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**Short-Term Changes in Self-Efficacy and Quality of Life Following a
Multidisciplinary Rehabilitation Program for Patients with
Parkinson's Disease**

A quantitative study



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Article

Changes in Quality of Life and Self-Efficacy Following a Multidisciplinary Rehabilitation Program for Patients with Parkinson's Disease

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Abstract

Background. General self-efficacy has been found to be associated with quality of life outcomes in diverse clinical groups, but evidence for the associations between general self-efficacy and quality of life in patients with Parkinson's disease is scarce.

Aim. To examine whether a brief multidisciplinary rehabilitation program can promote positive changes in functional status, general self-efficacy, and quality of life, and whether general self-efficacy at the beginning of the program was associated with quality of life at its conclusion.

Methods. Patients with Parkinson's disease ($n = 83$) completed the General Self-Efficacy Scale and the Parkinson's Disease Questionnaire at the beginning of a multidisciplinary rehabilitation program and at three weeks follow-up. Differences between men and women were investigated with independent t -tests and Chi Square tests, and within-person changes in general self-efficacy and quality of life with paired t -tests. Raw associations were analyzed with Pearson's correlation coefficient r . Internal consistency was analyzed with Cronbach's α . Hierarchical linear regressions were conducted to assess the independent associations between the independent variables and the quality of life scale score at follow-up, while adjusting for the covariance between the independent variables.

Results. Patients reported higher functional status, general self-efficacy and quality of life at three weeks follow-up, compared to their baseline scores. The initial models showed that higher functional status ($\beta = -0.29, p < 0.05$) and general self-efficacy ($\beta = -0.31, p < 0.01$) were associated with higher quality of life at follow-up. However, including baseline quality of life as independent variable in the final model substantially weakened these associations.

Conclusion. Patients reported positive changes in functional status, general self-efficacy and quality of life after a multidisciplinary rehabilitation program. The study suggests that to

increase quality of life in patients with Parkinson's disease, occupational therapists should assess and aim to improve the patient's functioning and general self-efficacy.

Introduction

Parkinson's disease can severely threaten self-efficacy and quality of life, and these factors may be reduced with disease progression. In a study by Fujii and coworkers on 143 patients with Parkinson's disease in Tokyo, it was suggested that to increase self-efficacy amongst patients with Parkinson's disease, social and psychological support and providing health education were important [1]. Additionally, self-efficacy has been found to be important for effective disease management and for adherence to medication in chronic diseases, such as diabetes and juvenile chronic arthritis, suggesting that self-efficacy can predict disease management [2]. These factors are also presumed to affect a person with Parkinson's disease.

Motor symptoms such as, tremor, rigidity and bradykinesia, and non-motor symptoms such as, anxiety, depression, fatigue, cognitive impairment, sleep disorders, and restless legs can result in increased dependence in activities of daily living (ADLs), loss of autonomy, social isolation and falls [3-6]. Non-motor symptoms occur in 90% of people with Parkinson's disease, and research has shown that non-motor symptoms have a greater impact on health-related quality of life than motor symptoms alone [5, 7]. Reduced functional mobility and reduced ability to perform ADLs have been closely linked to quality of life in persons with Parkinson's disease [8]. Consequently, as Parkinson's disease symptoms progress and worsen, maintaining independence in ADLs may decrease, resulting in reduced quality of life.

For several years, exercise-based programs have been the main intervention used when treating persons with Parkinson's disease, and they have been identified as beneficial for improving both physical functioning and quality of life [3, 9]. Furthermore, Giardini and coworkers found that amongst persons with Parkinson's disease, enhanced functioning and rediscovered autonomy was reported after intensive rehabilitation treatment [10].

Consequently, with improved physical and functional capabilities, participants claimed to

have gained better symptoms control and overall body control, denoting higher perceived self-efficacy. However, the weakness of exercise-based programs alone is that they do not necessarily address the specific non-motor symptoms occurring in Parkinson's disease [5, 11]. By addressing both motor and non-motor symptoms, multidisciplinary rehabilitation programs may be better equipped to assist the patient with Parkinson's disease to self-manage their disease, to increase their self-efficacy, and ultimately to improve their quality of life [12]. However, while some research studies indicate that multidisciplinary rehabilitation programs can improve self-perceived performance in ADLs, general functioning, and quality of life [13-15], research on the effects of multidisciplinary rehabilitation programs on self-efficacy in persons with Parkinson's disease, is scarce [16].

Furthermore, better exercise capacity and higher self-efficacy prior to starting a rehabilitation program have been associated with improved quality of life [17], and rehabilitation programs have been found to reduce the psychosocial impact of disease in a number of studies on chronic and progressive diseases such as, multiple sclerosis, chronic obstructive pulmonary disease, cancer, and myocardial infarction [17-20]. This evidence suggests that self-efficacy is important to target in rehabilitation programs [17]. However, to date, there are no similar studies concerned with patients with Parkinson's disease.

The complexity of Parkinson's disease and adverse burden pertained to living with the disease may pose challenges on sustaining self-efficacy and compromise quality of life. However, modern multidisciplinary rehabilitation programs, frequently including the expertise of occupational therapists, explicitly aim at increasing a person's sense of self-efficacy [12] and to inspire a patient's sense of mastery in everyday challenges. Promoting self-efficacy through activities is also considered a core element of occupational therapy [21], and knowledge about self-efficacy and quality of life, and the associations between them,

may contribute to shape and strengthen therapy interventions for patients with Parkinson's Disease.

Study Aim. The aim of the study was to examine (i) whether positive changes in functional status, general self-efficacy and quality of life occurred among patients with Parkinson's disease after a brief multidisciplinary rehabilitation program, and (ii) whether initial general self-efficacy was associated with quality of life at the conclusion of the intervention when controlling for demographic variables and baseline quality of life.

Methods

Design and Context

The study had a prospective longitudinal design. The data material was collected at a specialized rehabilitation center in Baerum, Norway.

Intervention

The multidisciplinary rehabilitation program had a duration of three weeks. Upon arrival, participants were awarded a primary contact to ensure a unified team working towards goals set by the participant him/herself. The multidisciplinary team consisted of 10 different professions such as occupational therapists, physical therapists, doctors, neurologists, nurses, sports educators, cognitive behavioral therapists, and nutritionists [22]. Commencing the multidisciplinary rehabilitation program, participants were assessed by the relevant professional/s and typically had close follow-up the first week with individual and group-based exercise. Participants would see the physical therapist individually at least three times a week, 30 minutes each time, and when required participants would have one on one with the occupational therapist and/or the sports educator. Additionally, participants had a program set specifically up for him/her containing disease-specific group-based exercises and other physical activity group exercises that they were highly encouraged to attend every day.

Participants also had the option of going to disease-specific educational groups, where they, for example, would learn about nutrition and medication, talk to peers, and ask the professionals questions. Based on need, cognitive behavioral therapy was available. Towards the end of the program, participants were expected to be able to perform individually tailored exercises and activities, with the aim of carrying it over to everyday life.

Participation Recruitment and Inclusion Criteria

Patients with Parkinson's disease ($n = 87$) were individually recruited for the study upon arrival at the rehabilitation center during January 2018 through May 2018. All of the patients with Parkinson's disease who were admitted during the study period were asked to participate in the study as long as they were admitted for treatment, met the diagnostic criteria, were classified within Hoehn and Yahr stages I-IV [23], and provided written informed consent.

Measures

The questionnaires (PDQ-39 and GSE: see below for description), used before and after the three weeks rehabilitation program, were handed out the first day with written and verbal instructions. A sociodemographic questionnaire containing age, gender, level of education, and Parkinson's disease duration, was included in the handout. Scores on functional status by the MiniBestTest (MBT) [24] were later extracted from participants' records upon completion of the rehabilitation program.

The Parkinson's Disease Questionnaire 39 [25] was developed for assessing quality of life in persons with Parkinson's disease, and has been found to have satisfactory internal consistency (Cronbach's $\alpha = .89$) and convergent validity in relation to the Hoehn and Yahr ($r = 0.51, p < 0.001$) [25, 26]. Test-retest reliability has been found to be adequate (r ranging 0.79- 0.93) [27]. The instrument consists of 39 questions addressing the issues of mobility, ADLs, emotional well-being, stigma, social support, cognition, communication, and bodily discomfort. For all the items on the 8-dimension scale, the respondents are asked to indicate

how often they experience difficulties ranging from “never” to “always or cannot do at all”. The score range is 39-195, with higher scores indicating lower quality of life.

The General Self-efficacy Scale [28] consists of 10 items (scored 1-4; “not at all true” to “exactly true”) and was designed to assess optimistic self-beliefs related to coping with a variety of demands in life [28]. The scale explicitly refers to personal agency, i.e., the belief that one’s actions are the cause of successful outcomes. It is a well-known and accepted instrument that measures one underlying construct of general self-efficacy [29]. Score range is 10-40, with higher scores indicating higher general self-efficacy.

Hoehn and Yahr (H&Y) describes the different stages of Parkinson’s disease, from mild to severe, on an arbitrary staging scale from I-V [23]. Stage I is characterized by unilateral involvement only with minimal or no functional disability, while stage V is characterized by confinement to bed or wheelchair unless aided. The staging method allows for reproducible assessments of the patient’s general functional level made by independent examiners, and is practical, widely accepted and frequently utilized [30]. In this study, the physical therapist in the participant’s multidisciplinary team performed the Hoehn and Yahr assessment.

Functional status was measured with the MiniBestTest [24], and the assessment was performed by the physical therapist. The participant demonstrates specific tasks and is subsequently classified as having normal functioning (2 points), moderate problems (1 point) or severe problems (0 points).

Data analysis

One person did not meet the inclusion criteria, two left the rehabilitation center after only a few days for various reasons, and one left without filling out the questionnaires. These were all removed from the data set prior to the analyses. Scale scores were computed provided that the participants had less than 20 % missing scores on the relevant scale items. In the eventual

case of missing values, values were replaced with the mean of the completed items. Cases with missing values subsequent to the replacement procedure were deleted analysis by analysis (casewise deletion). Thus, n varied between analyses. Initial descriptive analyses used means (M) and standard deviation (SD) for continuous variables and frequencies and percentages for categorical variables. Internal consistency of the PDQ-39 scale and the general self-efficacy scale were examined with Cronbach's α , and coefficients exceeding 0.70 were considered acceptable.

As appropriate, independent t -tests and Chi Square tests were conducted to analyze differences between men and women. Paired t -tests were conducted to analyze the differences in mean scores (general self-efficacy and quality of life) between baseline and three weeks follow-up. Raw associations between general self-efficacy and quality of life were assessed with Pearson's correlation coefficient r . Cohen's guidelines [31] for correlation suggest a small positive correlation when $r = 0.10- 0.29$, a medium positive correlation when $r = 0.30- 0.49$, and a large positive correlation when $r = 0.50- 1.00$. A hierarchical linear regression analysis was conducted to assess the independent associations between the independent variables and the quality of life scale score while adjusting for the covariance between the independent variables. There were three subsequent models, where Model 1 included the independent variables age, gender, Parkinson's disease duration, education, functional ability (H&Y) and functional status (MBT). Model 2 also included baseline general self-efficacy scores, and Model 3 also included quality of life scores. All data were analyzed using the statistical software IBM SPSS for Windows [32]. Statistical significance was set at $p < 0.05$.

Ethics

Prior to commencing the study, approval from the Norwegian Regional Committee for Medical and Health Research Ethics (project number 2017/1584) was obtained. Participants

provided a written informed consent to participate in the study, after having been informed that participation was voluntary, that opting not to participate would not adversely affect their rehabilitation, and that their responses would be treated in confidence.

Results

Sample Characteristics

The sociodemographic characteristics of the sample are displayed in Table 1. Eighty-three ($n = 83$) participants completed the measures at baseline and at three weeks follow-up, and these constituted the study sample. Among the participants, the mean age of the sample was 69.0 years ($SD = 8.3$ years), with 48 being male (57.8%) and 35 (42.2%) female. The sample's mean Parkinson's disease duration was 5.0 years ($SD = 3.7$ years). Fifty-one participants (61.4%) reported having three years of higher education or more. Eighteen (21.7%) participants were in Hoehn and Yahr stage I, 38 (45.8%) in stage II, 24 (28.9%) in stage III and three (3.6%) participants were in stage IV.

Internal consistency for the quality of life scale (valid for 72.3% of the sample) was Cronbach's $\alpha = 0.94$, and for the general self-efficacy scale (valid for 91.6% of the sample) Cronbach's $\alpha = 0.91$, thus, indicating very good internal consistency. Mean scores for baseline general self-efficacy was 25.3 ($SD = 6.8$) for women and 26.5 ($SD = 6.2$) for men (ns). The mean scores for baseline quality of life for women was 82.2 ($SD = 20.6$), and 76.8 ($SD = 20.7$) for men (ns). The mean score for baseline functional status (MBT) for women was 23.6 ($SD = 3.8$), and 23.0 ($SD = 3.9$) for men (ns).

Table 1

Characteristics of the study participants

	All ($n=83$)	Women ($n=35$)	Men ($n=48$)	
	<u>M (SD)</u>	<u>M (SD)</u>	<u>M (SD)</u>	p
Age ($n = 83$)	69.0 (8.3)	70.3 (7.2)	68.0 (9.0)	0.21
Parkinson's disease duration ($n = 81$)	5.0 (3.7)	5.4 (3.6)	4.7 (3.8)	0.42
Education level ($n = 81$)	n (%)	n (%)	n (%)	0.51
Higher education	51 (63.0)	20 (58.8)	31 (66.0)	
Lower education	30 (37.0)	14 (41.2)	16 (34.0)	
	<u>M (SD)</u>	<u>M (SD)</u>	<u>M (SD)</u>	
Functional status (MBT) ($n = 74$)	23.3 (3.8)	23.6 (3.8)	23.0 (3.9)	0.46
General self-efficacy ($n = 82$)	26.0 (6.5)	25.3 (6.8)	26.5 (6.2)	0.44
Quality of life ($n = 77$)	79.0 (20.7)	82.2 (20.6)	76.8 (20.7)	0.26

Note. On categorical variables with missing responses (i.e., $n < 83$), the valid percent is reported. Statistical tests are independent t -tests (continuous variables) and Chi-square tests (categorical variables).

Changes in functional status, general self-efficacy and quality of life

Functional status scores changed from baseline ($M = 23.5$, $SD = 3.3$) to three weeks follow-up ($M = 24.7$, $SD = 3.1$, $p < 0.001$, Cohen's $d = 0.37$), suggesting improved functional status at three weeks follow-up. There was a change in general self-efficacy score from baseline ($M = 26.0$, $SD = 6.2$) to three weeks follow-up ($M = 27.8$, $SD = 6.7$, $p < 0.01$, Cohen's $d = 0.28$), suggesting higher general self-efficacy at three weeks follow-up. Lastly, quality of life changed from baseline ($M = 77.9$, $SD = 19.6$) to three weeks follow-up ($M = 71.7$, $SD = 18.6$, $p < 0.001$, Cohen's $d = 0.32$), denoting improved quality of life at follow-up.

Associations with quality of life

Higher baseline general self-efficacy showed a large correlation ($r = -0.50, p < 0.001$) with higher baseline levels of quality of life. Higher baseline general self-efficacy and higher levels of quality of life at three weeks follow-up showed a medium correlation ($r = -0.42, p < 0.001$).

Table 2 shows the results from the regression analyses. Hierarchical linear regressions were conducted to assess associations between each of the independent variables and quality of life at three weeks follow-up. In Model 1, the demographic (age, gender and education) and clinical variables (Parkinson's disease duration, functional ability [H&Y], and functional status [MBT]) explained 28.5% of the variance, with higher functional status showing a statistically significant association with higher quality of life ($\beta = -0.29, p < 0.05$). Baseline general self-efficacy explained an additional 8.6% of the total quality of life variance when included in Model 2, with higher general self-efficacy showing a statistically significant association with higher quality of life ($\beta = -0.31, p < 0.01$). When included in Model 3, baseline quality of life explained an additional 35.0% of the total quality of life variance, showing a strong and statistically significant association with quality of life three weeks later ($\beta = 0.75, p < 0.001$), rendering the initial association between baseline general self-efficacy and quality of life non-significant.

Table 2

Hierarchical linear regression analyses showing direct associations with quality of life at three weeks follow-up

<u>Independent variables</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Age	0.05	-0.00	0.09
Sex	0.05	0.02	-0.04
Parkinson's disease duration	0.23	0.21	0.04
Education	-0.20	-0.14	-0.01
Functional ability (H&Y)	0.12	0.11	-0.01
Functional status (MBT)	-0.29*	-0.25	-0.17
Explained variance	28.5 %**		
Baseline general self-efficacy		-0.31**	-0.03
R² change		8.6 %*	
Explained variance		37.2 % **	
Baseline quality of life			0.75**
R² change			35.0%**
Explained variance			72.2 %**

Note. Table content is standardized beta weights, indicating the strength of association with quality of life at three weeks follow-up. Variable coding: Male = 1, female = 2. Higher education = 1, lower education = 0. Higher functional ability score indicated lower functional ability, whereas higher functional status score indicates higher functional status. Higher general self-efficacy scores indicate higher general self-efficacy, whereas lower quality of life scores indicated higher quality of life. * $p < 0.05$, ** $p < 0.01$.

Discussion

To the best of our knowledge, this is the first study to examine whether functional status and general self-efficacy are associated with quality of life after a three-week multidisciplinary rehabilitation program for patients with Parkinson's disease. The study suggests that a multidisciplinary rehabilitation program can promote positive change in functional status, general self-efficacy, and quality of life. Moreover, different regression models showed that baseline functional status and baseline general self-efficacy were associated with quality of life at three weeks follow-up. However, both of these associations practically vanished when controlling for baseline quality of life scores.

Our results showed that functional status, general self-efficacy, and quality of life improved from baseline to three weeks follow-up. After completing the baseline functional status testing, one would assume that the adversities that were found, among others, were the aim of the exercise program participants underwent and worked on during their the three-week multidisciplinary rehabilitation program. Consequently, one explanation for the higher reported functional status could be due to focusing and working on improving the physical adversities during the rehabilitation program. Improved functioning has similarly been found in other studies [14, 33]. Additionally, the multidisciplinary rehabilitation program may have provided tools for participants to better self-manage their disease, resulting in higher general self-efficacy at follow-up. Thus, higher levels of quality of life at the end of the rehabilitation program could be an effect of improved functioning and general self-efficacy [1, 2, 8, 15]. Another explanation for the positive results could be that the participants experienced that there is hope, even for a progressive disease such as Parkinson's disease, although it has no cure [34, 35].

From Model 1 in our regression analyses, it was interesting to see that baseline functional status showed an association with higher quality of life at three weeks follow-up,

while Hoehn and Yahr did not. Preliminary analyses showed that the Hoehn and Yahr was associated with higher levels of quality of life at three weeks follow-up when functional status (MBT) scores were not included in the regression analysis. This may indicate that the MiniBestTest is a more nuanced measure of functional capability than the Hoehn and Yahr, and therefore better able to express an association with quality of life. Furthermore, the Hoehn and Yahr scale has been criticized for not completely capturing impairments and disability from other motor features of Parkinson's disease and for not providing information on non-motor symptoms [30], denoting participants could be classified as Hoehn and Yahr stage I because of unilateral involvement only, despite having severe bradykinesia and tremor of the dominant hand. One should therefore use the Hoehn and Yahr with caution as each stage does not necessarily represent a higher degree of overall motor dysfunction.

When including baseline general self-efficacy in Model 2 of the regression analyses, we found higher baseline general self-efficacy to be associated with higher levels of quality of life, while the association between functional status and quality of life was weakened and no longer statistically significant. This suggests that participants' own beliefs in their capabilities seemed to play a more important role than measures based on external observations, like the MBT, for explaining quality of life at a later point in time.

Similar to our findings, baseline general self-efficacy, and also changes in general self-efficacy, have been found to predict higher quality of life and health at follow-up in adolescents with type 1 diabetes, juvenile rheumatoid arthritis and people with morbid obesity [2, 36]. In view of this, our results were expected. In line with Bandura's theory of self-efficacy, self-efficacy is described as a belief in one's capabilities to organize and execute the courses of action required to produce given attainments [37]. Thus, self-efficacy contributes to explain human behaviors and coping outcomes [38, 39]. One interpretation of the findings is that participants who reported higher baseline beliefs in their own capabilities,

utilized and benefitted more from the rehabilitation program compared with those who reported lower baseline general self-efficacy. In turn, this may have resulted in higher follow-up quality of life among those with higher initial self-efficacy. Additionally, those who reported higher baseline general self-efficacy may have been more capable to deal with the adverse effects of the disease, as general self-efficacy has been associated with effectively dealing with stressful situations [40]. These findings emphasize the importance of occupational therapists' focus on increasing general self-efficacy throughout rehabilitation programs for patients with Parkinson's disease. Patients reporting lower baseline general self-efficacy should be given special attention, as they seem to benefit less from rehabilitation and to report lower quality of life at follow-up.

As expected, higher baseline quality of life was strongly associated with higher quality of life at three weeks follow-up, and when baseline quality of life was included in Model 3, all other associations were weakened and no longer statistically significant. A broadly composed measure of quality of life, like the PDQ-39, is likely to be quite stable over time, reflecting that quality of life is in fact a more generic concept than for example emotions tied to immediate circumstances. In addition, the shorter the time span between the measurements, the stronger the association between quality of life scores. One could therefore expect patients who already report higher baseline quality of life to report higher follow-up quality of life. Similar results have been found in stroke patients who participated in a rehabilitation program (mean duration of 57 days), where baseline quality of life was found to predict follow-up quality of life [41]. As demonstrated in our study, the association between the two quality of life scores was dominating to the extent that the previously detected associations became weaker and no longer significant.

This study elucidates the changes reported by participants with Parkinson's disease after having participated in a three-week multidisciplinary rehabilitation program, which

included the work of occupational therapists. Occupational therapists aim at enhancing people's abilities and building people's confidence to overcome adversity, and to facilitate coping strategies for their current life situation [21]. Specifically, the results indicate that rehabilitation professionals should be targeting patients scoring lower on baseline general self-efficacy, as these patients may require more attention from rehabilitation professionals compared with those already scoring higher on general self-efficacy. However, further research is needed to identify what kind of follow-up would benefit this patient group. The degree to which changes are sustained beyond the conclusion of the rehabilitation program should be further examined.

Study Limitations

This study is limited by a relatively small sample size. The sample was also one of convenience, thus, generalizations should be made with caution. Participants may have interpreted the questionnaires differently as well as becoming disinterested while filling them out, possibly resulting in skewed results. We used a general measure for measuring quality of life. However, one could assume that certain aspects of quality of life change more, while others change less, but this is not assessed in the present study.

The participants' level of activity throughout the stay was not recorded. Participation may have varied substantially from person to person, which could have affected the results. Which activities the individual patient participated in during the multidisciplinary rehabilitation program was not accounted for, and future studies should report more clearly both the level, and the content of activity participation during the rehabilitation program. Medication, and/or adjustment of medication during the stay, was not accounted for, and this could have influenced the results. Additionally, we report findings from a brief rehabilitation program, and sustained changes are not reported. With this in mind, one should therefore use these results with caution.

Conclusion

This study showed that persons with Parkinson' disease reported positive changes in general self-efficacy and self-reported quality of life following a brief multidisciplinary rehabilitation program. Persons with higher functional status (MBT) and higher scores on general self-efficacy at the start of the rehabilitation program, reported higher scores on quality of life at three weeks follow-up, compared to their counterparts. However, the associations between functional status (MBT) and quality of life was weakened when adjusting for baseline quality of life scores. To increase quality of life in patients with Parkinson's disease, the study indicates that occupational therapists and other rehabilitation professionals should assess, and aim to improve, the patient's functioning and general self-efficacy.

Data Availability

The dataset used to support the findings of this study will be available from the authors on reasonable request when the research is completed.

Conflicts of Interest

The authors have no conflicts of interest.

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Abstract

Background: Parkinson's disease affects 1-2% of people in Norway over 60 years of age. Parkinson's disease is characterized by motor and non-motor symptoms, which can impair mobility, and challenge everyday life. As Parkinson's disease symptoms worsen, maintaining higher self-efficacy and quality of life may be difficult. A multidisciplinary approach is recommended, and multidisciplinary rehabilitation programs can be pivotal to increase self-efficacy and quality of life. However, the evidence for the associations between self-efficacy and quality of life in patients with Parkinson's disease, is scarce.

Aims: i) Whether positive changes in functional status, self-efficacy, and quality of life can occur following a three-week multidisciplinary rehabilitation program for patients with Parkinson's disease, ii) whether initial general self-efficacy was associated with quality of life at three weeks follow-up when controlling for demographic variables and baseline quality of life, and iii) whether initial levels of self-efficacy and quality of life moderate changes on the same variables.

Methods: Eighty-three participants with Parkinson's disease completed the General self-efficacy scale and the Parkinson's Disease Questionnaire-39 at the beginning of a multidisciplinary rehabilitation program and at the three-week follow-up. Paired t-tests and Wilcoxon signed rank tests were conducted to analyze differences in scores between baseline and three weeks follow-up. Hierarchical linear regressions were conducted to assess direct associations between the independent variables and quality of life scale scores, while adjusting for the covariance between the independent variables. Paired t-tests were conducted, after splitting the sample by the median scores, to assess whether initial levels of general self-efficacy and quality of life moderated changes on the same variables.

Results: Positive changes in functional status, self-efficacy, and quality of life occurred following a three-week multidisciplinary rehabilitation program. Initial models showed that higher baseline general self-efficacy was associated with higher quality of life at follow-up. However, this association was weakened when baseline quality of life was included in the model. Initial general self-efficacy and quality of life scores moderated the changes in general self-efficacy and quality of life. Participants with the poorest initial scores showed most gains.

Keywords: Parkinson's disease, self-efficacy, quality of life, multidisciplinary rehabilitation program

Sammendrag

Bakgrunn: Parkinson sykdom rammer 1-2% av Norges befolkning over 60 år, og blir karakterisert av motoriske og ikke-motoriske symptomer. Disse symptomene kan blant annet redusere mobilitet og utfordre hverdagslivet til den rammede, og å opprettholde mestringstro og livskvalitet kan bli utfordrende på grunn av progredierende symptomer. En tverrfaglig tilnærming til Parkinson sykdom er anbefalt, og et tverrfaglig rehabiliteringsopphold ved et rehabiliteringssenter kan være avgjørende for å øke mestringstro og livskvalitet. Likevel er det få studier som har undersøkt sammenhenger mellom mestringstro og livskvalitet for personer med Parkinson sykdom.

Formål: i) Å undersøke om positive forandringer i funksjonell status, mestringstro, og livskvalitet rapporteres etter et tre-uker tverrfaglig rehabiliteringsopphold for personer med Parkinson sykdom, ii) om initiell mestringstro er assosiert med livskvalitet ved tre ukers oppfølging etter å ha kontrollert for demografiske variabler og initiell livskvalitet, og iii) om initielle verdier av mestringstro og livskvalitet modererer forandringer på de samme variablene.

Metode: Åttitre deltakere med Parkinson sykdom fullførte General self-efficacy scale og Parkinson's Disease Questionnaire-39 ved starten av et tre-uker langt tverrfaglig rehabiliteringsopphold og etter tre uker. Parrete t-tester og Wilcoxon signed rank tester ble utført for å analysere forskjellene i scorer mellom baseline og tre-uker oppfølging. Hierarkiske regresjonsanalyser ble utført for å undersøke direkte assosiasjoner mellom de uavhengige variablene og livskvalitet, samtidig som analysene justerte for kovarians mellom de uavhengige variablene. Parrete t-tester ble utført, etter at gruppen ble splittet ved median score, for å undersøke om initielle verdier av mestringstro og livskvalitet modererte endringer på de samme variablene.

Resultater: Positive forandringer i funksjonell status, mestringstro, og livskvalitet ble rapportert etter et tverrfaglig rehabiliteringsopphold. Initielle modeller viste at høyere initiell mestringstro var assosiert med høyere livskvalitet, men disse assosiasjonene ble vesentlig svakere da initiell livskvalitet ble inkludert i modellen. Initielle verdier av mestringstro og livskvalitet modererte forandringene i mestringstro og livskvalitet. Deltakere med dårligst initiell mestringstro og livskvalitet viste mest økning i mestringstro og livskvalitet.

Nøkkelord: Parkinsons sykdom, mestringstro, livskvalitet, tverrfaglig rehabiliteringsopphold

1.0 Introduction

If you think you can, you probably can. If you think you can't – well, that self-limiting and self-fulfilling belief might actually stop you from doing something you are perfectly capable of doing

– Albert Bandura

Parkinson's disease is a progressive, chronic, idiopathic, neurological disease that affects 1-2% of people in Norway over 60 years (Norwegian Parkinson's Association, N.D.). It is considered the second most common neurodegenerative disease after Alzheimer's disease (McDonald, Richard, & DeLong, 2003). As the Norwegian population continues to age, it is expected that the incidence of Parkinson's disease will increase (Skirbekk, Strand, & Eriksen, 2016).

Parkinson's disease is mainly characterized by motor manifestations such as tremor, rigidity and bradykinesia due to the loss of dopamine-producing cells in the substantia nigra (Samii, Nutt, & Ransom, 2004), often impairing a person's mobility. However, non-motor manifestations such as anxiety, depression, fatigue, difficulty speaking and sleep disorders, occur in 90% of people with Parkinson's disease (Chaudhuri, Odin, Antonini, & Martinez-Martin, 2011) and can pose great challenges in everyday life. Furthermore, cognitive deterioration can occur in Parkinson's disease, particularly in the later stages, and common problems include difficulties with concentration and memory, and the decreased flexibility in changing the focus of attention (Muslimovic, Post, Speelman, & Schmand, 2005). When a person experiences distracting factors in the environment or when several tasks are performed simultaneously, daily activity performance, such as, planning and executing making a meal, becomes challenging (Zgaljardic, Borod, Foldi, & Mattis, 2003).

The motor and non-motor symptoms can, additionally, result in falls, social isolation, loss of leisure activities, increased dependence in activities of daily living (ADLs), loss of autonomy and reduced quality of life for the person affected (Cascaes da Silva et al., 2016; Global Parkinson's Disease Survey Steering Committee, 2002; Martinez-Martin, Rodriguez-Blazquez, Kurtis, & Chaudhuri, 2011; Norwegian Parkinson's Association, N.D.).

Parkinson's disease is a complex disease, and with the challenges one faces with ADLs, mobility and sustaining independence, one's self-efficacy could negatively be affected.

Self-efficacy pertains to the beliefs in one's own capabilities to organize and execute the courses of action required to produce desired outcomes (Bandura, 1997). Moreover, self-efficacy beliefs can regulate aspirations, choice of behavior courses, mobilization, and maintenance of effort, and once formed, self-efficacy beliefs influence the course of action pursued, effort expended, perseverance in the face of difficulties, the nature of thought patterns and the amount of stress experienced in demanding situations (Bandura, 1977). Consequently, as the Parkinson's disease symptoms worsen, maintaining the belief in one's capabilities may become hard, and reduced self-efficacy could result in setbacks. Conversely, persons who report higher self-efficacy may stand a greater chance at succeeding in demanding tasks, may recover more quickly when setbacks occur and may better self-manage their disease (Bandura, 1997; Cramm, Strating, & Nieboer, 2013). Furthermore, higher general self-efficacy has been associated with higher self-reported health, life satisfaction and levels of physical activity (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005; Luszczynska, Scholz, & Schwarzer, 2005; Schwarzer, Baessler, Kwiatek, Schroeder, & Zhang, 1997). In chronic diseases, such as diabetes and juvenile chronic arthritis, self-efficacy has been found to be important for effective disease management and for adherence to medication (Cramm et al., 2013). Although no similar studies have been conducted on Parkinson's disease, it seems reasonable to expect the same for patients with Parkinson's disease.

With worsening Parkinson's disease symptoms and reduced self-efficacy, a person's quality of life could, easily be threatened (Chapuis, Ouchchane, Metz, Gerbaud, & Durif, 2005; Reuther et al., 2007). Quality of life is defined as a person's sense of well-being that stems from satisfaction or dissatisfaction with areas of life that are important to the person (Post, 2014). A sense of well-being is core to the quality of life concept and is related mainly to the stability of good health, being able to engage in meaningful activities and having close relations to family and friends. Well-being is subjective, individual, multidimensional, self-administered, and temporally variable (Fuhrer, 2000; Schipper, Clinch, & Olweny, 1996), denoting that a person with reduced ability to perform and participate in desired activities, may experience reduced quality of life. Reduced functional mobility and reduced ability to perform ADLs have been closely linked to quality of life in persons with Parkinson's disease (Reuther et al., 2007). In other words, if a person experiences reduced mobility and decreased independence in ADLs, it could negatively affect his or her quality of life.

It is believed that humans create identity and roles through participation in activity (Kielhofner, 2008). Participation in desired activities can create a sense of belonging and

purpose in life. Moreover, a person's autonomy, i.e. self-determination, is viewed as a superior value of human life in the western world (Vetlesen, 2003). However, when affected by disease, reduced autonomy may occur, and participation in desired activities may become challenging. Persons with Parkinson's disease often find themselves unable to perform and participate in activities to the same extent as before they were affected with the disease (D. Tan, Danoudis, McGinley, & Morris, 2012). As the person no longer can contribute to the same extent as before, the limited ability can cause frustration and adversity as a person may no longer feel autonomous, independent or have self-efficacy, and the role-changes can have negative consequences for a person's quality of life.

For several years, exercise-based programs have been the main intervention used when treating persons with Parkinson's disease. They have been identified as beneficial for improving both physical functioning and quality of life (Cascaes da Silva et al., 2016; Cusso, Donald, & Khoo, 2016; Goodwin, Richards, Taylor, Taylor, & Campbell, 2008). However, as research has shown that non-motor symptoms such as fatigue, anxiety, depression and sleep disorders, have a greater impact on health-related quality of life than do the motor symptoms (Barone et al., 2009; Martinez-Martin et al., 2011), exercise programs alone, may not be the most optimal intervention when dealing with people with Parkinson's disease as both motor and non-motor symptoms need to be addressed to improve self-efficacy and, ultimately, quality of life (Trend, Kaye, Gage, Owen, & Wade, 2002).

A multidisciplinary rehabilitation program can be pivotal to ensure that a person affected with Parkinson's disease can uphold his or her participation in meaningful activity, autonomy in life and quality of life (The Ministry of Health and Care Services, 2016-2017; Trend et al., 2002). Moreover, the European physiotherapy guideline for Parkinson's disease and the Dutch guidelines for occupational therapy in Parkinson's disease rehabilitation, both recommend a multidisciplinary approach when working with patients with Parkinson's disease due to the complex nature of the disease (Keus, Munneke, Graziano, & al., 2014; Sturkenboom et al., 2011). These guidelines have been acknowledged by Norwegian professionals as relevant as similar guidelines are currently not available in Norway. A multidisciplinary approach has been defined as activities that involve the efforts of individuals from a number of disciplines, and the team has a synergistic group activity, producing more than each could accomplish individually (Melvin, 1980). The team can consist of neurologists, physical therapists, occupational therapists, speech therapists, sport

educators, nutritionists, Parkinson's disease nurses, cognitive behavioral therapists and general practitioners, among others.

Furthermore, rehabilitation is defined by The Social and Health Department as time-limited, planned processes with clearly defined goals and means, where several professions collaborate to aid a person's own efforts to gain the best possible function and coping skills, independence and social and community participation (Social- and Health Department, 2001). Successful rehabilitation is, according to St.meld. 21, presupposed by collaboration between different professions on several levels and has in recent years included quality of life as a pivotal aim (St.meld. 21 (1998-1999)). Moreover, St. Meld. 21 (1998-1999) states that rehabilitation should seek to help the patient attain self-efficacy and quality of life.

Giardini and colleagues (2017) found that persons with Parkinson's disease experienced enhanced functionality and rediscovered autonomy after a multidisciplinary intensive rehabilitation treatment. With improved physical and functional capabilities, participants claimed to have gained better symptoms control and overall body control, denoting increased self-efficacy. Moreover, Fujii and colleagues (1997) found that to increase self-efficacy among patients with Parkinson's disease, social and psychological support, and providing health education, were important factors associated with increased self-efficacy. This denotes that with higher self-efficacy, one is expected to better cope with the adverse ramifications of the chronic disease. Furthermore, patient education and health promotion interventions have been found to improve self-efficacy in patients with Parkinson's disease (Montgomery, Lieberman, Singh, & Fries, 1994). In turn, higher general self-efficacy, has been linked to a broad and stable sense of personal competence to deal more effectively with a variety of stressful situations, and may explain a broader range of human behaviors and coping outcomes when the context is less specific (Luszczynska, Gutiérrez-Doña, et al., 2005; Schwarzer & Jerusalem, 1995).

In related medical research, better baseline exercise capacity has been found to predict significantly reduced psychosocial impact of disease, improved physical activity and quality of life in chronic obstructive pulmonary disease (Bentsen, Wentzel-Larsen, Henriksen, Rokne, & Wahl, 2010), suggesting that higher physical functioning is important for quality of life. To improve physical functioning, self-efficacy and quality of life, multidisciplinary rehabilitation programs aim at addressing both motor and non-motor symptoms (Trend et al., 2002). Additionally, these types of programs aim at facilitating better self-management of

disease and at improving the physical and psychological state of a person through applying Bandura's (1997) four main sources of self-efficacy (mastery experiences, vicarious learning, physiological feedback, and verbal persuasion) factors. In turn, the multidisciplinary rehabilitation programs can increase a patient's chances of successful outcomes from the rehabilitation program and higher levels of quality of life, which is in line with rehabilitation aims (Social- and Health Department, 2001).

Playing a crucial part of the multidisciplinary teams addressed before, occupational therapists work specifically to enhance a person's self-efficacy and facilitate a person's ability to participate in desired and meaningful activities (Norwegian Occupational Therapy Association, 2017). Occupational therapists have been found to contribute to improving self-perceived performance in daily activities, and to structuring interventions aimed at teaching self-management and cognitive behavioral strategies for integrating performance patterns into daily life (Foster, Bedekar, & Tickle-Degnen, 2014; Sturkenboom et al., 2014). Although the role of occupational therapists in the rehabilitation of patients with Parkinson's disease has been acknowledged by specialists in Parkinson's disease and by people affected with it (Sturkenboom et al., 2011), the effectiveness of occupational therapy is still ambiguous (Dixon et al., 2007; Foster et al., 2014; Jansa & Aragon, 2015). This appears to be due to the lack of high-quality studies. However, the Dutch guidelines for occupational therapy in people with Parkinson's disease rehabilitation suggested that the same basic methodological principles and tools for practice within occupational therapy still apply and are well-suited for use with patients with Parkinson's disease (Sturkenboom et al., 2011). The occupational therapist aims to facilitate and enable participation in meaningful activities such as, personal care, work, and leisure activities within the patient's own context (Stabel & Borg, 2013). Moreover, persons with Parkinson's disease may find themselves challenged in terms of performing ADLs independently as the disease can reduce their mobility and self-belief. By helping patients with Parkinson's disease manage meaningful activities and find coping strategies, a person may acquire higher self-efficacy, feel less depressed and socially isolated and ultimately, improve his or her quality of life.

Despite the strong evidence in favor of providing multidisciplinary rehabilitation programs to people with Parkinson's disease, few studies have examined whether inpatient (and outpatient) multidisciplinary rehabilitation programs promote positive changes in functional status, general self-efficacy, and quality of life. The need for further research as well as long-term follow-up have been highlighted (Gage & Storey, 2004; S. B. Tan, Williams, & Kelly,

2014). Nevertheless, research by Ferrazzoli and colleagues (2018), indicated that a four-week multidisciplinary rehabilitation, which included individual sessions with a physical therapist, occupational therapist and speech therapist for four daily rehabilitation sessions five days a week, improved quality of life both at short-term and at the four-month follow-up. Single studies have shown significant changes in emotions, improved self-perceived performance in ADLs, physical mobility, physical, psychological and social functioning, and improved quality of life (Ferrazzoli et al., 2018; Goodwin et al., 2008; Sturkenboom et al., 2014; S. B. Tan et al., 2014; Tomlinson et al., 2012). However, evidence of positive sustained effects of multidisciplinary rehabilitation programs to improve self-efficacy and quality of life is ambiguous and inconclusive due to lack of controlled experiments (S. B. Tan et al., 2014). This does not indicate that multidisciplinary rehabilitation programs are unsuccessful, rather, it highlights the need for well-designed research studies.

Based on the research cited above, it seems to follow that higher self-efficacy could be the key to succeeding in ADLs, participation in society, benefitting more from multidisciplinary rehabilitation programs, and ultimately, to a higher quality of life. Facilitating self-efficacy, often the job of the occupational therapist, would be of critical importance. One of the occupational therapist's aims for rehabilitation is to facilitate and inspire the patient's sense of accomplishment to better his or her self-efficacy in accordance with his or her own goals (Cramm et al., 2013), and it is in line with Bandura's (1997) theory of self-efficacy.

The knowledge this thesis aims at providing will be relevant for occupational therapy as a profession and for society in general. This thesis will contribute with knowledge to further develop multidisciplinary rehabilitation programs, such that interventions that specifically aim at increasing self-efficacy for people with Parkinson's disease have a more solid knowledgebase to lean on.

1.1 Research Aims and Hypotheses

To date, no studies have examined the associations between functional status, general self-efficacy and quality of life before and after a brief multidisciplinary rehabilitation program. This master thesis' initial purpose (see article) was therefore to examine whether (i) positive changes in functional status, general self-efficacy, and self-reported quality of life can be achieved among patients with Parkinson's disease over the course of a three-week multidisciplinary rehabilitation program, and (ii) whether initial general self-efficacy was

associated with quality of life at the conclusion of the intervention when controlling for demographic variables and baseline quality of life.

As a part of the thesis itself, the purpose was to examine (iii) whether initial levels of general self-efficacy and quality of life moderate changes on the same variables, (iv) whether scores on the quality of life subscales changed from the beginning of the three-week multidisciplinary rehabilitation program to the conclusion, and (v) associations with subscale scores at follow-up.

1.2 Structure of The Master Thesis

The master thesis' main research questions and results are presented in the article. The article is intended for publication in "Occupational Therapy International" and has followed this journal's guidelines, see attachment.

First, the International Classification of Functioning, Disability and Health (ICF) will be presented as the main theoretical and conceptual framework to illustrate the complex nature patients with Parkinson's disease face in everyday life and how this is relevant to occupational therapy. Second, an extended presentation of the methods used and the results pertaining to both the initial and supplemental results, will be presented. Following the results, the discussion and the relevance for occupational therapy, will be presented. Last, the conclusion will be presented.

1.3 Theoretical Framework: The International Classification of Functioning, Disability and Health

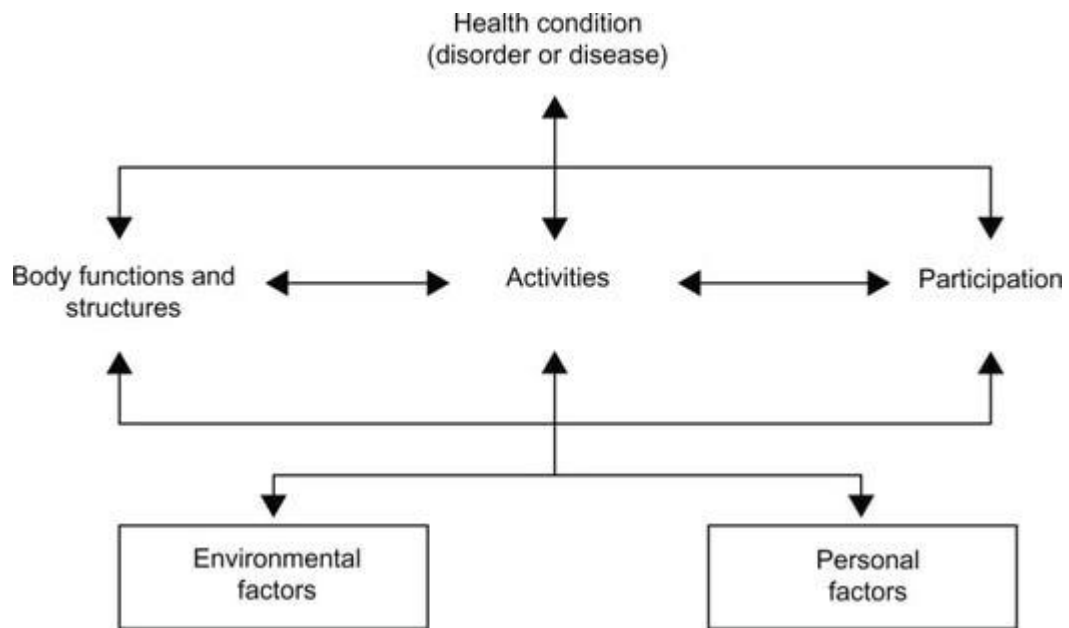
The ICF is a classification of functioning, disability and health. The ICF is the World Health Organization's (WHO) framework for health and disability at both individual and population levels (World Health Organization, 2001). Its main goal is to create uniform fundamental ideas and a standard language to describe health and health-related states from a biological, individual, and societal perspective, and to create a conceptual framework (World Health Organization, 2006). Two main areas are encompassed by the ICF: i) function and disability, - under which bodily functions and bodily structures, and activity and participation, are included, and ii) contextual factors, - under which environmental and personal factors, - are included. The ICF as a classification does not model function and disability as a "process", - instead, it is used to describe the process by offering - an aid to assess different conceptual structures and domains (World Health Organization, 2006). Additionally, the ICF describes the consequences health conditions have on functioning and disability, and describes both

positive and negative conditions. Aspiring Norwegian occupational therapists are taught to use the ICF as a part of their theoretical and conceptual framework during their studies towards their bachelor's degrees (OsloMet, 2018), suggesting that the ICF is relevant for understanding people with Parkinson's disease as it demonstrates how people can be affected by their environment, context, bodily functions, and activities in which they partake.

WHO defines the ICF as a "biopsychosocial" model (World Health Organization, 2001), inferring a holistic, coherent perspective of health, disease, and disability in the light of both biological, mental, and social factors, as well as environmental factors (see Figure 1; Engel, 1977; World Health Organization, 2006). It was launched as an alternative to the "biomedical" model which regards disability as an individual problem caused by disease, injury or other health issues that need medical treatment (Engel, 1977), and the "social model of disability" which sees disability as a socially -created problem and not at all an attribute of an individual, where the physical environment is unaccommodating, and where negative attitudes and exclusion by society is the main contributory factor in disabling people (World Health Organization, 2002). WHO believed the two models alone, were inadequate.

Figure 1 illustrates the interactions of the ICF: a person's functioning within a certain domain is presented as a dynamic interaction, or a complex relationship between health and contextual factors (i.e. environmental factors and personal factors; World Health Organization, 2006). Therefore, changes in one domain may cause changes in one or several of the other domains. Furthermore, personal factors are considered the unique background for the person's existence and self-expression, and includes intrapersonal characteristic and factors such as life experience, age, gender, coping strategies, self-efficacy, behavior pattern, volition, lifestyle and the person's education and profession. These individual traits are not specifically classified in the ICF, however, they are included to demonstrate that they can influence a person's experience of disability, both positively and negatively.

Figure 1: The interactions of ICF's conceptual framework.



The Dutch guidelines for occupational therapy use the ICF as their basis for describing the consequences of Parkinson's disease by for example using the domains "activity" and "participation" (Sturkenboom et al., 2011). Thus, occupational therapists often base their assessments on ICF's different domains. Using the ICF in practice denotes a uniform language and understanding, and it covers the biopsychosocial state of a person. The ICF is therefore a good illustration of the inherent complexity that persons with Parkinson's disease face in everyday life situations, and how a person's activity performance can be affected by the interactions between personal factors and the environment. Moreover, a person's capacity and ability to execute the different domains, have been linked with self-efficacy and quality of life (Schrag, Jahanshahi, & Quinn, 2000).

According to Unicare Fram, the ICF constitutes the foundation for practice at the rehabilitation center (Unicare, N.D.) in the sense that rehabilitation has a holistic approach. Additionally, the Parkinson's Disease Questionnaire-39 (PDQ-39; see description below), - includes several domains that align with the ICF, such as communication, mobility, bodily function, cognition, and well-being. These examples demonstrate why the ICF is relevant in this research study.

As outlined here, the ICF demonstrates dynamic interactions between the different domains, e.g. where personal factors, such as self-efficacy, may be a crucial part of the person's

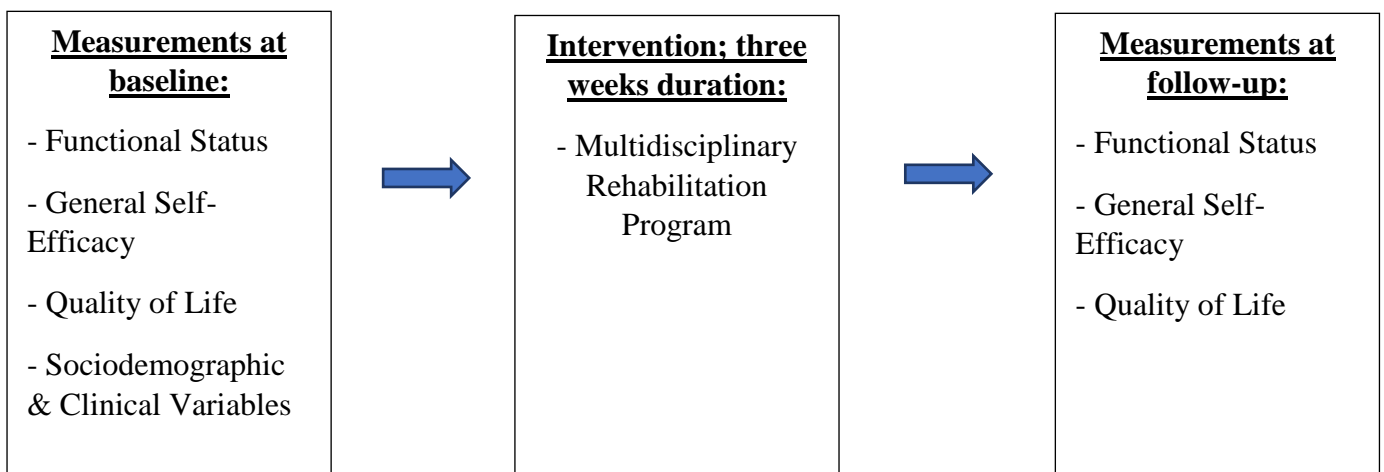
functioning. Thus, this thesis will use ICF as a conceptual and theoretical framework to ensure a unified understanding of the main concepts, and for illustrating the complexity between the different domains affecting persons with Parkinson's disease.

2.0 Materials and Method

2.1 Study Design

The study had a prospective longitudinal design as it followed the participants during a brief multidisciplinary rehabilitation program. It allowed for pre- and post- measurements of functional status, general self-efficacy, and quality of life to detect associations between the variables and changes from baseline to three weeks follow-up. The flow chart presented in Figure 2 demonstrates the process.

Figure 2: Flow chart.



2.2 Context and Intervention

Data were collected at a rehabilitation center in eastern Norway that specializes in the rehabilitation of people with Parkinson's disease. The rehabilitation center is situated in a scenic environment, where patients have direct access to nature. Depending on patients' needs, their length of stay varies, however, typically lasting 3-5 weeks. Patients are provided individual rooms and are served meals, and have the opportunity to go home on leave over the weekends.

Upon arrival, patients are awarded a primary contact to ensure a unified team working towards goals set by the participants themselves. A multidisciplinary team collaborate with the participants to create an extensive rehabilitation program in accordance with the

participant's specific needs, goals, and more importantly, towards a life at home after rehabilitation, and the team follows participants throughout their entire stay. The multidisciplinary team could consist of different professionals such as occupational therapists, physical therapists, doctors, neurologist, nurses, sports educators, cognitive behavioral therapists, and nutritionists (Unicare, N.D.). Commencing the multidisciplinary rehabilitation program, patients are assessed by relevant professionals and typically have close follow-ups the first week with individual and group-based exercise led by the different professionals. Patients see the physical therapist individually at least three times a week, 30 minutes each time, and only when especially required would they have one-on-ones with the occupational therapist and/or the sports educator. Follow-up by the occupational therapist would typically occur if patients have great difficulties with ADLs such as personal hygiene, or difficulties with cognition. Additionally, patients have a program set specifically up for them containing disease specific group-based exercises and other physical activity group exercises that they are highly encouraged to attend and participate in every day. Staff are unable to confirm whether patients attend each of the classes on their schedule. Ultimately, the patient was responsible for their own attendance. On their schedules, patients also have the option of going to disease specific educational groups, where they, for example, can learn about nutrition and medication, talk to peers, and ask the professionals questions. Based on need, cognitive behavioral therapy is available. Toward the end of the program, patients are expected to be able to perform the exercises the therapists set up for them individually with the aim of carrying it over to everyday life.

2.3 Participation Recruitment

Most participants in this study came from the south-east region of Norway. They had different needs – some came soon after receiving the Parkinson's disease diagnosis, were well-functioning and wanted to learn how to better self-manage the disease, while others could have had more advanced Parkinson's disease symptoms and needed more assistance.

Participants were individually recruited upon arrival at the rehabilitation center from January 2018 through May 2018. Data were collected at baseline – on the day of arrival of the patient at the rehabilitation center, at three weeks follow-up, and if applicable, upon departure if the stay exceeded three weeks (Time 3). Each participant was given three envelopes with written and verbal instructions upon arrival.

Envelope one contained two forms of consent (one to keep and one to sign), the assessment measures for general self-efficacy and quality of life, and a form for sociodemographic information. Envelopes two and three contained the assessment measures for self-efficacy and quality of life. Neither therapists nor the participants had access to the baseline scores when completing the three weeks follow-up and/or the third assessment measures as the questionnaires were subsequently returned to the receptionists in charge of the envelopes. All but one participant filled the forms out individually. Eighty-seven individuals were recruited (48 men and 35 women), of which 87 were enrolled and provided baseline data, 83 provided data at the three weeks follow-up, and 14 participants provided data beyond the three weeks follow-up (Time 3).

2.4 Inclusion Criteria

Patients with a Parkinson's disease diagnosis who were admitted at the rehabilitation center between January 2018 and May 2018, who scored mild to moderate (stages I to IV) on the Hoehn and Yahr (H&Y; 2001) staging scale (see below for description), and who were able to provide written informed consent, were asked to participate in the study.

2.5 Exclusion Criteria

Patients on assessment stays, patients with Parkinson's plus (multiple system atrophy, progressive supranuclear palsy, or Lewy body dementia), patients who scored a "V" on the H&Y (2001) scale, and patients unable to give written consent, were excluded from participating in the study.

2.6 Measures

2.6.1. Hoehn and Yahr

Hoehn and Yahr (2001) is an arbitrary staging scale from 1-5 from 1967 that describes the different stages of Parkinson's disease from mild to severe: stage 1) characterized by unilateral involvement only, usually with minimal or no functional disability, Stage 2) bilateral Parkinson's disease symptoms, but no difficulties walking, Stage 3) bilateral Parkinson's disease symptoms and minor difficulties walking, stage 4) bilateral Parkinson's disease symptoms with moderate difficulty walking, and lastly Stage 5) characterized by confinement to bed or wheelchair unless aided. The scale is widely accepted and utilized, and the method of staging is practical and allows for reproducible assessments by independent examiners of the general functional level of the patient. It does not require extensive

knowledge or assessment time and it can be used by anyone. All participants were assessed and scored by a physical therapist during their first 24 hours at the rehabilitation center.

2.6.2 Parkinson's Disease Questionnaire 39

The PDQ-39 (Peto, Jenkinson, Fitzpatrick, & Greenhall, 1995) was specifically designed for people with Parkinson's disease. The PDQ-39 is a set of 39 questions comprising eight subscales. Mobility (10 items) addresses problems of mobility, such as difficulties of getting around in public places, problems of getting around the house. Activities of daily living (six items) addresses a variety of limitations in ADL, for example, difficulties in washing oneself, or in dressing oneself. Emotional well-being (six items) addresses various emotional problems, such as feeling depressed, or feeling worried about the future. Stigma (four items) addresses various social difficulties arising from Parkinson's disease, such as feeling the need to conceal Parkinson's disease from others, such as avoiding eating or drinking in public. Social support (three items) addresses perceived support from social relationships, such as having problems with close relationships, not getting support from family or close friends. Cognitions (four items) addresses a variety of cognitive problems, such as difficulties with concentration, problems with memory. Communication (three items) addresses a variety of problems of communication with others, such as difficulties with speech, feeling unable to communicate properly. Bodily discomfort (three items) addresses various bodily symptoms, such as painful muscle cramps or spasms, aches and pains in joints. The participants scored from "best, i.e. no problem at all" to "worst, i.e. maximum level of problem", with higher scores indicating lower quality of life.

The PDQ-39 has been found to have satisfactory internal consistency (Cronbach's $\alpha = 0.89$), and convergent validity in relation to Hoehn and Yahr ($r = 0.51, p < 0.001$) (Jenkinson, Fitzpatrick, Peto, Greenhall, & Hyman, 1997). Test-retest reliability has been found to be adequate (r ranging 0.79- 0.93; Hagell & Nygren, 2007). The Norwegian version (Oxford University Innovation, 2016) was used in this research study.

The PDQ-39 was, in this study, found to have very good internal consistency with Cronbach's $\alpha = 0.94$, thus, corresponding with the PDQ-39 developer's results (Cronbach's $\alpha = 0.89$). For the eight subscales of PDQ-39, internal consistency was Cronbach's $\alpha = 0.80$ (valid for 77.1% of the sample), indicating the reliability and validity of our results. In this study, participants' scores on the subscales mobility, ADL, emotional wellbeing, social support and communication, did not show a statistical difference from baseline to three

weeks follow-up. Therefore, we investigated the internal consistency of the three remaining subscales. Cronbach's α for the subscales of quality of life were 0.83 (stigma), 0.77 (cognition) and 0.64 (bodily discomfort).

2.6.3 The General Self-Efficacy Scale

The general self-efficacy scale (Schwarzer & Jerusalem, 1995) was designed to assess optimistic self-beliefs to cope with a variety of difficult demands in life and consist of 10 items. Questions include "I can always manage to solve difficult problems if I try hard enough", "it is easy for me to stick to my aims and accomplish my goals", and "I can usually handle whatever comes my way." Participants scored from "not at all true" to "exactly true", and higher scores indicated higher levels of general self-efficacy.

The general self-efficacy scale is currently available and translated in to 32 languages, including Norwegian (Røysamb, 1997), is widely used within the medical field (Bonsaksen, Lerdal, & Fagermoen, 2012; Lerdal, Gay, Bonsaksen, & Fagermoen, 2017), and has undergone several multicultural validation studies (Luszczynska, Scholz, et al., 2005; Scholz, Dona, Sud, & Schwarzer, 2002; Schwarzer et al., 1997). Nilsson, Hagell and Iwarsson provide support for the validity and reliability of the general self-efficacy scale scores in people with mild, moderate and severe Parkinson's disease (Nilsson, Hagell, & Iwarsson, 2015). In this study, internal consistency was Cronbach's α 0.91 (valid for 91.6% of the sample), indicating very good internal consistency.

2.6.4 The Mini-Balance Evaluation Systems Test

The MiniBestTest (MBT) is a tool that was developed for predicting a person's likelihood of falls by assessing dynamic balance (Franchignoni, Horak, Godi, Nardone, & Giordano, 2010). The MBT is comprised of 14 items on a 3-level ordinal scale, with higher scores indicated higher functional status. It has shown to be the most accurate tool for identifying older adults with a history of falls when compared with "Timed Up and Go" (Yingyongyudha, Saengsirisuwan, Panichaporn, & Boonsinsukh, 2016). In this study, the multidisciplinary teams' physical therapist assessed the participants at the beginning and at the conclusion of the rehabilitation program. The MBT scores were extracted from journal notes upon completion.

2.6.5 Demographic and Clinical Characteristics

Information about gender, age, level of education, and Parkinson's disease duration were collected through a sociodemographic questionnaire.

2.7 Ethics

Prior to commencing the study, approval from the Norwegian Regional Committee for Medical and Health Research Ethics (project number 2017/1584) was obtained. The rehabilitation center was extensively informed about the intent, study design, procedures, and questionnaires prior to and during data collection¹.

Participants were informed about the study by the rehabilitation center's staff. Consent was explained verbally and in writing, namely: i) participation was voluntary, ii) opting out would not adversely affect their rehabilitation program or treatment, iii) withdrawal was possible at any time, iv) the data provided by the participant would be managed in confidence and not be made available to the rehabilitation center, and v) the data would be presented as anonymous data in the final report. Participants provided written consent.

2.8 Data Analysis

One participant did not meet the inclusion criteria, two left the rehabilitation center after only a few days, and one did not fill out the questionnaires. These three participants were excluded from all analyses. Due the low number of participants staying beyond three weeks ($n = 14$), no analyses of Time 3 data were conducted as they would have low statistical power. Scale scores were computed provided that participants had less than 20 % missing on the relevant scale items. In the eventual case of missing values, values were imputed with the mean of the completed items. Cases with missing values subsequent to the replacement procedure were deleted analysis by analysis (casewise deletion). Thus, n varied between analyses. Initial descriptive analyses used means (M), medians (Md), range, and standard deviation (SD) for continuous variables and frequencies and percentages for categorical variables. Internal consistency of the quality of life scale, the three quality of life subscales that changed, and the general self-efficacy scale were examined with Cronbach's α . Coefficients exceeding 0.70 are usually considered acceptable.

¹ Although the researcher was affiliated with the rehabilitation center as an employee at the time of the study, the researcher had no direct contact with the participants at any time during their stay at the rehabilitation center, nor was she approached for further information regarding the study.

Descriptive preliminary analyses were conducted to ensure no violations of the assumptions of normality of the sample data. In cases where these assumptions were not met, non-parametric tests were used. As appropriate, independent *t*-tests and Chi Square tests were conducted to analyze the differences between men and women. Paired *t*-tests and Wilcoxon signed rank tests were conducted to analyze the differences in scores (functional status, general self-efficacy, quality of life, and the subscales of the quality of life) between baseline and three weeks follow-up.

Raw associations between general self-efficacy and quality of life scores were assessed with Pearson's correlation coefficient *r*. Cohen's guidelines (Cohen, 1988) for correlation, suggest a small positive correlation when $r = 0.10- 0.29$, a medium positive correlation when $r = 0.30- 0.49$, and a large positive correlation when $r = 0.50- 1.00$.

Hierarchical linear regressions were conducted to assess the direct associations between the independent variables and the quality of life scale score while adjusting for the covariance between the independent variables. There were three models: Model 1 included the independent variables age, gender, Parkinson's disease duration, education, functional ability (H&Y) and functional status (MBT). Model 2 also included baseline general self-efficacy scores, and Model 3 also included quality of life scores.

To assess whether initial levels of general self-efficacy and quality of life moderated changes on the same variables, paired sample *t*-tests were conducted after splitting the sample. The sample was split at the median levels of general self-efficacy and quality of life. Different change scores in the two groups at the three weeks follow-up would be interpreted as evidence of moderating effects.

Effect sizes were reported as standardized beta values, and effect sizes > 0.30 were considered of medium size and clinically significant (Cohen, 1992). All data were analyzed using the statistical program IBM SPSS (IBM Corporation, 2016). Statistical significance was set at $p < 0.05$.

3.0 Results

3.1 Sample Characteristics

The sociodemographic characteristics of the sample are displayed in Table 1 (in article). Eighty-three participants completed the measures at baseline and at three weeks follow-up.

The mean age was 69.0 years ($SD = 8.3$ years). Forty-eight (57.8%) were male and 35 (42.2%) female. Participants had a mean Parkinson's disease duration of 5.0 years ($SD = 3.7$ years). There were no statistically significant differences in scores between women and men on any of the variables as assessed at baseline.

3.2 Changes in Functional Status, General Self-Efficacy and Quality of Life

Functional status (MBT) scores changed for the better from baseline ($M = 23.5$, $SD = 3.3$) to three weeks follow-up ($M = 24.7$, $SD = 3.1$, $p < 0.01$, Cohen's $d = 0.37$). There was a change in general self-efficacy scores from baseline ($M = 26.0$, $SD = 6.2$) to three weeks follow-up ($M = 27.8$, $SD = 6.7$, $p < 0.001$, Cohen's $d = 0.28$), and lastly, quality of life changed from baseline ($M = 77.9$, $SD = 19.6$) to three weeks follow-up ($M = 71.7$, $SD = 18.6$, $p < 0.001$, Cohen's $d = 0.32$), all denoting improvement at follow-up.

3.3 Associations with Quality of Life

Higher baseline general self-efficacy showed a large correlation ($r = -0.50$, $p < 0.001$) with higher baseline quality of life (the correlation is negative because a lower quality of life score indicates a higher quality of life). Table 2 (in article) shows the results from the regression analyses. Hierarchical linear regressions were conducted to assess associations between each of the independent variables and quality of life at three weeks follow-up. Model 3 showed that baseline quality of life had the strongest association with quality of life at follow-up, which made the other associations detected in Models 1 and 2, substantially smaller and no longer statistically significant.

3.4 Changes in General Self-Efficacy and Quality of Life Scores Moderated By Baseline Scores

The changes in general self-efficacy and quality of life scores between participants with higher and lower initial levels are presented in Figures 3 and 4. For those with lower initial levels of general self-efficacy, general self-efficacy changed markedly between baseline ($M = 20.87$, $SD = 3.7$) and three weeks follow-up ($M = 24.18$, $SD = 5.2$, $p < 0.001$, Cohen's $d = 0.73$). For those with higher initial levels, general self-efficacy did not change significantly from baseline ($M = 31.15$, $SD = 3.0$) to three weeks follow-up ($M = 31.40$, $SD = 6.1$, ns, Cohen's $d = 0.05$).

For those with higher initial levels of quality of life, quality of life changed from baseline ($M = 61.79$, $SD = 8.3$) to three weeks follow-up ($M = 58.45$, $SD = 9.9$, $p < 0.01$, Cohen's $d = 0.37$). For those with lower initial levels of quality of life, quality of life markedly changed

from baseline ($M = 95.29$, $SD = 11.7$) to three weeks follow-up ($M = 86.07$, $SD = 15.2$, $p < 0.001$, Cohen's $d = 0.68$).

In other words, participants reporting lower baseline general self-efficacy and quality of life increased their general self-efficacy and quality of life more in comparison to those with initial higher levels.

Figure 3. Changes in general self-efficacy

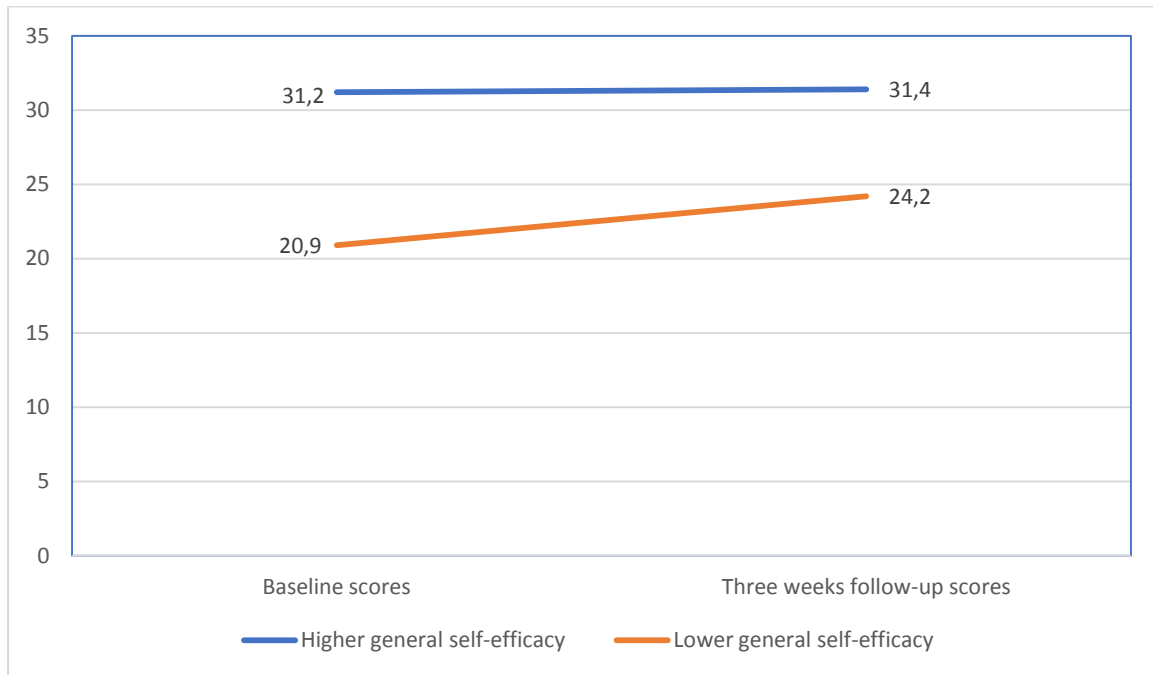
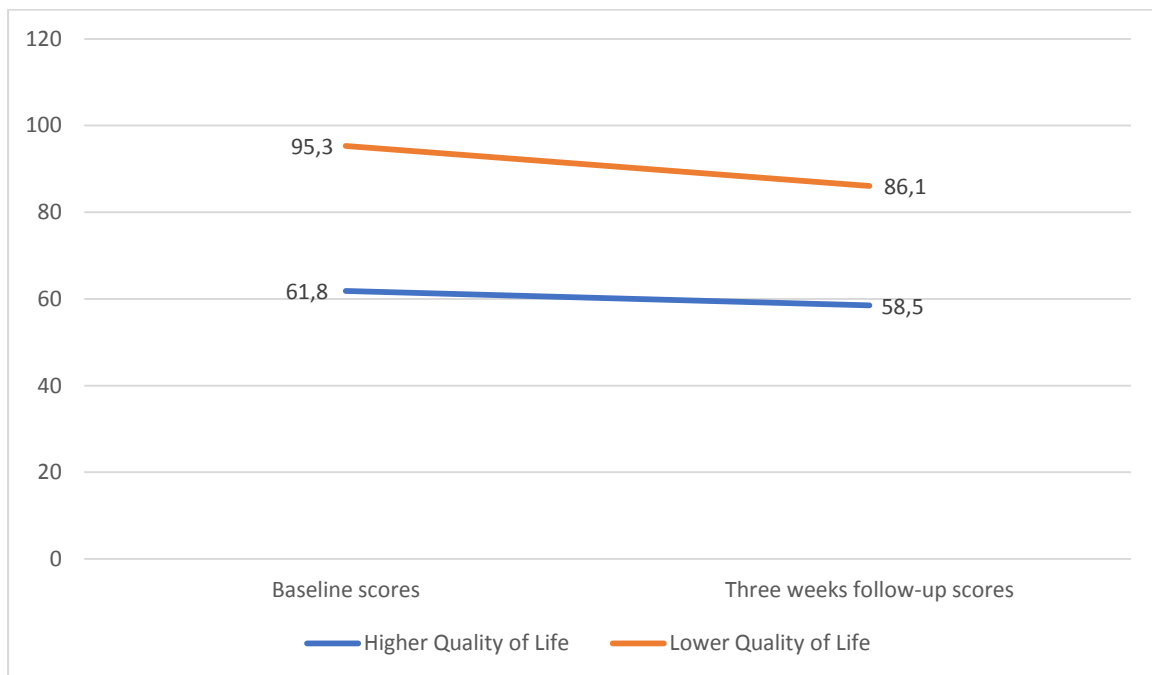


Figure 4. Changes in quality of life



3.5 Changes in The Subscales of Quality of Life

Three quality of life subscales showed improvements after the brief multidisciplinary rehabilitation program. Stigma scores changed from baseline ($Md = 6.0$, $Range = 4-14$) to three weeks follow-up ($Md = 6.0$, $Range = 4-15$, $p < 0.05$, $Z = -2.5$). There was a change in cognition scores from baseline ($M = 9.2$, $SD = 2.9$) to three weeks follow-up ($M = 8.4$, $SD = 2.7$, $p < 0.01$, Cohen's $d = 0.29$), and lastly, bodily discomfort changed from baseline ($M = 7.5$, $SD = 2.6$) to three weeks follow-up ($M = 6.5$, $SD = 2.3$, $p < 0.01$, Cohen's $d = 0.41$).

3.6 Associations with Quality of Life Subscales Stigma, Cognition and Bodily Discomfort

In the bivariate correlation analyses, no statistically significant differences were found between higher quality of life for the subscales stigma and bodily discomfort and the independent variables. Pertaining to cognition, higher quality of life was associated with lower age ($r = 0.42$, $p < 0.01$) and better functional ability (H&Y; $r = 0.40$, $p < 0.05$). Thus, a medium correlation between the cognition subscale and age and functional ability was indicated.

Stigma was not normally distributed and was subsequently excluded from the regression analyses. The analyses were conducted to assess associations between each of the independent variables and the quality of life subscales at the three weeks follow-up

(cognition and bodily discomfort) that were found to change during the follow-up period. In the subsequent hierarchical regression analyses, it was adjusted for the same variables as included in the main analyses (Table 2 in article). Tables 1 and 2 show the results from the regression analyses of cognition and bodily discomfort, respectively.

For cognition, the demographic and clinical variables explained 29.0% ($p < 0.05$) of the variance, with higher age ($\beta = 0.33, p < 0.05$) and lower education ($\beta = -0.38, p < 0.01$) showing the strongest associations with higher quality of life scores for cognition (indicating that older participants and participants with less education perceived a lower quality of life). In the second model, baseline general self-efficacy explained an additional 5.5% of the total cognition variance when included in Model 2, with higher age ($\beta = 0.29, p < 0.05$), lower education ($\beta = -0.33, p < 0.01$) and lower general self-efficacy ($\beta = -0.24, p < 0.05$) showing the strongest associations with higher quality of life scores for cognition. When included in Model 3, baseline cognition explained an additional 30.6% of the total cognition variance, showing the strongest association with cognition at the three weeks follow-up ($\beta = 0.70, p < 0.001$), rendering the initial associations non-significant.

Within the subscale bodily discomfort, the demographic and clinical variables explained 18.5% of the variance, with female gender showing the strongest association with higher bodily discomfort scores ($\beta = 0.33, p < 0.05$). In Model 2, baseline general self-efficacy explained an additional 2.7% of the total bodily discomfort variance when included in the second regression model, with female gender showing the strongest association with higher quality of life scores for bodily discomfort ($\beta = 0.32, p < 0.05$). When included in Model 3, baseline bodily discomfort explained an additional 37.6% of the total bodily discomfort variance, showing the strongest association with bodily discomfort at the three weeks follow-up ($\beta = 0.68, p < 0.001$).

Table 1. Hierarchical regression analyses for cognition

Hierarchical linear regression analyses showing direct associations with the quality of life subscale cognition at three weeks follow-up ($n = 65$)

<u>Independent variables</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Age	0.33*	0.29*	0.13
Sex	0.06	0.04	0.00
Parkinson's disease duration	0.05	0.03	0.03
Education (dic.)	-0.38*	-0.33**	-0.16
Functional ability (H&Y)	0.14	0.13	0.00
Functional status (MBT)	-0.01	0.02	-0.06
Explained variance	29.0 %**		
Baseline general self-efficacy		-0.24*	0.00
R² change		5.2 %*	
Explained variance		34.1 % **	
Baseline cognition			0.70**
R² change			30.6 %**
Explained variance			64.7 %**

Note. Table content is standardized beta weights, indicating the strength of association with the quality of life subscales at three weeks follow-up. Variable coding: Male = 1, female = 2. Higher education = 1, lower education = 0. Higher functional ability score indicated lower functional ability, whereas higher functional status score indicates higher functional status.

* $p < 0.05$, * $p < 0.01$.

Table 2. Hierarchical regression analyses for bodily discomfort

Hierarchical linear regression analyses showing direct associations with the quality of life subscale bodily discomfort at three weeks follow-up ($n = 64$)

<u>Independent variables</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Age	-0.04	0.07	0.01
Sex	0.33*	0.32*	0.16
Parkinson's disease duration	0.00	0.02	-0.08
Education (dic.)	-0.15	-0.12	-0.12
Functional ability (H&Y)	0.18	0.17	0.17
Functional status (MBT)	-0.12	-0.10	-0.03
Explained variance	18.5 %		
Baseline general self-efficacy		-0.17	0.04
R² change		2.7 %	
Explained variance		21.1 %	
Baseline bodily discomfort			0.68 **
R² change			37.6 %**
Explained variance			58.8 %**

Note. Table content is standardized beta weights, indicating the strength of association with the quality of life subscales at three weeks follow-up. Variable coding: Male = 1, female = 2. Higher education = 1, lower education = 0. Higher functional ability score indicated lower functional ability, whereas higher functional status score indicates higher functional status.
* $p < 0.05$, * $p < 0.01$.

4.0 Discussion

4.1 Summary of the Results

The main results are presented in the article and suggest that participants achieved significant positive changes in functional status, general self-efficacy, and quality of life during the three-week multidisciplinary rehabilitation program. On average, participants saw a 1.19 point improvement in functional status (MBT), 1.78 point improvement in general self-efficacy, and a 6.16 point improvement in quality of life. Moreover, this study examined whether changes in general self-efficacy and quality of life were moderated by participants' initial levels of general self-efficacy and quality of life. Our results show that baseline levels moderated positive change in general-, most apparent in the sharp increase for those who

reported having lower baseline general self-efficacy and quality of life. However, the results denote that the participants with the sharpest increase still reported lower levels compared with the participants who reported higher initial levels in general self-efficacy and quality of life.

One could assume that participants who reported lower initial general self-efficacy and quality of life experienced worse motor and non-motor symptoms compared with those who reported higher initial general self-efficacy and quality of life. Reduced functional status has been linked with reduced independence, inability to perform ADLs and decreased mobility (Lawrence, Gasson, Kane, Bucks, & Loftus, 2014; Trend et al., 2002). Thus, as symptoms are worse, participants' scores in functional status (MBT), general self-efficacy, and quality of life would reflect this notion. After participating in the brief multidisciplinary rehabilitation program, where the focus, among others, was on regaining functional mobility, and learning coping strategies and better self-management of the disease, one could assume that the focus and training regarding these factors was successful in affecting participants' experiences of both general self-efficacy and quality of life. Moreover, participants could have experienced social and psychological support, and they were able to attend health education courses to learn how to better self-manage their disease. This is in line with Fujii and colleagues' findings concerning social and psychological support and health education for increasing self-efficacy among participants with Parkinson's disease (Fujii et al., 1997). Although studies are limited concerning Parkinson's disease and self-efficacy, studies involving other diseases such as breast cancer, found that interventions aimed at increasing self-efficacy, increased both self-efficacy and quality of life (Lev et al., 2001).

4.2 Baseline Scores as a Moderator of Outcome

The results suggested that initial general self-efficacy and quality of life scores moderated the changes in general self-efficacy and quality of life, respectively. Specifically, participants with lower initial levels of general self-efficacy and quality of life saw more improvement in their scores compared with participants who reported higher initial levels of general self-efficacy and quality of life. Participants reporting lower initial levels could have had more to gain compared with participants who reported higher initial levels. The lower initial levels may have inferred that the participants' performance was poor and may have indicated the magnitude of the challenges that the participants faced. As the lowest reported levels for general self-efficacy and quality of life were subsequently 12 and 121.11 points, this could suggest that there was much room for improvement, whereas the highest levels for general

self-efficacy and quality of life were subsequently 39 and 41 points, denoting that there would have been less room for improvement. For the participants reporting higher initial levels, sustaining higher levels of general self-efficacy and quality of life may be a more relevant aim for the rehabilitation program than actually improving it.

4.3 Changes in the Quality of Life Subscales and Variables Associated with these Subscales

Furthermore, this study also examined the changes within the subscales of quality of life from baseline to three weeks follow-up, and whether the independent demographic and clinical variables were associated with the subscales of quality of life at follow-up. Among the quality of life subscales, stigma, cognition, and bodily discomfort had a statistically significant positive change from baseline to the three weeks follow-up, whereas mobility, ADL, emotional well-being, social support and communication did not. This is somewhat dissimilar to the results found by Ferrazzoli and colleagues (2018) as they found all subscales except stigma to be significantly different at their four-week follow-up.

The questions asked in the section for stigma were questions such as, “have you felt like you need to hide your disease from others?” and “have you avoided situations where you have had to eat and drink in public places?” An explanation for the positive change in perceived stigma seen in this study could be that participants obtained higher levels of self-efficacy during the rehabilitation program which contributed to change their thought patterns. Higher levels of self-efficacy have been linked to reduced psychosocial impact of disease and improved quality of life in chronic diseases such as multiple sclerosis, chronic obstructive pulmonary disease, cancer, and myocardial infarction (Bentsen et al., 2010; Brink, Alsen, Herlitz, Kjellgren, & Cliffordson, 2012; Heckman et al., 2011; Motl, McAuley, Wynn, Sandroff, & Suh, 2013). Additionally, it has been suggested that that the psychosocial impact of the disease can be reduced immediately after a rehabilitation program (Bentsen et al., 2010), which contributes to explain the decrease in stigma scores.

Furthermore, during the rehabilitation program participants were among peers who were all in the same situation as themselves, thereby relieving them of pessimistic attitudes towards the stigma and judgement that many may feel when they for example drop their food or spill their drinks in public. Being among peers and professionals with knowledge about Parkinson’s disease, may have contributed to participants feeling safe as they were a part of an understanding environment. Moreover, this could have influenced their pattern of thoughts

and, consequently, their improved scores at the end of the three-week rehabilitation program. However, this is likely to be a short-term improvement that would probably not last as participants returned home, as similar studies with a longer follow-up did not find stigma to change over time (Ferrazzoli et al., 2018).

Cognition was found to change significantly from baseline to three weeks follow-up, which is similar to the results found by Ferrazzoli and colleagues (2018). The questions for the subscale cognition pertain to unexpectedly falling asleep during the day, trouble concentrating, and loss of memory. During the stay at the rehabilitation center, participants followed a planned schedule throughout the day which may have prevented them from falling asleep unexpectedly as activities kept them occupied. Additionally, participants may have learnt compensating and energy conservation techniques which helped them keep a better overview throughout the day. There are a lot of dynamic processes and stimuli occurring at once at the rehabilitation center, and participants are therefore required to increase their awareness to keep up. Contrary to their home situation where many may experience less stimuli to keep them occupied, the rehabilitation program could have contributed to increase participants' awareness which again could explain the improved cognition scores at the three weeks follow-up (Peterson, King, Cohen, & Horak, 2016).

Model 1 of the regression analyses showed that higher age and lower levels of education were associated with lower reported quality of life for cognition. Difficulties with novel experiences that require substantial self-initiated processing, with reduced memory, and with simultaneity capacity have been associated with older age (Park & Festini, 2017), and lower levels of education have been found to be associated with lower quality of life (Eurostat Statistics Explained, 2018). As shown in Model 2, lower baseline levels of general self-efficacy was associated with lower levels of quality of life for cognition, suggesting that all three variables, higher age, lower education and lower self-efficacy, could lead to a disbelief in one's capabilities which result in lower levels of quality of life for cognition. According to Eurostat Statistics Explained (2018), education enhances people's understanding of the world they live in and the perception of their ability to influence it, which is in line with Bandura's theory of self-efficacy wherein self-efficacy influences the nature of thought patterns (Bandura, 1997). Higher education and knowledge can increase a person's resources to better deal with daily challenges, which in turn can increase a person's self-efficacy. Moreover, education level and higher levels of self-efficacy contribute to explain cognition-related quality of life. As expected based on our initial findings where baseline quality of life showed

the strongest association with the three weeks follow-up quality of life, baseline cognition showed the strongest association with the three weeks follow-up cognition, rendering insignificant the previously detected associations. The multidisciplinary rehabilitation program was one of a relatively short duration, hence, measurements were conducted within a short time span. Thus, one should expect participants who reported higher baseline levels to report higher follow-up levels as cognition is likely to be quite stable over a short period of time.

Lastly, bodily discomfort addressed areas such as, painful muscle cramps or spasms, joint pain, pain in general, and unpleasant temperature. A possible explanation for the improved scores at the three weeks follow-up could be that participants experienced different stimuli and movement patterns than they were used to at home, that they exercised regularly with focus on eccentric exercise for reduction of muscle cramps and spasms, or that medication was adjusted at the rehabilitation center. Additionally, sleep, rest and nutrition were structured during the rehabilitation stay which may have contributed to the improved scores at the three weeks follow-up.

Model 1 of the regression analyses showed that female gender was associated with lower quality of life for bodily discomfort. Women have been found to have a lower threshold for general pain tolerance compared with men (Fillingim, King, Ribeiro-Dasilva, Rahim-Williams, & Riley, 2009), which could explain the results for bodily discomfort.

Interestingly, when included in Model 2, general self-efficacy was not found to be associated with bodily discomfort. But, female gender was still associated with bodily discomfort at follow-up, denoting that being a woman played a more significant role in bodily discomfort than general self-efficacy. Thus, general self-efficacy may not have influenced pain tolerance and perceived bodily discomfort. As shown in Model 3, when including baseline bodily discomfort, baseline bodily discomfort showed the strongest, and the only, association with follow-up quality of life for bodily discomfort, denoting that baseline scores are strongly associated with the outcome of bodily discomfort three weeks later.

On another note, it was surprising to see that the analyses did not find that the participants reported a statistically significant difference between the baseline and follow-up scores for the subscale “mobility”, despite the results suggesting a statistically significant difference between baseline and three weeks follow-up scores for functional status (MBT). Thus, this may indicate that the participants did not experience the improvement in functional status in

everyday life, despite the fact that functional status tests showed improvement. This could also denote that the test situation may not have transferred directly to everyday situations that made participants feel like they had higher quality of life because of it.

4.4 The ICF in Rehabilitation of Patients with Parkinson's Disease

The rehabilitation process can be divided into stages: assessment, defining goals and planning measures, implementation of measures and assessment of effects (Steiner et al., 2002). Thus, the rehabilitation process is, understandably, intricate and involves multiple factors and many people on many levels preferably working towards unified goals. The ICF is a useful tool for assessing a patient's total situation as the ICF focuses on health conditions, activity, participation, personal factors, and environmental factors (Kjeken, 2003). Additionally, the ICF can be a useful tool to ensure user involvement as one is dependent on involving the patient and/or next of kin to collect information (World Health Organization, 2001). A patient with Parkinson's disease may experience challenges in any or all the domains within the ICF and by collecting this information, one can see the intricate, dynamic interactions between all the factors pertaining to the patient and his or her life (see example in the next paragraph). Thus, the ICF contributes to view the patient in a holistic way. In view of the ICF being considered a "biopsychosocial model", suggesting that disability stems from the interaction of a health condition with personal and environmental factors, thoroughly assessing a person's personal factors, should be a pivotal factor for successful rehabilitation. Personal factors and traits, such as self-efficacy, may determine a person's course of action, and also a certain outcome (Bandura, 1997). Moreover, self-efficacy can be pivotal to a patient's coping abilities pertaining to self-management of the disease which affects quality of life.

An example from personal experience when working with patients with Parkinson's disease, demonstrates how interactions of the different domains of the ICF are dynamic and influence each other. A patient with Parkinson's disease had difficulties getting dressed and found the situation quite stressful. The patient had multiple times experienced difficulties getting dressed due to reduced mobility, bradykinesia and tremors, and had consequently had to ask for help leaving him thinking he was useless and hopeless. Additionally, the patient often found himself missing out on planned activities due to spending too much time getting dressed. As one can see from this example, several domains that constitutes the ICF are affected. The health condition (Parkinson's disease) reduced the patient's body functions and structures (bradykinesia and tremor), making getting dressed difficult (the activity). Consequently, the amount of time he spent getting dressed caused him to miss participating

(participation) in the activities that he desired, which in turn reduced his self-efficacy (personal factors).

Unfamiliar or stressful situations can often worsen a patient's Parkinson's disease symptoms. Stigmatization, as a result of lack of understanding from the environment, is something many people with Parkinson's disease face, and a thought like, "what if I cannot walk through this doorway carrying my coffee cup without freezing and spilling? I will make a fool of myself", can trigger an emotional response of fear, which can result in an escalation of Parkinson's symptoms (negative bodily function). This draws parallels to the theory that cognitive behavioral therapy (Beck & Beck, 1995) applies. First, a thought occurs, which second, triggers an emotional response, which third, affects bodily functions, often generating a spiraling cycle of negative responses and behavior (Berge & Repål, 2008). As activity and participation can be affected by a patient's health condition and environmental factors, a patient could, consequently, find him- or herself withdrawing from, for example, social events. However, according to Bandura (1977), self-efficacy influences the nature of thought patterns and the amount of stress experienced in demanding situations. Thus, unless the person has the self-efficacy to change his/her thoughts that affects the stress experienced in the given situation, the worsened Parkinson's disease symptoms may inhibit the patient's actions which are necessary to succeed in the task at hand. Moreover, higher levels of self-efficacy are important for believing in successful outcomes, and, maybe in particular, when facing the adversities that chronic diseases, such as Parkinson's disease, create. Furthermore, Bandura (1999) proposed that positive experiences are gained when a person is driven to work through their challenges on their own terms, as this in turn can boost their self-efficacy.

As demonstrated through the ICF, personal factors interact in combination with environmental factors, activity and participation, and can either inhibit or promote a person's abilities and the outcome. As one can see from these examples, self-efficacy is of great importance to successfully executing tasks or handling situations. Furthermore, as seen in our study, higher general self-efficacy was associated with higher quality of life, and one can argue that being inhibited from participating in desired activities because of lower levels of general self-efficacy, may result in reduced quality of life. Thus, professionals working with patients during multidisciplinary rehabilitation programs should focus on all the interactive domains pertaining to the ICF and, in particular, the personal factors such as self-efficacy from the very beginning to ensure higher quality of life.

4.5 The ICF, Occupational Therapy, Self-Efficacy and Quality of Life

A multidisciplinary team frequently includes the expertise of an occupational therapist. The occupational therapists' most central concepts are occupation and participation (Norwegian Occupational Therapy Association, 2017), and they transfer this contribution to the rehabilitation program. The ICF terminology has been found to reflect the occupational therapist's professional responsibility (Haglund & Henriksson, 2003) as it for example includes activity, participation and contextual factors. Additionally, the ICF can be a useful tool for the occupational therapist to identify and categorize patients' needs and desired activities, and for goal setting. However, as the occupational therapist adds a unique contribution to multidisciplinary rehabilitation, specific terminology may need to be added for the occupational therapist to analyze an occupation at a more detailed level to fully understand why patients have difficulties performing an activity.

Moreover, as implied through its title, one of the ICF's central concepts is human functioning and it pertains to functioning, disability and contextual factors (World Health Organization, 2001). To fully comprehend human functioning, one needs to acknowledge that human functioning is a complex phenomenon comprised of several factors, and as Figure 1 demonstrates, the factors interact and affect each other. The occupational therapist's understanding of the factors will determine what they see and what they search for. However, the occupational therapist can use the ICF to grasp the complexity that surrounds a patient with Parkinson's disease, both on a personal level and on a contextual level. They can later add their unique occupational therapy methods to analyze activity and participation more in depth. The occupational therapist can assess a patient's body function and structures, activity, participation, environmental factors, personal factors and health condition, and create a treatment plan using the ICF as it covers all these factors.

As Parkinson's disease is a complex disease, patients may experience being affected across all the factors in the ICF. It was previously explained how a person with Parkinson's disease can be inhibited from performing ADLs due to reduced mobility and that his or her independence may be reduced which consequently can reduce quality of life (Lawrence et al., 2014). In line with St.meld. 21 (1998-1999) where it is stated that one of the aims of rehabilitation is to obtain good quality of life, an occupational therapist works towards higher quality of life too. However, to determine what good quality of life is for an individual, thorough assessment pertaining to the factors that the ICF is comprised of, is necessary as the ICF encompasses many areas in life. Thus, depending on the patient's goals and needs, an

occupational therapist can for example aim rehabilitation at increasing a patient's capabilities in specific occupations through activity to manage ADLs more satisfactorily and to become more independent in the desired activity. In turn, this is proposed to increase quality of life (Reuther et al., 2007; Sturkenboom et al., 2014). Bandura (1977) suggested that one can increase self-efficacy through mastery experiences, vicarious learning, physiological feedback, and verbal persuasion and the occupational therapist aims at doing so through occupation. In this study, higher general self-efficacy was found to be associated with higher levels of quality of life, thus it is suggested that an occupational therapist should also aim rehabilitation at increasing a patient's general self-efficacy, as without the appropriate levels of general self-efficacy, a patient may not find or have the resources to succeed with his or her desired occupations (Bandura, 1997).

An earlier example showed how participation in a desired activity could be inhibited due to lower levels of general self-efficacy. The example demonstrated how challenging living with Parkinson's disease can be and how the ICF addresses human functioning. Being inhibited from moving independently around while for example carrying a cup of coffee and a plate of food from the kitchen to the living room, or from the counter at the coffee shop to the table without spilling or having to ask another person for help, may generate thoughts of uselessness and hopelessness. It could also make people feel like they have reduced independence as they are dependent on others for help. Consequently, a person's self-efficacy for that particular situation, may be compromised and reduced. In such cases, an occupational therapist's understanding of occupation and participation, and his or her ability to analyze the different steps of an occupation, may contribute to enhance patients' self-efficacy and sustain independence. Additionally, the example demonstrates why occupational therapy interventions aiming at increasing self-efficacy can be pivotal for successful rehabilitation. If the occupational therapist can help patients either learn compensating techniques, new solutions, or cues for managing situations, a patient may find themselves regaining skills for managing the activity. As positive experiences can be gained when a person is driven to work through their challenges, patients may gain higher self-efficacy (Bandura, 1999). With increased self-efficacy, patients can continue performing the occupation independently or satisfactorily. In turn, with the help and assistance from an occupational therapist, this may contribute to higher quality of life as patients are able to overcome the adverse ramifications that Parkinson's disease poses.

4.6 Methodological Implications

This study had a prospective longitudinal design which measured changes over a three-week follow-up period and relations between functional status, self-efficacy, and quality of life. For quality assurance, a second person conducted the same analyses ensuring identical results. Although the rehabilitation program was of a relatively short duration (three weeks), it is reasonable to expect the occurrence of a real change. However, a rehabilitation program of a longer duration would be preferable.

Although intervention programs with two measurement occasions offer valuable information, the use of additional follow-up measurement occasions would provide more information as more variation can be detected when more variables are included (Alessandri, Zuffianò, & Perinelli, 2017). It is also easier to detect random error across multiple measurements. Additionally, if more time points were included, we could have detected whether changes continued, the direction and slope of the effects could have been further explored: did they remain favorably, remain stable, return to baseline, or get worse?²

The study design did not include a control group or long-term follow-up due to the limitations in time and resources. Had a control group been included, one could have eliminated and isolated variables to know exactly what caused a difference in the results between the groups, strengthening the internal validity of the study. Without a control group, one cannot be certain that the detected changes occurred due to the intervention and not due to confounding circumstances. As a control group was not included, the results need to be interpreted and applied with caution. The lack of long-term follow-up inhibits this study from detecting whether there was a sustainable change. It was not unexpected that participants reported improvements immediately after the intervention as they could have benefitted from factors such as being with likeminded peers, receiving professional help and staying physically active. Being physically active, has shown to have an effect on depression, anxiety, emotions, mood, self-esteem and cognitive impairments (Creek, Lougher, & Van Bruggen, 2009), and with feeling less depressed or less anxious, one could expect

² The research design did have a third time measurement, however, only 14 participants provided data at that time and analyses were, consequently, not conducted. Additionally, the participants' third time measures were within a few days of the second time measure and would therefore not have provided valuable information.

improvements immediately after the rehabilitation program. However, this may not be the case when they return home if they do not continue staying active. The rehabilitation program aims to implement exercises and tools that patients can use when they return home. It would therefore be of interest to have had the resources to conduct a follow-up assessment.

Although the study sample was one of convenience as patients at a specific rehabilitation center were recruited, participation in the rehabilitation program was random. The authors asserted no control or influence over who applied to and were accepted to the rehabilitation program. However, the authors recognize that the participants who were recruited to participate in the study, typically, had been referred to the rehabilitation center either through encouragement from their doctor or neurologist, or from their own desire to attend, denoting that they could have been extra motivated to participate in the rehabilitation program. This may have contributed to selection bias, indicating that the sample was not representative of the study population, which in this case included all Norwegian adults suffering from Parkinson's disease (Laake, Hjartåker, Thelle, & Veierød. M, 2007). This could compromise generalizability.

The authors did not have direct contact with the participants during their rehabilitation program. This is considered a strength in this study because, although participants may have felt loyalty towards their multidisciplinary teams, they were informed that only the researchers would have access to their questionnaires. This could have enabled participants to answer the questionnaires more truthfully.

The questionnaires general self-efficacy and PDQ-39 are considered a strength in this study as they have been well tested in people with Parkinson's disease (Hagell & Nygren, 2007; Jenkinson et al., 1997; Nilsson et al., 2015). Internal consistency was found to be good for general self-efficacy, PDQ-39 and for the subscales of PDQ-39. Future studies will also be able to compare their scores to the results found in this thesis as publicly available measures have been used.

Despite the good internal consistency of PDQ-39, some participants refrained from answering questions due to the questions' nature. The lack of completed responses could be considered a weakness of this study. For example, question 28 (see questionnaire attached) asked whether the participant experienced support from a spouse. However, many of the participants did not have a spouse or significant other, and neither of the response alternatives were suitable for answering, leaving participants not answering the question at all.

Additionally, some respondents skipped entire pages of questions. Filling out the questionnaire may have taken up to 15 minutes, and because some participants had reduced ability to concentrate and also could have been distracted while filling out the questionnaires, this could have caused them to forget to fill out the remaining questions (Zgaljardic et al., 2003). Some participants could have neglected to complete their questionnaires due to lack of motivation. The authors allowed up to 20% missing for scale scores to be computed. Had the study included more participants, the results would have been less vulnerable to missing responses.

Another weakness of the study was the relatively small sample size ($n = 83$). A small sample size decreases statistical power. Future studies should aim to include more participants and a control group for comparison purposes. Had the study included more participants in the analyses, one might have found a statistically significant difference between the demographic and clinical variables such as age, gender, and Parkinson's disease duration.

Participants themselves were accountable for participating in the activities that were scheduled for them during the rehabilitation program, and actual participation was not specifically recorded in this study. Thus, participation varied from person to person. Some participated more than others in the scheduled activities, making it hard to determine how much participation was needed to detect a change. Furthermore, medication was not accounted for and could have been adjusted during the rehabilitation program. Thus, participants could have experienced improved functioning due to increased or adjusted medication, and consequently, could have reported improved scores. Future studies should aim at including a detailed list including how much and in what groups each participant actually partakes, and also include detailed description of medication intake.

The Hoehn & Yahr staging scale stages disease severity (Goetz et al., 2004; Hoehn & Yahr, 2001). However, the Hoehn and Yahr scale has been criticized for not capturing completely impairments and disability from other motor features of Parkinson's disease and provides no information on non-motor symptoms (Goetz et al., 2004), denoting that a patient could be classified as stage I because of unilateral involvement only, despite having severe bradykinesia and tremor of the dominant hand. One should therefore use these results with caution as each stage does not necessarily represent a higher degree of overall motor dysfunction.

One often hears about qualitative studies being subject to interpretation. One must keep in mind that questionnaires also open for interpretation as people view and understand concepts and questions differently. For example, the PDQ-39 asks “how often have you experienced difficulties carrying a shopping bag the last 30 days?” and “how often have you had to stay at home more than you would like?”. Some responders wrote a side note stating that they had not tried this or been at home within the last 30 days, and therefore left it either blank, or they crossed off “never”. Others may have interpreted these questions differently, and, consequently, thought about the last time they were in that particular situation, or had that issue, and answered accordingly. This may have affected the results as scores would depend on the interpretation of the question. Although, interpretations also occur in quantitative research, the questionnaires, PDQ-39 and general self-efficacy scale, were standardized and validated. Furthermore, the quality of life subscale bodily discomfort was found to have Cronbach’s α 0.64. Thus, denoting that the results pertaining to the subscale bodily discomfort should be interpreted with caution.

5.0 Conclusion

The results suggest that participants with Parkinson’s disease reported positive changes in functional status, general self-efficacy, and quality of life following a three-week multidisciplinary rehabilitation program. This study showed that initial general self-efficacy and quality of life scores moderated follow-up scores for general self-efficacy and quality of life. In concrete terms, those with the poorest initial self-efficacy and quality of life showed the most gains. However, the results also suggested that there is still a large gap after the three-week multidisciplinary rehabilitation program between participants who initially reported general self-efficacy and quality of life to be above and below the respective median values. The results indicate that there is a need to assess patients’ general self-efficacy prior to commencing a rehabilitation program to successfully increase patients’ general self-efficacy and quality of life. Further empirical research is needed to determine what types of interventions can be appropriate. Additionally, the sustained changes after the multidisciplinary rehabilitation program should be further examined.

This thesis has elucidated how the ICF can be a relevant tool within a multidisciplinary rehabilitation program as one can assess patients’ holistic situations. The important role that occupational therapists play and their contribution when working with patients with Parkinson’s disease in a multidisciplinary rehabilitation setting, have been demonstrated.

Moreover, the occupational therapist's expertise within occupation and participation is invaluable for enhancing a person's self-efficacy and quality of life. The knowledge of the associations between self-efficacy, quality of life and functional status this study has provided, could contribute to improve interventions and rehabilitation programs for people with Parkinson's disease. Future research should assess what these interventions should include and how relevant elements should be included.

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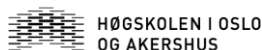
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Attachments

Attachment 1: Consent form



FORESPØRSEL OM DELTAKELSE I FORSKNINGSPROSJEKT

Parkinson sykdom, livskvalitet og mestringstro

Dette er et spørsmål til deg om å delta i et forskningsprosjekt. Forskerne vil undersøke sammenhenger mellom mild til moderat Parkinson sykdom, mestringstro og livskvalitet hos personer med Parkinson sykdom som er på rehabilitering ved et rehabiliteringssenter. Vi vil også undersøke om mestringstro og livskvalitet kan endre seg gjennom et rehabiliteringsopphold. Derfor ønsker vi din deltakelse da du er på et rehabiliteringsopphold nå.

HVA INNEBÆRER PROSJEKTET?

Prosjektet innebærer at du vil få utdelt spørreskjema ved ankomst, etter 3 uker, og dersom rehabiliteringsoppholdet ditt varer lengre enn 3 uker vil du også få utdelt spørreskjema ved avreise. Der vil du bli bedt om å krysse av på spørsmål som angår din livskvalitet og mestringstro. Behandlingsopplegget du skal få på rehabiliteringssenteret vil ikke påvirkes av at du er med i forskningsprosjektet og svarene du gir vil heller ikke påvirke behandlingen. Det vil ta ca. 20 minutter å svare på de to spørreskjemaene ved hver anledning.

I prosjektet vil vi innhente og registrere følgende opplysninger om deg fra journalen din: alder, kjønn, utdanningsnivå, et mål for fungering i dagliglivets aktiviteter, et mål for mobilitet og antall år med Parkinson sykdom.

MULIGE FORDELER OG ULEMPER

Deltakelse i forskningsprosjektet vil ikke gi noen ulemper for deg og din behandling. All behandling foregår som normalt uavhengig av deltakelsen i forskningsprosjektet. Deltakelse krever at du setter av ca. 20 minutter til å svare på spørreskjemaene ved hver anledning. Det er ingen fordeler med å være med i forskningsprosjektet, men opplysningene dine og erfaringene fra studien vil kunne hjelpe andre med Parkinson sykdom i fremtiden.

FRIVILLIG DELTAKELSE OG MULIGHET FOR Å TREKKE SITT SAMTYKKE

Det er frivillig å delta i prosjektet. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke. Dette vil ikke få konsekvenser for din videre behandling.

Dersom du trekker deg fra prosjektet, kan du kreve å få slettet innsamlede opplysninger, med mindre opplysningene allerede er inngått i analyser eller brukt i vitenskapelige publikasjoner. Dersom du senere ønsker å trekke deg eller har spørsmål til prosjektet, kan du kontakte Tore Bonsaksen 90086015 Tore.Bonsaksen@hioa.no / Victoria Ritter 97076563 vic.croker1@gmail.com

HVA SKJER MED INFORMASJONEN OM DEG?

Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Du har rett til innsyn i hvilke opplysninger som er registrert om deg og rett til å få korrigert eventuelle feil i de opplysningene som er registrert.

Alle opplysningene vil bli behandlet uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger. En kode knytter deg til dine opplysninger gjennom en navneliste. Det er kun autorisert personell knyttet til prosjektet som har adgang til navnelisten og kan finne tilbake til deg. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres.

Prosjektleder har ansvar for den daglige driften av forskningsprosjektet og for at opplysninger om deg blir behandlet på en sikker måte. Informasjon om deg vil bli anonymisert ved at navnelisten slettes etter forskningsprosjektets slutt.

GODKJENNING

Prosjektet er godkjent av Regional komite for medisinsk og helsefaglig forskningsetikk, (REK saksnr. 2017/1548).

SAMTYKKE TIL DELTAKELSE I PROSJEKTET

Det er frivillig å delta i forskningsprosjektet og dersom du ikke ønsker å delta, trenger du ikke å oppgi noen grunn, og det vil ikke få noen konsekvenser for behandlingen din videre.

JEG ER VILLIG TIL Å DELTA I PROSJEKTET

Sted og dato

Deltakers signatur

Deltakers navn med trykte bokstaver

Attachment 2: General self-efficacy scale

Mestringstro

Her er noen spørsmål om dine forventninger om å mestre hendelser og situasjoner i hverdagen. Sett kryss ved det svaret som passer best for deg.

	Ikke riktig	Litt riktig	Nokså riktig	Helt riktig
1. Jeg klarer alltid å løse vanskelige problemer hvis jeg prøver hardt nok				
2. Hvis noen motarbeider meg, så kan jeg finne måter og veier for å få det som jeg vil				
3. Det er lett for meg å holde fast på planene mine og nå målene mine				
4. Jeg føler meg trygg på at jeg vil kunne takle uventede hendelser på en effektiv måte				
5. Takket være ressursene mine så vet jeg hvordan jeg skal takle uventede situasjoner				
6. Jeg kan løse de fleste problemer hvis jeg går tilstrekkelig inn for det				
7. Jeg beholder roen når jeg møter vanskeligheter fordi jeg stoler på mestringsevnen min				
8. Når jeg møter et problem, så finner jeg vanligvis flere løsninger på det				
9. Hvis jeg er i knipe, så finner jeg vanligvis veien ut				
10. Samme hva som hender så er jeg vanligvis i stand til å takle det				

PDQ-39**Spørreskjema vedrørende Parkinsons sykdom (PDQ-39)**

Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene opplevd følgende?

Vær vennlig å sette ring rundt ett tall for hvert spørsmål

	Aldri	Sjelden	Noen ganger	Ofte	Alltid eller er overhodet ikke i stand til
1. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å drive de fritidsaktivitetene du ønsker?	1	2	3	4	5
2. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å ta deg av hjemlige sysler som husarbeid, matlaging eller arbeid i hagen?	1	2	3	4	5
3. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å bære handleposer?	1	2	3	4	5
4. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt problemer med å gå 1 kilometer?	1	2	3	4	5
5. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt problemer med å gå 100 meter (eller ca ett kvartal)?	1	2	3	4	5
6. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt problemer med å bevege deg rundt i huset som du ønsker?	1	2	3	4	5
7. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å ta deg frem på offentlige steder?	1	2	3	4	5
8. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt behov for følge når du skal ut?	1	2	3	4	5
9. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... vært redd eller engstelig for å falle på et offentlig sted?	1	2	3	4	5

Spørreskjema vedrørende Parkinsons sykdom (PDQ-39)

Vær vennlig å sette ring rundt ett tall for hvert spørsmål

	Aldri	Sjelden	Noen ganger	Ofte	Alltid eller er overhodet ikke i stand til
10. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... måttet holde deg hjemme mer enn du setter pris på?	1	2	3	4	5
11. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å dusje/bade?	1	2	3	4	5
12. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å kle på deg?	1	2	3	4	5
13. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å kneppe knapper eller knytte skolisser?	1	2	3	4	5
14. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt problemer med å skrive tydelig?	1	2	3	4	5
15. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt problemer med å dele opp maten?	1	2	3	4	5
16. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å holde et glass eller en kopp uten å søle ut innholdet?	1	2	3	4	5
17. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt deg deprimeret?	1	2	3	4	5
18. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt deg isolert eller ensom?	1	2	3	4	5
19. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt trang til å gråte?	1	2	3	4	5

Spørreskjema vedrørende Parkinsons sykdom (PDQ-39)

Vær vennlig å sette ring rundt ett tall for hvert spørsmål

	Aldri	Sjelden	Noen ganger	Ofte	Alltid eller er overhodet ikke i stand til
20. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt deg sint eller bitter?	1	2	3	4	5
21. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt deg engstelig?	1	2	3	4	5
22. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... bekymret deg for fremtiden?	1	2	3	4	5
23. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt at du må skjule sykdommen for andre?	1	2	3	4	5
24. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... unngått situasjoner som innebærer at du må spise eller drikke på offentlige steder?	1	2	3	4	5
25. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt deg brydd på offentlige steder?	1	2	3	4	5
26. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... bekymret deg for hvordan folk reagerer på deg?	1	2	3	4	5
27. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt problemer med nære personlige forhold?	1	2	3	4	5
28. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... ikke fått den støtten du trenger fra din ektefelle eller partner?	1	2	3	4	5
29. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... ikke fått den støtten du trenger fra familie eller nære venner?	1	2	3	4	5

Spørreskjema vedrørende Parkinsons sykdom (PDQ-39)

Vær vennlig å sette ring rundt ditt tall for hvert spørsmål

	Aldri	Sjelden	Noen ganger	Ofte	Alltid eller er overhodet ikke i stand til
30. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... uventet falt i søvn om dagen?	1	2	3	4	5
31. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt konsentrasjonsvansker, for eksempel når du leser eller ser på tv?	1	2	3	4	5
32. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt at hukommelsen svikter?	1	2	3	4	5
33. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vonde drømmer eller hallusinasjoner?	1	2	3	4	5
34. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt vanskelig for å snakke?	1	2	3	4	5
35. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt deg ute av stand til å kommunisere skikkelig?	1	2	3	4	5
36. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt at andre overser deg?	1	2	3	4	5
37. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt smertefulle muskeltremor eller spasmer?	1	2	3	4	5
38. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... hatt smerter i ledd eller andre deler av kroppen?	1	2	3	4	5
39. Som en følge av Parkinsons sykdom, hvor ofte har du i løpet av de siste 30 dagene... følt deg ubehagelig varm eller kald?	1	2	3	4	5



Sosiodemografisk skjema

Har bruker gitt samtykke til datainnsamling?

- Ja
- Nei

Hvilket år fikk du Parkinson diagnose?

Kjønn (sett ring rundt): mann/ kvinne

Fødselsår:

Utdannelse:

Hvor mange år har du gått på skole/studier?

Sett kryss ved den høyeste utdanningen du har fullført:

- Ikke fullført 9/10-årig grunnskole
- Fullført 9/10-årig grunnskole
- Videregående skole eller yrkesskole med fagbrev
- Høgskole eller universitet inntil 3 år
- Høgskole eller universitet 4 år eller mer

Attachment 5: Guidelines for publication in Occupational Therapy International

Language Editing

Hindawi has partnered with Editage to provide an English-language editing service to authors prior to submission. Authors that wish to use this service will receive a 10% discount on all editing services provided by Editage. To find out more information or get a quote, please [click here](#).

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Terms of Submission

Manuscripts must be submitted on the understanding that they have not been published elsewhere and are only being considered by this journal. The submitting author is responsible for ensuring that the article's publication has been approved by all the other coauthors. It is also the submitting author's responsibility to ensure that the article has all necessary institutional approvals. Only an acknowledgment from the editorial office officially establishes the date of receipt. Further correspondence and proofs will be sent to the author(s) before publication, unless otherwise indicated. It is a condition of submission that the authors permit editing of the manuscript for readability. All inquiries concerning the publication of accepted manuscripts should be addressed to oti@hindawi.com. All submissions are bound by the Hindawi [terms of service](#).

Peer Review

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Our Research Integrity team will occasionally seek advice outside standard peer review, for example, on submissions with serious ethical, security, biosecurity, or societal implications. We may consult experts and the academic editor before deciding on appropriate actions, including but not limited to: recruiting reviewers with specific expertise, assessment by additional editors, and declining to further consider a submission.

Concurrent Submissions

In order to ensure sufficient diversity within the authorship of the journal, authors will be limited to having two manuscripts under review at any point in time. If an author already has two manuscripts under review in the journal, they will need to wait until the review process of at least one of these manuscripts is complete before submitting another manuscript for consideration. This policy does not apply to Editorials or other non-peer reviewed manuscript types.

Article Processing Charges

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Units of Measurement

Units of measurement should be presented simply and concisely using the International System of Units (SI).

Preprints

Hindawi supports the deposition of manuscripts in preprint servers, and does not consider this to compromise the novelty of the results. Articles based on content previously made

public only on a preprint server, institutional repository, or in a thesis will be considered. The preprint should be cited.

Article Types

The journal will consider the following article types:

Research Articles

Research articles should present the results of an original research study. These manuscripts should describe how the research project was conducted and provide a thorough analysis of the results of the project. Systematic reviews may be submitted as research articles.

Clinical Studies

A clinical study presents the methodology and results of a study that was performed within a clinical setting. These studies include both clinical trials and retrospective analyses of a body of existing cases. In all cases, clinical studies should include a description of the patient group that was involved, along with a thorough explanation of the methodology used in the study and the results that were obtained.

When publishing clinical trials, Hindawi aims to comply with the recommendations of the International Committee of Medical Journal Editors (ICMJE) on trial registration. Therefore, authors are requested to register the clinical trial presented in the manuscript in a public trial registry and include the trial registration number at the end of the abstract. Trials initiated after July 1, 2005, must be registered prospectively before patient recruitment has begun. For trials initiated before July 1, 2005, the trial must be registered before submission.

Reviews

A review article provides an overview of the published literature in a particular subject area.

Formatting

An optional research article manuscript template can be downloaded [here](#). We recommend that all manuscripts follow the structure below:

Title and Authorship Information

The following information should be included:

- Manuscript title
- Full author names
- Full institutional mailing addresses
- Email addresses

Abstract

The manuscript should contain an abstract. The abstract should be self-contained, citation-free, and should not exceed 300 words.

Introduction

This section should be succinct, with no subheadings.

Materials and Methods

This part should contain sufficient detail that would enable all procedures to be repeated. It can be divided into subsections if several methods are described.

Results and Discussion

This section may be divided into subsections or may be combined.

Main Text (Review only)

This section may be divided into subsections or may be combined.

Conclusions

This should clearly explain the main conclusions of the article, highlighting its importance and relevance.

Data Availability (excluding Review articles)

This statement should describe how readers can access the data supporting the conclusions of the study and clearly outline the reasons why unavailable data cannot be released. For guidance on composing a Data Availability statement, including template examples, please see [here](#).

Conflicts of Interest

Authors must declare all relevant interests that could be perceived as **conflicting**. Authors should explain why each interest may represent a conflict. If no conflicts exist, the authors should state this. Submitting authors are responsible for coauthors declaring their interests.

Funding Statement

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Acknowledgments

All acknowledgments (if any) should be included at the very end of the manuscript before the references. Anyone who made a contribution to the research or manuscript, but who is not a listed author, should be acknowledged (with their permission).

References

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Preparation of Figures

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consecutive order. Figures should be supplied in either vector art formats (Illustrator, EPS, WMF, FreeHand, CorelDraw, PowerPoint, Excel, etc.) or bitmap formats (Photoshop, TIFF, GIF, JPEG, etc.). Bitmap images should be of 300 dpi resolution at least unless the resolution is intentionally set to a lower level for scientific reasons. If a bitmap image has labels, the image and labels should be embedded in separate layers.

Preparation of Tables

Tables should be cited consecutively in the text. Every table must have a descriptive title and if numerical measurements are given, the units should be included in the column heading. Vertical rules should not be used.

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A section titled “Supplementary Material” should be included before the references list with a concise description for each supplementary material file. Supplementary materials are not modified by our production team. Authors are responsible for providing the final supplementary materials files that will be published along with the article.

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