PRDOA 12 (2025) 100349

Contents lists available at ScienceDirect

Clinical Parkinsonism & Related Disorders

journal homepage: www.sciencedirect.com/journal/clinical-parkinsonism-and-related-disorders

Original Articles

Differences between patient- and therapist-rated working alliance and their relationships with physical rehabilitation outcomes in individuals with Parkinson's disease

Keita Sue [a,b], Kazumi Sakurai [a], Daiki Usuda [a], Katsuyuki Kobayashi [a], Keiko Nakamura [c], Tomomi Kinoshita [d], Kimito Momose [b,*]

[a] Department of Rehabilitation, JA Nagano Kouseiren Kakeyu-Misatyama Rehabilitation Center Kakeyu Hospital, Ueda, Japan
[b] Department of Fundamental Physical Therapy, School of Medicine, Shinshu University, Matsumoto, Japan
[c] Department of Rehabilitation, JA Nagano Kouseiren Asama Nanroku Komoro Medical Center, Komoro, Japan
[d] Department of Neurology, JA Nagano Kouseiren Kakeyu-Misatyama Rehabilitation Center Kakeyu Hospital, Ueda, Japan

ARTICLE INFO

Keywords:
Working alliance
Parkinson's disease
Rehabilitation
Lee Silverman Voice Treatment BIG
Physical therapy
Gait

ABSTRACT

Introduction: Working Alliance (WA) significantly influences therapeutic success in psychotherapy or rehabilitation for musculoskeletal problems. The perception of WA often differs between patients and therapists. However, little is known about WA in patients with Parkinson's disease (PD) and its relationship with clinical outcomes following physical rehabilitation. This study aimed to examine the differences in WA between patients and physical therapists in the early phase of a physical rehabilitation program and explore their relationships with improvements in gait-related assessments.

Methods: Twenty-one patients with PD who participated in the Lee Silverman Voice Treatment BIG program were included. Gait-related assessments, which included gait speed at 10-meter walking test (10-MWT) and timed up & go, were conducted before and after the program. WA was assessed using Working Alliance Inventory (WAI) for both patients and therapists after the completion of the fifth session. The difference between patient- and therapist-rated WAI was analyzed using an unpaired *t*-test. Correlational analyses between both patient- and therapist-rated WAI scores and improvement rates in gait-related assessments were also performed.

Results: Patients rated WAI scores significantly higher than therapists. Only patient-rated WAI scores were correlated with improvement rates in gait speed on 10-MWT, while therapist-rated WAI showed no significant correlation.

Conclusion: The results suggest patients with PD perceived WA higher than therapists in the early phase of rehabilitation, and patients' perceptions may influence functional improvements in rehabilitation.

1. Introduction

Parkinson's disease (PD) is a rapid growing neurodegenerative disease and the leading cause of disability worldwide [1]. Hence, delaying and preventing disability in this population is a critical concern. Gait impairment is a common disabling symptom in individuals with PD. Physical exercise, including physical therapy, is a prominent intervention for gait impairment alongside medication [2], and the improvement of these impaired abilities may be more effectively achieved by increasing the dose of exercise [3]. A previous study reviewed various motivators to exercise and reported that support from medical professionals plays a positive role in encouraging people with PD to start or engage in exercise [4]. In this regard, the relationship between individuals with PD and healthcare professionals, particularly physical therapists (PT) who train them, appears to be important for achieving functional improvement following exercise.

Working alliance (WA) refers to collaboration between patients and clinicians with different aspects during therapy, and the model suggested by Bordin is one of the most widely accepted [5]. This model highlights three core components: (1) consensus on tasks in therapy, (2)

* Corresponding author at: Department of Fundamental Physical Therapy, School of Medicine, Shinshu University, 3-1-1, Asahi, Matsumoto, Nagano 390-8621, Japan.
E-mail address: kmomose@shinshu-u.ac.jp (K. Momose).

https://doi.org/10.1016/j.prdoa.2025.100349
Received 9 November 2024; Accepted 12 May 2025
Available online 13 May 2025

bond between patient and therapist, and (3) agreement on therapeutic goals. WA is a promising factor that contributes to success in psychotherapy [6]. Furthermore, the roles of WA have been studied in rehabilitation, particularly for individuals with musculoskeletal pain. These studies have demonstrated that stronger WA between PTs and patients may help reduce chronic pain [7], improve patient-report functional outcomes [8], and increase adherence to therapy [9]. However, limited studies have explored the impacts on clinical outcomes among people with neurodegenerative problems, such as PD. Moreover, most previous research has focused on its influence on patient-perceived outcomes, such as pain, rather than on objectively assessed outcomes.

WA can be assessed using working alliance inventory (WAI), which can be rated by therapists, clients (patients), and observers [10]. The "Rashomon effect," where different raters score differently, is often reported in this assessment [11,12]. While some studies have found that therapist- or observer-rated WA influenced more closely psychotherapeutic outcomes [6,13], other research suggests that patient-rated WA is positively associated with rehabilitation outcomes, particularly in individuals with musculoskeletal conditions [9]. This discrepancy may indicate which WA ratings influence clinical outcomes may differ depending on the targeted population. Thus, further study is necessary to determine the differences in WA between patients and therapists and to explore which rater's WA is more closely related to clinical outcomes, particularly in objective assessment, among individuals with PD.

The purposes of this study were: (1) to examine the differences in patient- and therapist-rated WA at the early phase of the physical rehabilitation program in individuals with PD, and (2) to explore their relationships with improvements in gait ability.

2. Methods

2.1. Study design and ethical approval

We conducted a prospective observational study. The study was approved by the medical ethics committee of Kakeyu Hospital (Approval number: 2020001) and conducted in accordance with the Declaration of Helsinki. All participants were informed of the study's purpose, procedure, and potential risks and provided written informed consent prior to data collection.

2.2. Participants

Patients admitted at Kakeyu hospital for Lee Silverman Voice Treatment (LSVT) BIG program, regarded as an intensive rehabilitation program, between April 2022 to August 2024 were consecutively screened for eligibility. The LSVT BIG is the technique focusing on restoring the normal movement amplitude from underscaling movement through the standardized protocol with high effort and intensity [14]. Each session of the program includes four core components, incorporating gait training with big movements. A previous study revealed that this protocol may improve gait-related functions in patients with PD compared to general exercise [15]. This population was selected to ensure uniformity in the rehabilitation intervention. The inclusion criteria were as follows: (1) agreement to participate in this study, (2) no changes in medication during the program, (3) mini-mental state examination (MMSE) $\geq$ 24, (4) completion for 4 consecutive days a week for 4 weeks program, including daily homework training, and (5) no prior experience with WA assessment before the study.

2.3. Program procedure

Baseline (pre-program) assessments were conducted within two to three days of admission. These assessments included the movement disorder society unified parkinson's disease rating scale (MDS-UPDRS) [16] to evaluate the severity of PD comprehensively, the MMSE to assess global cognitive function, and the hospital anxiety and depression scale (HADS) [17] to measure self-perceived anxiety and depression. Gait-related assessments were also administered during this period. All measurements were performed during the patient's "on phase".

Before starting the program, patients set attainable goals that relate to daily life challenges, including walking and sit-to-stand movements, together with their PTs. The four consecutive days a week for 4 weeks program was delivered by six PTs with an average of 19.8 years of clinical experience (standard deviation $\pm$ 8.5). All PTs were trained and certified in the LSVT BIG technique. Each patient was trained with the same PT throughout the program to ensure consistency. Each session with their PT lasted 60 min, and patients were also encouraged to perform daily homework training for a fixed amount of time. The PTs personalized the patient's homework training and monitored their adherence at the beginning of each session.

Post-program assessments, identical to the baseline evaluations, were conducted within two to three days of program completion, and the results were shared with the patients.

2.4. Outcome measures

2.4.1. Working alliance inventory

The patient- and therapist-rated WA were assessed using WAI, a valid measure of WA [10] and frequently used in rehabilitation research [8]. This self-report questionnaire consists of 36 items rated on a Likert scale from 1 to 7, with a maximum score of 252. Higher score indicates a stronger perceived WA during the therapy. The total score can be divided into three subscales: goal, task, and bond. The permission to use both client (patient) and therapist versions of WAI was obtained from the society for psychotherapy research prior to the study. The assessments of WAI for both patients and PTs were conducted after the fifth session of the 16-session program because the initial WA is considered to develop during this phase [12].

2.4.2. Gait-related assessments

The gait-related assessments included the 10-m walking test (10-MWT) [18] and the timed up & go (TUG) test [19], both of which were performed by the same two PTs and an occupational therapist. The 10-MWT was used to assess gait speeds at both comfortable and maximal speeds. The walking path was 16 m in total, with 3 m allocated for acceleration and deceleration. The assessors instructed patients to walk the 16 m path without the use of walking aids, and walking speeds were measured using a handheld stopwatch as they passed through 10-m marks on the path. Each test, at comfortable and maximal speed, was performed twice before and after the program. The mean speeds (m / sec) for each condition were calculated and used for analysis.

For TUG test, the patients sat on a chair with 43 cm seat height and armrests. Assessors explained and demonstrated the test procedure, which involved standing up, walking to a landmark 3 m away, turning around, and returning to the chair as quickly as possible. The time (sec) was measured using a stopwatch. The test was conducted twice and the mean time for both trials was used for analysis.

2.5. Statistical analysis

The sample size was calculated using free software G* power 3.1.9.4 (Heinrich Heine University, Dusseldorf, Germany) prior to the study. We set alpha to 0.05, power to 0.8, and effect size to 0.6, based on a previous correlational study in WA among individuals with neurological problems [20]. This calculation indicated the minimum required sample size was 17.

The patients' characteristics were presented as mean $\pm$ standard deviation (SD) or median (quintile range) for numerical data or in actual numbers for categorical data. The analysis proceeded in four steps. First, we confirmed the effects of LSVT BIG program on gait parameters using a paired *t*-test. Second, we analyzed the homogeneity between the 3 subscores of WAI obtained from patients and therapists using an unpaired *t*-

test. Third, we conducted correlational analyses using Pearson's product's moment correlation coefficient to confirm the relationship between patient- and therapist-rated WAI and improvements in gait assessments. For the correlational analysis, the results in gait-related assessments (10-MWT at two speeds and TUG) before and after the program were converted to improvement rates for normalization of initial gait abilities using the following equation:

$$\textit{Improvement rate in gait related tests} = \frac{\textit{pre program assessment} - \text{post program assessment}}{\textit{pre program assessment}} \times 100$$

Finally, partial correlational analyses were performed between the WAI scores and the improvement rates in gait-related assessments, controlling for depressive symptoms measured by HADS. This was based on prior research showing that depressive symptoms are associated with gait abilities in people with PD [21]. All statistical analyses were conducted using SPSS version 25 (International Business Machine Corp., Armonk, NY, USA). Statistical significance was considered at P-values < 0.05, with no adjustment for multiplicity, as this study was exploratory in nature.

3. Results

A total of 27 potential participants were screened and 3 declined to participate, and 3 did not complete the program (1 due to a COVID-19 outbreak, 1 due to discharge for personal reasons, and 1 who was unable to appropriately complete the program). Ultimately, 21 patients were included in the final analysis. The patients' demographic characteristics are shown in Table 1.

Gait-related assessments significantly improved following LSVT BIG program (Table 1).

Table 1
Participant's characteristics and changes in gait-related assessments.

Variables	Pre-program	Post-program	95 % confidence interval		P value
			Lower	Upper	
Age, years	70.4 ± 6.9				
Sex (Female / Male), n	16/5				
BMI, kg/m^2	22.5 ± 4.7				
Disease duration, months	79.6 ± 55.0				
LEDD, mg	642.8 ± 271.3				
Hohen & Yahr scale	3 (3–3)				
MDS-UPDRS, points	40.8 ± 12.4				
FIM, points	119.0 ± 7.4				
MMSE, points	28.4 ± 1.6				
HADS					
total score, points	14.3 ± 6.3				
depression score, points	7.4 ± 4.2				
anxiety score, points	6.9 ± 4.1				
Gait-related assessments					
comfortable speed at 10-MWT, m/min	1.05 ± 0.19	1.21 ± 0.20	−0.20	−0.10	P < 0.001
maximal speed at 10-MWT, m/min	1.43 ± 0.31	1.57 ± 0.32	−0.18	−0.10	P < 0.001
Timed Up & Go test, sec	9.43 ± 2.69	8.48 ± 2.60	0.56	1.37	P < 0.001

Values are presented as mean ± standard deviation, number, or median (interquartile).
BMI; body mass index; LEDD; levodopa equivalent dose; MDS-UPDRS; The Movement Disorder Society-sponsored Revision of the Unified Parkinson's Disease Rating, FIM; functional independence measure; MMSE; mini-mental state examination; HADS; hospital anxiety and depression scale; 10-MWT; 10-m walking test.

Comparisons of WAI scores between patients and therapists are presented in Table 2. Patients rated the WAI task ($P = 0.031$) and bond ($P = 0.006$) scores significantly higher than their therapists. While patients' goal scores tended to be higher than their therapists' ratings, the difference was not statistically significant ($P = 0.156$).

The results of correlational analyses are presented in Table 3. In patient-rated WAI, the task score was significantly correlated with an improvement rate of comfortable speed at 10-MWT. Additionally, patient-rated task, bond, and goal scores and the improvement rate of maximal speed at 10-MWT showed significant correlations. No significant correlations were found between WA scores and the improvement rate in TUG performance. In therapist-rated WAI, there were no significant correlations with the improvement rate in each gait-related assessment.

While some significant relationships disappeared or diminished when controlling for depression score in HADS using Pearson's partial correlational analyses, patient-rated task score remained significantly correlated with the improvement rate in comfortable speed at the 10-MWT, and patient-rated goal score significantly correlated with the improvement rate in maximal speed at the 10-MWT (Table 4). No significant relationships were observed in therapist-rated WAI.

4. Discussion

This study aimed (1) to examine the differences in WA between patients with PD and their PTs at the early phase of the rehabilitation program, and (2) to explore the relationship between WA and improvements in gait ability following the program. The results showed that the patient-rated WAI was significantly higher than the therapist-rated score. Moreover, patient-rated WAI was moderately correlated with the improvement rates in gait-related assessments following the program. To the best of our knowledge, this is the first study to explore relationships between WAI and changes in objectively assessed measurements in physical rehabilitation programs among individuals with PD.

Previous studies have shown that patients with psychological or behavioral challenges tend to provide higher WA ratings than their therapists [22,23]. This trend was also observed in counseling regarding strength training via telephone by PTs [24]. Similarly, our findings showed that patients with PD rated WAI higher than their therapists in two out of three sub-scores, which supports previous studies. This may suggest that patients facing challenges, regardless of the nature of their condition, tend to perceive a stronger alliance with their therapists. Interestingly, there was no statistical difference in the goal score between patients and their therapists. This could be explained by the collaborative nature of the LSVT BIG program, which is programmed to set goals before the program between the patients with PD and their therapists [14]. This collaboration might have contributed to the consistent goal-setting between patients and therapists in the current study.

The speeds in gait-related assessments significantly improved following the LSVT BIG program, similar to previous studies [25]. More importantly, this improvement rates were moderately correlated

Table 2
Comparison of patient- and therapist-rated working alliance inventory.

	Patient-rated	Therapist-rated	95 % confidence interval		P value
			Lower	Upper	
total score	223.0 ± 22.1	207.9 ± 17.2	2.905	27.286	**0.017**
task score	74.7 ± 8.1	69.6 ± 6.4	0.470	9.435	**0.031**
bond score	74.9 ± 9.2	68.2 ± 6.2	2.128	12.063	**0.006**
goal score	73.5 ± 7.6	70.1 ± 6.3	−1.213	7.317	0.156

Values are presented as mean ± standard deviation.

Table 3
Correlation coefficient between patient-, therapist-rated WAI and improvement rate in gait-related assessments.

	Improvement rate in comfortable speed at 10-MWT	Rate of change in maximal speed at 10-MWT	Improvement rate at TUG
Patient-rated			
total score	0.379 (0.090)	**0.581 (0.006)**	0.116 (0.615)
task score	**0.529 (0.016)**	**0.458 (0.037)**	−0.006 (0.979)
bond score	0.111 (0.632)	**0.445 (0.043)**	0.198 (0.389)
goal score	0.416 (0.061)	**0.666 (0.001)**	0.105 (0.650)
Therapist-rated			
total score	0.149 (0.520)	0.157 (0.498)	0.268 (0.240)
task score	0.271 (0.236)	0.157 (0.498)	0.195 (0.394)
bond score	−0.057 (0.807)	0.001 (0.997)	0.385 (0.085)
goal score	0.189 (0.413)	0.117 (0.613)	0.139 (0.549)

WAI; Working alliance inventory, 10-MWT; 10-m walking test, TUG; Timed up & go.

Table 4
Spearman's partial correctional analysis between patient-, therapist-rated WAI and improvement rate in gait-related assessments.

	Improvement rate in comfortable speed at 10-MWT	Improvement rate in maximal speed at 10-MWT	Improvement rate at TUG
Patient-rated			
total score	0.387 (0.092)	**0.493 (0.027)**	0.061 (0.779)
task score	**0.525 (0.017)**	0.388 (0.097)	−0.059 (0.821)
bond score	0.102 (0.669)	0.389 (0.090)	0.165 (0.487)
goal score	0.443 (0.051)	**0.548 (0.012)**	0.030 (0.900)
Therapist-rated			
total score	0.143 (0.548)	0.006 (0.978)	0.247 (0.293)
task score	0.270 (0.250)	0.174 (0.462)	0.194 (0.412)
bond score	−0.062 (0.795)	−0.074 (0.755)	0.375 (0.103)
goal score	0.182 (0.443)	−0.088 (0.712)	0.092 (0.699)

Controlled by depression score from the Hospital anxiety and depression scale. WAI; Working alliance inventory, 10-MWT; 10-m walking test, TUG; Timed up & go.

with patient-rated WAI. Our results suggest that WA may also play a positive role in physical rehabilitation for people with PD to a certain degree. Notably, these significant relationships were only observed in patient-rated, and the results differ from previous findings in psychotherapy, where therapist- or observer-rated WA influences the outcomes [6,13]. While the reason for this conflict is unclear, one possible explanation is that participants in this study may have had higher expectations for the treatment. A previous study that examined the placebo effects of medication on motor function revealed that "expensive" placebo medication led to greater motor improvements compared to "cheap" placebo in moderate to severe PD [26]. The patients in the current study voluntarily participated in the rehabilitation program and may have high expectations for the treatment. In fact, the patients rated higher WAI scores than their therapists in this study.

Our results revealed that the patient-rated task score was correlated with improvement rates in both comfortable and maximal gait speeds. Additionally, the patient-rated goal score demonstrated the strongest relationship with improvement rate among our findings. These results suggest that a patient's perception toward tasks and goal-setting in their physical rehabilitation may be related to physical improvements. A previous survey may support our results, indicating that both patients and clinicians recognized tasks related to patient's daily living, and goal setting as critical motivational factors in rehabilitation [27]. Interestingly, significant relationships were observed only for gait speeds during the 10-MWT, not for the TUG test. The 10-MWT requires only a straightforward walk at comfortable or maximal speed, whereas the TUG test involves more complex movements, including sit-to-stand, turning, and walking. Additionally, the TUG has been associated with cognitive function in individuals with PD [28]. The complexity and cognitive demands of the TUG may have limited the direct impact of therapist-trained movements, even with higher patient-perceived WA. Another possible explanation is the specificity of the LSVT BIG program itself. The program includes four core components that incorporate gait training emphasizing big movements, which patients practice in every session. This frequent exposure to big movement training may influence patients' perceptions of the program's tasks and goals.

Patients with PD often experience mood disturbances, such as depression in addition to motor symptoms. Depression is considered a barrier to engaging in exercise [4] and affects gait performance in patients with PD [21]. Our results showed that the relationship between task and goal scores and the improvement rate in gait speed remained statistically significant even after controlling depression scores using HADS, while this significant relationship could not be observed in the bond score in both speeds at 10-MWT. These findings suggest that patient perception of tasks and goals for their therapy possibly influence achieving therapeutic success during physical rehabilitation. A previous study, which found that bond scores were unrelated to symptom reduction, while goal and task scores were significantly associated with symptom improvement during psychotherapy [29], further supports our results.

Our findings may provide insight into the significance of patient and therapist relationships in physical rehabilitation for neurological diseases and suggest that clinicians should value patients' perceptions and share the goals and tasks with their patients from the early stage of rehabilitation.

This study has some limitations and the results should be interpreted carefully. First, we focused on exploring the relationships between WAI and improvement rate in gait-related assessments with a small sample size but did not explore the influence of WA on physical rehabilitation outcomes. Further studies should be conducted using a large sample size with multi-regression analysis to reveal the impact of WA using possible confounders. Second, our findings may not be generalizable to other rehabilitation programs, as the LSVT BIG protocol is specifically tailored for PD and requires trained therapists. Therefore, future studies should investigate whether similar relationships between WA and rehabilitation outcomes could be observed in usual rehabilitation programs that do not require specific therapist training. Finally, our results may not apply to patients with other levels of PD severity, as a previous study indicated that the disease severity may affect functional improvements following intensive inpatient rehabilitation [30].

5. Conclusion

Patient-rated WAI was higher than their therapist-rated at the early phase of rehabilitation, and several scores were correlated with the rate of improvement in gait-related assessments among people with PD following intensive physical rehabilitation. Some correlations remained significant even after controlling patients' depressive moods. This may indicate patient perceived WA possibly influences the clinical outcomes, and clinicians may carefully value patients' perceptions during physical rehabilitation for therapeutic success.

CRediT authorship contribution statement

Keita Sue: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Kazumi Sakurai:** Data curation, Writing – review & editing. **Daiki Usuda:** Data curation, Writing – review & editing. **Katsuyuki Kobayashi:** Data curation, Writing – review & editing. **Keiko**

Nakamura: Data curation, Writing – review & editing. **Tomomi Kinoshita:** Supervision, Writing – review & editing. **Kimito Momose:** Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing.

Funding

This research received no specific funding.

Data availability

The datasets used in the current study are available from the corresponding author upon reasonable request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

We would like to thank all staff at Kakeyu-Misayama Rehabilitation Center Kakeyu Hospital for their understanding and support in this study.

References

[1] L.M. Shulman, Understanding disability in Parkinson's disease, Mov. Disord. 25 (2010) 131–135, https://doi.org/10.1002/mds.22789.
[2] A. Mirelman, P. Bonato, R. Camicioli, T.D. Ellis, N. Giladi, J.L. Hamilton, C.J. Hass, J.M. Hausdorff, E. Pelosin, Q.J. Almeida, Gait impairments in Parkinson's disease, Lancet Neurol. 18 (2019) 697–708, https://doi.org/10.1016/S1474-4422(19)30044-4.
[3] W. Cui, D. Li, L. Yue, J. Xie, The effects of exercise dose on patients with Parkinson's disease: a systematic review and meta-analysis of randomized controlled trials, J. Neurol. 270 (2023) 5327–5343, https://doi.org/10.1007/s00415-023-11887-9.
[4] S. Schootemeijer, N.M. Van Der Kolk, T. Ellis, A. Mirelman, A. Nieuwboer, F. Nieuwhof, M.A. Schwarzschild, N.M. De Vries, B.R. Bloem, Barriers and motivators to engage in exercise for persons with Parkinson's disease, J. Parkinsons. Dis. 10 (2020) 1293–1299, https://doi.org/10.3233/JPD-202247.
[5] A.O. Horvath, L. Luborsky, The role of the therapeutic alliance in psychotherapy, J. Consult. Clin. Psychol. 61 (1993) 561–573, https://doi.org/10.1037//0022-006x.61.4.561.
[6] A.C. Del Re, C. Flückiger, A.O. Horvath, B.E. Wampold, Examining therapist effects in the alliance-outcome relationship: a multilevel meta-analysis, J. Consult. Clin. Psychol. 89 (2021) 371–378, https://doi.org/10.1037/ccp0000637.
[7] M. Kinney, J. Seider, A.F. Beaty, K. Coughlin, M. Dyal, D. Clewley, The impact of therapeutic alliance in physical therapy for chronic musculoskeletal pain: a systematic review of the literature, Physiother. Theory Pract. 36 (2020) 886–898, https://doi.org/10.1080/09593985.2018.1516015.
[8] M.B. Holmes, A. Scott, J. Camarinos, L. Marinko, S.Z. George, Working Alliance Inventory (WAI) and its relationship to patient-reported outcomes in painful musculoskeletal conditions, Disabil. Rehabil. 45 (2023) 1363–1369, https://doi.org/10.1080/09638288.2022.2060337.
[9] F. Babatunde, J. MacDermid, N. MacIntyre, Characteristics of therapeutic alliance in musculoskeletal physiotherapy and occupational therapy practice: a scoping review of the literature, BMC Health Serv. Res. 17 (2017) 375, https://doi.org/10.1186/s12913-017-2311-3. Erratum. In: BMC Health Serv Res. 17 (2017) 820. 10.1186/s12913-017-2776-0.
[10] A.O. Horvath, L.S. Greenberg, Development and validation of the Working Alliance Inventory, J. Consult. Clin. Psychol. 36 (1986) 223–233, https://doi.org/10.1037/0022-0167.36.2.223.
[11] R.B. Ardito, D. Rabellino, Therapeutic alliance and outcome of psychotherapy: historical excursus, measurements, and prospects for research, Front. Psychol. 2 (2011) 1–11, https://doi.org/10.3389/fpsyg.2011.00270.
[12] N.S. Ribeiro, F.A.B. Colugnati, N. Kazantzis, L.M.A. Sartes, Observing the working alliance in videoconferencing psychotherapy for alcohol addiction: reliability and validity of the working alliance inventory short revised observer, Front. Psychol. 12 (2021) 1–13, https://doi.org/10.3389/fpsyg.2021.647814.
[13] A.O. Horvath, D. Symonds, Relation between working alliance and outcome in psychotherapy: a meta-analysis, J. Consult. Clin. Psychol. 38 (1991) 139–149, https://doi.org/10.1037/0022-0167.38.2.139.
[14] C. Fox, G. Ebersbach, L. Ramig, S. Sapir, LSVT LOUD and LSVT BIG: behavioral treatment programs for speech and body movement in Parkinson disease, Parkinsons. Dis. 2012 (2012), https://doi.org/10.1155/2012/391946.
[15] M.N. McDonnell, B. Rischbieth, T.T. Schammer, C. Seaforth, A.J. Shaw, A. C. Phillips, Lee Silverman Voice Treatment (LSVT)-BIG to improve motor function in people with Parkinson's disease: a systematic review and meta-analysis, Clin. Rehabil. 32 (2018) 607–618, https://doi.org/10.1177/0269215517734385.
[16] C.G. Goetz, B.C. Tilley, S.R. Shaftman, G.T. Stebbins, S. Fahn, P. Martinez-Martin, W. Poewe, C. Sampaio, M.B. Stern, R. Dodel, B. Dubois, R. Holloway, J. Jankovic, J. Kulisevsky, A.E. Lang, A. Lees, S. Leurgans, P.A. LeWitt, D. Nyenhuis, C. W. Olanow, O. Rascol, A. Schrag, J.A. Teresi, J.J. van Hilten, N. LaPelle, P. Agarwal, S. Athar, Y. Bordelan, H.M. Bronte-Stewart, R. Camicioli, K. Chou, W. Cole, A. Dalvi, H. Delgado, A. Diamond, J.P. Dick, J. Duda, R.J. Elble, C. Evans, V.G. Evidente, H.H. Fernandez, S. Fox, J.H. Friedman, R.D. Fross, D. Gallagher, C. G. Goetz, D. Hall, N. Hermanowicz, V. Hinson, S. Horn, H. Hurtig, U.J. Kang, G. Kleiner-Fisman, O. Klepitskaya, K. Kompoliti, E.C. Lai, M.L. Leehey, I. Leroi, K. E. Lyons, T. McClain, S.W. Metzer, J. Miyasaki, J.C. Morgan, M. Nance, J. Nemeth, R. Pahwa, S.A. Parashos, J.S. Schneider, K. Sethi, L.M. Shulman, A. Siderowf, M. Silverdale, T. Simuni, M. Stacy, M.B. Stern, R.M. Stewart, K. Sullivan, D. M. Swope, P.M. Wadia, R.W. Walker, R. Walker, W.J. Weiner, J. Wiener, J. Wilkinson, J.M. Wojcieszek, S. Wolfrath, F. Wooten, A. Wu, T.A. Zesiewicz, R. M. Zweig, Movement Disorder Society-Sponsored Revision of the Unified Parkinson's Disease Rating Scale (MDS-UPDRS): scale presentation and clinimetric testing results, Mov. Disord. 23 (2008) 2129–2170, https://doi.org/10.1002/mds.22340.
[17] A.S. Zigmond, R.P. Snaith, The hospital anxiety and depression scale, Acta Psychiatr. Scand. 67 (1983) 361–370, https://doi.org/10.1111/j.1600-0447.1983.tb09716.x.
[18] T. Steffen, M. Seney, Test-retest reliability and minimal detectable change on balance and ambulation tests, the 36-item short- form health survey, and the unified Parkinson disease rating scale in people with parkinsonism, Phys. Ther. 88 (2008) 733–746, https://doi.org/10.2522/ptj.20070214.
[19] K.B. Foreman, O. Addison, H.S. Kim, L.E. Dibble, Testing balance and fall risk in persons with Parkinson disease, an argument for ecologically valid testing, Park. Relat. Disord. 17 (2011) 166–171, https://doi.org/10.1016/j.parkreldis.2010.12.007.
[20] M. Schönberger, F. Humle, T.W. Teasdale, Subjective outcome of brain injury rehabilitation in relation to the therapeutic working alliance, client compliance and awareness, Brain Inj. 20 (2006) 1271–1282, https://doi.org/10.1080/02699050601049395.
[21] N.T. Dragašević-Mišković, V. Bobić, M. Kostić, I. Stanković, S. Radovanović, K. Dimitrijević, M. Svetel, I. Petrović, M. Đurić-Jovičić, Impact of depression on gait variability in Parkinson's disease, Clin. Neurol. Neurosurg. 200 (2021), https://doi.org/10.1016/j.clineuro.2020.106324.
[22] N. Wolf, P. van Oppen, A.W. Hoogendoorn, A.J.L.M. va. Balkom, H.A.D. Visser, Therapeutic alliance and treatment outcome in cognitive behavior therapy for obsessive-compulsive disorder, Front. Psych. 13 (2022) 1–9, https://doi.org/10.3389/fpsyt.2022.658693.
[23] A.R. Bethea, M.C. Acosta, D.L. Haller, Patient versus therapist alliance: whose perception matters? J. Subst. Abuse Treat. 35 (2008) 174–183, https://doi.org/10.1016/j.jsat.2007.09.007.
[24] B.J. Lawford, K.L. Bennell, P.K. Campbell, J. Kasza, R.S. Hinman, Therapeutic alliance between physical therapists and patients with knee osteoarthritis consulting via telephone: a longitudinal study, Arthritis Care Res. 72 (2020) 652–660, https://doi.org/10.1002/acr.23890.
[25] S. Eldemir, K. Eldemir, F. Saygili, C. Ozkul, R. Yilmaz, M.C. Akbostancı, A. Guclu-Gunduz, The effects of standard and modified LSVT BIG therapy protocols on balance and gait in Parkinson's disease: a randomized controlled trial, Brain Behav. 14 (2024) 1–8, https://doi.org/10.1002/brb3.3458.
[26] A.J. Espay, M.M. Norris, J.C. Eliassen, A. Dwivedi, M.S. Smith, C. Banks, J. B. Allendorfer, A.E. Lang, D.E. Fleck, M.J. Linke, J.P. Szaflarski, Placebo effect of medication cost in Parkinson disease, Neurology 84 (2015) 794–802, https://doi.org/10.1212/wnl.0000000000001282.
[27] K. Oyake, K. Yamauchi, S. Inoue, K. Sue, H. Ota, J. Ikuta, T. Ema, T. Ochiai, M. Hasui, Y. Hirata, A. Hida, K. Yamamoto, Y. Kawai, K. Shiba, A. Atsumi, T. Nagafusa, S. Tanaka, A multicenter explanatory survey of patients' and clinicians' perceptions of motivational factors in rehabilitation, Commun. Med. 3 (2023) 1–9, https://doi.org/10.1038/s43856-023-00308-7.
[28] E.L. Stegemöller, J. Nocera, I. Malaty, M. Shelley, M.S. Okun, C.J. Hass, Timed up and go, cognitive, and quality-of-life correlates in Parkinson's Disease, Arch. Phys. Med. Rehabil. 95 (2014) 649–655, https://doi.org/10.1016/j.apmr.2013.10.031.
[29] C.A. Webb, R.J. Derubeis, R.C. Shelton, Two aspects of working alliance: differential relations with depressive symptom change, J. Consult. Clin. Psychol. 79 (2011) 279–283, https://doi.org/10.1037/a0023252.
[30] M. Meloni, F.L. Saibene, S. Di Tella, M. Di Cesare, F. Borgnis, R. Nemni, F. Baglio, Functional and cognitive improvement after an intensive inpatient multidisciplinary rehabilitation program in mild to severe Parkinson's disease: a retrospective and observational study, Front. Neurol. 12 (2021) 1–9, https://doi.org/10.3389/fneur.2021.626041.