

# The Effect of Exercise Therapy on the Quality of Life of Pregnant Women with Dorsopathies

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**Abstract** – 70 pregnant patients were examined with a diagnosis of dorsopathy, which were divided into 2 groups: group 1 performed the course of therapeutic gymnastics procedures (n = 35), group 2 was control (n = 35). If dorsopathy was diagnosed before pregnancy, patients gave Rg-, CT- or MRI-conclusion to their obstetrician-gynecologist. If for the first time they had low back pain (LBP) during the ongoing pregnancy, they were directed to consultation with the neurologist. The duration of the course of therapeutic gymnastics was 450 minutes (7.5 hours), it was held three times a week during 5 weeks under control physician exercises therapy. To assess the quality of life and the level of disability, we used the Oswestri questionnaire, EuroQol-5D questionnaire (EuroQuality of life-5 Dimensions), visual analog scale (VAS), verbal rating scale (VRS). The 1st group filled this questionnaire twice (before and after the course of physician exercises), the 2nd group – only once (at the time the LBP was registered, Me (gestational age) = 32 weeks). The analysis of the data allowed obtaining statistically significant results confirming the effectiveness of the physician therapy during pregnancy of women with dorsopathy.

**Keywords** – *Pregnancy, physician therapy, quality of life, low back pain (LBP), dorsopathy.*

## I. INTRODUCTION

In the developed countries low back pain (LBP) has reached the size of pandemic and is a very serious problem not only in medicine and society, but also in economy [1]. The main symptom complex of this group is pain in the trunk and limbs of non-visceral etiology caused by degenerative and/or inflammatory diseases of the spine and adjacent muscles [2]. Complete or at least partial elimination of LBP leads to an

improvement in the patient's quality of life (QL). Most often, pregnant women complain about the pain in the low back (LBP). V. Porvaznik et al. [1] considered that LBP was to be localized between the XII pair of ribs and gluteal folds. The main place among the medical methods of treatment of dorsopathies with acute pain in the lumbar region is occupied by NSAIDs and central muscle relaxants. Despite the sufficient list of drugs approved for use during pregnancy [3, 4] NSAIDs are contraindicated for pregnant women throughout the gestation period due to inherent embryotoxic and teratogenic effects, as well as due to unexplored pharmacokinetics and pharmacodynamics in the mother and fetus [5]. Also, drug therapy increases the number of allergic reactions, and with prolonged use can have an adverse effect on the developing fetus [6]. In most cases in Europe and America the tactics of treatment of the pain syndrome of dorsopathies during pregnancy is "watch and wait" [7].

The European current guidelines for the diagnosis and treatment of LBP and pelvic pain, published in 2008, mentioned for the first time that pregnant women should be encouraged to exercise with a focus on daily life and avoid maladaptive behaviours [8]. The latest systematic reviews with meta-analysis of 2015–2019 years were analyzed. All of them were aimed at study of non-pharmacological treatment during pregnancy with one aim "How to reduce LBP?". The aim of systematic review by Liddle S.D. et al. (2015) was to study the influence of prenatal exercises (taking into account the frequency, intensity, force, type and volume) on backache, which were divided into low back pain (LBP), pelvic pain (PP) and mix of them both (LBP + PP). They were during not only pregnancy, but in the postpartum period too. 654

pregnant women were selected for 7 studies. The authors consider there were registered substandard statistical results on the assessment of the impact of exercises (any exercises on land or in water) on reduction of the pain syndrome, but also they saw that physical exercises reduce functional disability and sick leaves more than routine prenatal care. The studies could get a higher score, a higher quality assessment could be obtained from the introduction of a harmonized classification system that can be used to classify women according to their symptoms so that treatment can be adapted accordingly [9]. Shiri R. Et al. (June 2017) conducted a systematic review and meta-analysis of controlled trials on the study of the effect of physical exercises on the LBP. It has been shown that therapeutic physical exercises reduce the risk of developing LBP and related disability, and the combination of exercises with isometric exercises or aerobic exercises performed 2–3 times a week is a reasonable recommendation for the prevention of LBP in the general population. Also, there was a decrease in the number of issued sick leaves for this disease in the group using isometric exercises, and there was a lack of control groups in these studies, a small number of using quality of life questionnaires used in these studies [10].

However, a study by Chou R et al. (2017), which involved not only pregnant patients but patients of different sexes and age groups, was assessed as moderate quality, indicating the following: physical activity has a slight positive effect on the severity of LBP compared to conventional treatment, which is comparable to the effectiveness of other non-drug methods recommended for the treatment of acute or chronic LBP [11].

Advantages of therapeutic physical exercises over other cost-effective and efficient non-pharmacological methods of treatment of backache (such as acupuncture, spinal manipulation, cognitive behavioral therapy) is that they need minimal equipment and can be used at home by yourself [12].

## II. THE AIM OF RESEARCH

The aim of this study is to examine the effect of exercises (therapeutic physical exercises) on quality of life of pregnant women with the dorsopathies diagnosis.

## III. METHODS AND MATERIALS

The object of this study was pregnant women with the dorsopathies diagnosis. The diagnosis must be confirmed during the pregnancy by a neurologist that a pregnant woman already have had the Rg-, CT- or MRI-conclusion. The total number of 70 pregnant women with dorsopathies was examined, they were divided into two groups: 1st - examined group performing a complex of physical exercises (n=135), 2nd – control group (n=35). The gestation period, during which the courses of procedures for exercise therapy started, was chosen from the 23rd to the 38th week of pregnancy (exercises for the II and III trimesters were performed). All patients were examined in accordance with the order of the Ministry of Health, RF, № 572 (from 01.11.2012). Selection and study of these groups were carried out in the period from November 2015 to March 2018. The course of procedures consisted of 15 procedures, performed 3 times a week, during 5 weeks. The procedure duration was 30 minutes. The total duration of the course was 450 minutes (7.5 hours). The structure of each exercise therapy procedure consisted of an introductory part (5 minutes): various options for walking at a

slow pace; the main part (20 minutes): stretching exercises for all parts of the spine; exercises for stretching the muscles of the back; exercises for stretching the muscles of the perineum and pelvic floor; the final part (5 minutes): simple relaxation exercises. The starting positions were chosen: standing without support, standing on all fours, sitting on a chair, lying on its back and on its side. Exercises were selected simple and general development, contributing to the maintenance of the tone of the abdominal muscles and back muscles, skills of wright breathing. The course of procedures contained exercises aimed at improving the elasticity of the muscles of the pelvic floor and adductor muscles of the thigh, the preservation and development of spinal mobility, pelvic joints and hip joints, to relieve pain in the back. Women signed a voluntary informed consent to participate in the study groups, as well as to collect anamnesis, laboratory and hardware survey data.

In the current study we evaluated the following aspects of life: mobility, self-care, household activity, pain, anxiety / depression, sleep, the level of disability. The analysis of the above aspects was carried out by filling in a specialized questionnaire before and after completing the therapeutic exercises course (in group 1), and in the period of 32–38 weeks (in group 2). This questionnaire included the Oswestry questionnaire, the EuroQol 5-D questionnaire, a visual analogue scale (VAS), a verbal rating scale (VRS). The level of disability was assessed according to the results of the Oswestry questionnaire.

Criteria for inclusion in the study: 1) gestational age over 16 weeks of pregnancy; 2) severe pain in the back; 3) the diagnosis of dorsopathy, confirmed by a specialist (neurologist); 4) the woman's desire to perform a course of isometric exercises/ course of therapeutic gymnastics; 5) the possibility of medical monitoring of treatment in an outpatient setting.

Criteria for exclusion from the study: 1) placental presentation, moderate and severe eclampsia, divergence of the pubic joint, threatening premature birth, polyhydramnios, bleeding during pregnancy; 2) multiple pregnancy; 3) suspicion of premature detachment of the normally located placenta, the failure of the uterine scar; 4) subfebrilitet of unclear genesis; 5) acute inflammatory diseases of unclear Genesis; 6) acute thrombophlebitis; 7) exacerbation of extra genital diseases; 8) categorical refusal of a woman to participate in the study.

Calculations of descriptive statistics were processed using software package STATISTICA for Windows (10.0 (StatSoft inc.)). The distribution was determined to be different from the normal, hence nonparametric statistical methods of data analysis were used when comparing the results of the two groups. The value of the level of statistical significance for this study (p) was accepted = 0.05. To describe the sample distribution of quantitative features different from the normal one, the number of objects of study (n), median (IU), upper and lower quartile (LQ/UQ and LQ/UQ) were indicated. Intragroup comparison was performed using Wilcoxon test. Cross-group comparison of the obtained data was carried out using the Mann-Whitney test, the Fisher angular transformation method ( $\varphi$ ) (when the data were evaluated as a percentage) or the criterion –  $\chi^2$  (at  $n \leq 30$ ). For the coefficient

of contingency of Pearson's results were interpreted as follows:  $\leq 0,3$  – a weak relationship;  $0,3 < S \leq 0,7$  – moderate relationship, with  $\geq 0,7$  - strong bond [13].

**IV. RESULTS**

By the criterion of "age" in the study groups there were no differences:  $U = 1882,5$  with  $p > 0.05$  (0.064), but anthropometric data groups differed among themselves: body mass (kg):  $U = 1722,5$  with  $p < 0.05$  ( $p=0.014$ ), growth (sm)  $U = 2352$  with  $p > 0.05$ ; body mass index (Quetelet index)  $U = 1695$  with  $p=0.01$ . An analysis of the parity of pregnancies showed that there were slightly more recurrences, although the difference was not statistically confirmed: first-pregnant 15 (42,9 %) and 19 (55 %), recurrent pregnancy 20 (57,1 %) and 16 (45 %) with  $\chi^2=0,92$  and  $p=0.33$  (in groups 1 and 2 respectively). Analysis of the parity of labor also did not reveal a statistically significant difference in this criterion, although clinically the difference in the parity of labor was almost twice: first-pregnant 25 (71,4 %) and 23 (66,7 %), recurrent pregnancy 10 (28,6 %) and 12 (33,3 %) with  $\chi^2=0,26$  and  $p=0.6$  (in groups 1 and 2 respectively). When comparing groups, complicated obstetric gynecological anamnesis was assessed diseases such as:

- menstrual disorders 9 (25,7 %) and 8 (23,5 %) respectively, with  $\phi=0,045$  and  $p=0.83$ ;
- ovarian cysts 2 (5,7 %) and 2 (5,7 %) with  $\phi=0$  and  $p=1$ ;
- uterine myoma 3 (8,5 %) and 1 (2,55 %) with  $\phi=1,284$  and  $p=0.22$ ;
- vaginitis 8 (22,8 %) and 4 (11,4 %)  $\phi=1,64$  and  $p=0,2$ ;
- sexually transmitted infections 6 (17,4 %) and 8 (22,8 %)  $\phi=0,32$  and  $p=0.57$ ;
- early miscarriage 4 (11,4 %) and 3 (8,5 %)  $\phi=0,32$  and  $p=0,57$ ;
- late spontaneous miscarriage 0(0 %) and 2 (5,7 %)  $\phi=4,06$  and  $p=0.047$ ;
- induced abortion 8 (22,8 %) and 3 (8,5 %)  $\phi=2,85$  and  $p=0,09$ .

All of them are shown in figure 1.

Thus, the difference in the groups was only according to the criterion of late spontaneous miscarriage (in group 2> in group 1, with  $p=0,047$ ), while all other criteria were statistically identical in the two groups.

The first table (I) presents the data obtained after analyzing the results of the completed EuroQol-5D questionnaires. The second table (II) shows the results of an additional assessment of pain syndrome changes in the studied group using VAS and VRS.

According to the results of the Oswestry questionnaire: the level of disability after executing the LH course was twice as high as in group 2. An intergroup comparison was made after completing the course of LH procedures and the results were obtained:  $U = 89$ ,  $p < 0.001$ .

Separately, from the Oswestry questionnaire, the aspect of vital activity "sleep" was evaluated, since it plays an important

role in the life of every pregnant woman. As a result of the intragroup analysis (group 1: before and after completing the course of LH procedures), data were obtained:  $T = 0$ ,  $Z = 4.78$ ,  $p < 0.001$ . When intergroup comparison (from group 1, the results were evaluated after performing the LH procedures), the criterion was  $\chi^2 = 46.1$ ,  $p < 0.001$ , and  $C = 0.63$  (moderate coupling).

**TABLE I. RESULTS OF EUROQOL-5D QUESTIONNAIRE DATA**

Study groups/aspects of life	Group 1 (n=35)		Group 2 (n=35)	Statistical value
	Before treatment (Abs/Rel)	After treatment (Abs/Rel)	Results (Abs/Rel)	
<b>Mobility</b>				
«I have no problems with movement»	24 (65,58 %)	31 (88,57 %)	10 (28,5 %)	Wilcoxon test (T)=0; Z=2.52; p=0.012.  $\chi^2$ test =26.3; p<0.001; C=0.52
«I have some difficulty with movement»	10 (28,6 %)	4 (11,43 %)	21 (65,6 %)	
«I am completely bedridden»	1 (2,85 %)	0 (0 %)	4 (11,4 %)	
<b>Self service</b>				
«I have no problems with service»	25 (71,4 %)	25 (71,4 %)	5 (14,38 %)	Wilcoxon test (T)=0; Z=2.36; p=0.017.  Test $\chi^2=26.6$ ; p<0.001; C=0.52
«I have some problems with washing or dressing»	10 (28,6 %)	10 (28,6 %)	20 (57,1 %)	
«I am completely bedridden»	0 (0 %)	0 (0 %)	10 (28,6 %)	
<b>Household activity</b>				
«I have no problems with every day duties»	19 (54,29 %)	21 (60 %)	2 (5,71 %)	Wilcoxon test (T)=0; Z=2.665; p=0.007.  Test $\chi^2=29$ ; p<0.001; C=0.54
«I have some problems with daily duties»	15 (42,86 %)	14 (40 %)	21 (60,74 %)	
«I can't do my daily routine»	1 (2,86 %)	0 (0 %)	12 (34,28 %)	
<b>Pain syndrome</b>				
«I do not feel any pain or discomfort»	0 (0 %)	5 (14,3 %)	0 (0 %)	Wilcoxon test (T)=0; Z=2.52; p=0,01. Criteria $\chi^2=12.06$ ; p=0.002; C=0.38
«I feel mild pain or discomfort»	30 (85,7 %)	30 (85,7 %)	28 (80 %)	
«I feel extreme pain or discomfort»	5 (14,3 %)	0 (0 %)	7 (20 %)	
<b>Anxiety / Depression</b>				
«I do not feel anxiety or depression»	0 (0 %)	18 (51,43 %)	12 (34,2 %)	Wilcoxon test (T)=0; Z=3.82; p<0.001.  Test $\chi^2=7.2$ ; p=0.027; C=0.3
«I feel mild anxiety or depression»	34 (97,14 %)	17 (48,57 %)	17 (48,57 %)	
«I feel extreme anxiety or depression	1 (2,86 %)	0 (0 %)	6 (17,3 %)	

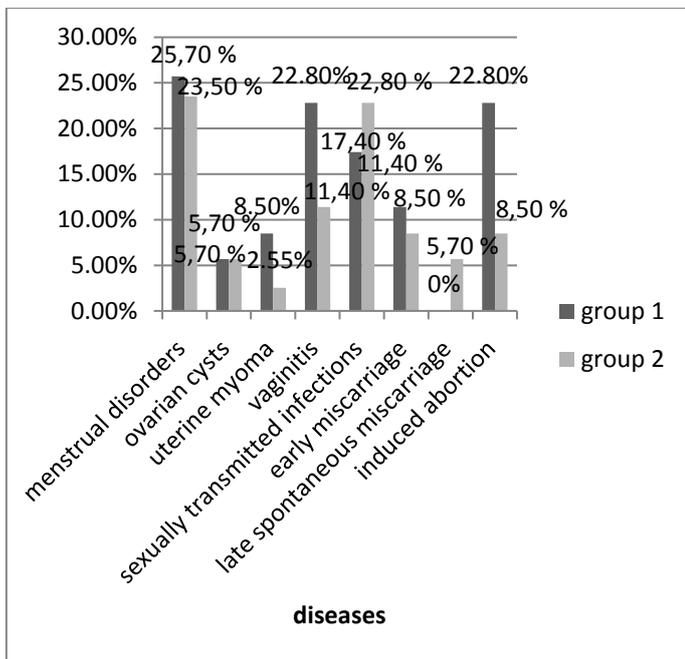


Fig. 1. Structure of complicated obstetric gynecological anamnesis.

TABLE II. RESULTS OF VAS AND VRS DATA

Rating scales of LBP	Study groups	Statistical value	
		Me (LQUQ)	Wilcoxon test Mann-Whitney test
VAS	Group 1 before treatment	7 (6/8)	Wilcoxon test T=0; Z=5.35; p p<0.001. When comparing 1 (after treatment) and 2 groups U=105 with p<0.001.
	Group 1 after treatment	3 (2;3)	
	Group 2	7 (5;7)	
VRS	Group 1 before treatment	8 (68)	Wilcoxon test T=0; Z=5.35; p p<0.001. When comparing 1 (after treatment) and 2 groups U=452 with p<0.001.
	Group 1 after treatment	4 (2/4)	
	Group 2	6 (4/8)	

V. CONCLUSION

All pregnant women were from one general population in terms of: age, anthropometric anamnesis, parity of pregnancies, complicated obstetric and gynecological history (at p >0,05). Thus, evaluating the results of the study and the obtained statistically confirmed data, it is necessary to assign a course of physical therapy procedures to pregnant women with dorsopathies in order not only to improve their quality of life, but also to reduce pain syndrome in the back. Improvement of vital activity was noted 2 times compared with the control group at p ≤0.002, the decrease pain syndrome in the back - 1.9 times (according to VAS, VRS and EuroQol-5D questionnaire), improvement in mobility (at p <0.001), self-service (at p <0.001), household activity (at p <0.001), sleep (p <0.001) and decrease in anxiety / depression (at p <0.001).

All pregnant women who have a diagnosis of dorsopathy should be sent to a course of therapeutic gymnastics in order to relieve pain in the back, as well as to improve the quality of her life. It is necessary to further study the effect of exercise on the course and descent of childbirth, as well as on the condition of the newborn.

It should also be noted that in America and Europe, greater priority is given to methods of manual therapy (soft tissue techniques) and osteopathy in order to relieve LBP during pregnancy. And currently, numerous studies are being conducted to study / confirm the effectiveness of the latter two methods in pregnant women. Further research on this pathology and methods of its non-drug treatment is necessary [14].

References

- [1] V.V. Povoroznyuk, V.O. Litvin, "Pain in the lower back: a modern view of the problem", Retrieved from: health-ua.com/article/19305-bol-v-nizhnej-chasti-spiny-sovremennyj-vzglyad-na-problemu. Accessed March 23, 2018.
- [2] S.P. Markin, The diagnosis and treatment of dorsopathies. Voronezh: Gos. Med. Akad., 2005.
- [3] N.I. Tapilskaya, S.N. Gaidukov, "Elimination of Folate Deficiency the Main Strategy of Homocysteinaemia Correction of Endothelial Dysfunction", Gynecology, 2013, vol. 15, no. 3, pp. 70–74.
- [4] N.I. Tapilskaya, N.A. Vorobtsova, S.N. Gaidukov, "The use of Viferon in the Third Trimester of Pregnancy for Prevention of Infection of Infants by Human Papillomavirus", Terra Med. Nova, 2006, vol. 4, no. 44, pp. 15–17.
- [5] N.N. Volodin, Y.B. Belousov, S. Zyryanov, Pharmacotherapy individual States in pregnancy. Red. academician. Moscow: Miklos, 2012, 176 p.
- [6] O.V. Rylova, Influence of various methods of prenatal preparation on the course of pregnancy, quality of life and psycho-emotional status of women, PhD dissertation thesis. Samara, 2009, 28 p.
- [7] F. Schwerla, "Osteopathic manipulative therapy in women with postpartum low back pain and disability: a pragmatic randomized controlled trial", Am Osteopath. Assoc., vol. 115, no. 7, pp. 416–425, 2015.
- [8] H.B.A.Vleeming, H.C. Ostgaard et al. "European guidelines for the diagnosis and treatment of pelvic girdle pain", Eur, Spine, J. no. 17, pp. 794–819, 2008.
- [9] S.D. Liddle, V. Pennick, "Interventions for preventing and treating low-back and pelvic pain during pregnancy", Cochrane Database Syst. Rev. (Online), vol. 30, no. 9, CD001139, 2015.
- [10] R. Shiri, D. Coggon, K. Falah-Hassani, "Exercise for the Prevention of Low Back Pain: Systematic Review and Meta-Analysis of Controlled Trialspubmed", Am J. Epidemiol. vol. 187, no. 5, pp. 1093–1101, 2018. DOI: 10.1093.
- [11] R. Chou, R. Deyo, J. Friedly et al., "Nonpharmacologic therapies for low back pain: a systematic review for an American College of Physicians clinical practice guideline", Ann. Intern. Med., no. 166, pp. 493–505, 2017.
- [12] C.W. Lin, M. Haas, C.G. Maher et al., "Cost-effectiveness of guideline-endorsed treatments for low back pain: a systematic review", Eur. Spine J., no. 20, pp. 1024–38, 2011.
- [13] O. Yu. Rebrova, Statistical analysis of medical data. Application of the Statistica application package. Moscow: Media Sphere, 2002, 312 p.
- [14] G.A. Suslova, S.N. Gaiducov, Y.A. Vaganova, "The effectiveness of the methods of medical rehabilitation during pregnancy to relieve pain in the back caused by dorsopathies", J. of modern probl. of sci. and ed., Electronic res., vol. 6, 2016.