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SPECIFICITIES OF MODIFYING AN OUTPATIENT PHYSICAL THERAPY SYSTEM FOR THE PATIENTS OF ORTHOPEDIC PROFILE AND ITS INFLUENCE ON THERAPEUTIC ALLIANCE CRITERIA

Actuality. The therapeutic alliance is a part of the therapeutic relationship between the patient and the therapist, influencing the setting and achievement of goals, the patient's motivation, and, as a result, the outcome of rehabilitation.

Material and methods. The study involved 113 patients who completed a standard course of physical therapy during 2013–2015, and 135 patients who completed a course of physical therapy during 2016–2018 after physical therapy system modification. The Working Alliance Inventory (WAI) questionnaire was used to assess the level of therapeutic alliance formation. Patients were grouped by the type of attitude to the disease (psychotypes). The course of physical therapy comprised 12–15 classes.

Research results. The comparison of indicators of therapeutic alliance formation in groups with similar psychotypes and different physical therapy systems confirmed the advantages of a modified physical therapy system and the implemented measures in several items. Thus, 2016–2018 patients with rational psychotypes had an advantage in nine items out of twelve, and patients with irrational psychotypes – in eleven items out of twelve. At the same time, overall scores in the “goal items”, “task items” and “bond items” domains were higher amongst 2016–2018 patients. Besides, when comparing the results of therapeutic alliance formation among 2016–2018 patients with irrational psychotypes and 2013–2015 patients with rational psychotypes we observed either absence of any statistical difference, or a significant advantage of the patients of a modified physical therapy system.

Conclusion. The results of the study confirmed the benefits of the modifications implemented in physical therapy system and measures of managing physical therapy process, as well as highlighted the benefits for the patients with irrational attitude to the disease.

Key words: physical rehabilitation, therapeutic exercises, musculoskeletal disorders, communication, professional-patient relations.

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ОСОБЛИВОСТІ МОДИФІКАЦІЇ СИСТЕМИ АМБУЛАТОРНОЇ ФІЗИЧНОЇ ТЕРАПІЇ ДЛЯ ПАЦІЄНТІВ ОРТОПЕДИЧНОГО ПРОФІЛЮ ТА ЇЇ ВПЛИВ НА КРИТЕРІЇ ТЕРАПЕВТИЧНОГО АЛЬЯНСУ

Актуальність. Терапевтичний альянс є частиною терапевтичних взаємин між пацієнтом і терапевтом, впливає на постановку й досягнення цілі, мотивацію пацієнта і, як наслідок, на результат реабілітації.

Мета дослідження – визначення впливу модифікації системи амбулаторної фізичної терапії пацієнтів ортопедичного профілю на критерії терапевтичного альянсу на основі оцінювання стану пацієнтів.

Матеріал і методи. У дослідженні взяли участь 113 пацієнтів, які пройшли стандартний курс фізичної терапії протягом 2013–2015 рр., і 135 пацієнтів, які пройшли курс фізичної терапії протягом 2016–2018 рр. після модифікації системи фізичної терапії. Для оцінювання рівня формування терапевтичного альянсу використовували опитувальник WAI (Working Alliance Inventory). Пацієнти були згруповані за типом ставлення до хвороби (психотипи). Курс фізичної терапії складався з 12–15 занять.

Результати дослідження. Порівняння показників формування терапевтичного альянсу в групах зі схожими психотипами й різними системами фізичної терапії підтвердило переваги модифікованої системи фізичної терапії та реалізованих заходів за кількома пунктами. Так, пацієнти з раціональними психотипами 2016–2018 рр. мали перевагу за дев'ятьма пунктами з дванадцяти, а пацієнти з ірраціональними психотипами – за одинадцятьма пунктами з дванадцяти. Водночас загальні бали в пунктах «цільові пункти», «завдання» й «обов'язкові пункти» були вищими серед пацієнтів 2016–2018 рр. Крім того, під час порівняння результатів формування терапевтичного альянсу серед пацієнтів 2016–2018 рр. із нераціональними психотипами й пацієнтів 2013–2015 рр. із раціональними психотипами ми спостерігали або відсутність будь-якої статистичної різниці, або значну перевагу пацієнтів модифікованої системи фізичної терапії.

Висновок. Результати дослідження підтвердили переваги модифікації, упроваджених у систему фізичної терапії та заходів управління фізіотерапевтичним процесом, а також висвітлили переваги для пацієнтів із нераціональним ставленням до хвороби.

Ключові слова: фізична реабілітація, терапевтичні вправи, захворювання опорно-рухового апарату, комунікація, професійні стосунки з пацієнтом.

Introduction. Actuality. Professional and interpersonal characteristics of the relationship between a physical therapist and a patient are crucial factors that influence therapy effectiveness and satisfaction with it. A good level of communication promotes patient's trust to the specialist, which eventually turns into therapeutic alliance.

Therapeutic alliance between clinicians and patients evoked interest in the fields of medical care (Stewart, 1995) and psychotherapy (Horvath et al., 1991; Martin et al., 2000). Therapeutic alliance, also referred to as a working alliance, therapeutic relationship or helping

alliance, is a general construct which comprises in its theoretical definition a collaborative nature, affective relationship, and agreement about the goal and objectives between patients and clinicians (Martin et al., 2000; Van Lunteren et al., 2020). Other constructs, such as trust (Hall et al., 2002) and empathy (Mercer et al., 2004), may overlap with this definition and are also used to assess alliance quality. This concept is also studied in the fields of physical rehabilitation and physical therapy (Hall et al., 2010; Taccolini Manzoni et al., 2018; Kinney et al., 2020).

The evidence of therapeutic alliance importance in achieving good results from physical therapy is currently accumulating (Taccolini Manzoni et al., 2018; Kinney et al., 2020; Lawford et al., 2020). However, it has already been proved that a good therapeutic alliance between a physical therapist and patients with chronic musculoskeletal pain may improve intervention outcomes. Comprehending the factors of positive and negative impact on these relationships facilitates the formation of a strong therapeutic alliance (Leysen et al., 2021; Kishikawa et al., 2022). According to the researchers, terminological content of a therapeutic alliance concept remains unchanged and transfers to the traditional principles in the sphere of physical therapy (Kinney et al., 2020; Healy et al., 2023).

Our previous study (Fedorenko et al., 2019a) focused on determining specificities of therapeutic alliance formation between outpatients with orthopedic disorders after completing a physical therapy course and their physical therapists, based on patients' psychotypes. The results confirmed the relevance of the measures implemented to improve therapeutic alliance formation (namely taking into account the types of attitude to the disease, supplementing methods of managing physical therapy system and the process of physical therapy in particular, enhancing motivation of patients and medical staff, detecting ways of improving the quality of physical therapy services), and check their efficiency.

The aim of the research: to determine the impact of modifications in outpatient physical therapy system amongst orthopedic profile patients on therapeutic alliance criteria based on patients' assessment.

Research materials and methods. *Organization of the research.* The Working Alliance Inventory (WAI) questionnaire was used to assess the level of therapeutic alliance formation. In general, the questionnaire was designed to evaluate the elements of work collaboration in all forms of relationship related through (Munder et al., 2010; Vitomskyi et al., 2019). The patient was using the SF Hatcher Client form, which consists of 12 questions. These questions are divided into three domains: goal items; task items; bond items.

A 5-point Likert scale is used for each question, ranging from 1 (rarely) to 5 (always). Accordingly, the maximum score in question domains for the patient is 20 points.

The questionnaire was filled in after completing a physical therapy program.

Participants. The study involved 113 patients (53 men and 60 women), average age is 43.18 ± 8.88 (36.5–51.0) who completed a standard course of physical therapy during 2013–2015, and 135 patients

(70 men and 65 women), average age is 43.83 ± 9.12 (37.0–52.0) who completed a course of physical therapy during 2016–2018 after physical therapy system modification. with Chronic low back pain. The exclusion criteria were: patients with lumbar radiculopathy and/or with potentially dangerous conditions, including extravertebral pathology (prostatitis, endometriosis, chronic inflammatory diseases of the pelvic organs, kidney disease, aortic aneurysm, etc.), other specific pathology (malignant neoplasms, infectious diseases, fractures, inflammatory rheumatic diseases, "horse tail" syndrome, etc.), as well as mental disorders during the last 3 years.

The study was conducted at "FESCO" Medical Center, Brovary, Ukraine.

The samples included the patients who had properly completed the questionnaires after giving permission to collect, store, and process the obtained data; worked at least 15 hours per week, did not have comorbid conditions, and had systematically completed the whole course. The groups of 2013–2015 patients were denoted by letter G, and the groups of 2016–2018 patients were denoted by letter M (modified program).

The methods of determining types of attitudes to the disease were used to check the existence of patient's personality influence on the assessment of physical therapy satisfaction. Thus, attitude to the disease was a patients' grouping factor.

According to the literature data (Kolomiets', 2017; Kocherha et al., 2022), which refer harmonious, ergopathic and anosognostic types of reaction to the "rational" ones, 2013–2015 patients were divided into G+ group (n=58, rational types of reaction to the disease) and G- group (n=55, irrational); 2016–2018 patients were divided into M+ group (n=71) and M- (n=64) group.

Intervention. Standard course of physical therapy comprised 12–15 classes (40–60 minutes each; therapeutic exercises and mechanotherapy according to the doctor's prescription), physiotherapy (magnetotherapy, electromyostimulation according to the doctor's prescription) and massage (7–8 procedures). Course duration was 5–6 weeks.

Modified course of physical therapy was supplemented with new therapeutic exercises (with elastic bands; with fitball; exercises in functional gymnastics according to Gray Institute (3D Maps); exercises with post isometric relaxation).

Besides, physical therapy system included a number of innovations to enhance the role of a physical therapist in physical therapy system (assessment of patient's condition; prescription and replacement of exercises,

Table 1

Indicators of therapeutic alliance amongst 2013–2015 (G+) and 2016–2018 (M+) patients with rational psychotypes, scores

Items		Groups	
		G+(n=58)	M+(n=71)
1	Me (25%; 75%)	4 (3; 4)	5 (4; 5)**
	$\bar{X} \pm S$	3.90±0.69	4.56±0.55
2	Me (25%; 75%)	3(3; 3)	4 (4; 5)**
	$\bar{X} \pm S$	2.93±0.37	4.27±0.45
3	Me (25%; 75%)	4 (4; 4)	4 (4; 4)
	$\bar{X} \pm S$	4.07±0.37	4.11±0.46
4	Me (25%; 75%)	2 (2; 3)	4 (4; 5)**
	$\bar{X} \pm S$	2.43±0.50	4.34±0.48
5	Me (25%; 75%)	4 (4; 5)	4 (4; 5)
	$\bar{X} \pm S$	4.21±0.52	4.25±0.55
6	Me (25%; 75%)	4 (3; 4)	4 (4; 5)**
	$\bar{X} \pm S$	3.71±0.46	4.31±0.47
7	Me (25%; 75%)	4 (4; 4)	4 (4; 4)
	$\bar{X} \pm S$	4.07±0.37	4.15±0.5
8	Me (25%; 75%)	4 (4; 4)	5 (5; 5)**
	$\bar{X} \pm S$	4.24±0.43	4.83±0.38
9	Me (25%; 75%)	4 (4; 4)	4 (4; 5)*
	$\bar{X} \pm S$	4.02±0.51	4.24±0.49
10	Me (25%; 75%)	4 (3; 4)	5 (4; 5)**
	$\bar{X} \pm S$	3.88±0.68	4.52±0.56
11	Me (25%; 75%)	4 (3; 4)	4 (4; 5)**
	$\bar{X} \pm S$	3.55±0.50	4.46±0.5
12	Me (25%; 75%)	4 (3; 4)	4 (4; 5)**
	$\bar{X} \pm S$	3.84±0.77	4.27±0.51
The "goal items" score	Me (25%; 75%)	14 (12.75; 15)	17 (17; 19)**
	$\bar{X} \pm S$	13.93±1.39	17.94±1.34
The "task items" score	Me (25%; 75%)	15 (13; 15)	18 (16; 18)**
	$\bar{X} \pm S$	14.55±2.12	17.62±1.52
The "bond items" score	Me (25%; 75%)	16 (16; 17)	17 (16; 17)*
	$\bar{X} \pm S$	16.36±0.97	16.76±1.13

Note. * – the difference between group indicators is statistically significant $p < 0.05$, ** – $p < 0.01$.

dosage); to increase motivation of patients (Fedorenko et al., 2019a) and physical therapists (Vitomskiy et al., 2019); to improve managing physical therapy process and service quality, and take into account characteristics of patients with irrational attitude to the disease (Fedorenko et al., 2018).

These measures were implemented for better therapeutic alliance formation by enhancing a number of criteria: “patient’s understanding of his/her changes caused by the therapy”, “the frequency of finding new ways to deal with the patient’s problem resulted from what the patient is doing in therapy”, “patient’s feeling that physical therapy will help him/her accomplish the necessary changes”, “the frequency of patient’s thinking that the way to deal with his/her problem is correct”.

Statistical analysis. The obtained results were processed by means of mathematical statistics, using Statistica 12.0 (StatSoft, USA). Mean value (\bar{x}), root-mean-square deviation (S), median value (Me), upper and lower quartiles (25%; 75%) were measured. To assess significance of the difference, Student’s t-test (for independent groups) was used provided there was a normal distribution of study results; Mann-Whitney U-test (for independent groups) was used provided the indicators had a distribution other than normal.

It should be mentioned that 2016–2018 patients had no statistical differences in primary life quality results (SF–36, EQ–5D–5L) as compared with 2013–2015 patients, which was achieved by means of screening to improve the analysis of physical therapy satisfaction scores.

Research results and their discussion. The analysis of therapeutic alliance scores is presented as a comparison of 2013–2015 and 2016–2018 groups, namely G+ group with M+ group and G– group with M– group, as well as a comparison of M+ group with M– group.

Consider the results of a statistical analysis of therapeutic alliance scores amongst 2013–2015 and 2016–2018 patients with rational psychotypes (Table 1).

The first questionnaire item, which focuses on patient’s understanding of the possible changes caused by the therapy, denoted a statistical advantage of 2016–2018 patients who had completed a modified program of physical therapy (Table 1). In particular, in M+ group Me (25%; 75%) indicators were 5 (4; 5) points; in G+ group they were 4 (3; 4) points ($p < 0.01$). Mean value difference comprised 0.66 points. Maximum and best score is 5 points.

The next questionnaire item focuses on the frequency of finding new ways to deal with the patient’s problem resulted from what the patient is doing in therapy. Me (25%; 75%) indicators were 4 (4; 5) points in M+ group and 3 (3; 3) points in G+ group ($p < 0.01$). Mean value difference comprised 1.34 points. Maximum and best score is 5 points.

The third item focuses on patient's belief that a physical therapist likes him/her. Me (25%; 75%) indicators were 4 (4; 4) points in M+ and G+ groups ($p>0.05$).

The fourth questionnaire item evaluates collaboration between a physical therapist and a patient on setting therapy goals. Me (25%; 75%) indicators were 4 (4; 5) points in M+ group and 2 (2; 3) points in G+ group ($p<0.01$). Mean value difference comprised 1.91 points. Thus, M+ group indicators were statistically better, which reflects effectiveness of the measures implemented to increase involvement of a physical therapist in patient's examination, setting program goals and content.

The level of mutual respect between a patient and a physical therapist, which is assessed in the fifth questionnaire item, had statistically similar scores in M+ and G+ patients. Me (25%; 75%) indicators were 4 (4; 5) points ($p>0.05$) in both groups.

The sixth questionnaire item focuses on assessing joint work of a physical therapist and a patient on mutually agreed goals. Me (25%; 75%) indicators were 4 (4; 5) points in M+ group and 4 (3; 4) points in G+ group ($p<0.01$). Mean value difference comprised 0.6 points. Thus, 2016–2018 patients with rational psychotypes had statistically better indicators, which reflect effectiveness of the measures implemented to increase involvement of a physical therapist in patient's examination, setting program goals and content.

According to the seventh questionnaire item, focused on the patient's feeling that he/she is appreciated by a physical therapist, no statistical difference between the groups was determined. Me (25%; 75%) indicators were 4 (4; 4) points in both M+ and G+ groups ($p<0.01$). Mean value difference was not significant.

The next questionnaire item focuses on mutual agreement of a physical therapist and a patient that the patient needs to work on self-improvement. 2016–2018 patients who had completed a modified course of physical therapy had a statistical advantage: Me (25%; 75%) indicators were 5 (5; 5) points in M+ group and 4 (4; 4) in G+ group ($p<0.01$). Mean value difference comprised 0.15 points.

The ninth questionnaire item focuses on the fact that a patient feels being cared for by a physical therapist, even when the patient does not follow therapist's instructions. Me (25%; 75%) indicators were 4 (4; 5) points in M+ group and 4 (4; 4) points in G+ group ($p<0.05$). Mean value difference comprised only 0.22 points.

The tenth questionnaire item focuses on patient's feeling that physical therapy will help him/her accomplish the necessary changes. Me (25%; 75%) indicators were 5 (4; 5) points in M+ group and 4 (3; 4) points in G+ group ($p<0.01$). Mean value difference comprised 0.64 points, which is quite significant considering the rating system.

The eleventh questionnaire item focuses on the level of establishing by a physical therapist and a patient a good understanding of the changes that would be beneficial to the patient. Me (25%; 75%) indicators were 4 (4; 5) points in M+ group and 4 (3; 4) points in G+ group ($p<0.01$). Mean value difference comprised 0.91 points. Thus, 2016–2018 patients with rational psychotypes had statistically better indicators, which reflects effectiveness of the measures implemented to increase involvement of a physical therapist in patient's examination, introduce assessment of the surroundings and analyze activity and participation in order to provide better pain dynamics, physical and social functioning.

The twelfth questionnaire item focuses on assessing the frequency of patient's thinking that the way to deal with his/her problem is correct. Me (25%; 75%) indicators were 4 (4; 5) points in M+ group and 4 (3; 4) points in G+ group ($p<0.01$). Mean value difference comprised 0.43 points. Thus, the effectiveness of the measures, implemented to increase involvement of a physical therapist in patient's examination, setting program goals and content, as well as the variability of this content, was confirmed.

Patients with rational psychotypes had significantly better overall "goal items" score amongst 2016–2018 patients who had completed a modified course of physical therapy (Table 1). Me (25%; 75%) indicators were 17 (17; 19) points in M+ group and 14 (12.75; 15) points in G+ group ($p<0.01$). Mean value difference comprised 4.01 points. Thus, M+ patients had a 28.8% mean value excellence over G+ group.

The overall "task items" score was also significantly better among M+ patients. Me (25%; 75%) indicators were 18 (16; 18) points in M+ group and 15 (13; 15) points in G+ group ($p<0.01$). Mean value difference comprised 3.07 points. Thus, M+ patients had a 21.1% mean value excellence over G+ group.

The overall score of the last domain reflects the "relationship" level items. This score was also significantly better amongst 2016–2018 patients who had completed a modified course of physical therapy (Table 1). Me (25%; 75%) indicators were 17 (16; 17) points in M+ group and 16 (16; 17) points in G+ group ($p<0.05$). Mean value difference comprised 0.4 points. Thus, M+ patients had a 2.4% mean value excellence over G+ group. Consider the results of a statistical analysis of therapeutic alliance assessment amongst 2013–2015 and 2016–2018 patients with irrational attitude to the disease (Table 2).

According to the first questionnaire item (patient's understanding of what changes he/she can undergo as a result of the therapy), a statistical advantage was determined amongst 2016–2018 patients who had completed a modified course of physical therapy (table 2). Me (25%; 75%) indicators were 4 (4; 4) points in M– group and 3 (3; 4) points in G– group ($p<0.01$). Mean value difference comprised 0.66 points. Maximum and best score is 5 points.

Table 2
**Indicators of therapeutic alliance amongst
 2013–2015 (G–) and 2016–2018 (M–) patients
 with irrational psychotypes, scores**

Items		Groups	
		G–(n=55)	M–(n=64)
1	Me (25%; 75%)	3 (3; 4)	4 (4; 4)* ^{###}
	$\bar{X} \pm S$	3.31±0.69	3.97±0.5
2	Me (25%; 75%)	3 (3; 3)	4 (4; 4)* ^{###}
	$\bar{X} \pm S$	2.82±0.47	3.95±0.45
3	Me (25%; 75%)	3 (3; 4)	4 (4; 4)*
	$\bar{X} \pm S$	3.38±0.49	4.05±0.45
4	Me (25%; 75%)	2 (2; 2)	4 (4; 4)* [#]
	$\bar{X} \pm S$	2.13±0.34	4.13±0.55
5	Me (25%; 75%)	4 (3; 4)	4 (4; 4.75)*
	$\bar{X} \pm S$	3.65±0.48	4.13±0.6
6	Me (25%; 75%)	3 (3; 4)	4 (4; 5)*
	$\bar{X} \pm S$	3.38±0.49	4.19±0.59
7	Me (25%; 75%)	3 (3; 4)	4 (4; 4)*
	$\bar{X} \pm S$	3.36±0.49	4.06±0.56
8	Me (25%; 75%)	4 (4; 4)	4 (4; 5)* ^{###}
	$\bar{X} \pm S$	4.09±0.40	4.42±0.56
9	Me (25%; 75%)	4 (3; 4)	4 (4; 4) [#]
	$\bar{X} \pm S$	3.87±0.61	4.02±0.55
10	Me (25%; 75%)	3 (3; 4)	4 (4; 4)* ^{###}
	$\bar{X} \pm S$	3.29±0.53	3.94±0.47
11	Me (25%; 75%)	3 (3; 4)	4 (4; 5)* ^{###}
	$\bar{X} \pm S$	3.38±0.49	4.17±0.58
12	Me (25%; 75%)	3 (3; 4)	4 (4; 4)* ^{###}
	$\bar{X} \pm S$	3.29±0.57	4.00±0.44
The “goal items” score	Me (25%; 75%)	12 (12; 14)	16 (16; 18)* ^{###}
	$\bar{X} \pm S$	12.98±1.28	16.91±1.83
The “task items” score	Me (25%; 75%)	12 (11; 15)	16 (16; 16)* ^{###}
	$\bar{X} \pm S$	12.71±1.69	15.86±1.69
The “bond items” score	Me (25%; 75%)	14 (13; 15)	16 (15.25; 17)* [#]
	$\bar{X} \pm S$	14.27±1.10	16.25±1.37

Note. * – the difference between group indicators is statistically significant $p < 0.01$, # – the difference between group indicators is statistically significant $p < 0.05$ as compared to M+ group, ### – $p < 0.01$.

The results of the second questionnaire item (the frequency of finding new ways to deal with the patient’s problem resulted from what the patient is doing in therapy) were significantly better in M– group. Me (25%; 75%) indicators were 4 (4; 4) points in M– group and 3 (3; 3) points in G– group ($p < 0.01$). Mean value difference comprised 1.13 points.

The results of the third questionnaire item (patient’s belief that a physical therapist likes him/her) were as follows: Me (25%; 75%) indicators were 4 (4; 4) points in M– group and 3 (3; 4) points in G– group ($p < 0.01$).

The assessment of collaboration between a physical therapist and a patient in setting therapy goals (the fourth questionnaire item) was statistically better among 2016–2018 patients. Me (25%; 75%) indicators were 4 (4; 4) points in M– group and 2 (2; 2) points in G– group ($p < 0.01$). Mean value difference comprised 2 points. This reflects effectiveness of the measures implemented to increase involvement of a physical therapist in patient’s examination, setting program goals and content.

The fifth questionnaire item (the level of mutual respect between a patient and a physical therapist) had statistically higher scores in M– group. Me (25%; 75%) indicators were 4 (4; 4.75) and 4 (3; 4) points in M– and G– groups respectively ($p < 0.01$). Mean value difference comprised 0.48 points.

The results of the sixth questionnaire item (assessment of joint work of a physical therapist and a patient on mutually agreed goals) were also statistically better in M– group. Me (25%; 75%) indicators were 4 (4; 5) in M– group and 3 (3; 4) in G– group ($p < 0.01$). Mean value difference comprised 0.81 points. Thus, the results of 2016–2018 patients with irrational psychotypes were higher, which reflects effectiveness of the measures implemented to increase involvement of a physical therapist in setting program goals and content as well as monitoring its implementation.

Patient’s feeling that he/she is appreciated by a physical therapist (the seventh questionnaire item) had higher scores among M– patients. Me (25%; 75%) indicators were 4 (4; 4) and 3 (3; 4) points in M– and G– groups respectively ($p < 0.01$). Mean value difference comprised 0.7 points. This reflects effectiveness of the approaches introduced to manage physical therapy process among the patients with irrational psychotypes.

The results of the eighth questionnaire item (mutual agreement of a physical therapist and a patient that the patient needs to work on self-improvement) confirmed statistical advantage among 2016–2018 patients who had completed a modified course of physical therapy: Me (25%; 75%) indicators were 4 (4; 5) points in M–

group and 4 (4; 4) points in G– group ($p < 0.01$). Mean value difference comprised 0.33 points.

The assessment of the fact that a patient feels being cared for by a physical therapist, even when the patient does not follow therapist's instructions, was not statistically better in any of the groups (the ninth item, table 2). Me (25%; 75%) indicators were 4 (4; 4) points in M– group and 4 (3; 4) points in G– group ($p > 0.05$).

The results of the tenth questionnaire item (patient's feeling that physical therapy will help him/her accomplish the necessary changes) in the groups with irrational psychotypes were as follows: Me (25%; 75%) indicators were 4 (4; 4) points in M– group and 3 (3; 4) points in G– group ($p < 0.01$). Thus, improved process of setting goals and their individualization, active participation of a patient and a physical therapist (i.e. of those who systematically worked to achieve these goals) in setting them, general and individualized recommendations promoted the raise of scores among 2016–2018 patients. Mean value difference comprised 0.65 points.

The eleventh item scores (establishing by a physical therapist and a patient a good understanding of the changes that would be beneficial to the patient) were as follows: Me (25%; 75%) indicators were 4 (4; 5) points in M– group and 3 (3; 4) points in G– group ($p < 0.01$). Mean value difference comprised 0.79 points. Thus, 2016–2018 patients with irrational psychotypes had statistically better indicators, which reflects effectiveness of the measures implemented to increase involvement of a physical therapist in patient's examination, introduce assessment of the surroundings, analyze activity and participation in order to provide better pain dynamics, physical and social functioning.

The twelfth questionnaire item (the frequency of patient's thinking that the way to deal with his/her problem is correct) had significantly higher scores in M– group. Me (25%; 75%) indicators were 4 (4; 4) points in M– group and 3 (3; 4) points in G– group ($p < 0.01$). Mean value difference comprised 0.71 points. Thus, the effectiveness of the measures implemented to increase involvement of a physical therapist in patient's examination, setting program goals and content, as well as the variability of this content was confirmed.

Among the patients with irrational psychotypes, the overall "goal items" score was significantly higher in 2016–2018 patients who had completed a modified course of physical therapy (Table 2). Me (25%; 75%) indicators were 16 (16; 18) points in M– group and 12 (12; 14) points in G– group ($p < 0.01$). Mean value difference comprised 3.93 points. Thus, M– patients had a 30.3% mean value excellence over G– group.

The overall "task items" score was also significantly higher among M– patients. Me (25%; 75%) indicators

were 16 (16; 16) points in M– group and 12 (11; 15) points in G– group ($p < 0.01$). Mean value difference comprised 3.15 points. Thus, M– patients had a 24.8% mean value excellence over G– group.

The last overall score reflects the "relationship" level items. This score was also significantly higher among 2016–2018 patients who had completed a modified course of physical therapy (Table 2). Me (25%; 75%) indicators were 16 (15.25; 17) points in M– group and 14 (13; 15) points in G– group ($p < 0.01$). Mean value difference comprised 1.98 points. Thus, M– patients had a 13.9% mean value excellence over G– group.

The presented statistical analysis answers the questions related to the benefits of a developed program, modifications in physical therapy management and their impact on the level of therapeutic alliance formation amongst the patients grouped according to their psychotypes. However, the following questions related to group indicators should be also considered:

- whether the level of therapeutic alliance amongst 2016–2018 patients with irrational attitude to the disease achieved the level of therapeutic alliance amongst 2013–2015 patients with rational attitude to the disease;
- what items had different scores amongst 2016–2018 patients with irrational attitude to the disease and the patients with rational attitude to the disease;
- whether there are any differences between the results of comparing G+ with G– groups and M+ with M– groups.

First, it should be noted that the comparison of the results of therapeutic alliance assessment questionnaire (a form for patient) in G+ and M– groups revealed that the results were either the same in both groups or better in M– group. This confirms better performance of a modified program and methods of managing physical therapy process. At the same time, this result is the most significant confirmation, since statistical differences between G+ group and G– group (Fedorenko et al., 2019) confirmed only the excellence of G+ group. We should note that when comparing G+ and M– groups, M– group had an excellence in item 2 (assessment of the frequency of finding new ways to deal with the patient's problem resulted from what the patient is doing in therapy) ($p < 0.01$); item 4 (assessment of collaboration between a physical therapist and a patient in setting therapy goals) ($p < 0.05$); item 6 (assessment of joint work of a physical therapist and a patient on mutually agreed goals) ($p < 0.05$); item 8 (mutual agreement of a physical therapist and a patient that the patient needs to work on self-improvement) ($p < 0.05$); item 11 (the level of establishing by a physical therapist and a patient a good understanding of the changes that would be

beneficial to the patient) ($p < 0.01$); overall “goal items” and “task items” scores. Thus, due to the introduced changes 2016–2018 patients with irrational attitude to the disease had better item scores, overall “goal items” and “task items” scores than 2013–2015 patients with rational attitude to the disease, and raised the items and overall “bond items” score to the level of 2013–2015 patients with rational attitude to the disease.

At the same time, the comparison of the results of M+ and M– groups (Table 2) revealed a statistical difference in the following items:

- 1 (patient’s understanding of the possible changes caused by the therapy) ($p < 0.01$);
- 2 (the frequency of finding new ways to deal with the patient’s problem resulted from what the patient is doing in therapy) ($p < 0.01$);
- 4 (collaboration between a physical therapist and a patient in setting therapy goals) ($p < 0.05$);
- 8 (mutual agreement of a physical therapist and a patient that the patient needs to work on self-improvement) ($p < 0.01$);
- 9 (a patient feels being cared for by a physical therapist, even when the patient does not follow therapist’s instructions) ($p < 0.05$);
- 10 (patient’s feeling that physical therapy will help him/her accomplish the necessary changes) ($p < 0.01$);
- 11 (the level of establishing by a physical therapist and a patient a good understanding of the changes that would be beneficial to the patient) ($p < 0.01$);
- 12 (assessing the frequency of patient’s thinking that the way to deal with his/her problem is correct) ($p < 0.01$);
- overall “goal items”, “task items” ($p < 0.01$) and “bond items” scores ($p < 0.05$).

It means that the level of therapeutic alliance formation in a modified program also had differences in patients’ scores depending on their psychotype.

In order to compare these differences with those of 2013–2015 patients, it is necessary to analyze the results of comparing M+ group with M– group (Table 2) and G+ group with G– group (Fedorenko et al., 2019). Thus, we determined significant differences in items 1, 10, 12 and overall “goal items”, “task items” scores in favor of groups with rational psychotypes in both comparisons ($p < 0.01$). A slightly smaller but significant difference was in item 4 and overall “bond items” score ($p < 0.05$) when comparing M+ group with M– group; when comparing G+ group with G– group the significance was better ($p < 0.01$).

At the same time, when comparing questionnaire results (a form for patients) of M+ group with M– group we did not determine any significant difference in item 3

(a patient thinks that a physical therapist likes him/her), item 5 (the level of mutual respect between a patient and a physical therapist), item 6 (assessing joint work of a physical therapist and a patient on mutually agreed goals) and item 7 (patient’s feeling that he/she is appreciated by a physical therapist), although they were determined when comparing G+ group with G– group (Fedorenko et al., 2019), but confirmed the advantages of G+ group. Thus, we can assert that the measures implemented to improve therapeutic alliance were effective, mainly in the “bond items” domain among the patients with irrational attitude to the disease.

On the contrary, when comparing questionnaire results (a form for a patient) of M+ group with M– group, we determined differences in favor of M+ group in item 2 (the frequency of finding new ways to deal with the patient’s problem resulted from what the patient is doing in therapy) ($p < 0.01$); item 8 (mutual agreement of a physical therapist and a patient that the patient needs to work on self-improvement) ($p < 0.01$); item 9 (a patient feels being cared for by a physical therapist, even when the patient does not follow therapist’s instructions) ($p < 0.05$); item 11 (the level of establishing by a physical therapist and a patient a good understanding of the changes that would be beneficial to the patient) ($p < 0.01$), which were not determined when comparing the results of G+ group with G– group (Fedorenko et al., 2019). However, as it was noted above, M– group had advantages over G+ and G– groups in all these items. Therefore, we cannot assert that the differences between M+ group and M– group in these items are a negative aspect.

Conclusion. Comparison of the results of therapeutic alliance formation in groups with similar psychotypes and different physical therapy systems confirmed the advantages of a modified system of physical therapy and the implemented measures in a number of items. Thus, 2016–2018 patients with rational psychotypes had advantages in nine items out of twelve, and patients with irrational psychotypes – in eleven items out of twelve. Besides, when comparing the results of therapeutic alliance formation among 2016–2018 patients with irrational psychotypes (M– group) and 2013–2015 patients with rational psychotypes (G+ group) we observed either absence of any statistical difference (i.e. score equaling, which was not observed in 2013–2015 patients), or a significant advantage of the patients of a modified physical therapy system (M– group).

These results confirmed the advantages of a modified physical therapy system as a whole, measures of managing physical therapy process, and highlighted particular advantages for the patients with irrational attitude to the disease.

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