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Factors of subjective assessment of the effectiveness of physiotherapy: a study on patients with degenerative disease of the spine

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Summary **Background.** Successful physiotherapy depends on many factors, including the conditions associated with the disease, the process of physiotherapy, and psychological variables, as these are known to have a strong influence on the motivation of the patient to continue treatment.
Objectives. To evaluate the role of depression symptoms, acceptance of illness, and level of pain for the assessment of the effectiveness of physiotherapy.
Material and methods. The study involved 83 patients (31 men and 52 women) who had received physical therapy as outpatients. The mean age of the study population was 45.63 years (SD = 12.94). The patients completed a set of self-reporting questionnaires: questionnaire with demographic information, Acceptance of Illness Scale, The Center for Epidemiologic Studies Depression Scale, and the Visual-Analogue Scale.
Results. The majority of respondents (42.2%) reported no improvement associated with treatment, even though the level of pain experienced after treatment was significantly lower than before. Regression analysis showed that the effectiveness of treatment was explained in 63% of cases by the severity of depression symptoms, the level of acceptance of illness, severity of pain after physiotherapy, and the level of pain before treatment.
Conclusions. Depression symptoms can greatly delay the process of physiotherapy and determine the evaluation of its effectiveness. Acceptance of illness and pain result in a more positive assessment of the treatments. Collaboration between a physiotherapist and a psychologist in recognizing the symptoms of depression and providing support in dealing with them, and fostering the development of a positive attitude towards the disease, can positively influence the efficiency of physiotherapy.
Key words: physical therapy modalities, treatment outcome, depression, pain, degenerative disease of the spine.

Background

Spinal (back) pain is one of the most common reasons for reporting to a primary care physician (PHC). As reported by Zielazny et al. [1], it has been estimated that around 70% of people aged over 30 have experienced at least one episode of back pain. Degenerative disease of the spine, i.e. degeneration of the spinal column, is a complex condition that affects the entire spinal motion segment, comprising intervertebral discs, vertebral bodies, intervertebral joints, ligamenta flava, and the longitudinal ligaments. Degenerative changes typically arise from the intervertebral discs, and these later spread to the border plaques and adjacent parts of the vertebral body, thus gradually affecting the remaining structure [1]. It is the most common cause of the patient's pain [2]. Relieving the symptoms associated with this condition is one of the tasks faced by the physiotherapist. The most commonly-applied techniques include massage, kinesitherapy (treatment with movement), mobilisation, and therapy based on treatment with physical factors. Wróblewska et al. [3] report that the use of the these various methods of rehabilitation resulted in improved well-being of the study patients.

The course of the physiotherapy process depends on many factors, including conditions closely related to the disorder (e.g. severity of injury, duration of illness or discomfort), factors associated with the physiotherapeutic process (e.g. type of physiotherapeutic interactions and the duration of treatments) and psychological factors (e.g. patient expectation about recovery, illness acceptance) [3–5]. These can affect the motivation of the patient to continue treatment, and shaping a positive attitude to the disease can significantly determine the effectiveness of physiotherapy [5]. This is underlined in the psychosomatic approach to medicine, which emphasizes that for the treatment to be effective, the relationship between the *some* (body) and *psyche* should be considered [6].

Physiotherapy is a special type of treatment: its effect is to restore physical fitness to earlier levels, or at least to reduce pain. However, in order for this to happen, the physiotherapy patient should in some cases actively participate in the treatment process: for example, by systematically performing the prescribed exercises, and making any necessary changes to lifestyle. This patient engagement affects physiotherapy effectiveness [7, 8]. Among the many psychosocial factors which could influence the willingness and involvement of the patient, and hence the effectiveness of physiotherapy, key roles have been attributed to acceptance of the disease [9] and the presence of symptoms of depression [10, 11].

According to Leder [12], patients displaying greater acceptance of the experienced ailments tend to demonstrate better adaptation and less psychological discomfort. Acceptance of the disease promotes a greater sense of security, and reduces the severity of negative reactions and experiencing difficult emotions in connection with the disease. Therefore, greater acceptance of the disease means greater effectiveness of the treatment process.

Previous studies on the relationship between depression and the course of physiotherapeutic interventions indicate that the presence of depression symptoms has a negative impact on both the course and effects of the treatment process [12]. This is probably due to the specificity of depression, which has a complex nature comprising numerous mental and somatic symptoms [13]. These include, for example, lowered mood and loss of motivation; these may reduce the commitment of the patient toward the rehabilitation process, and sometimes even indicate a passive attitude to the recommended interventions. In turn, tension or irritability may hinder contact and cooperation between the patient and the physiotherapist, which is essential for proper communication and adoption of treatment recommendations [5, 14].

According to Szczepańska et al. [14], the relationship between depression and the effectiveness of physiotherapy sometimes takes the form of a vicious circle, when the presence of depression symptoms slows the effectiveness of treatment, which in turn exacerbates the mental state of the patient, and consequently the somatic state. As studies in Poland indicate that almost 800,000 people aged 18–64 have experienced at least one episode of depression of any severity [15], there is clearly a need for a better understanding of the relationship between depression symptoms and the effectiveness of physiotherapy treatments.

Objectives

The aim of the study was to assess whether there is any relationship between the subjective assessment of the effectiveness of physiotherapy treatment in outpatients with degenerative disease of the spine and the following factors: the intensity of experienced pain, acceptance of the disease, and the presence of depression symptoms. The research was exploratory, with no directional hypotheses being formulated; however, the following research questions were proposed:
1. Do the level of experienced pain, acceptance of the disease, and symptoms of depression differ depending on how patients assess the effectiveness of physiotherapy?
2. Are there differences in the pain experienced before and after the treatment, and in the assessment of the effective-

ness of physiotherapy between women and men?
3. Which factors have the greatest influence on the subjective assessment of the effectiveness of physiotherapy?

Material and methods

The study is part of a larger project concerning the psychological aspects of the effectiveness of the physiotherapeutic process. It involved patients who used outpatient physiotherapy treatments in two outpatient rehabilitation clinics in Lodz (Lodzkie province, central Poland). The inclusion criteria included: medical diagnosis of degenerative disease of the spine, qualification for a cycle of outpatient physiotherapy treatment, and signed written informed consent for participation in the study. Exclusion criteria were: lack of willingness to cooperate and lack of informed consent, personal history of depression and/or current depressive episode, as well as current antidepressant treatment. Participation in the study was voluntary. Participants gave their informed consent and were informed that the results of the study would only be used for scientific purposes. The approval of the Bioethics Commission of the University of Social Sciences in Lodz was obtained (Ref. No. 1/R/2017/F).

The study had two stages – before (stage 1) and after the completed whole cycle of the treatment (stage 2). Participation in the first stage of the study consisted in completing a set of validated questionnaires (characterized below). In the second stage patients were asked to answer the questions about the subjective assessment of the effectiveness of physiotherapy treatment.

Initially, two hundred patients with medical diagnosis of spinal degenerative disease were invited to participate in the study. Group of 124 patients (62%) returned completed questionnaire sets and agreed to participate in the second stage of the study. In total, the results from 83 patients (52 women and 31 men) who fully completed the two stages of the study were analysed (Figure 1).

Characteristics of the study group

The average age of the study population was 45.63 (SD = 12.94). Most of the respondents were women (62.7%). The majority of participants had secondary education (44.6%), were married (66.3%), living in a large city (80.7%), and were in employment (51.8%). More detailed sociodemographic characteristics, including the sex of the respondents, are presented in Table 1.

The participants were also characterized in terms of health status and the course of physiotherapy treatment. Over half of all respondents (55.4%) regarded their current job as often be-
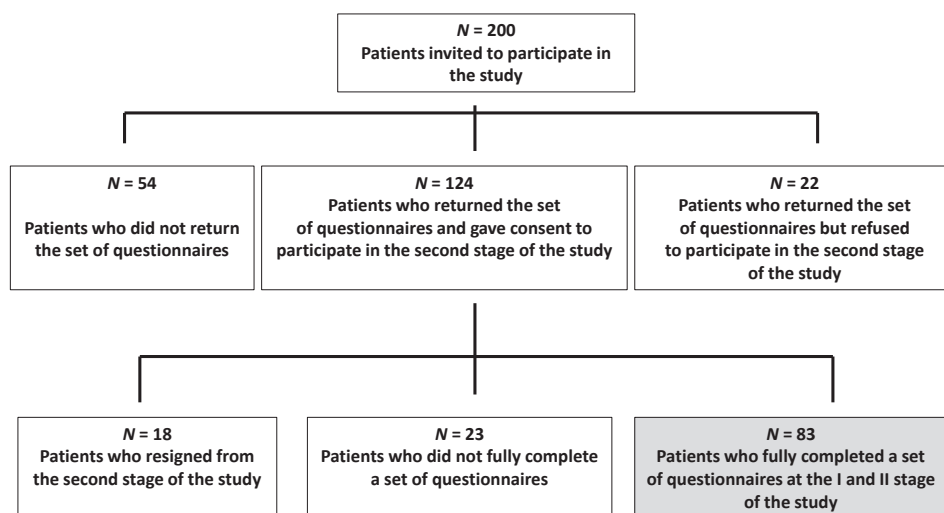
Figure 1. Flow diagram of recruitment of the study population

ing physically burdensome for them, and 63.9% found the job to be psychologically burdensome. In addition, 36.1% of respondents reported experiencing stressful situations in the previous six months (e.g. illness in the family or change/loss of job).

During the current cycle of treatment, as many as 81.9% of patients reported using kinesitherapy, 75.9% physical therapy, 71.1% massage, and only 30.1% mobilization. A high proportion of patients also reported using two types of intervention in the current treatment cycle (42.2%). More than half (61.4%) had already received a series of treatments in a similar form in the previous 12 months. The current cycle of treatment was the second in the previous year for 34.9%, while 16.8% reported undergoing physiotherapy four or five times during the previous year. Detailed characteristics are presented in Table 2.

The following measures were used in the study:
1. A demographic questionnaire which records demographic data and experienced ailments, the current state of the patient's health, as well as data concerning the course of physiotherapy treatment.
2. The Acceptance of Illness Scale (AIS) [16], Polish adaptation by Juczyński [17], was used to measure the degree of acceptance of the disease. The scale consists of eight statements describing the negative consequences of poor health: for example, the limitations associated with the disease or a sense of being dependent on the environment. Each item is scored on a 5-point Likert scale (from 1 – strongly agree, to 5 – strongly disagree). The total score therefore ranged between eight and 40

Table 1. Characteristics of the study population, taking into account sociodemographic variables		Total sample n = 83		Women n = 52		Men n = 31	
Age		M = 45.63; SD = 12.94 min 25; max 74		M = 46.35; SD = 13.27 min 25; max 74		M = 44.42; SD = 12.48 min 26; max 62	
		n	%	*n*	%	*n*	%
Education	primary	1	1.2	1	1.9	0	0
	secondary vocational education	26	31.3	12	23.1	14	45.2
	high school education	37	44.6	26	50.0	11	35.5
	higher education	19	22.9	13	25.0	6	19.4
Marital status	married	55	66.3	38	73.1	17	54.8
	divorced	16	19.3	4	7.7	12	38.7
	informal relationship	8	9.6	6	11.5	2	6.5
	widow/widower	4	4.8	4	7.7	0	0
Place of residence	large city	67	80.7	40	76.9	27	87.1
	small town	14	16.9	10	19.2	4	12.9
	village	2	2.4	2	3.8	0	0
Job status	employed	43	51.8	20	38.5	23	74.2
	pensioner	16	19.3	12	23.1	4	12.9
	retired	10	12.0	10	19.2	0	0
	unemployed	2	2.4	2	3.8	0	0
	on sick leave	12	14.5	8	15.4	4	12.9

Table 2. Characteristics of the study population according to factors related with the state of health and the course of physiotherapy		Total sample n = 83		Women n = 52		Men n = 31	
Feature		*n*	%	*n*	%	*n*	%
Physical workload	always	6	7.2	6	11.5	0	0
	often	46	55.4	27	51.9	19	61.3
	rarely	29	34.9	17	32.7	12	38.7
	not applicable (not working)	2	2.4	2	3.8	0	0
Mental workload	always	6	7.2	6	11.5	0	0
	often	53	63.8	32	61.5	21	67.7
	rarely	22	26.5	12	23.1	10	32.3
	not applicable (not working)	2	2.4	2	3.8	0	0
Experienced some stressful situation	yes	30	36.1	22	42.3	8	25.8
	no	53	63.8	30	57.7	23	74.2
Type of treatment in current treatment cycle[a]	massage	59	71.1	36	69.2	23	74.2
	mobilization	25	30.1	16	30.8	9	29
	physiotherapy	63	75.9	34	65.4	29	93.5
	kinesitherapy	68	81.9	43	82.7	25	80.6
Total number of treatment cycles	one	6	7.2	6	11.5	0	0
	two	35	42.2	21	40.4	14	45.2
	three	29	34.9	19	36.5	10	32.3
	four	13	15.6	6	11.5	7	22.6

Table 2. Characteristics of the study population according to factors related with the state of health and the course of physiotherapy		Total sample $n = 83$		Women $n = 52$		Men $n = 31$	
Feature		n	%	n	%	n	%
Treatment cycle	one	26	31.3	18	34.6	8	25.8
	two	29	34.9	14	26.9	15	48.4
	three	14	16.9	10	19.2	4	12.9
	four	8	9.6	8	15.4	0	0
	five	6	7.2	2	3.8	4	12.9
Underwent physiotherapy in the previous 12 months	yes	51	61.4	34	65.4	17	54.8
	no	32	38.6	18	34.6	14	45.2
Comorbidities	none	49	59.0	29	55.8	20	64.5
	hypertension	12	14.5	8	15.4	4	12.9
	diabetes	6	7.2	3	5.8	3	9.7
	hyperthyroidism or hypothyroidism	5	6.0	3	5.8	2	6.5
	allergy	3	3.6	2	3.8	1	3.2
	bronchial asthma	2	2.4	2	3.8	0	0
	chronic venous insufficiency	4	4.8	4	7.7	0	0
	migraine	2	2.4	1	1.9	1	3.2

[a] Totals for types of treatment characteristics may not equal the overall sample size due to multiple answer choice question.

points. The higher scores indicate acceptance of the current state of health, while the lower ones indicate lack of acceptance and problems in the emotional sphere.

3. The Center for Epidemiology Studies Depression Scale-Revised (CESD-R) [18], Polish adaptation by Koziara [19]. The scale consists of 20 statements describing wellbeing or behavior in the previous two weeks. Statements are scored on a 5-point Likert scale, from *0 = one day or less* to *4 = almost every day for the two weeks*. The total score ranges between 0 and 80 points. The authors of the tool suggest that a score of 16 points or higher should be considered as disturbing, i.e. suggesting the presence of depression symptoms.

4. The pain Visual Analogue Scale (VAS) – scale used to assess pain experienced in connection with the disease. The pain VAS is a continuous 10 cm (100 mm) scale composed of a horizontal (HVAS) or vertical (VVAS) scale [20]. The respondents indicate the level of pain according to the increasing score: from 0 – meaning no pain, up to 10 – the strongest pain experienced in life [21]. The scale was used twice in the study – the patients assessed the level of pain intensity experienced once before treatment and again after treatment.

5. After the end of treatment the patients were asked to make a subjective assessment of its effectiveness. Whether physiotherapy is effective can be assessed by objective functional tests or by a visible return to previous physical fitness. However, when the main symptom of the disease is pain, assessment of the effectiveness can be made by the patient by assessing the severity of the pain experienced after the treatment and by recording any subjective improvement in the perceived discomfort. For this reason, in the presented studies, respondents were asked to comment on one of three answers: "the improvement was greater than I expected", "the improvement was less than I expected", or "I do not feel any improvement".

Statistical analysis

The obtained data were subjected to statistical analysis using IBM® SPSS® Statistic 24. The Shapiro–Wilk normality test

was used in order to determine the type of distribution. The chi-square test was then used to estimate the significance of differences in population distributions. Non-parametric tests were used: the Mann–Whitney U-test to compare two independent groups, the Wilcoxon test for paired Samales, and the Kruskal–Wallis test for multiple samples comparisons. Regression analysis was used to verify predictors of outcome variable (effectiveness of physiotherapy). Values of $p < 0.05$ were taken as significant.

Results

Severity of pain and subjective assessment of improvement

The mean intensity of pain scores reported in the study group ($n = 83$) before and after treatment were, respectively, M = 6.5 (SD = 1.34; range 5 to 10) and M = 5.41 (SD = 1.51; range 1 to 9). These values can be considered as being located in the middle of the scale.

Differences between men and women were found to be statistically significant only in the assessment of the intensity of pain after treatment ($p < 0.05$) (Table 3).

Table 3. Comparing the level of severity of pain before and after treatment in women and men: the results of the Mann–Whitney U-test				
Variable	Women ($n = 52$)	Men ($n = 31$)	Z	p
The level of pain before physiotherapy treatment	M = 6.27 SD = 1.43	M = 6.87 SD = 1.36	-1.889	0.0625
The level of pain after physiotherapy treatment	M = 5.07 SD = 1.54	M = 5.97 SD = 1.30	-2.689	0.0087

The next part of the study examined whether significant differences existed between the severity of pain experienced before starting the treatment and the pain experienced after it. It was found that the pain at the end of treatment was significantly lower in the entire study population ($Z_{(2,83)} = -5.976$,

$p < 0.0001$), and both the group of women ($Z_{(2,52)} = - 4.661$, $p < 0.0010$) and men ($Z_{(2,31)} = - 3.839$, $p < 0.0001$). Cohen's d coefficient was found to be $d = 1$ in each case, which indicates a high strength effect.

Regarding the evaluation of the effectiveness of treatment by the patients (Table 4), as many as 42% of all respondents declared no improvement, while over 37% of respondents admit that the effect of the physiotherapy they received improved more than they expected. As the distribution of the analyzed variable differed depending on the sex of the participants, it was checked whether these differences were statistically significant. It was found that the assessment of the effectiveness of physiotherapy significantly differed between women and men (χ^2 (2, $n = 83$) $= 16.252$; $p < 0.0001$). In the group of women it was most common to report greater than expected improvement, while among men the most common response was that no improvement was felt.

Table 4. Distribution of results in the evaluation of the effectiveness of physiotherapy

Evaluation of the effectiveness of physiotherapy	Women (n = 52)		Men (n = 31)		Total (n = 83)	
	n	%	n	%	n	%
Greater improvement than I expected	23	44.2	8	25.8	31	37.3
Improvement less than I expected	8	15.4	9	29.0	17	20.5
I do not feel improvement	21	40.4	14	45.2	35	42.2

Symptoms of depression and acceptance of the disease

The presence of depression symptoms, indicated by 16 or more points on the CESD-R scale, was found in 39 (47%) of all subjects, 25 women and 14 men. No statistically significant difference was found between men and women in regard to depression symptoms: χ^2 (1, $n = 83$) $= 0.066$; $p = 0.7968$. Similarly, no statistically significant differences were found in the severity of the symptoms of depression between women (M = 12.81, SD = 6.06) and men (M = 13.84, SD = 6.17): $Z_{(2,81)} = 754.500$; $p = 0.6267$ (Mann–Whitney U-test).

The level of acceptance of the disease in the study group was on average 22.67 (SD = 9.88; range 6 to 40), which was approximately around the middle of the scale (eight to 40 points). The Mann–Whitney U-test found no significant difference be-

tween the level of acceptance of the disease between women (M = 23.23, SD = 9.88) and men (M = 21.74, SD = 9.97): $Z_{(2,81)} = 743.000$ ($p = 0.5522$).

The level of pain, the acceptance of the disease and symptoms of depression, and the effectiveness of physiotherapy

The Kruskall–Wallis test was used to identify whether the assessment of the effectiveness of physiotherapy was influenced by the level of pain experienced before and after treatment, the level of acceptance of the disease, and the severity of depression symptoms. Significant relationships were found for all factors apart from pain intensity before physiotherapy (Table 5).

The obtained results show that patients who declared better than expected improvement also reported the lowest pain level after physiotherapy (M = 4.65, SD = 1.58), had the highest level of disease acceptance (M = 30.16), and the least severe symptoms of depression (M = 8.81). In contrast, the opposite results, i.e. the highest level of pain after completion of physiotherapy (M = 6.17), the lowest acceptance of illness (M = 17.17) and the highest intensity depression symptoms (M = 17.37), were recorded among patients who reported a complete lack of improvement ("I do not feel any improvement").

Factors affecting the effectiveness of physiotherapy

In the final step, multiple linear regression optimized by the stepwise method was conducted to assess the variables determining the effectiveness of physiotherapeutic interventions. The explanatory variables introduced into the regression equation included the age of patients, patient sex, the presence of mental, physical and stress burdens, the total number of performed physiotherapeutic procedures, the cycle and type of treatments, the level of pain before and after treatment, the level of disease acceptance, and the severity of depression symptoms.

Regression analysis found the presence of depression symptoms explained almost 40% of the effectiveness of physiotherapy. Acceptance of the disease increases the effectiveness of physiotherapy to 47%, and a greater intensity of pain before treatment increases it to 51%. A higher level of pain intensity after treatment is associated with a further 11% increase in the effectiveness of physiotherapy. In total, the introduced variables explain almost 63% of the variance of the independent variable, i.e. the effectiveness of physiotherapy (Table 6). The remaining 27% depends on the influence of other factors.

Table 5. A comparison of the mean scores of the analyzed variables regarding the effectiveness of physiotherapy (Kruskall–Wallis test)

	Greater improvement than I expected (1)		Improvement less than I expected (2)		I do not feel improvement (3)		χ^2	p
	M	SD	M	SD	M	SD		
The level of pain before physiotherapy treatment	6.68	1.40	6.59	1.46	6.28	1.45	2.027	0.3629
The level of pain after physiotherapy treatment	4.65	1.58	5.23	1.09	6.17	1.27	16.253	0.0003[a, b, c]
Acceptance of the illness	30.16	7.44	20.35	5.94	17.17	9.21	30.322	< 0.0001[d, e, f]
Symptoms of depression	8.81	4.10	12.59	5.09	17.37	5.16	33.385	< 0.0001[g, h, i]

Post-hoc analysis: [a] differences between groups 1 and 2, $p = 0.211$; [b] differences between groups 1 and 3, $p < 0.001$; [c] differences between groups 2 and 3, $p < 0.05$; [d] differences between groups 1 and 2, $p < 0.001$; [e] differences between groups 1 and 3, $p < 0.001$; [f] differences between groups 2 and 3, $p < 0.05$; [g] differences between groups 1 and 2, $p < 0.009$; [h] differences between groups 1 and 3, $p < 0.001$; [i] differences between groups 2 and 3, $p < 0.05$.

Table 6. The coefficients of the regression analysis regarding predictors for assessing the effectiveness of physiotherapy

Variable in regression equation	R	R²	ß	T	p [95% CI]
STEP 1 **symptoms of depression**	0.631	**0.398**	0.631	7.322	p < 0.0001 [0.068 − 0.118]
STEP 2 symptoms of depression	0.686	**0.470**	0.439	4.394	p < 0.0001 [0.035 − 0.094]
acceptance of illness			-0.330	-3.298	p = 0.0014 [-0.048 − -0.012]
STEP 3 symptoms of depression	0.714	**0.509**	0.409	4.189	p < 0.0001 [0.032 − 0.089]
acceptance of illness			-0.262	-2.601	p = 0.0110 [-0.042 − -0.006]
pain before treatment			0.217	2.507	p = 0.0142 [0.026 − 0.230]
STEP 4 symptoms of depression	0.793	**0.628**	0.310	3.530	p = 0.001 [0.020 − 0.071]
acceptance of illness			-0.218	-2.460	p = 0.016 [-0.036 − -0.004]
pain before treatment			0.548	5.441	p = 0.0007 [0.206 − 0.443]
pain after treatment			-0.461	-4.993	p < 0.0001 [-0.405 − -0.174]

Discussion

It was found that the group of patients receiving treatment with a diagnosis of osteoarthritis of the spine present average levels of acceptance of the disease and an average severity of depression symptoms[1]. These results allow a more universal interpretation of the remaining results to be drawn.

Also, the intensity of the pain experienced in connection was found to be of an average level. However, attention should be paid to the differences between the sexes regarding the level of pain experienced after physiotherapy, this being significantly higher for men. This finding is not entirely consistent with previous findings on the relationship between patient sex and pain. For example, research by Fillingim et al. [23] shows that women tend to report greater sensitivity to pain of various modalities. Other authors report a higher incidence of chronic pain among women, and that the relationship between sex and the severity of pain alone is not so obvious [23]. Polish studies have noted that female patients with osteoarthritis of the spine also indicated a greater severity on the pain scale than male patients [24].

The level of reported pain was significantly lower after treatment in the whole group, among the group of women and the group of men, and this could be considered a measurable effect of physiotherapy. However, more than half of all respondents did not report feeling any improvement, or evaluated it as being less than expected. In addition, among the group of men, most patients did not feel improvement after treatment.

It seems, therefore, that it is not the intensity of pain experienced after the treatment that is crucial for the subjective assessment of its effectiveness. However, the results could imply that male patients may need additional support during the physiotherapy treatment.

Some interesting results were provided by the regression analysis, which suggested that the level of pain experienced before and after treatment does not play as important a role in assessing the effectiveness of physiotherapy as the presence of depression symptoms. These results are consistent with current knowledge [25–27]. To a lesser extent, the degree of acceptance of the disease was also found to play a role, which also corresponds to previously-presented studies.

Kułak and Kondzior [28] report no relationship between pain and the level of acceptance of the disease, or with symptoms of depression, in patients with discopathy of the lumbosacral spine. However, it should be emphasized that these studies only examined the relationship between acceptance of the disease and/or symptoms of depression with the severity of pain, and not with the subjective assessment of treatment. This is perhaps another argument indicating that the subjective improvement of treatment is a better way of obtaining information about the effectiveness of physiotherapy and the factors that affect this effectiveness.

It should be noted that patient sex was found to influence various parameters at various stages of the analysis, and that the variable *sex* was not among those finally entered in the regression equation, or one that determined the effectiveness of treatment.

Limitations of the study

The presented study is not free of limitations. Due to the small size of the study group, especially with regard to the analysis of gender differences, the presented results should be treated as more of a starting point for further exploration. In addition, the wide age range of the respondents may have a significant impact on the obtained results, and the small size of the study group precludes any analysis based on age subgroups.

It is worth considering the use of an additional method which will not be based only on the subjective beliefs of the patient to assess the effectiveness of physiotherapeutic treatment. The presented results, however, provide information that may contribute to the development of more holistic proposals for caring for patients with spinal osteoarthritis, e.g. including psychological assistance or psychotherapy, which will translate into

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[1] It should be clarified that although the results indicate the presence of depression symptoms (i.e. a score of 16 and above on the CESD-R) in 47% of the studied population, the mean results for both women and men occupy the middle of the scale. In addition, although the authors of the tool suggest that the result of 16 is considered to be a cut-off point (i.e. symptom-indicative or non-symptomatic), the study has not confirmed that this limit indeed differentiates clinical from non-clinical trials [17, 19].

greater real effectiveness. This approach is also promoted in international publications [29].

Conclusions

The success of physiotherapy in treating degenerative disease of the spine is dependent on the mental condition of the patient. A perceived lack of improvement by the patient, or a lower level of improvement than expected, is associated with more severe symptoms of depression and a lower level of acceptance of the disease: these two factors have the strongest impact on the assessment of the effectiveness of physiotherapy. Men experience a higher level of pain after termination of treatment and rarely feel improvement after treatment: they are more likely than women to assess the effectiveness of physiotherapy treatments as poor.

Cooperation between a physiotherapist and a psychologist in the diagnosis of depression symptoms may positively affect the effectiveness of the physiotherapeutic process. In addition, providing support in coping with the ailments, including help in shaping a positive attitude towards the disease, will have positive results.

References

1. Zielazny P, Biedrowski P, Lezner M, et al. Stopień akceptacji choroby, przekonania na temat kontroli bólu oraz strategie radzenia sobie z bólem wśród pacjentów zakwalifikowanych do zabiegu z powodu choroby zwyrodnieniowej kręgosłupa. *Adv Psychiatry Neurol* 2013; 22(4): 251–258 (in Polish).
2. Michoń P, Sałacka A, Kotkowiak L, et al. Najczęstsze postacie chorób narządu ruchu u pacjentów leczonych w praktyce lekarza rodzinnego. *Fam Med Prim Care Rev* 2010; 12(2): 279–281 (in Polish).
3. Wróblewska I, Bieszcz-Płostkonka K, Błaczczuk J, et al. Efektywność rehabilitacji w chorobach zwyrodnieniowych kręgosłupa. *Fam Med Prim Care Rev* 2014; 16(1): 35–38 (in Polish).
4. Chester R, Jerosch-Herold C, Lewis J, et al. Psychological factors are associated with the outcome of physiotherapy for people with shoulder pain: a multicentre longitudinal cohort study. *Br J Sports Med* 2018; 52: 269–275, doi: 10.1136/bjsports-2016-096084.
5. Aívazian TA, Zaítsev VP, Gorbunov FE, et al. Psychological predictors of rehabilitation efficiency of patients with radiculopathy after neurosurgical correction of compression discogenic syndrome. *Voprosy Kurortologii, Fizioterapii, i Lechebnoí Fizicheskoí Kultury* 2002; 5: 21–22.
6. Freyberger HJ, Schneider W, Stieglitz RD. *Kompendium psychiatrii psychoterapii medycyny psychosomatycznej.* Warszawa: Wydawnictwo Lekarskie PZWL; 2005 (in Polish).
7. Lequerica AH, Donnell CS, Tate DG. Patient engagement in rehabilitation therapy: physical and occupational therapist impressions. *Dis Rehab* 2009; 31(9): 753–760, doi: 10.1080/09638280802309095.
8. Judd M, Fancott C, Reet J. Patient engagement: what does it mean to physiotherapy practice and quality improvement? *Physiotherapy Practice* 2016; 32–34. Available from URL: http://www.cfhi-fcass.ca/sf-docs/default-source/collaborations/physiotherapy-practice-quality-qi-e.pdf?sfvrsn=ca90d244_2.
9. Juczyński Z. *Narzędzia pomiaru w promocji i psychologii zdrowia.* 2nd ed. Warszawa: Pracownia Testów Psychologicznych; 2009: 128–179 (in Polish).
10. Domka E, Ćwirlej A, Kwolek A. Zależność efektów rehabilitacji od stanu psychicznego pacjentów z przewlekłym zespołem bólowym kręgosłupa w odcinku lędźwiowo-krzyżowym. *Prz Med Uniw Rzesz* 2003; 4: 367–372 (in Polish).
11. Magoń G, Bejer A, Wosiek B, et al. Wpływ depresji na postępy rehabilitacji u pacjentów po przebytym udarze mózgu. *Adv Rehabil* 2005; 1: 41–46 (in Polish).
12. Leder S. *Jakość życia a psychiatria konsultacyjna i psychoterapia*. In: Meyza J, ed. *Jakość życia w chorobie nowotworowej. Wybrane zagadnienia.* Warszawa: Centrum Onkologii Instytut im. Marii Skłodowskiej-Curie 1997: 210–224 (in Polish).
13. Cramer AOJ, van Borkulo CD, Giltay EJ, et al. Major depression as a complex dynamic system. *PLoS ONE* 2016; 11(12): e0167490, doi: 10.1371/journal.pone.0167490.
14. Szczepańska J, Kowalska A, Rychlik M, et al. Elementy psychoterapii w procesie usprawniania pacjentów geriatrycznego oddziału rehabilitacyjnego. *Pol J Geriatr Psychiatry* 2007; 4(3): 149–158 (in Polish).
15. Zając J. *Rozpowszechnienie zachowań samobójczych*. In: Moskalewicz J, Kiejna A, Wojtyniak B, eds. *Kondycja psychiczna mieszkańców Polski: raport z badań Epidemiologia zaburzeń psychiatrycznych i dostęp do psychiatrycznej opieki zdrowotnej – EZOP Polska*. Warszawa: Instytut Psychiatrii i Neurologii; 2012: 243–247 (in Polish).
16. Felton BJ, Revenson TA, Hionrichsen GA. (adaptation Juczyński Z). *Skala akceptacji choroby AIS.* In: Juczyński Z. *Narzędzia pomiaru w promocji i psychoonkologii zdrowia.* Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego; 2009: 162–166 (in Polish).
17. Juczyński Z. *Narzędzia pomiaru w promocji i psychologii zdrowia.* Warszawa: Pracownia Testów Psychologicznych; 2001: 164 (in Polish).
18. Eaton W, Smith C, Ybarra M, et al. *Center for Epidemiologic Studies Depression Scale: review and revision (CESD and CESD-R).* In: Maruish ME, ed. *The use of psychological testing for treatment planning and outcomes assessment*. 3rd ed. Mahwah (NJ): Lawrence Erlbaum; 2004: 363–377.
19. Koziara K. Ocena depresyjności w populacji. Psychometryczna ocena polskiej wersji skali CESD-R. *Psychiatr Pol* 2016; 50(6): 1109–1117, doi: 10.12740/PP/61614 (in Polish).
20. Hawker GA, Mian S, Kendzerska T, et al. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). *Arthritis Care Res* 2011; 63: 240–252, doi:10.1002/acr.20543.
21. Domżał TM. Kliniczne podstawy badania i oceny bólu – wprowadzenie do tematu. *Pol Prz Neurol* 2007; 3(4): 211–215 (in Polish).
22. Van Dam N, Earleywine M. Validation of the Center for Epidemiologic Studies Depression Scale–Revised (CESD-R): pragmatic depression assessment in the general population. *Psychiatry Res* 2011; 186: 128–132, doi: 10.1016/j.psychres.2010.08.018.
23. Fillingim RB, King CD, Ribeiro-Dasilva MC, et al. Sex, gender, and pain: a review of recent clinical and experimental findings. *J Pain* 2009; 10(5): 447–485, doi: 10.1016/j.jpain.2008.12.001.
24. Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. *Br J Anaesth* 2013; 111(1): 52–58, doi: 10.1093/bja/aet127.
25. Kurowska K, Żbikowska A. Depresyjność a poczucie koherencji u pacjentów ze zmianami zwyrodnieniowymi kręgosłupa. *Now Lek* 2011; 80(6): 441–446. Available from URL: http://www.jms.ump.edu.pl/uploads/2011/6/441_6_80_2011.pdf (in Polish).

26. Rybakowski J, Jaracz J. Depresja a ból: nowe dane kliniczne, neurobiologiczne i psychofarmakologiczne. *Psychiatr Pol* 2005; 5: 937–950. Available from URL: http://www.psychiatriapolska.pl/uploads/PPt39n5s937Jaracz.pdf (in Polish).
27. Kuciel-Lewandowska J, Paprocka-Borowicz M, Laber W, et al. Ocena poziomu leku i depresji oraz natężenia bólu u pacjentów z chorobą zwyrodnieniową układu ruchu. *Fizjoter Pol* 2016; 16(2): 64–72. Available from URL: http://fizjoterapiapolska.pl/article/ocena-poziomu-leku-i-depresji-oraz-natezenia-bolu-u-pacjentow-z-choroba-zwyrodnieniowa-ukladu-ruchu-assessment-of-the-level-of-anxiety-depression-and-pain-intensity-in-patients-with-osteoarthritis/ (in Polish).
28. Kułak W, Kondzior D. Dyskopatia kręgosłupa odcinka lędźwiowo-krzyżowego w korelacji z natężeniem bólu, depresją i akceptacją choroby. *Probl Hig Epidemiol* 2010; 91(1): 153–157. Available from URL: http://www.phie.pl/pdf/phe-2010/phe-2010-1-153.pdf (in Polish).
29. Sharma A, Kudesia P, Shi Q, et al. Anxiety and depression in patients with osteoarthritis: impact and management challenges. *Open Access Rheumatol* 2016; 8: 103–113, doi: 10.2147/OARRR.S93516.

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