people suffering from chronic nonspecific low back pain.
*Methods*: The study included 21 participants, aged 40 to 60 (M=51.1, SD=5.9) who suffer from chronic nonspecific low back pain. The study included the initial and final depression test and the initial and final neuropathic pain test. Between the initial and the final testing, a three-week therapeutic procedure of yumeiho manual therapy and exercise was performed (15 treatments). Repeated estimates of depression and neuropathic pain were tested 30 and 60 days after the implementation of the rehabilitation protocol.
*Results*: Statistically significant improvements were noted between the initial and the final test in both observed variables. Significant improvements (lower depression and neuropathic pain) have also been noted 30 and 60 days after the implementation of the rehabilitation protocol (in relation to the initial state).
*Conclusion*: The findings indicate that the rehabilitation protocol, involving manual yumeiho therapy and exercise, is an effective method for treating depression and neuropathic pain in people suffering from chronic nonspecific low back pain. Considering the lack of research on the effects of manual therapy by yumeiho technique, the results contribute to a better understanding of technique which, although used in practice, has not been sufficiently explored. Further research is required, on comparing this rehabilitation model to other methods, as well as longer follow-up in the post-rehabilitation period.

**Keywords**: rehabilitation program; spine; movement; quality of life

## Introduction

During a lifetime period, about 84% of people experience at least one episode of low back pain, which represents 11–12% of the population's disability (Airaksinen et al., 2006). In case of acute low back pain, 75–90% of people recover within six weeks regardless of medical intervention, while about 25% of people develop chronic low back pain. Chronic low back pain is pain, muscle tension and discomfort between the lower rib arch and the lower gluteal furrow, with or without spreading in the leg (Vora et al., 2010). Depending on the cause, low back pain may be divided as nonspecific or specific (Grazio et al., 2012). Nonspecific low back pain is a type without a specific cause such as infection, tumour, fracture, osteoporosis, ankylosing spondylitis, radicular syndrome or cauda equina syndrome (Airaksinen et al., 2006). Psychosocial factors may also have an important role in developing and duration of chronic nonspecific low back pain. It primarily refers to depression, fear of disasters, kinesophobia and somatization (Pincus and McCracken, 2013). Long-term pain that does not decrease despite treatment, prolongation of disability, decreased movement in everyday life, depression, anxiety and sleep disorders are all part of a regular clinical finding in people suffering from chronic low back pain (Schaefer et al., 2014). Depression may predispose low back pain, while chronicity of pain affects the degree of disability, which is also associated to mental health (Wang et al., 2010). Such patients rate their pain higher and more complex than those who do not have depression (Tsuji et al., 2016). Burke et al. (2015) indicate that depression and chronic pain may occur in up to 80% of patients suffering from these disorders. Accordingly, in designing a rehabilitation model, these factors should be taken into account. This assumption is supported by insights suggesting an association between depression and low back pain, and emphasizing that their association may have a more significant biological link than simple cause and effect relation (Elman et al., 2011). Likewise, it is estimated that about 35% of patients with chronic pain syndromes suffer from neuropathic pain also (Bouhassira et al., 2008). Despite the development of modern technology in the diagnosis and treatment of low back pain, functional disability due to back pain has risen in recent decades (Deyo et al., 2014). Due to the complexity of treating chronic diseases, patients often use complementary-alternative medicine as an adjunct or instead the usual medical treatment (Rosenberg et al., 2008). One of the complementary-alternative methods is the manual therapy by yumeiho technique, in which the therapist's hands are the basic tool for the treatment. The main advantage of this technique is comprehensiveness because it combines methods of crushing, pressing and techniques of manipulation and mobilization of bone-joint structures (Saionji, 1990). After the literature overview, it is concluded that no study has been found examining the impact of manual yumeiho therapy and exercise on depression and neuropathic pain in people suffering from chronic nonspecific low back pain. The aim of this research was to examine the effects of the rehabilitation program, which includes manual yumeiho therapy and exercise, on depression in people suffering from chronic nonspecific low back pain.

## Methods

A sample of 21 participants (aged 40 to 60) was used. Sample size estimation was made by G*Power 3.1.9.2. The criteria for inclusion in the study were as follows: diagnosed low back pain syndrome for at least 3 months and pain intensity equal or higher than 4 according to the Visual Analogue Scale (VAS, Gould et al., 2001). Exclusion criteria: malignancies 5 years backwards, inflammatory rheumatic diseases, inability to control stool and urine, more severe cardiovascular disease, more severe neurological diseases, applied physical therapy in the lumbar spine 3 months backwards, disc extrusion and pregnancy. The criteria were checked by inspecting the medical records of each subject. Prior to joining the survey, all participants became familiar with the research objectives, protocol and potential risks. All participants received an explanation notice and signed consent of willing participation. The study included initial and final testing of depression level and neuropathic pain. Between initial and final testing, a three-week treatment procedure was performed (15 treatments in total). Depression levels were tested by the Beck Depression Scale (BECK, Beck et al., 1996). The questionnaire is consisted of 21 questions (rated 0 to 3). The minimum score is 0, the maximum is 63. Average results show that subjects with up to 9 points do not have depression; 14–19 points

indicate mild depression, while 20–28 points indicate moderate depression. Severe depression is estimated when a score is equal or higher than 29. Neuropathic pain was determined by the LANSS-The Leeds assessment of neuropathic symptoms and signs (Bennett, 2001). The highest possible sum is 24 (higher value means stronger pain intensity), while values equal or higher than 12 indicate that neuropathic mechanisms contribute to the feeling of pain. The longevity of the quality of rehabilitation program was monitored after the end of therapy, as well as one and two months after the end of the program by re-measurement of depression and neuropathic pain. Participants underwent 15 treatments over a 3-week period. The combination of yumeiho manual therapy and exercise was performed 3 times a week for 45 minutes (Monday-Wednesday-Friday), while separate training sessions were performed 2 times a week for 15 minutes (Tuesday–Thursday). Yumeiho therapy consists interchangeable and complementary components (methods of kneading and pressure). Their purpose is to soften and relax soft tissues. The third component involves techniques of manipulating bone-joint structures. Yumeiho therapy and exercise were conducted by an educated yumeiho therapist (master of kinesiology). The treatment is performed on the mat in kneeling position, with some interventions done in sitting or lying position. The exercise program included 30 exercises for improving neuromuscular control and increasing the mobility of the lumbar-gluteal region. The exercise program included specific exercises to strengthen *m. multifidus* and *m. transversus abdominis* and specific stretching exercises for *m. piriformis* and *m. quadratus lumborum*. Variables were presented by arithmetic mean, standard deviation, minimum and maximum values. Non-parametric statistical methods were used, depending on the distribution of the data. The Friedman's test was used to examine the difference between the initial condition and the observed measuring points (final condition, 30 and 60 days after the rehabilitation program).

## Results

BECK (depression)

Within those variable, descriptive indicators (Table 2), ranks (Table 3) are displayed first, then the differences between the first and other measuring points (final, 30 and 60 days after therapy), which is shown in Table 4.

**Table 1** *Basic parameters*

| | Age | Height | Weight |
|---|---|---|---|
| **$\bar{x}$** | 51,10 | 169,81 | 77,67 |
| **SD** | 5,941 | 6,509 | 16,608 |
| **Min** | 39 | 160 | 50 |
| **Max** | 60 | 179 | 130 |

Legend: $\bar{X}$ – arithmetic mean, SD – standard deviation, MIN – minimum, MAX – maximum

**Table 2** *Descriptive parameters*

| | N | $\bar{x}$ | SD | Min | Max |
|---|---|---|---|---|---|
| **BECK IN** | 21 | 10,90 | 7,483 | 0 | 25 |
| **BECK FIN** | 21 | 4,71 | 6,230 | 0 | 20 |
| **BECK 30** | 21 | 5,52 | 6,983 | 0 | 22 |
| **BECK 60** | 21 | 7,00 | 8,866 | 0 | 28 |

Legend: N – number of participants, $\bar{X}$ – arithmetic mean, SD – standard deviation, MIN – minimum, MAX – maximum

**Table 3** *Ranks*

| Indicator | Arithmetic mean of ranks |
|---|---|
| BECK IN | 3,45 |
| BECK FIN | 1,95 |
| BECK 30 | 2,17 |
| BECK 60 | 2,43 |

**Table 4** *Friedman's test*

| | |
|---|---|
| N | 21 |
| Chi-Square | 20,594 |
| df | 3 |
| Asymp. Sig. | **,000** |

The significance of p test is less than 0.05. Statistically significant differences in the BECK indicators were observed between an initial and other measuring points.

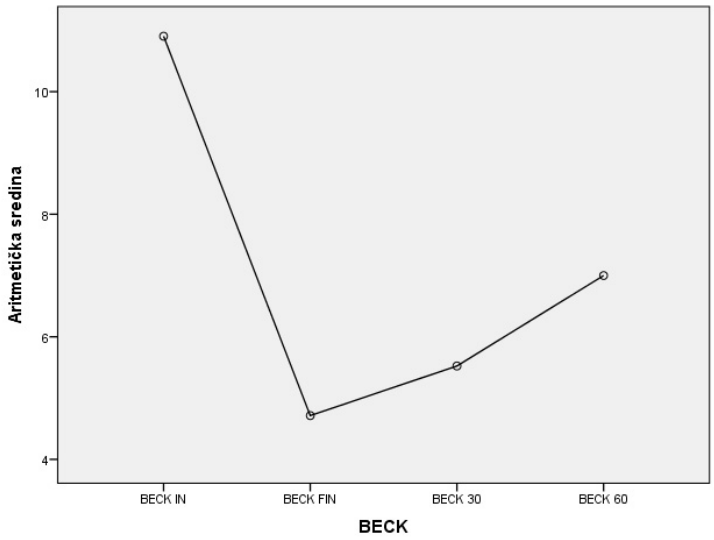


**Figure 1** *Differences in depression in people suffering from chronic nonspecific low back pain between the observation points (initial, final, 30 and 60 days after the therapy)*

*LANNS (neuropathic pain)*

Within that variable, descriptive indicators (Table 5), ranks (Table 6), then differences between the first and other measuring points are shown (final, 30 and 60 days after the therapy; Table 7).

**Table 5** *Descriptive parameters*

| | **N** | **$\bar{x}$** | **SD** | **Min** | **Max** |
|---|---|---|---|---|---|
| **LANNS IN** | 21 | 4,71 | 3,770 | 0 | 11 |
| **LANNS FIN** | 21 | 1,38 | 2,459 | 0 | 7 |
| **LANNS 30** | 21 | 1,29 | 2,261 | 0 | 7 |
| **LANNS 60** | 21 | 1,62 | 3,354 | 0 | 11 |

Legend: N – number of participants, $\bar{X}$ – arithmetic mean, SD – standard deviation, MIN – minimum, MAX – maximum

**Table 6** *Ranks*

| Indicator | Arithmetic mean of ranks |
|---|---|
| **LANNS IN** | 3,29 |
| **LANNS FIN** | 2,24 |
| **LANNS 30** | 2,19 |
| **LANNS 60** | 2,29 |

**Table 7** *Friedman's test*

| **N** | **21** |
|---|---|
| **Chi-Square** | 20,278 |
| **df** | 3 |
| **Asymp. Sig.** | **,000** |

The significance of p test is less than 0.05. Statistically significant differences in the LANNS indicators were observed between an initial and other measuring points.

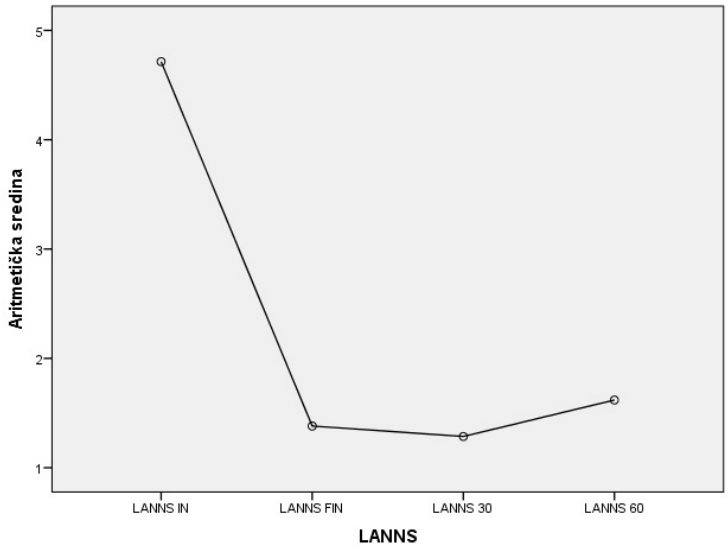


**Figure 2** *Differences in neuropathic pain in people suffering from chronic nonspecific low back pain between the observation points (initial, final, 30 and 60 days after the therapy)*

## Discussion

Participants who underwent rehabilitation program that included yumeiho manual therapy and exercise, reported a statistically significant reduction in depression and neuropathic pain at all observation points (final, 30 and 60 days after the rehabilitation program), compared to the initial measuring. Study suggests the quality of the used model. The data obtained, in addition to acute improvement, also indicate longer-lasting effect retention, which suggest the importance of continuity in care after the program. According to literature, only one study has compared the effects of manual therapy and exercise to physiotherapy program, in the treatment of depression (Niemistö et al., 2003). That study showed no statistically significant differences. Potential reasons may be caused by the mean age in used sample (24 to 46 years), and only 4 therapies performed in 4 weeks, unlike this study which included the active population of 40–60 years who performed 15 therapies in 3 weeks. In

mentioned study, the effects of the therapeutic protocol were measured after 5 and 12 months. This indicates that the high volume of therapies over a short period may significantly reduce depression in people suffering from chronic nonspecific low back pain. A review of the available literature did not identify any research that examined the impact of manual therapy and exercise on neuropathic pain in people suffering from chronic nonspecific low back pain. This research suggests that this combined model should be considered in the future, given the results that indicate significantly reduced neuropathic pain after a rehabilitation program. The effects were retained after 30 and 60 days. Relatively small sample is the limitation of the study and further research is needed to get a clearer picture. Authors recommend comparing this rehabilitation model to other methods, longer follow-up in the post-rehabilitation period and analysing the effects on a larger number of subjects.

## Conclusion

The results indicate that a rehabilitation protocol involving manual yumeiho therapy and exercise is an effective method of reducing depression and neuropathic pain in patients with chronic nonspecific low back pain. These results are valid only for this sample and do not allow generalization. Nevertheless, since the results showed positive effects, they may represent a valuable basis for planning further research on a larger sample of respondents.

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