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PSYCHOMETRIC EVALUATION OF PARKINSON'S DISEASE MEASUREMENT TOOLS FOR TOIMIA NETWORK; MODIFIED PARKINSON ACTIVITY SCALE AND PUSH AND RELEASE TEST

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The purpose of this thesis was to make a psychometric evaluation of two Parkinson's disease measurement tools for TOIMIA Network. The measurement tools evaluated are Modified Parkinson Activity Scale and Push and Release Test. The psychometric evaluation was conducted by collecting data of studies of the two measurement tools. Guideline of Parkinson's disease (2014) was used as a reference for the thesis, as it recommends Modified Parkinson Activity Scale and Push and Release Test outcome measures to be to use for persons with Parkinson's disease.

TOIMIA network is a Finnish database for valid measurement tools. As there is a continuous need for valid and reliable measurement tools, TOIMIA provides a national database of measurement tools for health professionals in Finland. The information was catered on to a Finnish format of a measurement tool evaluation form of TOIMIA network.

The psychometric evaluation was conducted according to the information of previous studies evaluating validity, reliability and responsiveness. Also basic information and description of the measurement tools were included, as well as factors of usability. Also codes of International Classification of Function (ICF) in relation to the chosen measurement tools are defined.

The information was collected and written in Finnish to TOIMIA networks' evaluation chart (see appendix 1 and 2). The chart includes basic knowledge and psychometric information of Modified Parkinson Activity Scale and Push and Release test, where basic knowledge of the measurement tools and the psychometric information are explained shortly in Finnish. The information that was filled to the official charts of TOIMIA network will be sent to a contact person of TOIMIA. The final aim of the thesis is to make the two evaluated measurement tools as a part of TOIMIA database of measurement tools.

CONTENTS

1. INTRODUCTION....5
2. PURPOSE OF THESIS....6
3. TOIMIA NETWORK....6
4. MEASUREMENT TOOLS FOR PARKINSON'S DISEASE REHABILITATION. 7
5. PARKINSON'S DISEASE....8
5.1. What is Parkinson's disease?....8
5.2. Prevalence and costs....9
5.3. Symptoms and disease progression....9
5.4. Impairments and limitations of Parkinson's disease....10
5.5. Quality of life....11
5.6. Treatment methods....12
5.7. The role of physiotherapy in Parkinson's disease....12
6. COMPONENTS OF PSYCHOMETRIC EVALUATION....14
6.1. Validity 14
6.2. Reliability....14
6.3. Responsiveness....15
7. INTRODUCTION TO INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF)....16
8. DESCRIPTION OF THE MEASUREMENT TOOLS....18
8.1. Parkinson Activity Scale and Modified Parkinson Activity Scale....18
8.2. Pull Test and Push and Release Test....18
9. EVALUATION OF MODIFIED PARKINSON ACTIVITY SCALE FOR TOIMIA NETWORK....19
9.1. Basic information of measurement tools and their relevance....19
9.2. Application and the methods of using the measurement tool....19
9.3. Psychometric evaluation of the measurement tool....20
10.EVALUATION OF PUSH AND RELEASE TEST FOR TOIMIA NETWORK .22
10.1.Basic information of measurement tool....22
10.2.Application and the methods of using the measurement tool....22
10.3. Psychometric evaluation of the measurement tool....23
11. CONCLUSION....25
12. THESIS PROCESS....26
13. DISCUSSION....27
REFERENCES....32
APPENDICES

APPENDIX 1. Psychometric evaluation of Push and Release Test

APPENDIX 2. Psychometric evaluation of Modified Parkinson Activity Scale

1. INTRODUCTION

Parkinson's disease is a progressive neurological disease (Findley 2007, 8-12). The cause of the disease is unknown (KNGF Guidelines, 2004, 18). Parkinson's disease causes functional impairments and symptoms are wide ranged and depend on the brain areas affected, but movement and function difficulties are typically experienced (Pendey et al. 2013, 70-79). Parkinson's disease symptoms may include resting tremor, balance issues, and motor skills, as well as issues in cognitive function (Morris & Iansek 1996, 649-669). Parkinson's disease affects 100-300 people from 100.000 persons, and is the most common neurodegenerative disease after Alzheimer's (Baumann 2012, 90-2; Findley 2007, 8-12). The cost in Europe alone is 798 billion euros annually. (Olesen et al. 2012, 155-162)

Measurement tools are used in the assessment, goal making and treatment planning for persons with Parkinson's disease. When patient is measured with a standardized measurement tool it provides health professionals with information of the severity of their condition. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 31-32.) There are multiple different measurement tools, which are widely used and continuously improved for better assessment to be used by various healthcare professionals (TOIMIA Website 01/2016).

The measurement tools are improved to be more direct and have better, more distinct results with patients from mild to serious symptoms. Measurement tools are used to detect various issues, often movement related issues in persons with Parkinson's in relation to activity, participation and body structures and functions. Measurement tool can aid the rehabilitation process by aiding in goal setting, motivating patient, setting up the treatment plan and detecting change in the condition. The measurement tool is chosen according to the individual needs of a patient with Parkinson's. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 31-41.)

This thesis is a psychometric evaluation of the two modified measurement tools proposed for TOIMIA Network of the National Institute of Health and Welfare in Finland. TOIMIA network is a national network of functional measures in Finland. As many measurements used today have not been properly evaluated for their validity and reliability, TOIMIA network is formed of research- and clinical institutions to evaluate measurement tools. (TOIMIA Website 01/2016.) Modified Parkinson Activity Scale (M-PAS) and Push and Release test (P&R-test) have been modified and studied comparing to the original versions of the measurement tools to increase measurement validity and reliability.

2. PURPOSE OF THESIS

The purpose for this thesis is to perform a psychometric evaluation for TOIMIA network of the National Institute of Health and Welfare in Finland. Evaluation is done based on information from previous studies of the two Parkinson's measurement tools. These measurement tools are Modified Parkinson Activity Scale and Push and Release Test. The psychometric information is catered in relation to the basic components of psychometric evaluation; validity, reliability and responsiveness. The thesis project (appendix 1 and 2) will be sent to TOIMIA with the aim to have the two measurement tools as a part of TOIMIA's Finnish database of valid measurement tools.

3. TOIMIA NETWORK

TOIMIA network is a Finnish online database of measurement tools accessible for everyone. It was formed through cooperation of several clinical institutions and research partners and it works towards providing high standard measurement tools. TOIMIA network aims to improve systemizing measurement tools of healthcare in Finland, as there are multiple measurement tools in use by health care professionals

are not checked for their validity and reliability as should (Website of TOIMIA, 8/2015.)

Currently there are 80 evaluated measurement tools on TOIMIA database. The measurement tools are evaluated by groups of experts based on their psychometric values. The database includes information of measurement tools including their psychometric properties, basic information of measurement tools as well as the user manuals. TOIMIA also uses a traffic light system for describing the measurement tools; green means usable, yellow means that there is not enough information of measurement tool or there are some defects in the quality of the measurement tool, red means that measurement tool should not be used. (Website of TOIMIA, 2/2016.)

4. MEASUREMENT TOOLS FOR PARKINSON'S DISEASE REHABILITATION

According to the "European Physiotherapy Guideline for Parkinson's disease" (2014) the purpose of using measurement tools for Parkinson patients is to provide information for the health professional of the seriousness of the patients' condition. The tools are useful when trying to measure the stage of the illness, and the impairments that the patient has. It also helps with making the treatment plan for a patient. Choosing the right measurement tool for the patient depends on the impairments and the goals of the patient. With the different testing methods, a physiotherapist is able to define the severity of the different limitations that may affect the patients' quality of life. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 3-41.)

Measurement tools can aid in making goals for patients. The testing can help the physiotherapist to treat the specific functional impairment the patient has with more accurate and effective treatment plan that is the most beneficial for the patient. Certain circumstances of measuring the patient might have an effect on the end result of the measurement tool. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 3-41.)

Parkinson's disease measurement tools help health professionals to communicate about patients' condition. Use of adequate evaluation tools is advised to use both to identify the limitations in ADL, for which physiotherapy can be helpful, and to evaluate changes following physiotherapy. (Keus et al. 2009, 263-269.) The European Physiotherapy Guideline recommends 16 measurement tools including Parkinson Activity Scale and Push and Release Test. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 95)

5. PARKINSON'S DISEASE

5.1. What is Parkinson's disease?

Parkinson's disease or PD is a neurological disorder which progresses over a period of time and decreases the quality of life and eventually results in impairment (Findley 2007, 8-12). The cause of PD in unknown, but environment and genetics are thought to have correlation with it (KNGF Guidelines, 2004, 18; Pendey et al. 2013, 70-79). PD causes dopamine production to decrease in a part of the brain called substantia nigra, which is a part of basal ganglia in the brain (KNGF Guidelines, 2004, 6; Pendey et al. 2013, 70-79). The basal ganglia are one of the functioning units of the brain in relation to motor control. When the basal ganglia do not work as it should PD symptoms occur. PD affects basal ganglia the most of all brain areas. (Morris & Iansek 1996, 649-669.) Impairments of PD can vary largely due to its wide affection area. The symptoms typically include difficulties in movement and function among other issues. (Pendey et al. 2013, 70-79.)

5.2. Prevalence and costs

PD is prevalent in 100-300 people from 100.000 (Baumann 2012, 90-2). After Alzheimer's disease PD is the most common neurodegenerative disease. The prevalence increases with age. With aging population PD is thought to become more prevalent. PD is also more common in men than women. (Findley 2007, 8-12; Pendey et al. 2013, 70-79.) World Health Organization has found that mental- and neurological diseases include the cost of over 30% from all the diseases in wealthy parts of the world. According to The European Brain Council, in 2004 the estimated cost for brain disorders in Europe alone was 386 billion euros per year. (Olesen et al. 2012, 155-162) A more recent study however shows that in 2010 the cost in Europe 798 billion euros annually (Europe including Norway, Switzerland and Iceland). This included healthcare provider costs, secondary care costs (e.g. nursing home), and time off work and pension money. (Olesen et al. 2012, 155-162.)

5.3. Symptoms and disease progression

The common symptoms of PD are tremor (at rest), hypokinesia (loss of muscle movement), rigidity (stiffness of movement) and akinesia (loss of power in voluntary movement). Although PD affects the motor skills, it can also cause cognitive deficits, such as dementia. (Morris & Iansek 1996, 649-669.) As many as 70-100% of persons with PD develop tremor at some point of their disorder (Baumann 2012, 90-2). Persons with PD perform single joint movements much more slowly compared to healthy individuals in the same age group. When performing complicated tasks that includes a combination of movements, people with PD are especially slow. Research emphasizes the fact that people with PD have difficulties in doing two things at the same time, or "dual tasking". (Morris & Iansek 1996, 649-669.)

Difficulties in balance are common in persons with PD. Balance issues heighten the risk for falling. Balance problems result from the decreased function of basal ganglia, which results into a person not being able to adjust their posture (trunk and limbs) as

needed. Due to the inability to make postural adjustments during unexpected situations may be one of the reasons for the common falls in people with PD. (Morris & Iansek 1996, 649-669.) Repeated falls are one of the most disabling issues in PD due to its possibly serious repercussions. The injuries that may result from falling may be very serious, such as hip or head related injuries, which may lower the quality of life of a person. Persons with Parkinson's who experience falls frequently are prone to become afraid of falling, which has an effect on the quality of life, and may decrease the activity of an individual. If activity is decreased, the aftermath results in reduced independence, lack of strength, increased risk of osteoporosis, decreased physical capacity, higher risk of cardiovascular illnesses, and increased morality. (Pickering et al. 2007, 1892-1900.)

In a study by Pickering et al. (2007) it was found that the biggest indicator of a person with PD falling is if a person has had two or more falls during the past year. (68% sensitivity, 81% specificity). They found that persons with Parkinson's experience falls commonly, and patients without previous falls have a noticeable chance of falling in the future. However, there is no clear ways of predicting the first fall in patients of PD. (Pickering et al. 2007, 1892-1900.) Measurements to for falls in people with PD are often not sufficient enough to predict falling. Also the testing methods of these tests are not defined. (Bloem et al. 2001, 950-958.) People with PD may also experience various non-motor symptoms. It has been found that patients suffering from PD for 18 years report various defects; decline in cognition 84%, falling 81 %, hallucinations, depression and dysphagia 50%, urinary issues 41%, and postural hypotension 35%. (Findley 2007, 8-12.)

5.4. Impairments and limitations of Parkinson's disease

Persons with PD may present with various difficulties in activities, such as balance, gait and moving from one place to the next. This may result in fear of falling, reduced independence, falls, and lack of activity, which itself may cause social

withdrawal, risk of osteoporosis or cardiovascular issues. Quality of life of people with PD may decrease. (Keus et al. 2007, 451–460.)

Fear of falls may result for people with PD which can cause inactivity. Inactivity may cause various issues such as loss of social interaction and independence, depression, sleep disturbances, constipation and pressure sores. Over time the risk of osteoporosis may develop, which further increases the risk for factures in the future. Physical fitness will be decreased with prolonged inactivity which can lead to cardiovascular issues. Risk of mortality becomes increased for people experiencing issues in balance and walking. (Bloem et al. 2001, 950-958.)

5.5. Quality of life

Quality of life can mean well-being, meaningful life roles and special relationships for example. There are multiple factors that can have an effect on a person's quality of life, and changes of the level of function may influence it. Loss of independence is connected to decreased quality of life, which decreases as the disorder progresses and functionality declines. (Koplas et al. 1999.) Quality of life is also linked to the level of disability, depression, and cognitive function. Support, individual factors and resources for healthcare have a connection to quality of life. (Schrag et al. 2000, 308–312.)

A Global Parkinson's Disease Survey performed in 2002 found that a little over 17% of people with PD have decreased quality of life due to the disease severity, while 60% of people reported that psychosocial factors are the real factors that affect it. (Nisenzon et al. 2011, 89-94.) Maintaining and improving function can help quality of life and is important in well-being. Also when a patient feels like they are in control, the quality of life is significantly higher. These factors should be noticed and made a part of the management program of patient to achieve the best quality of care. (Koplas et al. 1999.)

5.6. Treatment methods

Parkinson's disease and its various symptoms can be treated by physiotherapy, as the disease is difficult to treat with drugs or surgery (Keus et al. 2007, 451–460). Levodopa is one of the most effective drugs which has an effect on the symptoms of PD (Jankovic & Aguilar 2008, 743-57). People with PD get the most useful help from levodopa to their problems related to movement. While the disease advances, disease being progressive in nature, the effectiveness of levodopa will decrease. In fact, as many as 50% of people with PD have been shown to develop some resistance to levodopa, including motor fluctuations in the first 5 years of levodopa treatment. (Morris & Iansek 1996, 70-79.)

5.7. The role of physiotherapy in Parkinson's disease

Physiotherapists, among other health care professionals, aim to help coping with the various symptoms a person may acquire (Morris & Iansek 1996, 70-79). Physiotherapy is recommended for persons with Parkinson's, and most of them will receive physiotherapy at one point during their illness (Keus et al. 2007, 451–460). The main role of physiotherapy for all patients is to improve the quality of life, and to maintain and/or increase the functional abilities in the daily activities, while decreasing limitations. This promotes the independence, safety and health of a patient. (KNGF Guidelines, 2004, 32-47.)

Most commonly physiotherapists focus on improving the functional abilities of PD patients to improve their quality of life (Jankovic 2008, 368-376). Everything physiotherapists are able to treat, can be treated; these include physical capacities, such as gait, muscle strength, range of motion and flexibility (Keus SHJ, Munneke M, Graziano M, et al. 2014, 33-35). The individual goals and the severity of the condition of a patient determines the method and duration of treatment, as well as the frequency of it (Keus et al. 2009, 263-269). In the physiotherapeutic treatment there are five basic functional abilities treated; gait, balance, transfers, physical capacity

and manual activities (Keus SHJ, Munneke M, Graziano M, et al. 2014, 33-35). Physiotherapeutic treatment has the ability to improve patients' mobility in gait, balance and transfers (Keus et al. 2009, 263-269).

When it comes to rehabilitation, focusing on functional activities performed in a skillful way should be one of the main goals of treatment. Functional activities should be performed in various environments. Activities of daily living, such as balance activities, gait, writing and reaching should be included to the program. (Morris & Iansek 1996.)

The plan of care should be discussed and agreed with the individual, care takers and family members and other healthcare professionals (Parkinson's disease national clinical guideline, 2006). The treatment is aimed towards improving the functional capacity of a person, including reaching, gait, and transfers. Professionals should focus on instructing methods of how to cope with the disease. (Morris & Iansek 1996, 70-79.)

Physiotherapy may be needed by a Parkinson's patient, who is limited in one or more of the basic abilities, for example transfers, balance and gait. Physiotherapy may be needed also if the patient has fallen or has a fears that he/she may fall. Physiotherapists may also be needed for patient education of Parkinson's disease and its various effects on the body. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 33-40)

The duration and frequency of physiotherapy treatment depends on the need for therapy of the patient as well as the severity of the illness. The treatment goals will be specified together with the patient and the family members and the treatment will be focused on each patients' main problems and areas to be improved. Assessing the progress can be done with multiple different measurement tools. At least eight weeks of treatment is recommended for patients who have impairments in areas of physical capacity. Patients should be given a home exercise program to increase the

possibility of meeting their goals. In this case lower treatment frequency can be sufficient. Re-measurement should be done every four weeks to follow up with the program (Keus SHJ, Munneke M, Graziano M, et al. 2014, 33-40)

6. COMPONENTS OF PSYCHOMETRIC EVALUATION

6.1. Validity

Validity is a concept which can be broadly explained as the way of a measurement tools ability to measure what it is supposed to. Validity is defined as the degree to which an instrument can purely measure what it is supposed to measure. (de Vet et al. 2011, 150.) Validity can be measured by having a specific question relating to determined population (Website of American Academy of Orthotists & Prosthesists, 2/2016).

There are many different types of validity, but the general validity types are content validity, criterion validity and construct validity. Content validity aims to determine whether a measurement tool measures what it is supposed to measure in relation to its completeness. Criterion validity compares a measurement to a gold standard, if a gold standard has been developed. Construct validity is used when there is no gold standard available, and it aims to find if scores are knowledge based. An example of this is if patient has balance issues, can the measurement tool differentiate whether the patient has severe, moderate or mild balance issues. (de Vet et al. 2011, 150.)

6.2. Reliability

Reliability is defined by how much a measurement tool is “free from error”. This is an important factor of a measurement tool. There are different sub categories of reliability. First of these is inter-rater reliability, which measures the reliability

between different professionals. (de Vet et al. 2011, p. 96-98.) For example, when two physiotherapists are observing an exact same situation, their interpretation, thus rating, should match. Intra-rater reliability measures whether the same measurer will have the same score when measuring the same subject in two occasions. (de Vet et al. 2011, p. 96-97.) An example of this is if the same person measured came back for measurement (in a situation where the situation could have not changed from the previous) the result would still remain the same.

Test-retest reliability measures the sensitivity of the measurement to cause differences in results, without the condition having changed. An example of this is when measuring the same person in two occasions, where there should not be changes in the results gotten that may result from the test. (de Vet et al. 2011, p. 96-97.) An example of this is having a person fill a questionnaire twice; if the answers are the same both times the test-retest reliability is good. Reasons for the changes in the results may however be seen depending on the patients' motivation or the difference on instructions given (de Vet et al. 2011, p. 96-97.)

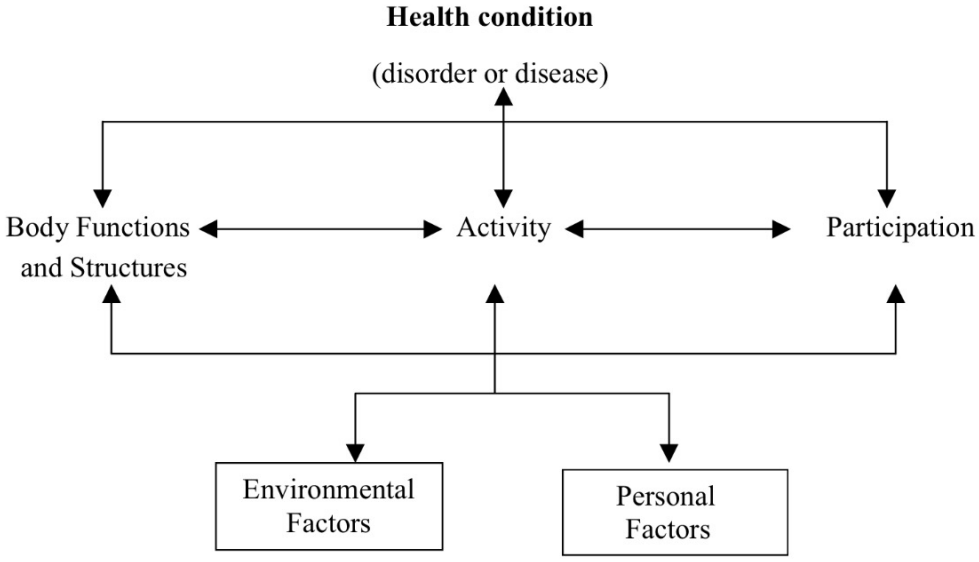
6.3. Responsiveness

When discussing of measurement tools, responsiveness means the ability of a measurement tool to measure change. This means that responsiveness aims to measure the change of score gotten from one measurement time to the next. (de Vet et al. 2011, 201-204.) This could be useful when for example detecting progress of a patient after rehabilitative treatment. Also a measurement tool result should not change if progress has not been made, which is one form of responsiveness; clinically effective change. Clinically effective change means that the change detected by a measurement tool should be meaningful. This means that although responsiveness means the measure of change in general terms, the change typically means statistically significant difference post-treatment. (de Vet et al. 2011, 203-204.)

7. INTRODUCTION TO INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF)

The International Classification of Functioning, Disability and Health, commonly known as ICF, is a frame work created to give a structure to function, disability and health by the World Health Organization (WHO). ICF is a system that enables health and disability to have a framework internationally. (Website of WHO, 01/2016.) ICF provides a language that is understood by health professionals internationally, and across health professions (Website of Centers for Disease Control and Prevention, 02/2016.) ICF is a systematic coding system that allows data collection and comparison (Website of Centers for Disease Control and Prevention, 01/2016). The aims for ICF include having a common communication method of health care professionals universally. It also provides information of the health state, and the progression towards health based science (Website of Centers for Disease Control and Prevention, 01/2016). ICF is constructed of domains with which health care professionals are able to give information of patients' condition and progression. An aim for ICF is to pay greater attention to health and function of a person instead of disability. (World Health Organization 2002.)

Concepts in relation to ICF are structure and function issues, which includes both physiological and anatomical body parts (body functions and structures), change or loss of body function (impairments), restriction in activities (activities), limitations to participate in meaningful activities (participation), limitations of the surroundings (environmental factors), and factors relating to person themselves, such as age or gender (personal factors) (see picture 1) (Website of Centers for Disease Control and Prevention, 01/2016). Disability affects a person in multiple different ways, all of which need to be considered – biological factors, individual factors and social factors of an individual (World Health Organization 2002).



Picture 1. ICF components and their connections to each other (World Health Organization 2002).

The ICF codes relating to measurement tools M-PAS and P&R test are listed here. Their name, code and example from the measurement tool is included. The ICF codes found relevant to M-PAS is capacity measure of mobility (d4). It includes changing basic body position (d410), which can be seen in M-PAS test for example transferring from standing to sitting. Lying down (d4100) which is part of M-PAS when getting in and out of bed. Sitting (d4103) and standing (d4104) are parts of M-PAS when sitting and getting up from the chair. Walking (d450) is seen when testing gait activities on M-PAS. Transferring oneself while lying (d4201) happens on testing when rolling on the bed to the left and right. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 101-137.) ICF code in relation to Push and Release test is involuntary movement reaction functions (b755) which is seen on P&R test when a patient leans on to therapists' arms and has to regain balance after therapist suddenly removes the support of the hands (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102; Jacobs et al. 2006, 1404-1413).

8. DESCRIPTION OF THE MEASUREMENT TOOLS

8.1. Parkinson Activity Scale and Modified Parkinson Activity Scale

Parkinson Activity Scale (PAS), original version of the Modified Parkinson Activity Scale, contains 10 different measurements. The weaknesses of PAS as a measurement tool are that it has a ceiling effect and was shown to not be sensitive enough when measuring only mildly effected PD patients (Keus et al. 2009, 263-269). The study "Effectiveness of physiotherapy in Parkinson's disease: the feasibility of a randomized controlled trial" was used as a pilot for the new improved Modified Parkinson Activity Scale (M-PAS). It was first introduced in the study article "Climetric Analyses of the Modified Parkinson Activity Scale". It studies the ceiling effect, concurrent validity, inter-rater agreement of the newly developed M-PAS, comparing expert and non-expert measurers. (Keus et al. 2009, 263-269.)

8.2. Pull Test and Push and Release Test

The original version of the push and release test is called the pull test, which is a better known assessment tool amongst therapists and neurologists. The pull test is recommended to be used when having a lot of communication between the therapists and neurologists for example. The pull test is one of the best known tool of postural instability in Parkinson's patients, and it is known to be an efficient and quick way for evaluation. (Hass et al. 2008, 530-531.) The pull test is executed by pulling back from the patients' shoulders while the examiner stands behind the patient. The ability of the patient to regain balance is scored from 0-4. The pull test has however many problems, one of them being the lack of specificity of conducting the test. (Hass et al. 2008, 530-531.)

The article "An Alternative Clinical Postural Stability" Push and Release Test to the original Pull Test. The subjects tested were; the sensitivity and specificity relating to the patients' balance confidence, the inter-rater reliability, the consistency of the

perturbation forces. The results show that the push and release test is more sensitive and consistent test of postural stability, when compared to the Pull Test. (Jacobs et al. 2006, 1404-1413.) The Push and Release test was created, and it is a modification of the original pull test. It is described as a simple test with just slight differences, but it has been measured to have multiple enhancements for measuring. The tests rating scale is different as well, to be able to assess and measure the milder balance abnormalities, which the previous test was not able to measure. (Jacobs et al. 2006, 1404-1413.)

9. EVALUATION OF MODIFIED PARKINSON ACTIVITY SCALE FOR TOIMIA NETWORK

9.1. Basic information of measurement tools and their relevance

Modified Parkinson Activity Scale (M-PAS) is a measurement tool with 14 parts, a couple of which have A and B part (18 activities in total), and it measures functional movements M-PAS includes chair transfers, bed transfers and gait akinesia and the purpose of it is to measure gait, balance and transfers in PD patients (Keus et al. 2009, 263-269). M-PAS measures quality of movement, and scoring of each activity is from 0 to 4 (score 4 is considered “normal”, and 0 that the measured is unable to do the task or requires physical assistance to do it). The total scoring of the measurement ranges from 0 to 56 points. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 131-137; Keus et al. 2009, 263-269.) Modified Parkinson Activity Scale is recommended to be used when planning goals for a patient (Keus et al. 2009, 263-269).

9.2. Application and the methods of using the measurement tool

The equipment used for measuring the parts of M-PAS are a chair, a water cup, a tape on the floor of a shape of a U (the U is taped 3 meters away from the chair, with

the sides of the U being the length of 1 meter each), and a bed with a pillow, sheets and a blanket similar. The cup needs to be 90% filled, and the bedding should be similar to what the measured person uses at home. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 131.)

Before the measurement starts, the measurer needs to document the date and the time the measurement is taken, if person is on OFF or ON period with their Parkinson's, how long ago the medications were taken, where the test takes place, and the height of the chair and bed used. The chair used in testing is recommended to be 40cm high or the height that the measured uses at home that cause them issues. (Keus et al. 2009, 263-269.) The type of blanked should be noted as well as the side the pillow is on when looking forward to the direction of the bed (Keus SHJ, Munneke M, Graziano M, et al. 2014, 131). Also it should be noted that the person measured uses the same shoes when measured (Keus SHJ, Munneke M, Graziano M, et al. 2014, 48). The time needed to complete all of the parts of modified Parkinson activity scale is measured to be about 20 minutes, ranging from 15-28 (Valkovic et al. 2008, 1453-1457). This indicates that the tester should reserve 30 minutes for the testing, to get all the needed results (Keus SHJ, Munneke M, Graziano M, et al. 2014, 101).

9.3. Psychometric evaluation of the measurement tool

The article "Clinimetric analyses of the Modified Parkinson Activity Scale" (2009) introduces the Modified Parkinson Activity Scale. The article discusses a research conducted, which included six expert Parkinson's disease physiotherapists and seven physiotherapists with no experience in working with Parkinson's disease patients. All of the physiotherapists had received information of Parkinson activity scale and Modified Parkinson Activity Scale (M-PAS) prior to examination day. On the day of measurements, a 45-minute video introduction on M-PAS were given to the physiotherapists, after which all of them evaluated the same patients (15 patients in total). Each evaluation took about 10-15 minutes. (Keus et al. 2009, 263-269.)

In the study there were 15 patients with the median age of 68.4, and length of the disease median of 8 years. UPDRS-III score was a median 42, and a median VAS-global functioning score was also 42. Hoehn and Yahr stage was from 2 to 4 (most 2-3). (Keus et al. 2009, 263-269.)

The scoring was median of 44 points (from 0-56 points). The measurement error was SSD 2.6/patient. The inter-rater error was SSD 1.3. There were no differences between the expert and non-expert physiotherapists in the scoring of the patients (p: 0.28). The non-experts did however have a bit more errors in total (non-expert error; 2.7, expert error 2.4). (Keus et al. 2009, 263-269.)

Concurrent validity correlation was measured to be good (0.64) between M-PAS and UPDRS motor scoring. Correlation between M-PAS and VAS-Global functioning was good as well (0.79). (Keus et al. 2009, 263-269.) M-PAS test re-rest reliability is excellent in total score (ICC 0.81 ON stage, ICC 0.93 OFF stage). The sub scoring of ON/OFF stage is from poor to excellent (ICC 0.41-0.98). Inter-rater reliability is excellent (Kappa 0.86-0.98). Internal consistency of M-PAS was measured to be satisfactory (Chair transferring 0.76, akinesia 0.75, and bed mobility with and without covers 0.79 to 0.89). (Valkovic et al. 2008, 1453-1457.)

M-PAS has no ceiling effect. A measurer can be an expert or non-expert physiotherapists. (Keus et al. 2009, 263-269.) Special training is not required, however the measurer of M-PAS has to have specific information of the measurement tool, its materials, and instructions given to the patient, and knowledge about the scoring opinions before conducting the measurement. One hour is recommended for basic knowledge of the measurement tool. M-PAS is a valid measurement tool to apply for patients to find out the possible goals of rehabilitation of Parkinson disease patients. (Keus et al. 2009, 263-269.) Responsiveness of the measurement tool is unknown for patients with PD. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 101)

10.EVALUATION OF PUSH AND RELEASE TEST FOR TOIMIA NETWORK

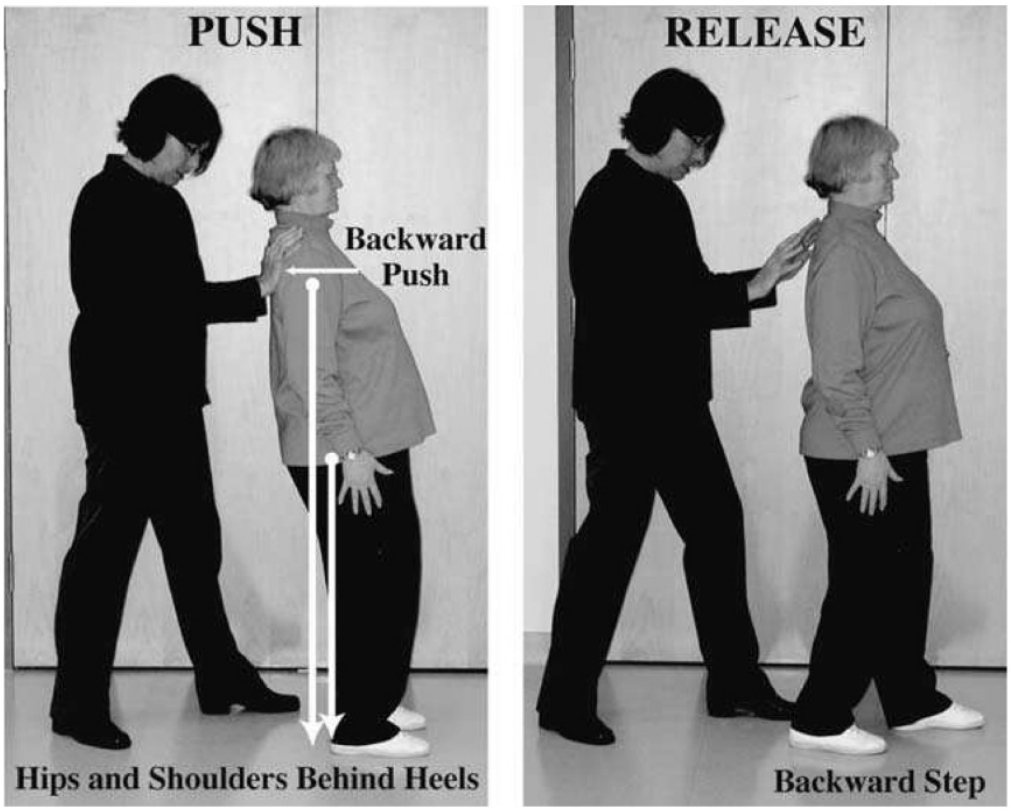
10.1.Basic information of measurement tool

The Push and Release test (P&R test) was created to measure postural instability, and to predict falls in Parkinson's disease (Jacobs et al. 2006, 1404-1413; Hass et al. 2008, 530-531). It is an improved version of a previous test called 'Pull test' (Jacobs et al. 2006, 1404-1413). Falls are a difficult and disabling part of Parkinson's disease, which makes it important to identify the risk for falls. Testing the risk for falling is however tricky, and creating measurement tools for this purpose has not been easy. (Hass et al. 2008, 530-531.) P&R test takes about 2 minutes, and is free of charge without any equipment needed. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102)

10.2.Application and the methods of using the measurement tool

Approximate time of assessment of push and release test is 2 minutes. P&R test is free and does not need any equipment to be able to perform it. In comparison to the original. The issue with using P&R test is that neurologists are not familiar with the test, which can make the communication more challenging. (Keus SHJ, Munneke M, Graziano M, et al. 2014.)

P&R test is done by patient leaning backwards while a measurer holds them still their hands on the upper back. Then the measurer quickly removes the support, and patient has to find a way to regain their balance (see picture 2). Scoring for the test is from 0 to 4, 0 being a "normal" response, while 4 means there is no attempt to regain balance after the support has been taken away. (Jacobs et al. 2006, 1404-1413.)



Picture 2. Shows the demonstration of the Push and Release Test. Notice that the therapist can only release the support from the back when the subjects' shoulders and hips go beyond heels as shown in on the picture. (Jacobs et al. 2006, 1404-1413.)

10.3. Psychometric evaluation of the measurement tool

The article "Pushing or Pulling to Predict Falls in Parkinson Disease?" (2008) discusses the two assessment tools the Pull tests based on previous studies done about them. The results are that the P&R test was found to be more sensitive of measuring early postural instability. The P&R test was also found to be an excellent test for fall prediction when patients were on their ON state, where as the Pull test is not very reliable during ON state. (Hass et al. 2008, 530-531.)

In a study by Jacobs et al. (2006) the push and release test and pull test are compared as well. The study included 69 patients, from whom 48 were male and 21 female. The average age was 67 years, ranging from 42-80 year olds. The average UPDRS

score was 24. Also a control group of people without Parkinson's disease was chosen, which included 35 males and 34 females, with the average age being 67. The study found that P&R test scores were higher compared to the pull test ($p < 0.01$). Also P&R test was found to be more sensitive for low balance confidence, and less specific for high balance confidence when comparing with Pull test. (Jacobs et al. 2006, 1404-1413.)

P&R test has better inter-rater reliability in comparison to Pull test (P&R test 1st trial; ICC 0.84, 3rd trial ICC 0.83, Pull test; 1st trial ICC 0.45, 3rd trial 0.74). However, when using the scoring system from P&R test to the Pull test the ICC results increased (ICC 0.45 to 0.75, and ICC 0.74 to 0.84). (Jacobs et al. 2006, 1404-1413.) At ON phase the discriminant validity was found to be 75% on fallers and 98% on non-fallers. On OFF phase the discriminant validity was 89% on fallers and 85% on non-fallers. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102.)

Pull forces (Pull test) had a bigger range in the force used compared to push forces on P&R test ($p < 0.01$), and on P&R the pull force applied were consistent with the examiners. However, the examiners of the Pull test did not have consistency in their pulling duration ($p < 0.0001$) (Jacobs et al. 2006, 1404-1413). When comparing ON and OFF states, Valkovic et al. (2008) found that on OFF state the Pull test and the P&R test had quite similar accuracies (Pull test 0.87, P&R test 0.90). However, when compared to the ON state accuracy, P&R test was found to be more accurate (Pull test 0.78, P&R test 0.87). Thus the study proves that P&R test is a more accurate measurement tool for persons with Parkinson's for ON stage measurement. (Valkovic et al. 2008, 1453-1457.)

P&R test results of discriminative validity for persons with Parkinson's with experiences of falling; OFF phase sensitivity was found to be 89%, and ON phase sensitivity 75%, while the results for Pull test in OFF phase was 69%, and ON phase 69%. For non-fallers the results of OFF phase specificity of P&R test were 85%, and

ON phase 98%. Pull test specificity of 98% in OFF phase, and 83% in ON stage. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102.)

The push and release test can be helpful in finding the risks for falling before the patient falls or has serious balance impairments. The push and release test has been however found to be more sensitive with patients with history of falls compared to the ones that have not. When measuring postural stability, the push and release test was more consistent and sensitive tool compared to the pull test. The correlation between different raters was also higher with P&R test. (Jacobs et al. 2006, 1404-1413.) Responsiveness of P&R test is not known for persons with Parkinson's (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102).

11. CONCLUSION

As a conclusion the psychometric evaluation of Modified Parkinson Activity Scale there is no expert –and non-expert difference in scoring of patients and concurrent validity was found to be good (Keus et al. 2009, 263-269). Test-retest reliability was excellent. Internal consistency was measured to be satisfactory. (Valkovic et al. 2008, 1453-1457.) No ceiling effect was found. The assessment can be performed by both expert and non-expert physiotherapists. M-PAS is a valid measurement tool to apply for patients to find out rehabilitation goals. (Keus et al. 2009, 263-269.) Responsiveness for M-PAS is unknown. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 101).

P&R test was also found sensitive in detecting postural instability when comparing to pull test. (Hass et al. 2008, 530-531.) P&R test was found to be more sensitive for low balance confidence when compared to pull test. Inter-rater reliability is also higher than on pull test. (Jacobs et al. 2006, 1404-1413.) Discriminant validity was found to be 75% on fallers and 95% on non-fallers. OFF phase discriminant validity was 98% on fallers, and 85% on non-fallers. (Keus SHJ, Munneke M, Graziano M,

et al. 2014, 102.) The force used was more consistent with examiners on P&R test compared to pull test (Jacobs et al. 2006, 1404-1413). At ON state of Parkinson's disease, P&R test was found more accurate than pull test. Responsiveness is not known for P&R test. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102.) P&R test was more consistent and sensitive tool when compared to pull test (Jacobs et al. 2006, 1404-1413).

12. THESIS PROCESS

The thesis process started May 2014 by choosing my thesis topic that was presented to me by a lecturer in my university. I started writing my thesis soon after getting familiar with my thesis topic and learning what the process includes (see figure 1). My thesis process was written during my regular studies and during summer. My thesis tutor teacher changed during the thesis process. Towards the end of the thesis process my thesis tutor teachers established a clear understanding of my thesis process. I finished the thesis process in time and got to present it on 16th of February 2016.

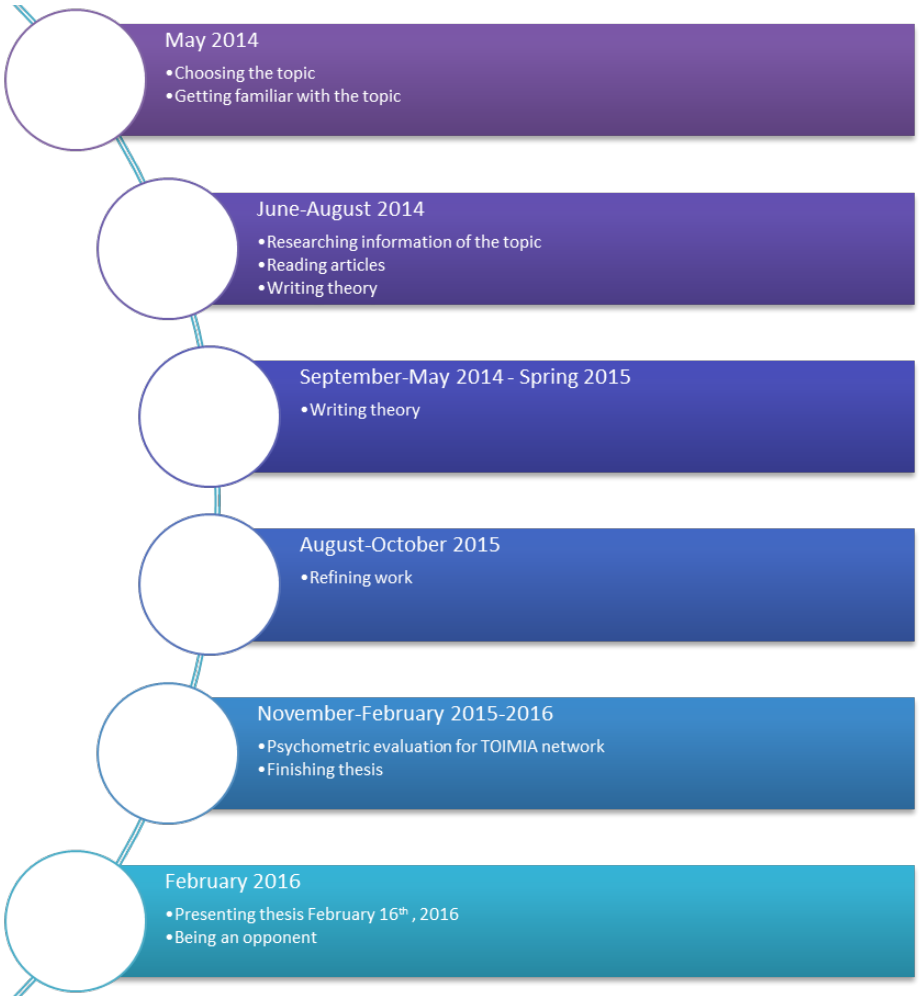


Figure 1. Thesis process shown in a chart.

13. DISCUSSION

When the thesis topic of 'psychometric evaluation of Parkinson's measurement tools' was introduced to me, I did not have a lot of knowledge of the topic. In fact it took a while to grasp the concept of my thesis and what it was about. After discussing with my tutor teacher and learning a bit more about the project I started feeling more comfortable about it.

I got presented with the topic by a neurological lecturer in my school. I got interested of the topic right from the beginning because it was a project type a work that felt meaningful that it will be used for Finnish database of valid measurement tools. Although making a psychometric evaluation on a measurement tool was not something I was familiar with, I wanted to take it as my topic and learn through the process.

During the thesis process there were some complications, one of which was a change of my original tutor teacher. The new thesis tutor teachers were not familiar with my topic. After discussion and meetings however everything went smoothly. At first writing was challenging, and limiting the topic was important. After a few months into the thesis process I got the gist of writing. Also finding relevant researches during the thesis process got easier as time went on and I learned to find the relevant studies for my use.

The thesis process has been valuable to increase my knowledge on measurement tools and thus increase my professional competence. Throughout the thesis process I learned tremendously about the validity and reliability, and psychometric evaluation of measurement tools. I can continue to find valid and reliable tools to measure functional outcomes in my future profession as a physiotherapist. I strongly believe that finding information of valid, reliable and high quality measurement tools will help me as a future physiotherapist to not only find the best possible outcome measure for my clients, but also be able to critically analyze the measurement tools used. The knowledge I have gotten from understanding the research terms. Also searching for reliable articles of Parkinson’s disease and other topics thought me how to find articles more effectively.

Since there are such a wide range of measurement tools to choose from, the psychometric evaluation of validity, reliability and responsiveness of measurement tools has given me information of how to choose the best possible tool with highest quality. I believe that understanding various research terms, which I have learned

during the thesis process, is going to be beneficial in the future. As a physiotherapist the overall knowledge of psychometric outcome measure properties and their connections to one another can help make the most well informed decision to measure a function of choice. With the highest quality measurement tool function can be evaluated to make the most well informed decision of plan of care as well as helping to guide the decision making process. The functional progression and gains of clients can also be seen with re-evaluation with the valid measurement tools used.

As my final product for the thesis was a psychometric evaluation for TOIMIA network by finding information from original research articles and sources, I have gained knowledge for my professional career. As a Finnish data base of evidence based measurement tools, TOIMIA network offers a great amount of practical tools for physiotherapists alike. Doing my thesis process for practical use for fellow health care professionals is tremendously meaningful and offers new valid tools to be used by health professionals in Finland.

The critical part of the thesis was to perform the psychometric evaluation for TOIMIA network for them to be a part of the national database of functioning. When it comes to validity of the Modified Parkinson Activity Scale the concurrent validity was found to be good. Test-retest reliability was excellent. Internal consistency was measured to be satisfactory. No ceiling effect was found. A measurement can be done by both expert and non-expert physiotherapists. Modified Parkinson Activity Scale is a valid measurement tool to apply for patients to find out rehabilitation goals.

Push and release test was more consistent and sensitive tool when compared to pull test. For push and release test was found to be an excellent test for patient who are at their ON state. It was also found more sensitive in detecting postural instability when comparing to previous version, pull test. Push and release test was found to be more sensitive for low balance confidence than pull test. Inter-rater reliability is also higher than on pull test. The force used was more consistent with examiners when

compared to pull test. When compared to pull test, push and release test was found to be more accurate measured at ON state of Parkinson's disease.

International Classification of Functioning, Disability, and Health (ICF) was a crucial part of my thesis process since measurement tool components are connected with ICF-coding system. This helps to identify the real functions that measurement tools are measuring. Understanding and using ICF as a health care professional is an important part of practice.

Furthermore, ICF is a part of the whole rehabilitation process, which begins from measuring the client. Valid measurement tools are a part of a process when defining a functional deficit, such as issues in balance. It is important to find an outcome measure that can, not only be a valid and sensitive tool to measure the issues in balance, but also be able to detect the changes when improvement happens. This is an important part to measure progression and can help guide the clinical decision making of plan of care process.

For future a topic relating to my thesis could be to perform a psychometric evaluation for measurement tools for different areas of physiotherapy for TOIMIA network. It would be interesting to see valid and reliable measurement tools for elderly people, children or specific diseases. The measurement tools for thesis work should be high quality so that it can be beneficial for health professionals to use in their practice in Finland.

Another topic for future thesis could be a research about which measurement tools that are lower or poor quality but still used by health professionals in Finland. This could go more deeply in to the issue of why certain measurement tools are used and chosen over others. One reason could be multi-professional team where for example psychologists prefer one test over another, which causes other team members to use the same measurement tool. Another reason could be that health professionals prefer a measurement tool that they have used for a long time and do not wish to change

although more valid tools have been created. This could be an interesting topic since there are a lot of outcome measures available for health professionals.

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APPENDIX 1

Push and Release Test

TOIMIA

LOMAKE 1: MITTARIN PERUSTIEDOT 3.0 (1.6.2014)

1. LOMAKKEEN TÄYTTÄJÄN TIEDOT	
Nimi ja oppiarvo Minttu Nykänen	**Pvm** 3.1.2016
Sähköposti xx	**Puhelin** xx

2. MITTARIN IDENTIFIOINTI- JA KÄYTTÖTIEDOT

Käytössä oleva vakiintunut nimi

Suomeksi: (Jos Suomessa käytetään mittarin englanninkielistä nimeä merkitse se tähän) Push and Release Test

Ruotsiksi: Nimi ei ole tiedossa

Englanniksi: Push and Release Test

Lyhenne

P&R Test / PR test

Mittarin nimen synonyymit

Mittarille ei ole synonyymia.

Arvion kohteena oleva versio

Arviotava kohde on Push and Release Test, jonka entinen versio on Pull Test.

Ylläpitotaho

Mittarilla ei ole ylläpitotahoa.

Käyttöoikeus (valitse alla olevista vaihtoehdoista toinen laittamalla rasti ruutuun).	
x	**Rajoittamaton**
	Rajoitettu (jos käyttöoikeus on rajoitettu, kuvaa alla miten)

Käännösprosessin kuvaus

'Push and Release Test' on mittari, jolle ei ole tehty suomennosta.

TOIMIA

LOMAKE 1: MITTARIN PERUSTIEDOT 3.0 (1.6.2014)

Edellytykset ja välineet mittarin käytölle
Ammattikoulutuksen tarve Testiin ei tarvita ammattikoulutusta.
Erillisen koulutuksen tai kurssin tarve Testiin ei tarvita erillistä koulutusta tai kurssia.
Mittarin käyttöön liittyvien lomakkeiden ja ohjeiden saatavuus Mittarin käyttöohjeet voi löytää muun muassa muun muassa eurooppalaisissa fysioterapian Parkinson taudin suosituksista. (Keus SHJ, Munneke M, Graziano M, et al. 2014)
Tarvittavien välineiden kuvaus Mittarin käyttöön ei tarvita välineitä.

3. MITTARIN KUVAUS

Mittarin alkuperäinen käyttötarkoitus (kuvaa lyhyesti)
Alkuperäinen 'Pull Test' kehitettiin mittaamaan tasapainon epävakautta Parkinson potilailla. (Jacobs et al. 2006)

Tiedonkeruumenetelmät (rastita sopivat vaihtoehdot)	
	Haastattelu
	Havainnointi
	Itse täytettävä kyselylomake
	Kliininen tutkimus
X	**Testi tai mittaus**

Toimintakyvyn ulottuvuus (rastita sopivat vaihtoehdot)	
X	**Fyysinen toimintakyky**
	Psyykkinen toimintakyky
	Sosiaalinen toimintakyky
	Kognitiivinen toimintakyky
	Yleinen toimintakyky (arkitoiminnot kuten ADL/IADL)
	Työkyky
	Muu

TOIMIA

LOMAKE 1: MITTARIN PERUSTIEDOT

3.0 (1.6.2014)

Mittarin kuvaamat ICF-luokituksen käsitteet
Kaikki ICF-koodit, joita mittarissa (esim. sen eri osioissa) mitataan Tahdosta riippumattomat liikereaktiotoiminnot (b755).
ICF-koodi mittarin tuloksen ollessa yksi lukema (esim. summapistemäärä)

Aikatarve
N. 2 minuuttia (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102)

Tulkinnan avuksi
Viitearvot (yleiset viitearvot) Mittarilla ei ole tiedossa viitearvoja.
Raja-arvot (arvoja, jotka erottelevat eri ryhmiä toisistaan) Mittarilla ei ole tiedossa raja-arvoja.

Mittari on mukana tutkimuksissa (1-3 keskeistä tutkimusta)Jacobs, Horak, Tran, Nutt. An alternative clinical postural stability test for patients with Parkinson's disease.J Neurol. 2006; 253 : 1404–1413 Hass, Bastiaan, Bloem, Okun. Pushing or pulling to predict fallsin Parkinson disease? Nature clinical practice neurology. 2008; vol 4 no 10.

Mittari on mukana suosituksissa (1-3 keskeistä suositusta) P&R test on suositeltu mittari Parkinson tautia sairastaville. Mittari on mukana eurooppalaisissa fysioterapian Parkinson taudin suosituksissa. (Keus SHJ, Munneke M, Graziano M, et al. 2014)

Mittarin tausta ja kuvaus (yksityiskohtaisesti)
P&R test on testi, jonka alkuperäisversiota 'Pull test' on muutettu ja parannettu. 'Pull test' laadittiin mittaamaan tasapainon epävakautta ja täten ennakoimaan kaatumisen riskiä. Pull test ei ole kuitenkaan tarpeeksi herkkä löytämään henkilöt, jotka ovat kaatuneet aikaisemminkin. Myöskään pisteytys ei ollut toimiva. P&R test kehitettiin, jotta testin tuloksista saataisiin potilaan tilannetta paremmin kuvaava tulos (Hass et al. 2008). (Jacobs et al. 2006).

P&R test testi on tarkoitettu Parkinsonia sairastaville ja se kestää 2 minuuttia. Testi tehdään niin, että potilas seisoo selkä vasten testaajaa. Potilas nojautuu taakse päin tukien testin ottajan käsiin, jotka ovat potilaan yläselän alueella. Potilaan plkapäiden ja lonkkien ollessa taaempana kun kantapäät, testaaja irrottaa tuen nopeasti. Testi testaa kuinka hyvin potilas pystyy pitämään tasapainonsa. Pisteytys on nollasta neljään; 0 - testattu pitää tasapainonsa yhden askeleen avustamana (normaali tulos), 1 - testattu pitää tasapainonsa ottamalla 2-3 pientä askelta taakseppäin, 2 - testattu pitää tasapainonsa, mutta joutuu ottamaan neljä tai useamman askeen taakseppäin, 3 - testattu ottaa askelia, mutta ei pysty välttämään kaatumista itsenäisesti, 4 - testattu ei pysty välttämään kaatumista tai ei pysty seisomaan itsenäisesti ollenkaan. (Jacobs et al. 2006).

5. LÄHTEET

Tarkista lähdeviitteiden merkintätavat TOIMIA:n käsikirjasta.

Alkuperäinen lähdeviite Jacobs, Horak, Tran, Nutt. An alternative clinical postural stability test for patients with Parkinson's disease.J Neurol. 2006; 253 : 1404–1413
Hyödylliset linkit
Muut lähdeviitteet Hass, Bastiaan, Bloem, Okun. Pushing or pulling to predict falls in Parkinson disease? Nature clinical practice neurology. 2008; vol 4 no 10

Valkovic, P., Brozova, H. Bötzel K, Růzicka E, Benetin J.Push-and-release test predicts Parkinson fallers and nonfallers better than the pull test: comparison in OFF and ON medication states. Mov Disord. 2008; 23(10): 1453-1457

TOIMIA **LOMAKE 2: MITTARIN PSYKOMETRISET TIEDOT** 3.0 (1.6.2014)

1. LOMAKKEEN TÄYTTÄJÄN TIEDOT	
Nimi ja oppiarvo Minttu Nykänen	**Pvm** 4.1.2016
Sähköposti xx	**Puhelin** xx

2. ARVIOITAVA MITTARI		
Mittarin nimi Push and Release Test		**Lyhenne** P&R test / PR test
Käyttötarkoitus Antaa näyttöä tasapainon epävakaudesta ja antaa mahdollisimman hyvä kuva testatun kaatumisriskistä. (Hass et al. 2008, Jacobs et al. 2006)		
Mittarin perustiedot (lomakkeen 1 tiedot)		
	Tiedot on kerätty (ei tehdä muutoksia/lisäyksiä)	
	Tiedot on kerätty (tehdään muutoksia/lisäyksiä)	
	Tietoja ei ole vielä kerätty (tiedot kerätään samassa yhteydessä)	

3. KÄYTETTYJEN ARTIKKELEIDEN TUTKIMUSASETELMIEN JA –AINEISTOJEN KUVAUS
Kuvaa lyhyesti keskeiset tutkimusasetelmaan ja –aineistoon liittyvät tiedot käytetyistä artikkeleista. Tutkimuksessaan Jacobs et al. (2006) vertaavat testejä Pull test ja P&R test. Tutkimukseen osallistui 69 Parkinsonia sairastavaa henkilöä, joiden keski-ikä on 67 vuotta. Naisia oli 21, miehiä 48. Taudin kesto oli keskimäärin 10 vuotta. Keskimääräinen UPDRS pistemäärä oli 24. Kontrolli ryhmänä on 69 inhmistä, joilla ei ole Parkinson tautia. Kontrolli ryhmän keski-ikä oli 67 vuotta. Naisia oli kontrolli ryhmässä 34, miehiä 35. (Jacobs et al. 2006).

4. MITTARIN PÄTEVYYS (VALIDITEETTI)

Kirjaa tulokset kyseisen käyttötarkoituksen kannalta oleellisilta pätevyyden osa-alueilta eri väliotsikoiden alle alla olevan jaottelun mukaisesti.

Ilmivaliditeetti (face validity)

Mittarin ilmivaliditeettia ei olla vielä tutkittu.

Yhteenveto	

Sisältövaliditeetti (content validity)

Mittarin sisältövaliditeettia ei olla vielä tutkittu.

Yhteenveto	

Kriteerivaliditeetti (criterion validity; jakaantuu samanaikaiseen ja ennustevaliditeettiin - kirjaa tiedot kyseisten otsikoiden alle)

Samanaikainen validiteetti (concurrent validity)

Mittarin samanaikaista validiteettia ei olla vielä tutkittu.

Yhteenveto	

Ennustevaliditeetti (predictive validity)

Mittarin ennustevaliditeettia ei olla vielä tutkittu.

Yhteenveto	

Rakennevaliditeetti (construct validity; jakaantuu rakenteen-, yhtäpitävyys-, erotteleva-, ryhmien erottelu- sekä käännetyn mittarin validiteettiin – kirjaa tiedot kyseisten otsikoiden alle)

Rakenteen validiteetti (structural validity)

Mittarin rakenteen validiteettia ei olla vielä tutkittu.

Yhteenveto	

Yhtäpitävä validiteetti (convergent validity)

P&R test:in yhtäpitävä validiteetti oli erinomainen ensimmäisen testin jälkeen (r = 0.604) ja riittävä kolmannen testin jälkeen (r = 0.553) verrattaessa potilaiden raportoimiin kaatumisiin viimeisen vuoden aikana. (Jacobs et al. 2006)

Yhteenveto	

Erotteleva validiteetti (discriminant validity) Tulokset erottelevasta validiteetista löydettiin olevan kaatumista kokeneille 89% OFF vaiheessa, 73% ON vaiheessa. Ei kaatuneille potilaille tulokset olivat OFF vaiheessa 85% ja ON vaiheessa 98% (Keus SHJ, Munneke M, Graziano M, et al. 2014, 102)

Yhteenveto	

Ryhmien erotteluvaliditeetti (known group validity) Mittarin erotteluvaliditeettia ei olla vielä tutkittu.

Yhteenveto	

Kulttuurien välinen validiteetti (cross-cultural validity) Mittarin kulttuurien välistä validiteettia ei olla vielä tutkittu.

Yhteenveto	

5. MITTARIN TOISTETTAVUUS (RELIABILITEETTI)

Kirjaa tulokset kyseisen käyttötarkoituksen kannalta oleellisilta toistettavuuden osa-alueilta eri väliotsikoiden alle alla olevan jaottelun mukaisesti.
Toistettavuus saman mittaajan mittaamana (test–retest; intra-rater)

Yhteenveto	

Mittaajien välinen toistettavuus (inter-rater) Mittaajien väline toistettavuus oli korkeampi P&R test:issä, kuin Pull test:issä. P&R test:in tulokset olivat ICC 0.84 ensimmäisellä kierroksella, ja ICC 0.83 kolmannella. (Pull test; ensimmäinen yritys ICC 0.45, kolmas yritys 0.74). (Jacobs et al. 2006)

Yhteenveto	

Sisäinen yhdenmukaisuus (internal consistency) Mittarin sisäistä yhdenmukaisuutta ei olla vielä tutkittu.

Yhteenveto	

6. MITTARIN MUUTOSHERKKYYS

Tietoja mittarin muutosherkkyydestä	
Kriteerivaliditeetti pitkittäisasetelmassa Ei tutkittua tietoa.	
Yhteenveto	
Rakennevaliditeetti pitkittäisasetelmassa Ei tutkittua tietoa.	
Yhteenveto	
Tietoja mittarin muutostulosten tulkinnasta	
Lattia- ja kattoefekti Ei tutkittua tietoa.	
Yhteenveto	
Pienin havaittava muutos (*Smallest/Minimal Detectable Change; SDC/MDC)* Ei tutkittua tietoa.	
Yhteenveto	
Pienin merkittävä muutos (*Minimal Important Change, MIC; Minimal Clinically Important Difference, MCID)* Ei tutkittua tietoa.	
Yhteenveto	

7. MITTARIN KÄYTTÖKELPOISUUS

Tietoja mittarin käyttökelpoisuudesta ja käyttökokemuksista
Mittari löytyy eurooppalaisen fysioterapian Parkinson taudin suosituksista. (Keus SHJ, Munneke M, Graziano M, et al. 2014)

8. LÄHTEET

Tarkista lähdeviitteiden merkintätavat TOIMIA:n käsikirjasta.

Alkuperäinen lähdeviite Jacobs, Horak, Tran, Nutt. An alternative clinical postural stability test for patients with Parkinson's disease. J Neurol. 2006; 253 : 1404–1413
Hyödylliset linkit
Muut lähdeviitteet Hass, Bastiaan, Bloem, Okun. Pushing or pulling to predict falls in Parkinson disease? Nature clinical practice neurology. 2008; vol 4 no 10 Valkovic, P., Brozova, H. Bötzel K, Růzicka E, Benetin J.Push-and-release test predicts Parkinson fallers and nonfallers better than the pull test: comparison in OFF and ON medication states. Mov Disord. 2008; 23(10): 1453-145

APPENDIX 2

Modified Parkinson Activity Scale

TOIMIA

LOMAKE 1: MITTARIN PERUSTIEDOT 3.0 (1.6.2014)

1. LOMAKKEEN TÄYTTÄJÄN TIEDOT	
Nimi ja oppiarvo Minttu Nykänen	**Pvm** 4.1.2016
Sähköposti xx	**Puhelin** xx

2. MITTARIN IDENTIFIOINTI- JA KÄYTTÖTIEDOT

Käytössä oleva vakiintunut nimi

Suomeksi: (Jos Suomessa käytetään mittarin englanninkielistä nimeä, merkitse se tähän)
Modified Parkinson Activity Scale

Ruotsiksi: Nimi ei ole tiedossa

Englanniksi: Modified Parkinson Activity Scale

Lyhenne
M-PAS

Mittarin nimen synonyymit
Modified PAS

Arvion kohteena oleva versio
M-PAS, joka on paranneltu versio testistä Parkinson Activity Scale (PAS). (Keus et al. 2009, 263-269)

Ylläpitotaho
Mittarille ei ole tiedossa olevaa ylläpitotahoa

Käyttöoikeus (valitse alla olevista vaihtoehdoista toinen laittamalla rasti ruutuun).	
X	**Rajoittamaton**
	Rajoitettu (jos käyttöoikeus on rajoitettu, kuvaa alla miten)

Käännösprosessin kuvaus
Käännösprosessi on ehdotus TOIMIA sivustolle englanninkielisten tietojen perusteella.

TOIMIA

LOMAKE 1: MITTARIN PERUSTIEDOT 3.0 (1.6.2014)

Edellytykset ja välineet mittarin käytölle	
Ammattikoulutuksen tarve	Mittarin käyttäjälle ei ole tarvetta ammattikoulutukselle.
Erillisen koulutuksen tai kurssin tarve	Mittarin käyttäjälle suositellaan tutustumaan M-PAS:in pisteytukseen, sekä lukemaan mittarin perustiedot. Myös miitattavalle annettavat ohjeet tulee olla selvillä ennen mittauksen tekemistä. N. 1 tunti riittää oppimaan testin perusteet. (Keus et al. 2009, 263-269)
Mittarin käyttöön liittyvien lomakkeiden ja ohjeiden saatavuus	Ohjeet mittarin käyttöön ovat löydettävissä muun muassa eurooppalaisissa fysioterapian Parkinson taudin suosituksista. (Keus SHJ, Munneke M, Graziano M, et al. 2014),
Tarvittavien välineiden kuvaus	Mittariin tarvittavat välineet ovat tuoli (40cm tai kotona käytettävän tuolin korkeus), vesikuppi (90% täynnä vettä), U-teipattuna lattiaan (3m päähän penkistä, U:n sivut 1m pituiset), sänky, tyyny, peitto ja lakanat. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 131)

3. MITTARIN KUVAUS

Mittarin alkuperäinen käyttötarkoitus (kuvaa lyhyesti)
Alkuperäinen mittari Parkinson Activity Scale mittaa päivittäisten toimintojen sujuvuutta, kuten tasapainoa ja vuodesiirtymisiä. (Keus SHJ et al. 2007, 67)

Tiedonkeruumenetelmät (rastita sopivat vaihtoehdot)	
	Haastattelu
X	**Havainnointi**
	Itse täytettävä kyselylomake
	Kliininen tutkimus
X	**Testi tai mittaus**

Toimintakyvyn ulottuvuus (rastita sopivat vaihtoehdot)	
X	**Fyysinen toimintakyky**
	Psyykkinen toimintakyky
	Sosiaalinen toimintakyky
	Kognitiivinen toimintakyky
X	**Yleinen toimintakyky (arkitoiminnot kuten ADL/IADL)**
	Työkyky
	Muu

TOIMIA

LOMAKE 1: MITTARIN PERUSTIEDOT

3.0 (1.6.2014)

Mittarin kuvaamat ICF-luokituksen käsitteet
Kaikki ICF-koodit, joita mittarissa (esim. sen eri osioissa) mitataan D410 asennonvaihtaminen, D4100 makuulle meno, D4103 istuminen, d4104 seisominen, d4201 asennon muuttaminen makuu asennossa, D450 käveleminen. (Keus SHJ, Munneke M, Graziano M, et al. 2014, 101-137)
ICF-koodi mittarin tuloksen ollessa yksi lukema (esim. summapistemäärä)

Aikatarve
Noin. 30 minuuttia (Keus SHJ, Munneke M, Graziano M, et al. 2014, 101)

Tulkinnan avuksi
Viitearvot (yleiset viitearvot) Mittarilla ei ole tiedossa viitearvoja.
Raja-arvot (arvoja, jotka erottelevat eri ryhmiä toisistaan) Mittarilla ei ole tiedossa raja-arvoja.

Mittari on mukana tutkimuksissa (1-3 keskeistä tutkimusta) S.H.J. Keus, A. Nieuwboer, B.R. Bloem, G.F. Borm, M. Munneke. Clinimetric analyses of the Modified Parkinson Activity Scale. Parkinsonism and Related Disorders 15. 2009, 263–269)

Mittari on mukana suosituksissa (1-3 keskeistä suositusta) M-PAS on suositeltu mittari Parkinson tautia sairastaville. Mittari on mukana eurooppalaisissa fysioterapian Parkinson taudin suosituksissa. (Keus SHJ, Munneke M, Graziano M, et al. 2014)

Mittarin tausta ja kuvaus (yksityiskohtaisesti) M-PAS on mittari, jota on kehitetty ja paranneltu entisen PAS mittarin pohjalta. Mittari koostuu 14. osasta ja yhteensä 18 aktivitieetista. Mittari on jaettu kolmeen testi-osaan; tuolilta- ja vuode siirtymisiin, sekä

kävelyn akinesiaan keskittyvään osioon. Testi on tarkoitettu mittaamaan päivittäisten toimintojen sekä liikkeiden laatua ja sujuvuutta. Koko testin maksimipistemäärä on 56 pistettä, minimi on 0. Joka aktiviteetista voi saada pisteitä nollasta neljään riippuen liikkeen laadusta. 4 pistettä on "normaali" ja 0 on ei onnistu tai tarvitsee apua liikkeen suorittamiseen. Testin tekemiseen tulee varata n. 30 minuuttia. Testiä on suositeltu käyttämään Parkinson potilaiden tavoitteiden laatimiseen. (Keus et al. 2009;
Keus SHJ, Munneke M, Graziano M, et al. 2014)

5. LÄHTEET

Tarkista lähdeviitteiden merkintätavat TOIMIA:n käsikirjasta.

Alkuperäinen lähdeviite

S.H.J. Keus, A. Nieuwboer, B.R. Bloem, G.F. Borm, M. Munneke.Clinimetric analyses of the Modified Parkinson Activity Scale. Parkinsonism and Related Disorders 15. 2009, 263–269

Hyödylliset linkit

Muut lähdeviitteet

Alice Nieuwboer, Willy De Weerdt, René Dom, Kris Bogaerts, Godelieve Nuyens. Development of an Activity Scale for Individuals With Advanced Parkinson Disease: Reliability and “On-Off” Variability. PHYS THER. 2000; 80:1087-1096.

Keus SHJ, Bloem BR, van Hilten JJ, Ashburn A, Munneke M. Effectiveness of physiotherapy in Parkinson’s disease: the feasibility of a randomized controlled trial. Parkinsonism Relat Disord. 2007; 13(2): 115-121.

4. MITTARIN PÄTEVYYS (VALIDITEETTI)

Kirjaa tulokset kyseisen käyttötarkoituksen kannalta oleellisilta pätevyyden osa-alueilta eri väliotsikoiden alle alla olevan jaottelun mukaisesti.

Ilmivaliditeetti (face validity)

Mittarin ilmivaliditeettia ei olla vielä tutkittu.

Yhteenveto	

Sisältövaliditeetti (content validity)

Mittarin sisältövaliditeettia ei olla vielä tutkittu.

Yhteenveto	

Kriteerivaliditeetti (criterion validity; jakaantuu samanaikaiseen ja ennustevaliditeettiin - kirjaa tiedot kyseisten otsikoiden alle)

Samanaikainen validiteetti (concurrent validity) Mittarin kriteerivaliditeetti on mitattu olevan hyvä (0.64) M-PAS mittarin ja UPDRS luokituksen välillä. Myös M-PAS ja 'VAS-Global functioning' välillä kriteeri validiteetti on hyvä (0.79). (Keus et al. 2009)

Yhteenveto	

Ennustevaliditeetti (predictive validity)

Mittarin ennustevaliditeettia ei olla vielä tutkittu.

Yhteenveto	

Rakennevaliditeetti (construct validity; jakaantuu rakenteen-, yhtäpitävyys-, erotteleva-, ryhmien erottelu- sekä käännetyn mittarin validiteettiin – kirjaa tiedot kyseisten otsikoiden alle)

Rakenteen validiteetti (structural validity)

Mittarin rakenteen validiteettia ei olla vielä tutkittu.

Yhteenveto	

Yhtäpitävä validiteetti (convergent validity)

Mittarin yhtäpitävää validiteettia ei olla vielä tutkittu.

Yhteenveto	

TOIMIA

LOMAKE 2: MITTARIN PSYKOMETRISET TIEDOT 3.0 (1.6.2014)

1. LOMAKKEEN TÄYTTÄJÄN TIEDOT	
Nimi ja oppiarvo Minttu Nykänen	**Pvm** 4.1.2016
Sähköposti XX	**Puhelin** XX

2. ARVIOITAVA MITTARI		
Mittarin nimi Modified Parkinson Activity Scale		**Lyhenne** M-PAS/Modified PAS
Käyttötarkoitus Mitata		
Mittarin perustiedot (lomakkeen 1 tiedot)		
	Tiedot on kerätty (ei tehdä muutoksia/lisäyksiä)	
	Tiedot on kerätty (tehdään muutoksia/lisäyksiä)	
	Tietoja ei ole vielä kerätty (tiedot kerätään samassa yhteydessä)	

3. KÄYTETTYJEN ARTIKKELEIDEN TUTKIMUSASETELMIEN JA –AINEISTOJEN KUVAUS

Kuvaa lyhyesti keskeiset tutkimusasetelmaan ja –aineistoon liittyvät tiedot käytetyistä artikkeleista.

Artikkeli "Clinimetric analyses of the Modified Parkinson Activity Scale." (2009) analysioi M-PAS:ia. Tutkimukseen osallistui 13 fysioterapeuttia; 6 Parkinson taudin eksperttiä ja 7 joilla ei ollut kokemusta Parkinson potilaista. Kaikki fysioterapeutit saivat M-PAS testin tiedot ennen tutkimuspäivää. Tutkimus-päivänä fysioterapeutit saivat 45 minuutin video johdantoluennon M-PAS:ista. Tämän jälkeen kaikki fysioterapeutit arvioivat 15 Parkinson potilasta yksi kerrallaan. Tutkittavien keskimääräinen taudinkesto oli 8 vuotta ja keski-ikä 68.4 vuotta. (Keus et al. 2009)

6. MITTARIN MUUTOSHERKKYYS

Tietoja mittarin muutosherkkyydestä	
Kriteerivaliditeetti pitkittäisasetelmassa Kriteerivaliditeettia ei ole tutkittu pitkittäisasemassa.	
Yhteenveto	
Rakennevaliditeetti pitkittäisasetelmassa Rakennevaliditeettia ei ole tutkittu pitkittäisasemassa.	
Yhteenveto	
Tietoja mittarin muutostulosten tulkinnasta	
Lattia- ja kattoefekti M-PAS mittarilla ei ole kattoefektiä. (Keus et al. 2009)	
Yhteenveto	
Pienin havaittava muutos (*Smallest/Minimal Detectable Change; SDC/MDC)* Pienin havaittava muutos on 7.2 (Keus et al. 2009).	
Yhteenveto	
Pienin merkittävä muutos (*Minimal Important Change, MIC; Minimal Clinically Important Difference, MCID)* Pienintä merkittävää muutosta ei olla vielä tutkittu.	
Yhteenveto	

7. MITTARIN KÄYTTÖKELPOISUUS

Tietoja mittarin käyttökelpoisuudesta ja käyttökokemuksista
Mittari löytyy eurooppalaisen fysioterapian Parkinson taudin suosituksista. (Keus SHJ, Munneke M, Graziano M, et al. 2014)

Erotteleva validiteetti (discriminant validity) Mittarin erottelevaa validiteettia ei olla vielä tutkittu.	
Yhteenveto	
Ryhmien erotteluvaliditeetti (known group validity) Mittarin erotteluvaliditeettia ei olla vielä tutkittu.	
Yhteenveto	
Kulttuurien välinen validiteetti (cross-cultural validity) Mittarin kulttuurien välistä validiteettia ei olla vielä tutkittu.	
Yhteenveto	

5. MITTARIN TOISTETTAVUUS (RELIABILITEETTI)

Kirjaa tulokset kyseisen käyttötarkoituksen kannalta oleellisilta toistettavuuden osa-alueilta eri väliotsikoiden alle alla olevan jaottelun mukaisesti.	
Toistettavuus saman mittaajan mittaamana (test–retest; intra-rater) Saman mittaajan mittaamaa toistettavuus oli erinomainen mittarin koko pistelukemasta (test-retest) (ICC 0.81 ON vaihe, ICC 0.93 OFF vaihe), mutta muuten heikosta erinomiaseen (ICC 0.41-0.98). (Nieuwboer et al. 2007).	
Yhteenveto	
Mittaajien välinen toistettavuus (inter-rater) Mittaajien välinen toistettavuuden (intra-rater) virhe lukema on erinomainen (kappa 0,86-0.98 ja SDD 1.3) (Nieuwboer et al. 2007).Asiantuntija- ja noviisifysiotera-peuttien pisteytysten välillä ei ole suurta eroa potilaiden pisteytyksensuhteen (p: 0.28). Noviisifysiotera-peuttejen virhepisteytys (2.7) oli hiukan suurempi kuin asiantuntijoiden (2.4), (Keus et al. 2009)	
Yhteenveto	
Sisäinen yhdenmukaisuus (internal consistency) Sisäinen yhdenmukaisuus on riittävä; tuoli-siirtymiset 0.76, akinesia 0.75, vuode-siirtymiset peiton kanssa ja ilman 0.79-0.89. (Nieuwboer et al. 2007).	
Yhteenveto	

8. LÄHTEET

Tarkista lähdeviitteiden merkintätavat TOIMIA:n käsikirjasta.

Alkuperäinen lähdeviite

S.H.J. Keus, A. Nieuwboer, B.R. Bloem, G.F. Borm, M. Munneke.Clinimetric analyses of the Modified Parkinson Activity Scale. Parkinsonism and Related Disorders 15. 2009, 263–269

Hyödylliset linkit

Muut lähdeviitteet Alice Nieuwboer, Willy De Weerdt, René Dom, Kris Bogaerts, Godelieve Nuyens. Development of an Activity Scale for Individuals With Advanced Parkinson Disease: Reliability and "On-Off" Variability. PHYS THER. 2000; 80:1087-1096

Keus SHJ, Munneke M, Graziano M, et al. European Physiotherapy Guideline for Parkinson's disease. KNGF/ParkinsonNet. 2014.