

Multidisciplinary intensive outpatient rehabilitation program for patients with moderate-to-advanced Parkinson's disease

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Abstract.

BACKGROUND: Intensive, multi-disciplinary, rehabilitation programs for patients with Parkinson's disease (PWP) have shown to be effective. However, most programs are based on in-patient service, which is expensive.

OBJECTIVE: To demonstrate the feasibility of a multidisciplinary, intensive, outpatient rehabilitation program (MIOR) for moderate to advanced Parkinson's Disease (H&Y ≥ 2).

METHOD: The MIOR program takes place at a community rehabilitation center ('Ezra Le'Marpe'), 3 times a week, 5 hours, 8 weeks, and includes 20 PWP in each cycle. The multi-disciplinary team includes physical, occupational, speech and hydro therapists. Additional activities include, social work groups, boxing, dancing and bridge.

RESULTS: Data was collected retroactively for the first two years. Data analysis includes 158 patient files who completed the program (mean disease duration 10.1 ± 6 and mean H&Y stage 2.8 ± 0.67). Assessments were performed at the beginning and end of the intervention. Positive results were collected: improvement in number of falls ($p < 0.0001$), Functional Independence Measure ($p < 0.0001$), quality of life ($p < 0.01$), balance ($p < 0.0001$), upper limb function ($p < 0.0001$) and paragraph reading vocal intensity ($p < 0.01$).

CONCLUSIONS: MIOR is a feasible program, showing positive results in moderate to advanced PWP's, improving quality of life, daily function, and motor performance. The current outcomes demonstrate feasibility of MIOR in addition to medical treatment.

Keywords: Parkinson's disease, rehabilitation, multidisciplinary, quality of life

1. Introduction

Parkinson's disease (PD) is a chronic, progressive, neurodegenerative, and multi-dimensional disease

involving a range of motor and non-motor symptoms (Sveinbjornsdottir, 2016). The disease affects both the patient's and caregivers' quality of life (QOL), who cope with the challenge of managing the disease's progressive course (Trang et al., 2020). Patients with Parkinson's disease (PWP's) experience difficulties in everyday function as well as decreased QOL, which are caused by changes in motor

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and cognitive abilities (Deck et al., 2019; Mallin et al., 2019). In 2013, van der Marck et al. demonstrated that multidisciplinary team treatment offers better outcomes compared to stand-alone care from a general neurologist. They proved that an intensive multi-disciplinary team approach is the preferred intervention method for a disease that causes both motor and non-motor disturbances (van der Marck et al., 2013). Additionally, in the past decade, several multidisciplinary inpatient rehabilitation programs have been developed and found to be a beneficial and optimal model in treating many aspects of Parkinson's disease and in enhancing the patient's QOL (Lo Buono et al., 2021; Radder et al., 2019). Studies have shown the importance of intensive care and how exercise induces neuroplasticity in PWP's, which causes improvement in both motor and cognitive circuitry. (Hirsch et al., 2016; Petzinger et al., 2013).

As a result of the proven efficacy of multidisciplinary care in PD, alongside the costs of providing care in a hospitalized environment, we publish the retrospective findings of our clinical experience to demonstrate the feasibility of a multidisciplinary intensive outpatient rehabilitation program (MIOR) for patients with moderate-to-advanced stages of PD.

2. Methods

2.1. Description of the project

The MIOR program began in a rehabilitation center ('Ezra Le'Marpe' in Bnei Brak, Israel) in 2016. It consisted of treatment sessions for 8 weeks, 3 times a week, 5 hours per day, starting at 3pm. Treatment included: occupational, physical, swallowing, speech and hydrotherapy, social work sessions, boxing, dance, bridge and informative lectures to family and caregivers.

This report is based on a review of data collected from the files of 183 PWP's who participated in the MIOR program during its first two years. The data included measurements taken as part of standard care procedures at the beginning and end of the MIOR program (Table 1). In addition, a follow-up assessment was performed in the center via a telephone interview. 33 patients were contacted one-year post intervention, and 34 patients were contacted both six months and one-year post intervention. Groups were contacted by the center as part of standard of care and according to the center's convenience. All participants were referred to the MIOR program by

their treating neurologist or applied to the program and were then approved by their doctor. The use of the patients' retrospective data was approved by the Helsinki committee of Tel Aviv Sourasky Medical Center (reference number 54717) which waived informed consent. The program is provided free of charge and is supported by philanthropy money raised by 'Ezra Le'Marpe'.

Inclusion criteria for the MIOR program were a PD diagnosis, $H\&Y \geq 2$, ability to walk with/without support, and physician's medical documentation approving participation in the program. All of the potential participants underwent a comprehensive evaluation at the beginning of the program, administered by experienced healthcare professionals. The same set of evaluations were administered during the last week of the program in order to assess the immediate effect of the intervention (Table 1). The tests were all administered in the afternoon hours (15:00-20:00), ON and OFF times were not controlled.

All therapy sessions were held in groups of 4-5 patients (4 groups in each cycle), some individual sessions were administered in cases that needed special attention (e.g. severe swallowing disturbances). The goal of Occupational Therapy sessions was to improve the patients' level of participation in everyday life. Each session focused on a different area of occupation, while incorporating: (1) treatment of the relevant motor and cognitive skills, (2) practice of the given function itself, (3) psycho-education regarding disease management. Each treatment session was comprised of exercises aimed at improving components of function, strategies to improve task performance, and/or assistive devices relevant to the given session. Moreover, each session allowed the patients to share with one another their own personal difficulties and solutions to their everyday function.

The main goal of the speech therapy sessions was to improve and maintain speech intelligibility and participation in daily communication. The treatment sessions focused on increasing vocal loudness in addition to improving quality of voice and speech characteristics. The treatment tasks gradually increased in complexity, from individual words to comprehensive conversation by the end of the program. The goal of these tasks was to implement the speech skills acquired, improve the patients' self-monitoring, and generalize the practiced techniques into spontaneous speech.

The goal of the Swallowing Therapy sessions was to improve swallowing functions, increase the patient's awareness of dysphagia symptoms, and

Table 1
Measurement tools

Measurement tool	Description	Scale
Functional Independence Measure (FIM) (Choo et al., 2018; Stineman et al., 1996)	independence in basic activities of daily living (BADL)	20–126: higher score indicates improvement.
Schwab and England Activities of Daily Living Scale (S&E) (Macleod & Counsell, 2016)	subjective questionnaire to evaluate the participant's self-perceived level of independence	0–4: higher score indicates improvement.
Parkinson's Disease Quality of Life Questionnaire-8 (PDQ-8) (Tan et al., 2004)	subjective quality of life	0–5: higher score indicates improvement.
The Montreal Cognitive Assessment (MoCA) (Marinus et al., 2011)	global cognitive ability	0–30: higher score indicates improvement.
No. of falls in a two months period	No. of falls in the two months prior to the intervention and during the two-month intervention	lower number indicates improvement.
The Purdue Pegboard Test (PPT) (Růžička et al., 2016; Tiffin & Asher, 1948)	fine motor skills and visual-motor accuracy.	4 scores –right- and left-hand function, symmetrical and asymmetrical coordination; higher score indicates improvement.
Jamar Hydraulic Hand Dynamometer (Jones et al., 2017; Schmidt & Toews, 1970)	grip strength in kilograms	higher score indicated improvement
Berg Balance Test (BERG) (Qutubuddin et al., 2005)	static balance and fall risk.	0–56: higher score indicates improvement.
Timed Up & Go (TUG) (Ba et al., 2017)	mobility, balance, walking ability, and fall risk	lower score indicates improvement.
The 10 Meter Walk (10MW) (Lang et al., 2016)	walking speed and length of stride	decrease in time and number of steps indicates improvement
Sit To Stand (STS) (Petersen et al., 2017)	functional lower extremity strength	higher score indicates improvement.
The Movement Disorder Society-sponsored revision of the Unified Parkinson's Disease Rating Scale (MDS-UPDRS) Part III (Goetz et al., 2008)	designed to monitor symptom severity in Parkinson's disease. Part III of the motor examination, was administered	0–132: lower score indicates improvement.
sustained vowel phonation (the vowel A)	Mean vocal intensity measured in two tests: sustained vowel phonation (the vowel A), reading a passage	higher intensity (dB) indicates improvement.
reading a passage		
Intelligibility of spontaneous speech (Yorkston et al., 1992)	The percentage was calculated by dividing the number of words identified by the clinician as intelligible, relative to the total number of words in the text paragraph/spoken by the participant, multiplied by 100	higher score indicates improvement.
Visual Analog Perceptual Rating Scale (VAPRS) (Schiffman et al., 1981)	self-perception of speech intelligibility, voice, and communication abilities.	1–9: lower score indicates improvement.
Swallowing Disturbance Questionnaire (SDQ) (Manor et al., 2007)	self-reported screening questionnaire to detect swallowing difficulties.	0.5–44.5: lower score indicates improvement.

The speech samples were audio-recorded in a quiet room with a head microphone (Audio Technica BP892cW-TH MicroSet). The data was acoustic analyzed using the PRAAT, Acoustic Analysis Software Program, Ver. 6.0.19.

promote safe swallowing. Practice included exercises to strengthen swallowing muscles, modify food/liquid consistencies, implement compensatory swallowing posture, and learn strategies to ensure safe swallowing for each participant.

The goal of the Physiotherapy sessions was to improve functional abilities such as walking, transfers, and bed mobility. Sessions were conducted on

a mattress, sitting in a chair or standing in an upright position, in order to practice functional goals and increase body awareness. Sessions focused on improving endurance, balance, strength and coordination. Patients practiced strategies to help improve freezing of gait, manage pain, and learn to recover from falls. Walking aids were fitted and sized based on need. The goal of hydrotherapy sessions was to

use the environment of water as a way to encourage bigger movements, improve balance, improve proprioception, and strengthen breathing muscles.

2.2. Measurement tools

See Table 1.

2.3. Data analyses

The data analysis was based on 158 medical files of patients who completed the program and underwent evaluations pre and post intervention. The participants' characteristics are shown in Table 2. Descriptive statistics were extracted for all clinical measures. Data were compared across time (i.e., pre/post 8 weeks of intervention) using the *t*-test for two related samples. Changes in the outcome measures are reported as mean scores and standard deviations. Spearman's rank correlation coefficients were calculated; a normal distribution was not found for the scales in question according to the one-sample Kolmogorov-Smirnov test. Correlations were considered weak for values < 0.29 , moderate for values between 0.30 and 0.59 and strong for values > 0.60 (Leonardi et al., 2012). The follow-up analysis included an ANOVA with repeated measures, with a Greenhouse-Geisser correction in order to determine whether the samples across time were significantly different. IBM SPSS version 24 (IBM Corp, Armonk, NY, USA) was used for all analyses, with an alpha level of 0.05.

3. Results

3.1. Participants

Nine groups of PD patients participated in the MIOR program during its first two years of operation. Out of 183 patients who entered the MIOR program,

Table 2
Participant characteristics

Variable	Measurement
Age (y)	69.6 (7.16)
Sex (% women)	31.8%
Hoehn & Yahr scale	2.8 (0.67)
Years since PD diagnosis	10.1 (6)
MoCA score prior to intervention	21.44 (4.45)

Measurements are presented as mean (standard deviation). PD, Parkinson's disease; MoCA, The Montreal Cognitive Assessment.

12 dropped out (one passed away, 11 had complicated health-related issues), five patients completed the program but failed to appear for evaluations, and eight patients with a diagnosis of Parkinsonism or Parkinson-plus Syndrome were excluded. The 158 patients (124 men and 34 women) included in the final data analysis had a mean age of 69.48 (SD = 7.40), mean years since PD diagnosis of 10.1 (SD = 6) years, and mean H&Y scale of 2.8 (SD = 0.67) (Table 2).

3.2. Independence in daily living and perceived QOL

The FIM score increased from 102.09 (SD = 13.83) to 106.73 (SD = 13.68) ($p < 0.0001$), demonstrating improvement in independence in activities of daily living (ADL). The S&E score increased from 70.26% (SD = 16.1%) to 74.24% (SD = 15.6%) ($p < 0.0001$), demonstrating improvement in self-perceived independence. The PDQ-8 score increased from 3.69 (SD = 0.71) to 3.91 (SD = 0.68) ($p < 0.0001$), demonstrating improvement in perceived QOL.

3.3. Cognitive abilities and events of falls

The MoCA score improved from 21.44 (SD = 4.45) to 22.97 (SD = 4.79) ($p < 0.0001$), indicating a rise in global cognitive ability. The number of falls reported by the participant, comparing the two-month period prior to their participation in the MIOR program to the number of falls during the two month of the program, decreased from 1.57 (SD = 3.76) to 0.75 (SD = 1.66) ($p < 0.01$), indicating a decrease in number of falls in spite of increased activity and mobility throughout the weeks of the program. (Table 3).

3.4. Motor abilities

The UPDRS -Part III score decreased from 35.87 (SD = 13.75) to 33.15 (SD = 13.31) ($p < 0.001$), demonstrating improvement in the severity of motor signs. The completion time of the TUG decreased from 18.92 seconds (SD = 13.75) to 13.03 (SD = 13.71) ($p = 0.13$), and the STS score increased from 7.91 (SD = 4.48) to 9.15 (SD = 4.3) ($p < 0.0001$), demonstrating improvement in functional mobility. The BERG score increased from 45.1 (SD = 9.79) to 48.21 (SD = 7.85) ($p < 0.0001$), demonstrating improvement in static and dynamic balance. Improvement was observed on the 10MW, both in completion time [10.71 (SD = 5) to 9.75 (SD = 4.01)

Table 3
Scores pre- and post-intervention

Measure	Pre-intervention score	Post-intervention score	No.	<i>P</i>
Functional Independence Measure (FIM)	102.09 (13.83)	106.73 (13.68)	156	<0.0001
Schwab & England (S&E)	70.26% (16.1%)	74.24% (15.6%)	156	<0.0001
Parkinson's disease QOL questionnaire (PDQ-8)	3.69 (0.71)	3.91 (0.68)	145	<0.0001
Montreal cognitive assessment (MoCA)	21.44 (4.45)	22.97 (4.79)	156	<0.0001
No. of falls	1.57 (3.76)	0.75 (1.66)	129	<0.01
Purdue Pegboard Test (PPT)				
Right arm	6.83 (2.64)	7.65 (2.44)	121	<0.0001
Left arm	6.59 (2.44)	7.08 (2.34)	119	<0.001
Symmetrical	4.44 (2.03)	4.99 (2.05)	119	<0.01
Asymmetrical	11.52 (5.83)	12.49 (5.55)	119	<0.0001
Dynamometer				
Right arm	26.34 (9.20)	27.23 (8.19)	136	<0.01
Left arm	24.82 (9.12)	26.13 (8.70)	135	<0.05
BERG	45.1 (9.79)	48.21 (7.85)	140	<0.0001
Time up and go (TUG)	18.92 (13.75)	13.03 (13.71)	96	=.13
10 Meter Walk (10MW)				
Seconds	10.71 (5)	9.75 (4.01)	141	<0.01
Steps	19.26 (6.26)	17.55 (5.29)	138	<0.0001
Sit to Stand	7.91 (4.48)	9.15 (4.3)	148	<0.0001
United Parkinson's disease rating scale (UPDRS) Part-III	35.87 (13.75)	33.15 (13.31)	100	<0.01
Sustained vowel phonation (dB)	75.98 (6.89)	79.77 (6.54)	71	<0.0001
Reading (dB)	69.48 (4.55)	70.96 (5.16)	70	<0.01
Intelligibility of spontaneous speech	97.47% (7.21%)	98.47% (4.32%)	151	<0.05
Visual analog perception rating scale (VAPRS)	4.03 (1.72)	3.66 (1.74)	95	<0.05
Swallowing disturbances questionnaire (SDQ)	10.3 (SD = 7.26)	9.18 (SD = 6.55)	80	=0.08

Scores are presented as mean (standard deviation).

($p < 0.01$) and number of steps [19.26 (SD = 6.26) to 17.55 (SD = 5.29) ($p < 0.0001$)], indicating improvement in speed and length of stride.

Grip strength increased from 26.34 (SD = 9.2)/24.82 (SD = 9.12) to 27.23 (SD = 8.19)/26.13 (SD = 8.7) for the right and left hand, respectively ($p = 0.053$ and $p < 0.001$ respectively). The score on the PPT individual hand function task increased from 6.83 (SD = 2.64)/6.59 (SD = 2.44) to 7.65 (SD = 2.44)/7.08 (SD = 2.34) for the right and left arm, respectively ($p < 0.0001$ and $p < 0.001$ respectively), demonstrating improvement in fine motor skills. The score on the PPT symmetrical task increased from 4.44 (SD = 2.03) to 4.99 (SD = 2.05) ($p < 0.01$), demonstrating improvement in symmetrical bilateral coordination. The score of the PPT asymmetrical task increased from 11.52 (SD = 5.83) to 12.49 (SD = 5.55) ($p < 0.0001$), demonstrating improvement in asymmetrical bilateral coordination and sequenced motion (Table 3).

3.5. Voice, speech and swallowing functions

Mean vocal intensity increased in sustained vowel phonation and reading: from 75.98 dB (SD = 6.89) to 79.77 dB (SD = 6.54) ($p < 0.0001$) and from 69.48 dB (SD = 4.55) to 70.96 dB (SD = 5.16) ($p < 0.01$), respectively. Spontaneous speech intelligibility rating increased from 97.47% (SD = 7.21%) to 98.47% (SD = 4.32%) ($p < 0.05$). The VAPRS score decreased from 4.03 (SD = 1.72) to 3.66 (SD = 1.74) ($p < 0.05$), indicating an improvement in self-perception of speech and voice functions. The SDQ score showed a trend towards improvement, from 10.3 (SD = 7.26) to 9.18 (SD = 6.55) ($p = .08$) (Table 3).

No clinically significant correlations were found between the improvement in the PDQ-8 and improvement in other modalities.

Participants and family members expressed their satisfaction with the program. Subjective reports from participants include: "my balance has improved,

and I am more independent”, “I can finally understand my handwriting”, “my grandson said – grandpa I can finally hear you”, “I’ve gained awareness of my limitations and have confidence in knowing that I can do anything”. The intervention itself was regarded as enjoyable, engaging, and well-rounded, which contributed to high motivation and 90.71% participant adherence.

3.6. Follow-up

The FIM differed significantly across the time points pre-intervention, post-intervention, 6 months post-intervention and one year post-intervention) [$F(2.37, 73.37) = 18.83, p < 0.001$] [mean across time points: 103.98, 110.24, 102.00, and 98.20]. The PDQ-8 did not differ significantly across time points [$F(2.35, 61.04) = 1.85, p = 0.16$] [mean across time points: 3.71, 3.92, 3.69, and 3.80]. The number of falls differed with a strong trend across time points [$F(2.23, 48.91) = 2.78, p = 0.07$] [mean across time points: 0.91, 0.45, 1.73, and 1.00]. The SDQ did not differ significantly across time points [$F(2.16, 62.73) = 2.33, p = 0.10$] [mean across time points: 8.04, 7.81, 9.62, and 9.32]. The VAPRS also did not differ significantly across time points [$F(2.69, 48.46) = 1.38, p = 0.26$] [mean across time points: 4.08, 3.76, 5.17, and 4.11].

In addition, the results prior to intervention and one year after were compared with a *t*-test for two related samples. The FIM score decreased from 103.98 to 98.2 one year later ($p < 0.001$), indicating a decline in self-reported ADL independence. The PDQ-8 score increased non-significantly, from 3.71 to 3.8 ($p = 0.31$), indicating the maintenance of perceived QOL. The number of falls in a two-month period increased non-significantly, from 0.91 to 1.00 ($p = 0.86$), indicating the maintenance of fall risk. The SDQ score increased from 8.04 to 9.32 ($p < 0.05$), indicating an increase in perceived swallowing disturbances. The VAPRS increased non-significantly from 4.08 to 4.11 ($p = 0.42$), indicating the maintenance of self-perception of speech function (Table 4).

4. Discussion

The findings above demonstrate the feasibility and positive effect of a multidisciplinary, intensive outpatient rehabilitation (MIOR) program in Israel. Patients who participated in this therapy program demonstrated improvement in various aspects of

Table 4
Assessment scores pre-intervention and at one year post-intervention

Measure	Pre-intervention	One year post-intervention	No.	<i>p</i>
FIM	103.98	98.2	65	<0.001
Falls	0.91	1.00	57	=0.86
PDQ-8	3.71	3.8	55	=0.31
SDQ	8.04	9.32	61	<0.05
VAPRS	4.08	4.11	50	=0.42

Scores are presented as mean (standard deviation).

motor function, daily function, global cognition and QOL post intervention. The MIOR program was based on a multidisciplinary therapy approach, and focused on the benefits of intensive and ambulatory intervention. Additional elements integrated into the program included the motor learning theory, psycho-education, and the use of compensatory strategies.

Psycho-education was used to help the patients better understand and manage their cognitive and motor symptoms. Understanding PD symptoms and how to manage them promotes a feeling of control, a feeling often lacking in PWP’s. PWP’s who are more knowledgeable about the disease and implement suitable strategies, cope better with the disease (Lorig & Holman, 2003), experience less depression, develop an internal locus of control, and improved QOL. (Liebermann et al., 2020). As one of the patients in the program explained: “I have gained awareness of my limitations alongside the confidence that everything can be done”. Psycho-education brings knowledge, thus a sense of power over one’s body and their disease.

Additionally, MIOR took place in a group setting, which focused on improving motor difficulties, voice, and speech in parallel to the psycho-social support groups led by a social worker. The groups incorporated providing information and facilitating open discussion in order to help reduce clinical disability (Ciordea et al., 2020).

Two of the main improvements were found in independence in performing ADL and global cognitive function. Improvement in global cognitive function can be attributed to two main aspects of the intervention. Firstly, the patients’ improvement in attention skills as a result of the intervention taking place in a group setting, that requires high attentional demands and constant cognitive engagement in order to follow the dynamic setting. The second aspect is the increase in awareness to cognitive changes and the use of cognitive strategies learned in the Occupational Therapy

sessions (Foster et al., 2018). Improvement in ADL may be attributed to improved motor skill, implementation of the motor strategies and improved cognitive function (Bronnick et al., 2006; Foki et al., 2016; Malling et al., 2019).

Our additional important finding is that the MIOR program demonstrated a significant decrease in the number of falls during the intervention period. This may be attributed to a greater awareness of factors that increase the risk of falls, improvement in balance, implementation of strategies such as internal and external cues (which were learned during Physiotherapy and Occupational Therapy sessions) and improvement in attention and global cognitive function. Swallowing function, as indicated by the SDQ, demonstrated a trend towards improvement following the MIOR intervention, a significant finding given that dysphagia is a disabling and 'hard to treat' symptom in PD. The educational information provided by the speech therapists may have increased the patients' awareness of dysphagia symptoms and caused the patients to be more conscious of their own swallowing functions, thus leading to a non-significant statistical result.

Our follow-up results demonstrated a decrease in self-reported BADL independence, alongside an increase in self-perceived swallowing disturbances. It is in contrast with the results of previous studies (Paul et al., 2017; Temlett & Thompson, 2006) in which follow up results revealed a stabilization of outcome measures at one-year post-intervention. However, we did find non-significant changes in falls and QOL, indicating maintenance of these results as well as a small improvement in self-perception of speech intelligibility. One of the possible explanations for these contradicting findings is that they are affected by the performance of follow-up by a phone interview, thus relying solely on patients' subjective reports and subjective feeling of the expected deterioration in comparison with their situation immediately after the end of the MIOR program 6–12 months before. But further prospective studies may shed light on the duration and components of the post rehabilitation positive effect.

The major limitations of this report stem from it being a retrospective review of a clinical program. Multiple factors were not controlled, including ON and OFF times during testing, implementation of pre- and post-intervention assessments by the same therapist, and tester blindness. Furthermore, there was no regard for comorbidities and medications and there was no control group. However, in a way, the patients

served as their own 'controls' since, as PD is a progressive disease, the measured improvements can be attributed to the intervention program. Additionally, most participants were able to complete the entire battery of assessments in the allotted time, due to their high motivation and awareness of the length of the evaluation from the start. However, there were a few participants who were unable to complete all the examinations at one session, and who completed them at a later time point.

The program was mainly implemented in group sessions and was therefore relatively uniform, however, a personalized approach was used in some cases to address specific patient needs. In regard to follow-up, it was performed by the center, in a small, randomly selected, and un-stratified sample, within the framework of standard of care and included participants from different groups, according to the availability of the center.

5. Conclusion

In conclusion, this article presents an intervention model for moderate to advanced PWP's. This method of care demonstrates improvement in daily function and QOL, indicating the feasibility and clinical importance of the MIOR program for PWP's. It should be emphasized that this manuscript describes a retrospective examination of a clinical program and not a clinical study. Nevertheless, it is worthwhile to describe the feasibility of a MIOR program which is a unique multidisciplinary collaborative teamwork, combining professionalism, and open dialogue between patient and therapists that helps strengthen the likelihood of improvement and promotes better QOL for PWP's and their families. We believe that such programs should be incorporated into the healthcare system, at least in part, and that additional prospective studies should be performed to prove their effectiveness.

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Conflict of interest

We declare that no funding was given for this retrospective observation, the money for this clinical

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