SAFETY PREDICTORS IN PERFORMANCE OF ACTIVITIES OF DAILY LIVING IN PATIENTS WITH PARKINSON'S DISEASE

Dissertation submitted for

MASTER OF OCCUPATIONAL THERAPY

2016-2018

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C	**H**

KMCH COLLEGE OF OCCUPATIONAL THERAPY

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI

CERTIFICATE

This is to certify that the research work entitled **"Safety Predictors in Performance of Activities of Daily living in patients with Parkinson Disease"** was carried out by **Reg. No.41614002** KMCH College of Occupational Therapy, towards partial fulfilment of the requirements of Master of Occupational Therapy (Advanced OT in Neurology) of the Tamil Nadu Dr. M.G.R. Medical University, Chennai.

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ACKNOWLEDGEMENT

"I am the LORD, the God of all mankind. Is anything too hard for me?

(Jeremiah 32:27)

First and foremost I thank **God Almighty** for his unconditional love and for giving me the wisdom to accomplish this project and bring it to a successful culmination.

I would like to thank **my family and my sister** for being a constant source of encouragement and support through their powerful prayers throughout my study.

I would like to extend my heartfelt gratitude to my Guide, **Mrs. Sujatha Missal, Principal, KMCH college of Occupational Therapy**, , for her incredible support, constant encouragement and patient teaching.

I am extremely thankful to **Mrs. Sugi Soumiyan**, **M.O.T. in Advanced Pediatrics** for supporting and giving me valuable suggestions for my thesis.

I am thankful to **Mr. S. G. Praveen MOT, Vice Principal**, for his support markedly by raising questions regarding my study so that I could continue without hardship later.

I am very much thankful to **Dr. V. ARUL SELVAN, Counsultant Neurologist** for his incredible support, and also for giving me his valuable time and suggestions.

I would like to mention my friends who were with me in all my ups and downs and supported me throughout my thesis, **Eldhose, Jobson**, and **Jithin** who was with me in all situations and all my other friends **Archana, Sakthi, Bhuvenesh,, Frankil, H.R .Dinesh** , as we supported each other.

Special thanks to **My friends** and all my seniors and juniors who supported me. My heartfelt gratitude to all the patients and caretakers who participated and cooperated in my study without them the thesis would not be possible.

Thank you Each and Every One!

CONTENT

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ABSTRACT

Background: Safety is recognized as an important factor in personal independence. Studies have found a significant relationship between ADL safety and fatigue, disease severity, and age and considered them to be predictors of performance safety in ADL among patients with PD. But they didn't consider the cognitive, motor skill; motivation and mental state for safety performance of ADL and suggested further research in this area.

Aim: Therefore the aim was to determine safety predictors for ADL in persons with Parkinson's' Disease.

Methods: An observational association-analysis design was applied for the study. Thirty three patients with PD participated in this study. Cognition was assessed using SCOPA, motor and mental scores were assessed using UPDRSI and III scale, motivation was assessed using AES scale, while performance safety was examined with the performance assessment of self-care skills (PASS).

Results: A significant relationship was observed between ADL safety and cognition (r, 0.645; $P < 0.001$), mental state (r, -0.512; $P < 0.001$), and motor (r, -0.607; $P < 0.001$).But no correlation with apathy (r,-.312;P=0.78)

Conclusion: Cognition, mental state and motor performance are predictors of performance safety in ADL among patients with PD. For implementing more effective interventions on safe ADL performance, rehabilitation teams should conduct more detailed safety assessments with a special focus on the effects of cognitive, mental state and motor on the performance of each activity.

Keywords: Parkinson disease, activity of daily living, safety predictor, cognition, disease severity and motivation.

INTRODUCTION

Parkinson's disease (PD) is a chronic, progressive, neurodegenerative disease with a multi factorial etiology. Characterized by hallmark signs of bradykinesia, rigidity, tremor, and postural instability.[1] It is a clinical condition characterized by depletion of dopamine in substantial nigra .The first description of Parkinson's disease was given by James Parkinson in early 19 th centaury . But the knowledge about this disease has been present in India since ancient times. Parkinson's disease is the second most common neurodegenerative disorder Alzheimer's disease , which effects ~ 1-2 % of the population above age of 60 and 4-5% above age 85 with a higher prevalence in men .[2]

There are very few population based studies determine the exact incidence and prevalence of Parkinson diseases in India. In door to door survey done in India in 2004, the prevalence rate of Parkinson were found to be 33 per 100,000(crude prevalence) and 76 per 100,000(age adjusted). Rural population had a higher prevalence compared to urban population.[2-3]

Activities of daily living (ADLs), often termed physical ADLs or basic ADLs, include the fundamental skills typically needed to manage basic physical needs, comprised the following areas: grooming/personal hygiene, dressing, toileting/continence, transferring/ambulating, and eating. These functional skills are mastered early in life and are relatively more preserved in light of declined cognitive functioning when compared to higher level tasks. In patients with Parkinson's disease, performance of some activities of daily living (ADL) is of great importance [5-6]. Progression of disease symptoms interferes with the patient's ability to perform daily activities, thereby leading to increased dependence on caregivers [7]. ADL performance can be studied by evaluating parameters, such as safety, independence, and adequacy. In general, independence and safety show the greatest interactions with each other. Although PD patients can be independent individuals, they may require caregiver supervision due to the low safety of ADL performance. [8] especially the rate and risk

of falling, is affected by disease severity .[10-16] Evidence also shows that more patients are institutionalized due to the greater severity of PD .[17] Overall, various individual characteristics can affect performance safety. Aging, which results in numerous changes in the body (eg sensory, proprioceptive, kinesthetic, vestibular, neural, cardiovascular, and cognitive changes), may affect the performance of ADL. In addition, considering the progressive nature of PD, the symptoms may deteriorate over time. [18] Overall factors affecting safety performance in ADL remain unclear in patients Parkinson's disease. This study hypothesized that cognitive, motor, motivation and mental state can influence the safety performance of ADL in PD.

NEED FOR THE STUDY

According to Tahereh Sefidi Heris, Malahat Akbarfahimi [19] in their study on safety predictors in performance of activity of daily living in patient with Parkinson disease .They found that there is a significant relationship between ADL safety and fatigue, disease severity, and age and considered them to be predictors of performance safety in ADL among patients with PD. But they didn't consider the cognitive, motor skill; motivation and mental state for perform ADL and suggested further research in this area.

According to Inga Liepelt-Scarfone (2013) et.al. [20] in their study suggested that not only cognitive factors but also non-cognitive factors seem to be linked to the diagnosis of Parkinson's disease dementia associated with significant impact on instrumental activities of daily living function. They saying that further study with large sample is needed for verifying their suggestion.

According to Jefferson & colleagues [21] there was no differences in ADL functioning between individuals with mild cognitive impairment and those with no cognitive impairment. However, as cognitive impairment worsens, the correlations between cognitive functioning and level of ADL dependence appear more consistent. According to Boyel etal [22] motivation may account for 15%_of the variance in basic ADLs.

Vermeulen, Jacques CL Neyens, [23]states that physical frailty indicatior are predictors of ADL disability of community dwelling elderly people 65yr and above. According to Vida Cotidina et al [24] found that mental illness affected an individuals' social participation and also his or her ADL.

There are relatively few studies on the safety predictors during ADL performance in patients with Parkinson disease. There were no studies found to be conducted in India related to safety predictors of ADL in PD therefore this study wanted to explore for the factors in this aspect on the Indian population.

RESEARCH QUESTION

Will Cognitive, disease severity (motor and mental state) motivation predict safety measures for ADL in Parkinson patient.

AIM AND OBJECTIVE

Aim

To determine safety predictors for ADL in persons with Parkinson's' disease.

Objective

To identify effective safety predictors (cognitive, motivation and disease severity) for ADL in patient with Parkinson disease.

HYPOTHESIS

Null Hypothesis

Cognitive, disease severity (motor and mental state), motivation will not have an influence on the safety performance of ADL in patients with Parkinson patient.

Alternate Hypothesis

Cognitive, disease severity (motor and mental state), motivation and mental state will have an influence on the safety performance of ADL in patients with Parkinson patient.

RELATED LITERATURE

Parkinson's disease (PD) has highly characteristic neuropathologic finding and clinical presentation, including motor deficits and in some cases, mental deterioration[27].

Pathophysiology

The two hall mark features in the substantia nigra pars compacta are loss of neurons and the presence of Lewy bodies. There is a positive correlation between the degree of nigrostriatal dopamine loss and severity of motor symptoms. PD is relatively asymptomatic until profound depletion (70% to 80%) of substantia nigra pars compacta neurons has occurred. Reduced activation of dopamine -1 and dopamine -2 receptor result in greater inhibition of the thalamus. Clinical improvement may be more tied to restoring activity at the dopamine -2 receptors than at the dopamine -1 receptor. Loss of presynaptiec nigrostriatal dopamine neurons results in inhibition of thalamic activity and activity in the motor cortex. Degeneration of nigrostriatal dopamine neurons results in a relative increase of stratial cholinergic activity which contribute to the tremor of PD.

Clinical presentation

PD develops insidiously and progresses slowly. Initial symptoms may be sensory , but as the disease progresses , one or more classic primary features presents.(eg resting tremor, rigidity , bradykinesia , postural instability that may lead to falls.) resting tremor is often sole presenting complaint. However, only two – third of PD patient have tremor on diagnosis, and some never develop the signs. Tremor is present is most commonly in hands, often begins unilaterally, and sometimes has a characteristic "pill –rolling" quality. Resting tremor is usually abolished by volitional movement and is absent during sleep. Muscular rigidity involves increased muscular resistance to passive range of motion and can be cogwheel in nature. Intellectual

deterioration is not inevitable, but some patient deteriorate in a manner indistinguishable from Alzheimer's disease.

General Features:

For clinically probable PD, the patient exhibits atleast two of the following resting tremor, rigidity or bradykinesia. Asymmetric onset (unilateralist) of these features is usual. Postural instability (difficulty with maintaining balance) is more common in advanced PD.

Motor symptoms

The patient experiences decreased manual dexterity, difficulty arising from a seated position, diminished arm swing during ambulation, dysarthria, dysphasia, festinating gait, flexed posture, freezing at initiation of movement, hypomima.

Autonomic and Sensory Symptoms

The patient experiences bladder and anal sphincter disturbances, constipation, diaphoresis, fatigue, olfactory disturbance , orthostatic blood pressure changes , pain, Parenthesis, paroxysmal vascular flushing seborrhea, sexual dysfunction .

Diagnosis

Clinically probably PD is diagnosed when at least two of the following are present: limb muscle rigidity, resting tremor(at 3 to 6 Hz and abolished by movement) or bradykinesia. Definite PD is diagnosed when there is at least two of the following : resting tremor, rigidity, bradykinesia and a positive response to antiparkinson medication.

Medical Management

The most frequently used medical management strategy for PD is the provision of a dopamine agonist to make up for the depletion of dopamine caused by the destruction of the substanita nigra. Levodopa is the medication most commonly used in the treatment of the PD. This oral medication is actually a precursor to

dopamine because dopamine is too large to cross the blood brain barrier. As PD progress, control of various motor symptoms through the use of levodopa becomes less effective. Surgical intervention, known as stereotactic surgery, has been used. In this surgery specific lesion are made in neurological structures to decrease the severity of PD symptoms. Neural transplantation has been used selectively for patients with PD. This process involves harvesting fetal mesencephalic neural tissue and then transplanting this tissue in to basal ganglia of patients with PD. The transplanted fetal tissue produces dopamine and thereby reduces the debilitating symptoms of progressive PD.[26,27]

Role of Occupational Therapy in PD

Occupational therapy services vary, depending on the client stage of PD. Typically an OT program would provide compensatory strategies, patient and family education, environmental and task modification and community involvement. During the initial stage of the disease, OT services should establish a daily routine exercise program addressing full range of motion. It is preferable to have a client with PD perform a short exercise program for 5 to 10 minute daily rather than a longer program three times in a week. Postural flexibility exercises should be included in the program. Modification of house hold items may decrease the impact of tremor during the initial stage of the disease process, for example the use of built-up handles for eating and for writing utensils should be use. Fatique is the common compliant and clients should develop a habit of taking frequent break during the day. During the early stages of the disease the client and family should be informed of community resource and support group, involvement in a community based group may provide the support needed to accommodate the changes in family roles and interaction .

As the disease progress, additional exercise can improve gait, rhythmic auditory stimulation in the form of music with an accentuated initial beat has been found to significant improve stride length and speed in clients in PD. During the middle stage of PD of person may have decreased oral motor control. The

Occupational Therapist should encourage oral motor exercise and provide education regarding food selection. As PD progress the client has further deterioration of motor skills, particularly execution of skilled, sequential movements. The occupational therapist should suggest modifications to activities to include visual cues, verbal prompts and rehearsal of movements. These strategies increase a clients ability to perform personal care and household activities.

During the last stages of PD a client's movement disorder and rigidity may eliminate the ability to perform personal care by the decreased ability to perform these tasks can significantly compromise a person's quality of life. OT services should be provided to further modify the home environment for access and control. The use of environment control units such as switch – operated television can be helpful. The client's ability to control the immediate environment can compensate for the loss experienced during the final stage of PD. The person with PD may no longer be able to dress himself or herself, but the through the use of various switches the client can select preferred television or radio programs, access room lighting and control a computer using a minimal motor action.

Although PD is a progressive, neurodegenerative disease diet, OT has much to offer the client with this disease. The diminishing ability to perform personal care and engage in self selected tasks has been identified as of the variables contributing to depression and the decreased quality of patients with PD. Throughout the progressive course of PD, OT addresses the ability of the person to engage in meaningful activities.[28]

Activity of daily living

The Activities of Daily Living (ADLs) are a tasks of self-maintenance, mobility, communication and home management that enables an individual to achieve personal environment.

ADLs are grouped according to various spheres of activity where relevant to the patient. Residual disability, skill acquired, vocation, home architecture and office

designs are all taken in to consideration while grouping ADLs. Activities are classified as Bed side activities, Wheel chair activities, Self-care activities, Miscellaneous hand activities, Ambulation, Elevation, Travelling ,Management of environment control devices, Communication

Role of occupational therapist in ADL

The role of occupational therapist in intervening in activities of daily living is unique and specific. The occupational therapist is trained to assessed analyze the patient performance to determine the degree and method of participation in self care. The occupational therapist assessment yields information about what factors are preventing performance whether those impairment can be corrected and whether the patient must learn to perform self-care task with adaptive equipment or technique. Overall the role of the occupational therapist is Observe the performance, Stimulate task performance within clients occupational roles and environment , analyse what is interfering with performance ,assess level of impairment in component skills, understand medical and psychological conditions. [26-28]

Cognition, Disease Severity (motor performance and, mental state) Motivation

Cognition refers to the integrated function to the human mind that together result in thought and goal directed action by Diller (1993). Cognition not only influences what a person chooses to do, it also indicated how an experiment is rembered and interpreted. Cognition clearly drives the selection, performance analysis and learning of all human occupation, which is why this important dimension is reflected in the profession's uniform terminology (American occupational therapy association). Cognition consist of an interactive hierarchy that include primary cognitive capacities (orientation, attention and memory), higher level thinking abilities(reasoning, concept formation and problem solving), and meta processes (executive function and self-awareness) [28]

A motor skill is a function, which involves the precise movement of muscles with the intent to perform a specific act. Most purposeful movement requires the

ability to "feel" or sense what one's muscles are doing as they perform the act. Motor skills are movements and actions of the bone structures. Typically, they are categorized into two groups: gross motor skills and fine motor skills. Gross motor skills are involved in movement and coordination of the arms, legs, and other large body parts and movements. They involve actions such as running, crawling and swimming. Fine motor skills are involved in smaller movements that occur in the wrists, hands, fingers, feet and toes. They involve smaller actions such as picking up objects between the thumb and finger, writing carefully, and even blinking. These two motor skills work together to provide coordination.[33]

Motivation is the reason for people's actions, desires, and needs. Motivation is also one's direction to behavior, or what causes a person to want to repeat a behavior. A motive is what prompts the person to act in a certain way, or at least develop an inclination for specific behavior. Motivation as a desire to perform an action is usually defined as having two parts, directional such as directed towards a positive stimulus or away from a negative one, as well as the activated "seeking phase" and consummator "liking phase". This type of motivation has neurobiological roots in the basal ganglia, and mesolimbic dopaminergic pathways. Activated "seeking" behavior, such as locomotor activity, is influenced by dopaminergic drugs, and micro dialysis experiments reveal that dopamine is released during the anticipation of a reward. The "wanting behavior" associated with a rewarding stimulus can be increased by microinjections of dopamine and dopaminergic drugs in the dorsorostral nucleus accumbens and posterior ventral palladium. Opioid injections in this area produce pleasure, however outside of these hedonic hotspots they create an increased desire.[5] Furthermore, depletion or inhibition of dopamine in neurons of the nucleus accumbens decreases appetitive but not consummatory behavior. Dopamine is further implicated in motivation as administration of amphetamine increased the break point in a progressive ratio self-reinforcement schedule. That is, subjects were willing to go to greater lengths (e.g. press a lever more times) to obtain a reward.[33]

Severity of disease (Mental state) includes our emotional, psychological, and social well-being. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make choices. Mental state is important at every stage of life, from childhood and adolescence through adulthood. A mental state is a state of mind that an agent is in. Most simplistically, a mental state is a mental condition. It is a relation that connects the agent with a proposition. Several of these states are a combination of mental representations and propositional attitudes. There are several paradigmatic states of mind that an agent has: love, hate, pleasure and pain and attitudes toward propositions such as: believing that, conceiving that, hoping and fearing that, etc. Mental states also include attitudes towards propositions, of which there are at least two—factive, non-factive, both of which entail the mental state of acquaintance. To be acquainted with a proposition is to understand its meaning and be able to entertain it. The proposition can be true or false, and acquaintance requires no specific attitude towards that truth or falsity. Factive attitudes include those mental states that are attached to the truth of the proposition—i.e. the proposition entails truth. Some factive mental states include "perceiving that", "remembering that", "regretting that", and (more controversially) "knowing that". Non-factive attitudes do not entail the truth of the propositions to which they are attached[33]

REVIEW OF LITERATURE

Tahereh Sefidi Heris, Malahat Akbarfahimi did a study on *safety predictors in performance of activity of daily living in patient with Parkinson disease* (2017)[11]. Sixty patients with PD participated in this study. Fatigue was assessed using the 16-item Parkinson fatigue scale while performance safety was examined with PASS clinical version .They found that there is a significant relationship between ADL safety and fatigue (r, 0.557; P < 0.001), disease severity (r, 0.558; P 0.001), and age (r, -0.636; P < 0.001). And they concluded that Age, fatigue severity, and disease are predictors of performance safety in ADL among patients with PD

Inga Liepelt-Scarfone ,Monika Fruhmann Berger,Deborah Prakash did a study on *Clinical Characteristics with an Impact on ADL Functions of PD Patients with Cognitive Impairment Indicative of Dementia(2013)* [12] . The aim of the study was study was to compare two groups of PD patients. Both groups had cognitive deficits severe enough to justify diagnosis of dementia, but they differed according to caregivers' rating on ADL dysfunction. Thirty of 131 Parkinson's disease patients fulfilled the Movement Disorders Society Task Force – recommended, cognitive Level-I-criteria for dementia. Results indicate that worse attention, visual-construction abilities, the postural instability and gait disorder subtype, communication problems, medication and presence of anxiety are related to activities of daily living dysfunctions in Parkinson's disease patients with cognitive decline indicative of dementia. In this study suggests that not only cognitive factors but also non-cognitive factors seem to be linked to the diagnosis of Parkinson's disease dementia associated with significant impact on instrumental activities of daily living function.

Dehorah A Cahn , Edith Salivan ,Paulak did a study on *differential contributions of cognitive and motor component processes to physical and*

instrumental activities of daily living in Parkinson's disease (1998) [13] . The purpose of this study was to identify the contributions that specific cognitive and motor functions make to ADLs. Executive functioning, in particular sequencing, was a significant independent predictor of instrumental ADLs whereas simple motor functioning was not. By contrast, simple motor functioning, but not executive functioning, was a significant independent predictor of physical ADLs. . Dementia severity, as measured by the Dementia Rating Scale, was significantly correlated with instrumental but not physical ADLs. The identification of selective relationships between motor and cognitive functioning and ADLs may ultimately provide a model for evaluating the benefits and limitations of different treatments for PD.

Daniel C. Mograbi Camila de Assis Faria Helenice ,Charchat Fichman, Emylucy Martins Paiva Paradela andRoberto Alves Lourenço did a study on *Relationship between activities of daily living and cognitive ability in a sample of older adults with heterogeneous educational level (2014)*[14]. This study aims to investigate the association between cognitive abilities and activities of daily living in older adults with and without dementia from a middle-income country. The sample consisted of 48 healthy older adults and 29 people with dementia, who were evaluated in an Outpatient Care Unit in a University Reference Center in Rio de Janeiro. The result suggest that educational level may be a mediating factor in the association of cognitive variables and activities of daily living.

Tibor Hortoba´gyi, Chris Mizelle, Stacey Beam, and Paul DeVita did a study on *Old Adults Perform Activities of Daily Living Near Their Maximal Capabilities(2003)* [15]. Old adults' ability to execute activities of daily living (ADLs) declines with age. One possible reason for this decline is that the execution of customary motor tasks requires a substantially greater effort in old compared with young adults relative to their available maximal capacity. Methods. They tested the hypothesis that the relative effort (i.e., the percentage of joint moment relative to maximal joint moment) to execute ADLs is higher in old adults compared with young adults. Healthy young adults (n 5 13; mean age, 22 years) and old adults (n 5 14;

mean age, 74 years) ascended and descended stairs and rose from a chair and performed maximal-effort isometric supine leg press. Using inverse dynamics analysis, we determined knee joint moments in ADLs and computed relative effort. They concluded that for healthy old adults, the difficulty that arises while performing ADLs may be due more to working at a higher level of effort relative to their maximum capability than to the absolute functional demands imposed by the task.

Ulrike Lueken, Ricarda Evens, Monika Balzer-Geldsetzer did *a Psychometric properties of the apathy evaluation scale in patients with Parkinson's disease(2017)* [16] . Parkinson's disease (PD) frequently entails non-motor symptoms, worsening the course of the disease. Apathy is one of the core neuropsychiatric symptoms that has been investigated in recent years; research is however hampered by the limited availability of well-evaluated apathy scales for these patients. We evaluated the psychometric properties of the Apathy Evaluation Scale (AES) in a sample of PD patients. Psychometric properties, convergent and discriminate validity and sensitivity/specificity were evaluated in patients with ($n = 582$) or without dementia/depression ($n = 339$) Internal consistency was high in the entire sample as well as in patients without dementia/depression. Correlations were moderate for convergent validity (UPDRS I item 4: motivation). While apathy could be differentiated from cognitive decline, it was related to depression (Geriatric Depression Scale, GDS-15). The overall classification accuracy based on the UPDRS I item 4 was comparable for AES and GDS scores. The AES exhibits good psychometric properties in PD patients with and without dementia and/or depression.

Denise Chisholm, Pamela Toto, Ketki Raina, Margo Holm and Joan Roger did a study on *Evaluating capacity to live independently and safely in the community: Performance Assessment of Self-care Skills (2014)* [17]. To determine clients' capacity for community living, occupational therapists must use measures that capture the person-task-environment transaction and compare clients' task performance to a performance standard. The Performance Assessment of Self-care Skills, a performance-based, criterion-referenced, observational tool, fulfills this purpose. In

this practice analysis, using data from this tool from multiple clinical studies (N = 941), the authors describe tasks that clients from various diagnostic populations could and could not perform independently and safely. For clinicians, the Performance Assessment of Self-care Skills can be used to identify which daily tasks are compromised and the point of task breakdown, as well as to provide guidance about potential interventions.

Dagmar Verbaan , Martine Jeukens-Visser did a study on *SCOPA-Cognition Cutoff Value for Detection of Parkinson's Disease Dementia (2014)*[18]. This study saying that The SCOPA-Cognition is a reliable and valid test to evaluate cognitive functioning in Parkinson's disease and is widely used in clinical and research settings. Recently, the Movement Disorder Society introduced criteria for Parkinson's disease dementia. The objective of the present study was to use these criteria to determine SCOPA-Cognition cutoffs for maximum accuracy, screening, and diagnosing of Parkinson's disease dementia. The current study presents SCOPA-Cognition cutoffs for maximum accuracy, screening, and diagnosing of Parkinson's disease dementia.

Amir Abdolahia, Nicholas Scogliob, Annie Killoranb did a study on *Potential reliability and validity of a modified version of the Unified Parkinson's Disease Rating Scale that could be administered remotely (2011)* [19]. This study says that the majority of the motor Unified Parkinson's Disease Rating Scale (UPDRS) items can be conducted visually, rigidity and retropulsion pull testing require hands-on assessment by the rater and are less feasible to perform remotely in patients' homes. They concluded that A modified version of the motor UPDRS without rigidity and retropulsion pull testing is reliable and valid and may lay the foundation for its use in remote assessments of patients and research participants.

METHODOLOGY

Place of Study:

This study was conducted in KMCH.

Study Design:

An observational association-analysis design

Target Population:

Patients with Parkinson disease.

Sample Size:

Sample size was determined using the formula

Total sample size = N $= \{(Z_\alpha + Z_\beta / C\}^2 + 3$

$\alpha = 0.50$ = Threshold probability for rejecting the null hypothesis. Type one error rate

$\beta = 0.200$= probability of failing to reject the null hypothesis under the alternative hypothesis. Type ii error.

r= 0.47= the expected correlation coefficient.

The standard normal deviate for $\alpha = Z_{\alpha =} 1.960$

The standard normal deviate for $\beta = Z_\beta = 0.842$

C= 0.5* in (1+r)(1-r) = 0.779

Therefore the total sample size $= N = \{(Z_\alpha + Z_\beta / C\}^2 + 3 = 33$

The study included 33 samples.

Sampling Technique:

Non probability convenient sampling.

Selection Criteria:

Inclusion Criteria:

Patients diagnosed with Parkinson disease, according to the UK brain bank criteria and age between 60-80 years .

Exclusion Criteria:

Co morbidity of other neurological disease.

Variables:

Independent Variable:

The dependent variable is cognitive disease severity (motor & mental state) motivation performance of patient.

Dependent Variable:

Ability to perform the ADL in safe manner.

Extraneous Variable:

Availability of patients during sessions

Tools Used

Scale for outcome in Parkinson disease cognition**,** Apathy evaluation scale**,** PASS home version **,**Unified Parkinson disease rating scale

Scale for outcome in Parkinson Disease Cognition

The Scales for Outcomes in Parkinson's disease-cognition (SCOPA-COG) is a valid and reliable instrument for assessing cognitive function in PD. The SCOPA-COG includes 10 items divided over four domains (memory, attention, and executive and visuospatial functioning), and its score ranges from 0-43. Administration takes about 15 minutes. The specificity of scale is o.87, and sensitivity is 0.80. Internal consistency is 0.83. Cutoff score of the scale is 22.

Apathy Evaluation Scale

The Apathy Evaluation Scale (AES) was developed by Marin (1991) as a method for measuring apathy resulting from brain-related pathology. He defined apathy as "lack of motivation not attributable to diminished level of consciousness, cognitive impairment, or emotional distress." AES address characteristic of goal directed behavior that reflects apathy. In the scale there is 18 items. Items are scored on a 4 point likert scale. Total score is 54. Higher score indicate the greater level of apathy in person behavior. Score more than 43 usually considered to indicate clinically significant apathy.

PASS home version

The Performance Assessment of Self-Care Skills (PASS) is also a performance-based observational test with a home and clinic version. The PASS is composed of 26 core tasks within four functional domains: Functional mobility (5 tasks : bed mobility, stair use, toilet mobility and management ,bathtub and shower mobility, indoor walking)**,** basic activity of daily living (3 tasks : oral hygiene, trimming toenails , dressing)**,** IADL with a cognitive emphasis (CIADL) (14 tasks: shopping, bill paying, check writing, balancing a checkbook, mailing, telephone use, medication management, 2 tasks related to obtaining information from the media, small home repairs, home safety, playing bingo, oven use, stove use, and use of sharp utensils)**,** IADL with a physical emphasis(PIADL) (3 task : changing bed linens, sweeping and taking out of garbage)**.** Performance is rated for independence, safety, and adequacy. If an individual requires assistance to complete a task, the PASS provides a hierarchy of prompts. The types of prompts, beginning with the least assistive and progressing to the most assistive are verbal supportive**,** verbal nondirective**,** verbal directive**,** gestures**,** task object or environmental rearrangement, demonstration**,** physical guidance**,** physical support**,** total assist. It is a criterion referenced, that is the client is rated according to established performance.

Unified Parkinson rating scale

The unified Parkinson disease rating scale was originally developed in the 1980 and had become the most widely used clinical rating scale for Parkinson disease. The number of items in scale is 50. Time taken for administration is 30. The UPDRS scale includes series of ratings for typical Parkinson's symptoms that cover all of the movement hindrances of Parkinson's disease. The UPDRS scale consists of the following five segments: Mentation, Behavior, and Mood, ADL, Motor sections, Modified Hoehn and Yahr Scale, Schwab and England ADL scale.

Each answer to the scale is evaluated by a medical professional that specializes in Parkinson's disease during patient interviews. Some sections of the UPDRS scale require multiple grades assigned to each extremity with a possible maximum of 199 points. Internal consistency of UPDRS is >0.90. Internal reliability is 0.79. A score of 199 on the UPDRS scale represents the worst (total disability) with a score of zero representing (no disability).

PROCEDURE:

An approval from the ethical committee, permission from the institutional head and consent from the patients and caregivers were attained. During the visit to the Neurologist's OP, the patients with Parkinson's' disease who fulfill the selection criteria were recruited for the study. PASS, SCOPA, Apathy evaluation scale and UPDRS was administered by the therapist, to find out the safety predictors for ADL in persons with Parkinson's' disease. Data analysis was done to find the correlation between ADL and cognitive disease severity (Motor and Mental state) motivation in Parkinson disease.

DATA ANALYSIS

Descriptive Statistics

The analysis were performed using SPSS 20, this included mean, SD for continues variables; frequency and percentage tables for categorical data.

Pearson's correlations were completed to evaluate SCOPA sum score and AES, UPDRS Part one (mental) and three (motor) subscale correlation with ADLs in PD patient.

Multiple linear regression analysis were completed to evaluate safety predictors of performing ADL

Demographic Variables

Table 1: Mean±sd, Percent

	MEAN	Std DEVATION	PERCENTAGE
Age	68.7	5	80
SCOPA	15.15	3.57	32
AES	19.1	1.50	27
UPDRS mental state	10	2.45	63
UPDRS Motor	44.39	8.99	79
PASS	.510	.613	2

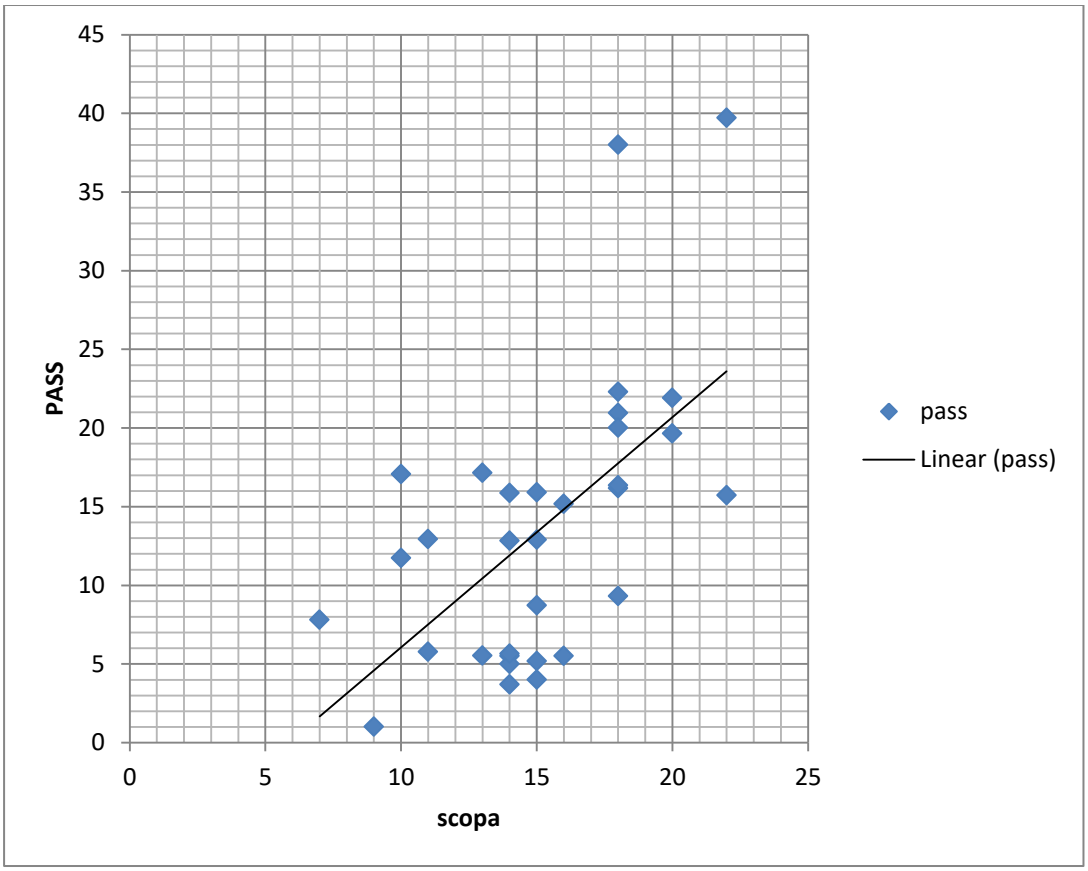
Table 2 :Correlation Between SCOPA & PASS

Variable 1	PASS	r value	p value
SCOPA	**FUNCTIONAL MOBILITY**		
	Bed mobility	.645**	.000
	Stair use	.621**	.000
	Toilet mobility	.617**	.000
	Bathtub and shower mobility	.512**	.002
	Indoor walking	.441*	.010
	Basic activities of daily living		
	Oral hygiene	.544**	.001
	Trimming toenails	.377**	.031
	Dressing	.627**	.000
	Instrumental ADL with Cognitive Emphasis		
	Shopping (moneyman)	.261	.142
	Bill paying by check	.537*	.001
	Checkbook balancing	.139	.441
	Mailing bills	.274	.123
	Telephone use	.426*	.013
	Medication management	.540**	.008
	Obtaining critical information from the media auditory	.479	.005
	Obtaining critical information from media visual	.237	.184
	Flash light repair	.285	.109
	Home safety	.200	.264
	Playing bingo	.078	.665
	Oven use	.309	.080
	Stovetop use	.384*	.027
	Use of sharp utensils	.285	.108
	Clean up after meal preparation	.450**	.009
	Instrumental ADL with Physical Emphasis		
	Taking out garbage	.351*	.045
	Changing bed lines	.438*	.011
	Sweeping	.162	.368

*correlation is significant at the 0.05 level (2 tailed)

** Correlation is significant at the 0.01 level (2tailed)

Graph 1 : Graphical representation of Correlation between SCOPA and PASS



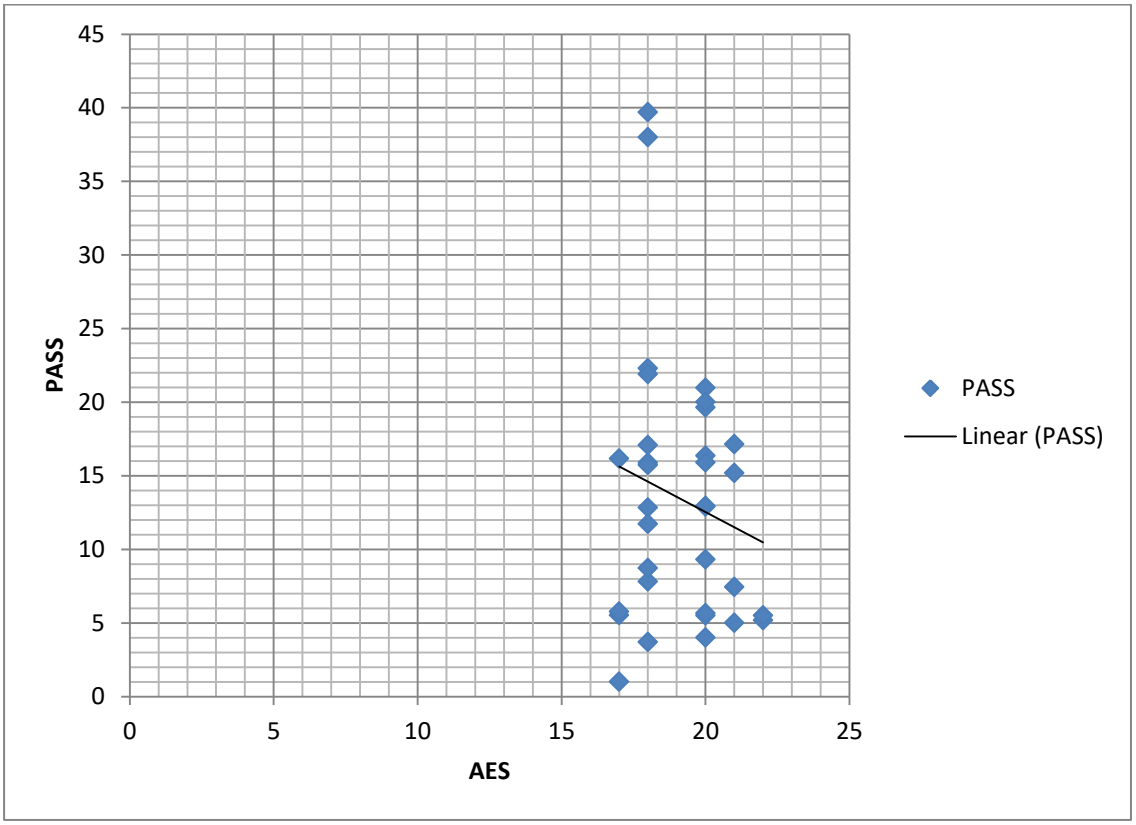
The graph shows positive correlation between SCOPA and ADL

Table 3 : Correlation between AES with PASS

Variable	PASS	r value	p value
	FUNCTIONAL MOBILITY		
AES	Bed mobility	-.312	.078
	Stair use	-.119	.509
	Toilet mobility	-.007	.968
	Bathtub and shower mobility	.198	.270
	Indoor walking	.084	.638
	BADL		
	Oral hygiene	.026	.888
	Trimming toenails	-.049	.788
	Dressing	-.200	.264
	IADL WITH COHNITIVE EMPHASIS		
	Shopping (moneyman)	-.004	.981
	Bill paying by check	-.191	.287
	Checkbook balancing	-.143	.427
	Mailing bills	-.185	.303
	Telephone use	-.086	.633
	Medication management	-.117	.518
	Obtaining critical information from the media auditory	-.163	.365
	Obtaining critical information from media visual	-422*	.015
	Flash light repair	-.339	.054
	Home safety	-.034	.853
	Playing bingo	.190	.290
	Oven use	-.082	.650
	Stovetop use	.000	1.00
	Use of sharp utensils	-.095	.597
	Clean up after meal preparation	-.166	355
	IADL WITH PHYSCIAL EMPHASICS		
	Taking out garbage	-.331	.600
	Changing bed linens	-.163	.366
	Sweeping	-.214	.232

*correlation is significant at the 0.05 level (2 tailed),** Correlation is significant at the 0.01 level (2tailed)

Graph 2: Graphical representation of Correlation between AES with PASS



The graph shows negative correlation between AES and ADL

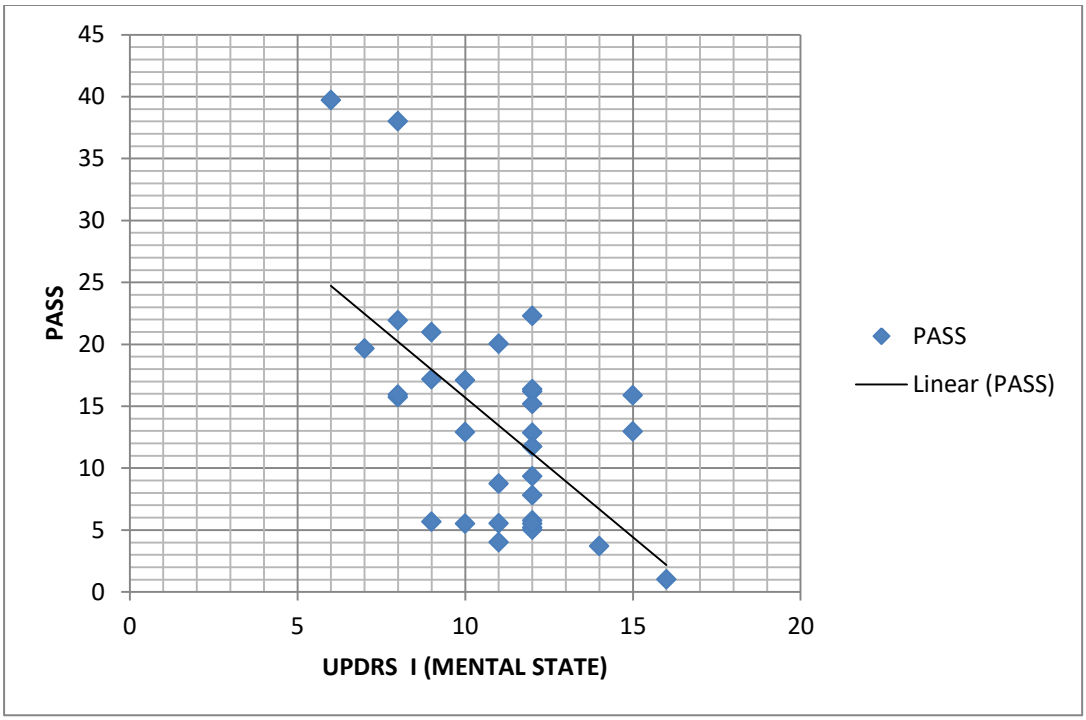
Table 4 :Correlation between disease severity-UPDRS I (mental state) with PASS

Variable	PASS	r value	P value
	FUNCTIONAL MOBILITY		
Disease Severity UPDRS I (Mental State)	Bed mobility	-.512**	.002
	Stair use	-.528**	.002
	Toilet mobility	-.475**	.005
	Bathtub and shower mobility	-.382*	.028
	Indoor walking	-.185	.301
	BADL		
	Oral hygiene	-.206	.249
	Trimming toenails	-.265	.136
	Dressing	-.425*	.014
	IADL WITH COGNITIVE EMPHASICS		
	Shopping (moneyman)	-.069	.703
	Bill paying by check	-.214	.232
	Checkbook balancing	.077	.668
	Mailing bills	-.190	.290
	Telephone use	-.139	.439
	Medication management	-.416*	.016
	Obtaining critical information from the media auditory	-.287	.105
	Obtaining critical information from media visual	-.201	.262
	Flash light repair	-.228	.202
	Home safety	-.175	.329
	Playing bingo	-.371*	.034
	Oven use	-.253	.156
	Stovetop use	-.324	.066
	Use of sharp utensils	-.329	.061
	Clean up after meal preparation	-214	.232
	IADL WITH PHYSICAL EMPHASIS		
	Taking out garbage	-.315	.074
	Changing bed linens	-.292	.099
	Sweeping	-.275	.121

*correlation is significant at the 0.05 level (2 tailed)

** Correlation is significant at the 0.01 level (2tailed)

Graph 3: Graphical representation of correlation between UPDRS mental state with PASS



The graph shows negative correlation between severity of disease (mental state) and ADL

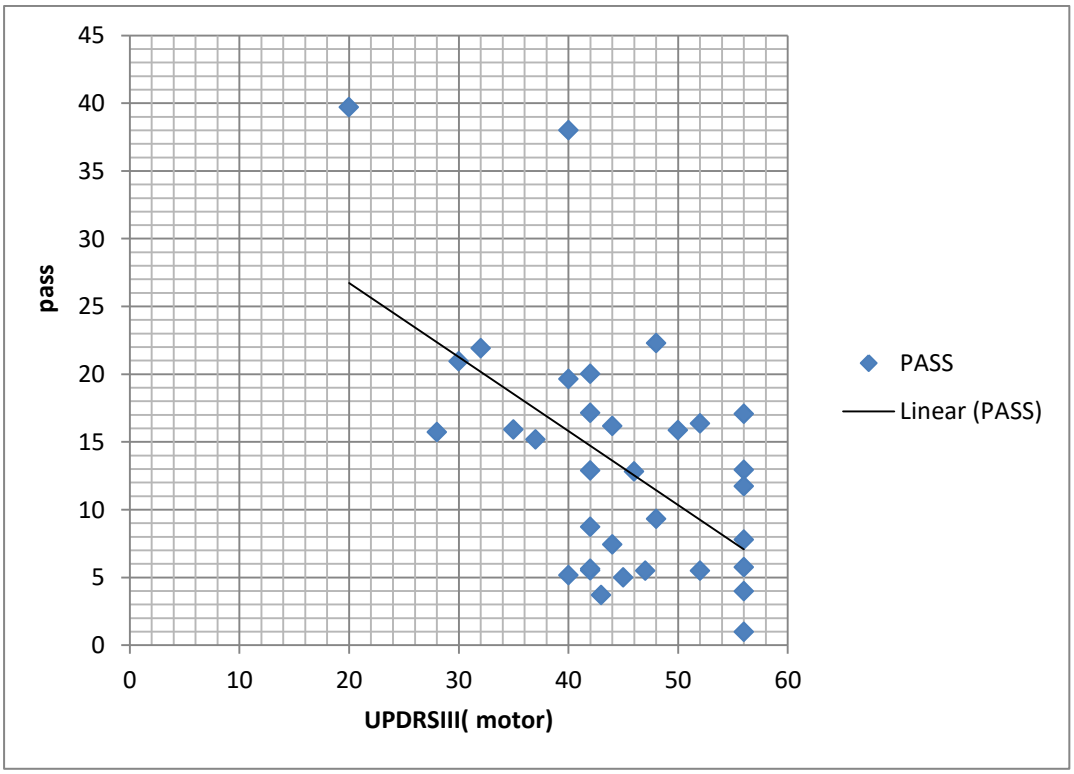
Table 5: Correlation between disease severity UPDRS III(MOTOR) with PASS

Variable	Pass	r value	P value
	FUNCTIONAL MOBILITY		
Disease Severity UPDRS III (Motor)	Bed mobility	-.607**	.000
	Stair use	-.621**	.000
	Toilet mobility	-539**	.001
	Bathtub and shower mobility	-.413*	.017
	Indoor walking	-.302	.088
	BADL		
	Oral hygiene	-.562**	.001
	Trimming toenails	-.378*	.030
	Dressing	-.617**	.000
	IADL WITH COGNITIVE EMPHASIS		
	Shopping (moneyman)	-.136	.450
	Bill paying by check	-.451**	.008
	Checkbook balancing	-.086	.636
	Mailing bills	-.26	.205
	Telephone use	-.391*	.025
	Medication management	-.554**	.001
	Obtaining critical information from the media auditory	-.599**	.000
	Obtaining critical information from media visual	-.171	.342
	Flash light repair	-.216	.228
	Home safety	-.191	.288
	Playing bingo	-.124	.492
	Oven use	-.433*	.012
	Stovetop use	-.417*	.012
	Use of sharp utensils	-458**	.007
	Clean up after meal preparation	-455**	.008
	IADL WITH PHSICAL EMPHASIS		
	Taking out garbage	-.481**	.005
	Changing bed linens	-.495**	.003
	Sweeping	-.277	.199

*correlation is significant at the 0.05 level (2 tailed)

** Correlation is significant at the 0.01 level (2tailed)

Graph 4 : Graphical representation of correlation between Disease Severity (Motor) UPDRS III and PASS



The graph shows negative correlation between Disease Severity (Motor Performance) and PASS

Table 6: ***Multiple Regression Analysis Predicting ADL***

Constant	**B**	**Std.Error**	**Beta**	**T**	**Sig**
SCOPA	3.360	.715	.645	4.697	.000
AES	-.683	.374	-.312	-1.828	.078
UPDRS1	-1.835	.554	-.512	-3.316	.002
UPDRS3	-7.962	1.873	-.607	-4.252	.000

RESULT

Participant Characteristics

Thirty three Parkinson's patient full filling the selection criteria participated in the study. The selected samples age ranged from 60-80years with a mean age of 68.9±5 (80%) The study participants included 15.16% females and 84.84% males. For the overall samples, the average of SCOPA was 15.15±3.57 (22%), AES was19.15±1.5 (22%), UPDRS mental 10.78±2.4(16%), UPDRS motor 44.39 ±8.99(56%) and PASS was .510±.613(2 %).

Correlation of SCOPA with PASS (table2)

Thirty two percent of the entire sample (n=33) reported low cognitive level, the table shows positive correlation between SCOPA and PASS. There was significant relationship among the 4 categories of ADL including functional mobility, BADL, CIADL and PIADL. Safety of function mobility i.e bed mobility , (r = .645.p=.000) , stair walking (r= .621, p=.000)toilet mobility (r =.612,p=.000), bath tub and shower mobility(r = .512, p=.002) had a high significant positive correlation with cognition.Whereas indoor walking (r=.441 , p=.010) had a medium significant positive correlation relationship with cognition. Among the 24 tasks included in PASS test components of BADl, oral hygiene (r=.544, p =.001), , dressing (r=.627, p= .000) had high positive correlation with cognition .Safety for CIADL components i.e bill paying by check(r =.537, p =.001) medication management (r =.540, p =.008) , obtaining critical information via auditory media(r=.479, p = .005) had a high positive correlation with cognition . In CIADL the components of , stove use , clean up after meal (r = .450, p =0.09), telephone use (r = .426 , p =.013) had a medium positive correlation with cognition. The PIADL components of changing bed linens(r = .351, p= .045), taking out garbage (r=.438, p =.011) had the medium significant correlation with cognition respectively. This shows that patients with better cognitive function had better performance safety in ADL. (Table 2, Graph:1)

Correlation of AES with PASS

Twenty seven percent of the entire sample (n=33) reported low motivation, the table shows no significant correlation between AES and PASS. Among the twenty six components of PASS only 2 components of CIADL showed a moderate negative correlation with apathy i.e obtaining critical information via visual media (p= .015 , r= -.422) and flash light repair (p=.054, , r= -.339)). This shows that apathy did not have as much effect on performance safety of ADl. (Table:3 Graph : 2)

Correlation of UPDRS mentation, behavior and mood with PASS.

Sixty three percentage of the entire sample (n=33) reported low mental state on the disease severity scale. The table 4 shows negative correlation between UPDRS mentation, behavior and mood and performance safety of ADL. Among the four categories of PASS the performance safety of functional mobility and very few components of CIADL had the most significant negative correlation with severity of PD (Mental state) but no correlation with PIADL. Among the 26 tasks of PASS the bed mobility(r = -.512, p =.002) and stair use(r = - .528, p=.002) had a high negative correlation but toilet mobility , (r = -.475 p = .028), shower mobility (r = -.382 , p =.028), dressing(r = -. 425, p = .014) , medication management (r = -.416, p =.016), playing bingo(r = -.371, p = .034) had the moderate negative correlation with severity of PD . This indicates that when the severity of PD increases performance safety of functional mobility reduces. (Table 4, Graph 3)

Correlation of UPDRS motor and PASS

Seventy nine percentage of entire sample (n=33) reported low motor performance, the table shows negative correlation between UPDRS motor and PASS. All the four categories of ADL in PASS scale had significant negative correlation with motor component of the severity of the disease. Especially safety of functional

mobility i.e bed mobility (r = -.607, p =.000), stair use (r = -.621, p =.000) toilet management (r= -.539 , p =.001) had a high negative correlation with the motor aspect of disease severity. On the other hand bath tub and shower (r = -.413, p = .017) had a moderate negative correlation with motor aspect of the disease severity. There was a high negative correlation between BADL components of oral hygiene (r = -.562, p=.001) and dressing (r = -.617 , p =.000)with disease severity . For CIADL), medication management (r= -.554, p = .001), obtaining critical information via auditory media (r = -.599, p =.000) had a high negative correlation and the components bill paying by check (r = =.451, p =.008), use of sharp utensils (r= -.458 , p = .007) , clean up after meal (r = -.455, , p -.008) had a moderate negative correlation .For PIADL taking out garbage (r = -.481, p =.005) and changing bed linens (r= -.495, p = .003)had a moderate correlation(0.01), trimming toenails (r = -.378, p =.030), telephone use (r=-.391, p = .025), oven use (r= -.433, p =.012), stove top use (r=-.417, p = .012) had a moderate negative correlation with the severity of disease. (Table 5 , graph 4). This indicates that as the motor components of the disease severity increased there was a decrease in the performance safety of ADL tasks.

Safety Predictors of Activity of daily living (Table 6)

Table 6: multiple regression analysis was used to predict safety in ADL performance With respect to cognition, motivation, severity of PD (mental state and motor).A significant regression was found with SCOPA(F =22.063, p<0.001) with an R^2 of .416.No significant regression was found with AES. A significant regression was found with severity of disease (mental state) (F=10.99, p <0.01) with an R^2 .262 and with motor component of severity of disease (F =18.09, p <0.001) with an R^2 .368. The predicted safety in ADL performance was 3.360 for cognitive, -1.853 for severity of disease (mental state) and -7.962 for severity of disease (motor performance). Cognitive is measured by SCOPA, severity of disease (mental state) and motor component of the severity of disease was measured by UPDRS.

The participants safety decreased by 3.360for each SCOPA, -1.853 for each severity of disease (mental state) and -7.962for each severity of disease (motor performance). Cognitive , severity of disease (mental state and motor performance) were significant predictors of safety in ADL performance .The regression results are presented in table 6and suggest the Motor severity of disease correlated more with functional mobility, BADL, PIADL and CIADL rather than with cognitive functions .

DISCUSSION

The main focus of the present study was to identify the predictors of the ADL. The result of the present study showed that cognitive, severity of disease (Mental State and Motor) are the safety predictors of performance in ADL among patients with PD. Performance safety in functional mobility and BIADL had the most significant correlation with cognitive and severity of disease.

According to the literature, amygdala plays a vital role in safety and mediation of emotional responses and memories. Schiller believes that "The human amygdala tracks the predictive aversive value of stimuli as they reverse from fear to safety". Failure to distinguish between safe and dangerous cues produces inappropriate responses[22], exposes the patient to more hazardous situations, and causes failure in performance of safe ADL [23].

It can be concluded that relationship between cognition, disease severity and performance safety of ADL is reasonable considering the neural basis of the underlying mechanism of both. Therefore there is an interrelation ship between performance safety of ADL and cognitive function and disease severity, which may lead to the concurrent occurrence of these disorders in PD. Specifically the PD patients in this study had enough motor disability (79%) and ADL showed selective relationships with severity of disease (motor) of the patient. Safety was affected by motor severity of the disease especially in physical activities such as bed mobility, stair use, toilet mobiity, oral hygiene, dressing which involve more muscular strength and postural stability. In fact as the disease progresses the symptoms tend to aggravate, which will naturally affect the performance safety of ADL.

Significant relation was also observed between performance safety in functional mobility and cognitive function, which is contrast with previous studies wherein only IADL showed selective relationship with executive functions[6].

Previous research has suggested that cognitive and motor dysfunction in PD do not share the same neuro pathological substrates (Cooper et al., 1991). The current findings indicate that physical and instrumental ADLs may also be sub served by separate neuro anatomical pathways, and that the breakdown in motor and cognitive processes in PD may differentially affect daily living skills.[13]

The results of the multiple regression analyses also revealed that specific components of motor functioning and cognitive functioning mediate performance on ADL showed a selective relationship with set-shifting abilities, even after motor control was taken into account. Self-regulation and cognitive shifting likely affect preparation of meals, taking medication in correct dosages at the correct time, and handling finances, and may decline considerably as the subcortical-frontal pathology of PD becomes more severe. The current results support previous findings that cognitive screening measures are predictive of ADL functioning (Nadler et al., 1993) and extend the findings to patients with PD. Further, more this study found a link between cognitive function, motor performance and ADL performances. This current result support the previous findings that a link between cognitive impairment, motor abnormalities and ADL performances.[13,]

It can be concluded that the relationship between safety and cognitive, severity of disease (motor performance) is reasonable, considering the normal neural basis of the underlying mechanism of safety and cognitive and severity of disease (Motor Performance). Therefore there is a interrelationship between safety and cognitive and severity of disease (Motor Scores), which may lead to concurrent occurrence of these disorder in PD. Safety was affected by cognitive and severity of disease (Motor Scores) especially in physical activities, such as carrying heavy objects , functional mobility and cleaning after meal preparation. The physical and cognitive functional related to age can affect ADL performance.

Many studies have evaluated the prevalence of apathy in patients with PD using different scales and have reported a prevalence rate of 16.5-70%, depending on

the assessment procedure and the study population.[21].The prevalence rate of apathy was 27% in the present study but there was no relation with apathy and performance safety of ADL. Only a notable relation was found with CIADL components obtaining critical information via visual media and flash light repair. This finding is in contrast with the previous study of Laatu et al who found that Apathy was significantly associated with ADL in PD (Lattu et al)[24]

Motivation in relation to planning organization and attention in combination with initiation of thoughts and behaviours is all important in an individual's ability to function independently (Ratko et al) [25]

CONCLUSION

In the present study, we found that cognitive functions motor and mental components of disease severity correlated significantly with performance safety of ADL in PD. The results indicate that more attention should be paid to identifying and treating cognitive, motor, mental symptoms. Though there was no significant relation between apathy and performance safety of ADL therapeutic interventions targeting apathy in PD would likely improve the quality of life of the patients. Hence, there is a need to identify these symptoms and treat them adequately to optimize safety predictors of ADL in patients with PD.

LIMITATIONS AND RECOMMENDATION

Limitations

- The sample size was small.
- Higher cognitive skills are not assessed.
- Though apathy was assessed, other psychiatric factors were not considered.

Recommendations

- To conduct on relationship between demographic factors and ADL safety.
- To conduct intervention study for Safety performance of ADL.
- To conduct longitudinal studying with large sample size.

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SCOPA-COG

Memory and learning

1. *Verbal recall*

Ten words are repeatedly shown for at least 4 seconds, get the patient to read them out loud, the time allowed for recall is unlimited. Underline each word that has been named. When words are named that were not shown, no penalty is given. When a false answer is changed (e.g. king into queen), it is correct.

Instruction: "Read the following 10 words aloud and try to remember as many as possible. After reading them all, name as many words as possible, the order of the words is not important".

10 words: Butter arm shore letter queen cabin pole ticket grass engine

(10 correct = 5, 8-9 correct = 4, 6-7 correct = 3, 5 correct = 2, 4 correct = 1, ≤ 3 correct= 0)

score ...../5

2. *Digit span backward*

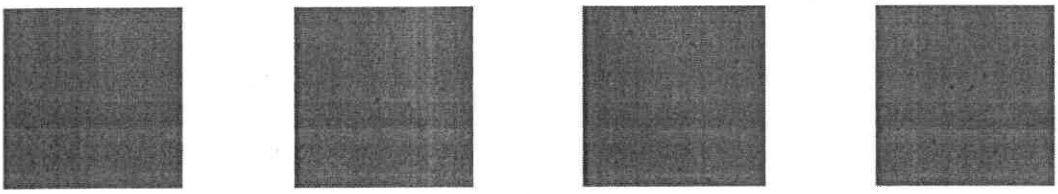
Ask the patient to repeat a series of numbers backwards; the numbers are read out separately, 1 second per number; if incorrectly repeated, the alternative in the second column is presented. Continue until both the first and the alternative series are repeated incorrectly. Make sure the time interval between numbers stays the same. Read the numbers calmly and make sure the time between numbers is equal. Record the highest series that is repeated correctly at least once; Give an example: "If I say 2-7-3, than you say (3-7-2)

backwards		score:
2-4	5-8	= 1
6-2-9	4-1-5	= 2
3-2-7-9	4-9-6-8	= 3
1-5-2-8-6	6-1-8-4-3	= 4
5-3-9-4-1-8	7-2-4-8-5-6	= 5
8-1-2-9-3-6-5	4-7-3-9-1-2-8	= 6
9-4-3-7-6-2-5-8	7-2-8-1-9-6-5-3	= 7

score ...../7

3. *Indicate cubes*

Point to the cubes in the order given below; the patient should copy this; do this slowly; the patient decides for himself with which hand he/she prefers. Indicate the cubes in the order as indicated. Observe carefully if the patient copies the order correctly. When a patient wants to correct a mistake, let him/her do the complete order again. This is not counted as a mistake. However, if the patient forgets the order and would like to see the order a second time, the researcher does not repeat the order again but starts with the next order.



1 2 3 4

a. 1-2-4-2

b. 1-2-3-4-3

c. 3-4-2-1-4

d. 1-4-2-3-4-1

e. 1-4-2-3

score ...../5

Attention

4. *Counting backwards (30 to 0)*

Instruction: "Would you subtract three from 30, and subtract three again from the result and continue till zero?".

Mistakes can be: the order, missing or not knowing a number, or not finishing off the series. Record the order of numbers named by the patient. If the patient asks where to start or how much to subtract, the researcher repeats the instructions but counts that as one mistake. If the patient makes a mistake but continues from that point to subtract three, it is only one mistake. If the patient stops the order and starts all over again, it is one mistake.

(0 mistakes = 2, 1 mistake = 1, ≥ 2 mistakes = 0)

score ...../2

5. *Months backwards*

Instruction: "Name the months of the year in reverse order, starting with the last month of the year".

Mistakes are: the order, missing or not knowing the next month, or not finishing off the series. Underline the months that are named correctly. When a month is passed over, this is a mistake, even if the patient corrects it later on. If the patient stops the order and starts all over again, it is one mistake. If the patient starts naming the month forward, repeat the instructions and count it as one mistake.

Dec- Nov-Oct-Sept-Aug-July-June-May-April-March-Feb-Jan.

(0 mistakes = 2, 1 mistake = 1, ≥ 2 mistakes = 0)

score ...../ 2

Executive functions

6. *Fist-edge-palm*

1. fist with ulnar side down, 2. stretched fingers with ulnar side down, 3. stretched fingers with palm down; Practice 5 times together with the patient, the patient chooses which hand he/she prefers. Do it slowly and tell the patient to watch carefully and repeat what you are doing. Practice first 5 rounds, with verbal help, e.g. FIST- STRETCH-PALM. Then tell the patient to make the movements alone.

Instructions: "Now it is your turn to make the three movements, fist-stretch-palm, 10 times in a row. You don't have to count, I will tell you when to stop".

Note the number of correct trios from a total of 10; Count carefully but not out loud. Every time a patient makes a wrong movement, count it as a mistake, even when the patient corrects it halfway.

(10 correct = 3, 9 correct = 2, 8 correct = 1, ≤ 7 correct = 0)

score ...../3

7. *Semantic fluency*

Tell the patient to name as many animal as he/she knows in one minute. Note all answers that are given by the patient. No repetition or variations of words, such as lion-lioness, tiger-tigress; categories are allowed, bird and pigeon are both correct. Count the number of animals correctly named. The purpose is that the patient generates the animals actively, therefore no clues are allowed. When the patient asks whether, for instance, naming different types of birds is allowed, this may be confirmed. When the patient almost immediately says he/she does not know any more animals, try to

stimulate the patient by saying "there is still a lot of time left", but do not give clues. When the patient starts naming other things than animals, do not correct the patient. Naming other things besides animals is not counted as an additional mistake.

(≥ 25 correct = 6, 20-24 = 5, 15-19 = 4, 10-14 = 3, 5-9 = 2, 1-4 = 1 0=0)

number of animals correct: .....

score ...../6

Write down all animals named:

8. *Dice*

Use 2 cards, one with YES = EVEN, NO = ODD; one with YES = HIGHER, NO = LOWER. Put the correct card face up next to the explanation of the test and make sure that the other, irrelevant card is out of sight. The first round (situation 1) is not scored, and the patient is corrected if necessary.

Situation 1: YES = EVEN

Put the card "YES=EVEN, NO=ODD" on the table and leave it there during the test.

Instruction: "Say YES for an even number on a dice and NO for an odd number, when you see a picture of a dice with an EVEN number of pips, I would like you to say YES, and NO when the number of pips is ODD".

Show the first two examples (3 even and 3 odd dices) and ask the patient "If you see one of these dice, do you say yes or no?" Tell the patient if the answer is correct or not. If the answer is not correct, explain why. It is important that the patient says YES or NO and not EVEN or ODD. Show the next two examples (with only one dice) and ask the patient "if you see this dice, do you say yes or no?" Tell the patient if the answer is correct or not. If the answer is not correct, explain why.

Then show the patient the following 10 dices. Correct the patient if the answer is wrong.

Situation 2: YES = HIGHER

With the card "example 1" (dice with 3 pips) the next condition starts. Put the card "YES=HIGHER, NO=LOWER" on the table and remove the former card.

Instruction: "Now, we change the test a little. When you see a picture of a dice that is higher than de dice on the page before, you say YES. When the dice is lower, you say NO".

Tell the patient you have an example (example 1). "Try to remember this dice" (turn the page) "Is this YES or NO?" Tell the patient whether the answer is correct or not. If the answer is not correct, explain why. Continue with example 2 and say "now remember this dice"(turn the page) "Is this YES or NO?" Tell the patient if the answer is correct or not. If the answer is not correct, explain why.

Then start the test and show all 10 dices one after another. The first response counts and corrections are not allowed. Do NOT correct when a wrong answer is given. If a patient corrects a wrong answer, it is still counted as a mistake. If the patient asks for the instruction, the researcher explains but that is counted as one mistake.

(10 correct = 3, 9 correct = 2, 8 correct =1, ≤ 7 correct = 0)

number correct: …./10

score ……../3

Visuo-spatial functions

9. *Assembling patterns*

The patient is shown 5 incomplete patterns and has to choose 2 or 3 shapes out of 4 to 6 possible alternatives in order to complete the pattern. First practice 2 figures.

Show the patient example A and give the instruction to choose the shapes that form the pattern. Tell the patient if the answer is correct or not. If the answer is not correct, explain why and give the correct solution. Repeat this with example B. Then show the 5 patterns. Do not tell the patient whether the answer is correct or not. There is no time limit. If the patient corrects a wrong answer, this is not counted as a mistake.

a. b. c. d. e.

score ……../5

SCOPA-COG

Memory

10. Delayed recall

Instruction: "Can you name as many as possible of the 10 words that you learned during the first test? "

Underline each word that has been named. When words are named that were not shown, no penalty is given. When a false answer is changed (e.g. king into queen), it is correct.

10 words: butter arm shore letter queen cabin pole ticket grass engine

(10 correct = 5, 8-9 correct = 4, 6-7 correct = 3, 5 correct = 2, 4 correct = 1, ≤ 3 correct= 0)

number of correct words: …. /10

score ……../5

Total COG score: … /43

Rating Scale*

Table 1. Apathy Evaluation Scale, Clinician Version [AES-C]

Name: _____ Date: _____
Rater: _____
Rate each item based on an interview of the subject. The interview should begin with a description of the subject's interest, activities and daily routine. Base your ratings on both verbal and non-verbal information. Ratings should be based on the past 4 weeks. For each item ratings should be judged:

Not at All Characteristic	Slightly Characteristic	Somewhat Characteristic	A Lot Characteristic
1	1	3	4

__ 1. S/he is interested in things.	+ C Q
__ 2. S/he gets things done during the day.	+ B Q
__ 3. Getting things started on his/her own is important to her/him.	+ C SE
__ 4. S/he is interested in having new experiences.	+ C Q
__ 5. S/he is interested in learning new things.	+ C Q
__ 6. S/he puts little effort into anything.	- B
__ 7. S/he approaches life with intensity.	+ E
__ 8. Seeing a job through to the end is important to her/him.	+ C SE
__ 9. He/she spends time doing things that interest her/him.	+ B
__ 10. Someone has to tell her/him what to do each day.	- B
__ 11. S/he is less concerned about his/her problems than her/him should be.	- C
__ 12. S/he has friends.	+ B Q
__ 13. Getting together with friends is important to her/him.	+ C SE
__ 14. When something good happens, he/she gets excited.	+ E
__ 15. S/he has an accurate understanding of her/him problems.	+ O
__ 16. Getting things done during the day is important to her/him.	+ C SE
__ 17. S/he has initiative.	+ O
__ 18. S/he has motivation.	+ O

Note: Items that have positive versus negative syntax are identified by +/-. Type of item: C = cognitive; B = behavior; E = emotional; O = other. The definitions of self-evaluation (SE) and quantifiable (Q) items are discussed in the administration guidelines [see Syllabus]. (Marin, 1991 [see References]) For self-rated and informant-rated versions of AES, the response options are Not at all true, Slightly true, etc. The Apathy Evaluation Scale was developed by Robert S. Marin, M.D. Development and validation studies are described in Marin et al., 1991 [see References]. Supplementary administration guidelines are available from the author.

*Reprinted from Seminars in Clinical Neuropsychiatry, Vol 1(4), Marin RS, Apathy: concept, syndrome, neural mechanisms, and treatment, 304-314, copyright 1996, with permission from Elsevier.

UNIFIED PARKINSON'S DISEASE RATING SCALE

I. MENTATION, BEHAVIOR AND MOOD

1. Intellectual Impairment
0 = None.
1 = Mild. Consistent forgetfulness with partial recollection of events and no other difficulties.
2 = Moderate memory loss, with disorientation and moderate difficulty handling complex problems. Mild but definite impairment of function at home with need of occasional prompting.
3 = Severe memory loss with disorientation for time and often to place. Severe impairment in handling problems.
4 = Severe memory loss with orientation preserved to person only. Unable to make judgements or solve problems. Requires much help with personal care. Cannot be left alone at all.

2. Thought Disorder (Due to dementia or drug intoxication)
0 = None.
1 = Vivid dreaming.
2 = "Benign" hallucinations with insight retained.
3 = Occasional to frequent hallucinations or delusions; without insight; could interfere with daily activities.
4 = Persistent hallucinations, delusions, or florrid psychosis. Not able to care for self.

3. Depression
1 = Periods of sadness or guilt greater than normal, never sustained for days or weeks.
2 = Sustained depression (1 week or more).
3 = Sustained depression with vegetative symptoms (insomnia, anorexia, weight loss, loss of interest).
4 = Sustained depression with vegetative symptoms and suicidal thoughts or intent.

4. Motivation/Initiative
0 = Normal.
1 = Less assertive than usual; more passive.
2 = Loss of initiative or disinterest in elective (nonroutine) activities.
3 = Loss of initiative or disinterest in day to day (routine) activities.
4 = Withdrawn, complete loss of motivation.

II. ACTIVITIES OF DAILY LIVING (for both "on" and "off")

5. Speech
0 = Normal.
1 = Mildly affected. No difficulty being understood.
2 = Moderately affected. Sometimes asked to repeat statements.
3 = Severely affected. Frequently asked to repeat statements.
4 = Unintelligible most of the time.

6. Salivation
0 = Normal.
1 = Slight but definite excess of saliva in mouth; may have nighttime drooling.
2 = Moderately excessive saliva; may have minimal drooling.
3 = Marked excess of saliva with some drooling.
4 = Marked drooling, requires constant tissue or handkerchief.

7. Swallowing
0 = Normal.
1 = Rare choking.
2 = Occasional choking.
3 = Requires soft food.
4 = Requires NG tube or gastrotomy feeding.

8. Handwriting
0 = Normal.
1 = Slightly slow or small.
2 = Moderately slow or small; all words are legible.
3 = Severely affected; not all words are legible.
4 = The majority of words are not legible.

9. Cutting food and handling utensils
0 = Normal.
1 = Somewhat slow and clumsy, but no help needed.
2 = Can cut most foods, although clumsy and slow; some help needed.
3 = Food must be cut by someone, but can still feed slowly.
4 = Needs to be fed.

10. Dressing
0 = Normal.
1 = Somewhat slow, but no help needed.
2 = Occasional assistance with buttoning, getting arms in sleeves.
3 = Considerable help required, but can do some things alone.
4 = Helpless.

11. Hygiene
0 = Normal.
1 = Somewhat slow, but no help needed.
2 = Needs help to shower or bathe; or very slow in hygienic care.
3 = Requires assistance for washing, brushing teeth, combing hair, going to bathroom.
4 = Foley catheter or other mechanical aids.

12. Turning in bed and adjusting bed clothes
0 = Normal.
1 = Somewhat slow and clumsy, but no help needed.
2 = Can turn alone or adjust sheets, but with great difficulty.
3 = Can initiate, but not turn or adjust sheets alone.
4 = Helpless.

13. Falling (unrelated to freezing)
0 = None.
1 = Rare falling.
2 = Occasionally falls, less than once per day.
3 = Falls an average of once daily.
4 = Falls more than once daily.

14. Freezing when walking
0 = None.
1 = Rare freezing when walking; may have starthesitation.
2 = Occasional freezing when walking.
3 = Frequent freezing. Occasionally falls from freezing.
4 = Frequent falls from freezing.

15. Walking
0 = Normal.
1 = Mild difficulty. May not swing arms or may tend to drag leg.
2 = Moderate difficulty, but requires little or no assistance.
3 = Severe disturbance of walking, requiring assistance.
4 = Cannot walk at all, even with assistance.

16. Tremor (Symptomatic complaint of tremor in any part of body.)
0 = Absent.
1 = Slight and infrequently present.
2 = Moderate; bothersome to patient.
3 = Severe; interferes with many activities.
4 = Marked; interferes with most activities.

17. Sensory complaints related to parkinsonism
0 = None.
1 = Occasionally has numbness, tingling, or mild aching.
2 = Frequently has numbness, tingling, or aching; not distressing.
3 = Frequent painful sensations.
4 = Excruciating pain.

III. MOTOR EXAMINATION

18. Speech
0 = Normal.
1 = Slight loss of expression, diction and/or volume.
2 = Monotone, slurred but understandable; moderately impaired.
3 = Marked impairment, difficult to understand.
4 = Unintelligible.

19. Facial Expression
0 = Normal.
1 = Minimal hypomimia, could be normal "Poker Face".
2 = Slight but definitely abnormal diminution of facial expression
3 = Moderate hypomimia; lips parted some of the time.
4 = Masked or fixed facies with severe or complete loss of facial expression; lips parted 1/4 inch or more.

20. Tremor at rest (head, upper and lower extremities)
0 = Absent.
1 = Slight and infrequently present.
2 = Mild in amplitude and persistent. Or moderate in amplitude, but only intermittently present.
3 = Moderate in amplitude and present most of the time.
4 = Marked in amplitude and present most of the time.

21. Action or Postural Tremor of hands
0 = Absent.
1 = Slight; present with action.
2 = Moderate in amplitude, present with action.
3 = Moderate in amplitude with posture holding as well as action.
4 = Marked in amplitude; interferes with feeding.

22. Rigidity (Judged on passive movement of major joints with patient relaxed in sitting position. Cogwheeling to be ignored.)
0 = Absent.
1 = Slight or detectable only when activated by mirror or other movements.
2 = Mild to moderate.
3 = Marked, but full range of motion easily achieved.
4 = Severe, range of motion achieved with difficulty.

23. Finger Taps (Patient taps thumb with index finger in rapid succession.)
0 = Normal.
1 = Mild slowing and/or reduction in amplitude.
2 = Moderately impaired. Definite and early fatiguing. May have occasional arrests in movement.
3 = Severely impaired. Frequent hesitation in initiating movements or arrests in ongoing movement.
4 = Can barely perform the task.

24. Hand Movements (Patient opens and closes hands in rapid succesion.)
0 = Normal.
1 = Mild slowing and/or reduction in amplitude.
2 = Moderately impaired. Definite and early fatiguing. May have occasional arrests in movement.
3 = Severely impaired. Frequent hesitation in initiating movements or arrests in ongoing movement.
4 = Can barely perform the task.

25. Rapid Alternating Movements of Hands (Pronation-supination movements of hands, vertically and horizontally, with as large an amplitude as possible, both hands simultaneously.)
0 = Normal.
1 = Mild slowing and/or reduction in amplitude.
2 = Moderately impaired. Definite and early fatiguing. May have occasional arrests in movement.
3 = Severely impaired. Frequent hesitation in initiating movements or arrests in ongoing movement.
4 = Can barely perform the task.

26. Leg Agility (Patient taps heel on the ground in rapid succession picking up entire leg. Amplitude should be at least 3 inches.)
0 = Normal.
1 = Mild slowing and/or reduction in amplitude.
2 = Moderately impaired. Definite and early fatiguing. May have occasional arrests in movement.
3 = Severely impaired. Frequent hesitation in initiating movements or arrests in ongoing movement.
4 = Can barely perform the task.

27. Arising from Chair (Patient attempts to rise from a straightbacked chair, with arms folded across chest.)
0 = Normal.
1 = Slow; or may need more than one attempt.
2 = Pushes self up from arms of seat.
3 = Tends to fall back and may have to try more than one time, but can get up without help.
4 = Unable to arise without help.

28. Posture
0 = Normal erect.
1 = Not quite erect, slightly stooped posture; could be normal for older person.
2 = Moderately stooped posture, definitely abnormal; can be slightly leaning to one side.
3 = Severely stooped posture with kyphosis; can be moderately leaning to one side.
4 = Marked flexion with extreme abnormality of posture.

29. Gait
0 = Normal.
1 = Walks slowly, may shuffle with short steps, but no festination (hastening steps) or propulsion.
2 = Walks with difficulty, but requires little or no assistance; may have some festination, short steps, or propulsion.
3 = Severe disturbance of gait, requiring assistance.
4 = Cannot walk at all, even with assistance.

30. Postural Stability (Response to sudden, strong posterior displacement produced by pull on shoulders while patient erect with eyes open and feet slightly apart. Patient is prepared.)
0 = Normal.
1 = Retropulsion, but recovers unaided.
2 = Absence of postural response; would fall if not caught by examiner.
3 = Very unstable, tends to lose balance spontaneously.
4 = Unable to stand without assistance.

31. Body Bradykinesia and Hypokinesia (Combining slowness, hesitancy, decreased armswing, small amplitude, and poverty of movement in general.)
0 = None.
1 = Minimal slowness, giving movement a deliberate character; could be normal for some persons. Possibly reduced amplitude.
2 = Mild degree of slowness and poverty of movement which is definitely abnormal. Alternatively, some reduced amplitude.
3 = Moderate slowness, poverty or small amplitude of movement.
4 = Marked slowness, poverty or small amplitude of movement.

IV. COMPLICATIONS OF THERAPY (In the past week)

A. DYSKINESIAS

32. Duration: What proportion of the waking day are dyskinesias present? (Historical information.)
0 = None
1 = 1-25% of day.
2 = 26-50% of day.
3 = 51-75% of day.
4 = 76-100% of day.

33. Disability: How disabling are the dyskinesias? (Historical information; may be modified by office examination.)
0 = Not disabling.
1 = Mildly disabling.
2 = Moderately disabling.
3 = Severely disabling.
4 = Completely disabled.

34. Painful Dyskinesias: How painful are the dyskinesias?
0 = No painful dyskinesias.
1 = Slight.
2 = Moderate.
3 = Severe.
4 = Marked.

35. Presence of Early Morning Dystonia (Historical information.)
0 = No
1 = Yes

B. CLINICAL FLUCTUATIONS

36. Are "off" periods predictable?
0 = No
1 = Yes

37. Are "off" periods unpredictable?
0 = No
1 = Yes

38. Do "off" periods come on suddenly, within a few seconds?
0 = No
1 = Yes

39. What proportion of the waking day is the patient "off" on average?
0 = None
1 = 1-25% of day.
2 = 26-50% of day.
3 = 51-75% of day.
4 = 76-100% of day.

C. OTHER COMPLICATIONS

40. Does the patient have anorexia, nausea, or vomiting?
0 = No
1 = Yes

41. Any sleep disturbances, such as insomnia or hypersomnolence?
0 = No
1 = Yes

42. Does the patient have symptomatic orthostasis?
(Record the patient's blood pressure, height and weight on the scoring form)
0 = No
1 = Yes

V. MODIFIED HOEHN AND YAHR STAGING

STAGE 0 = No signs of disease.
STAGE 1 = Unilateral disease.
STAGE 1.5 = Unilateral plus axial involvement.
STAGE 2 = Bilateral disease, without impairment of balance.
STAGE 2.5 = Mild bilateral disease, with recovery on pull test.
STAGE 3 = Mild to moderate bilateral disease; some postural instability; physically independent.
STAGE 4 = Severe disability; still able to walk or stand unassisted.
STAGE 5 = Wheelchair bound or bedridden unless aided.

VI. SCHWAB AND ENGLAND ACTIVITIES OF DAILY LIVING SCALE

100% = Completely independent. Able to do all chores without slowness, difficulty or impairment. Essentially normal. Unaware of any difficulty.
90% = Completely independent. Able to do all chores with some degree of slowness, difficulty and impairment. Might take twice as long. Beginning to be aware of difficulty.
80% = Completely independent in most chores. Takes twice as long. Conscious of difficulty and slowness.
70% = Not completely independent. More difficulty with some chores. Three to four times as long in some. Must spend a large part of the day with chores.
60% = Some dependency. Can do most chores, but exceedingly slowly and with much effort. Errors; some impossible.
50% = More dependent. Help with half, slower, etc. Difficulty with everything.
40% = Very dependent. Can assist with all chores, but few alone.
30% = With effort, now and then does a few chores alone or begins alone. Much help needed.
20% = Nothing alone. Can be a slight help with some chores. Severe invalid.
10% = Totally dependent, helpless. Complete invalid.
0% = Vegetative functions such as swallowing, bladder and bowel functions are not functioning. Bedridden.

DOCUMENTATION

Performance Assessment of Self-care Skills (PASS)	Independence					Safety	Adequacy	
	No Assists (Independent)	Verbal Assists (Min. Assist)	Gestures (Mod. Assist)	Physical Assists (Max. Assist)	Total Assist (Dependent)	Performance UNSAFE	Performance INADEQUATE	Not Assessed
Functional Mobility Domain								
Bed mobility								
Stair mobility								
Tub/shower mobility								
Toilet mobility								
Indoor walking								
BADL Domain								
Oral hygiene								
Dressing								
Trimming toenails								
Cognitive IADL Domain								
Shopping – cash exchange						NA		
Bill paying by check						NA		
Checkbook balancing						NA		
Preparing bills to be mailed						NA		
Telephone use						NA		
Medication management								
Obtaining critical information – Radio						NA		
Obtaining critical information – Newspaper						NA		
Small repairs (flashlight)								
Home safety awareness						NA		
Bingo						NA		
Oven use								
Stovetop use								
Use of sharp utensils								
IADL Domain - Physical emphasis								
Carrying out the garbage								
Changing bed linens								
Sweeping the floor								
Cleanup after meal preparation								

Comments/Recommendations:

(Therapist Signature) (Date)

DOCUMENTATION

Performance Assessment of Self-care Skills (PASS)	Independence					Safety	Adequacy	
	No Assists (Independent)	Verbal Assists (Min. Assist)	Gestures (Mod. Assist)	Physical Assists (Max. Assist)	Total Assist (Dependent)	Performance UNSAFE	Performance INADEQUATE	Not Assessed
Functional Mobility Domain								
Bed mobility								
Stair mobility								
Tub/shower mobility								
Toilet mobility								
Indoor walking								
BADL Domain								
Oral hygiene								
Dressing								
Trimming toenails								
Cognitive IADL Domain								
Shopping – cash exchange						NA		
Bill paying by check						NA		
Checkbook balancing						NA		
Preparing bills to be mailed						NA		
Telephone use						NA		
Medication management								
Obtaining critical information – Radio						NA		
Obtaining critical information – Newspaper						NA		
Small repairs (flashlight)								
Home safety awareness						NA		
Bingo						NA		
Oven use								
Stovetop use								
Use of sharp utensils								
IADL Domain - Physical emphasis								
Carrying out the garbage								
Changing bed linens								
Sweeping the floor								
Cleanup after meal preparation								

Comments/Recommendations:

(Therapist Signature) (Date)

KMCH ETHICS COMMITTEE

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EC Reg. No : ECR / 112 / Inst / TN / 2013

Ref: EC/AP/572/12/2017
12.12.2017

APPROVED

To

Mrs. Sujata Missal, M.Sc (OT), PGDR (OT),
Principal,
KMCH College of Occupational Therapy,
Avinashi road, Coimbatore - 641014

Dear Mrs. Sujata Missal,

The proposal entitled **"Safety Predictors in Performance of Activities of daily Living in Patients with Parkinson's Disease."** submitted by **Ms. Merin Babu** under your supervision was reviewed by the Ethics Committee in its meeting held on **09.12.2017** and permission is granted to carry out the study at **Kovai Medical Center and Hospital Ltd, Coimbatore, India.**

Regards,
Yours Sincerely,

Dr.Devdas Madhavan,
Member Secretary
Ethics Committee
Kovai Medical Center and Hospital

Copy to Clinical Guide:

Dr. V. Arul Selvan, MD, DM (Neuro), MRCP (UK), FRCP (Lon & Edin),
Consultant – Neurologist,
Kovai Medical Center and Hospital,
Avinashi Road, Coimbatore – 641014.

ETHICS COMMITTEE

KMCH ETHICS COMMITTEE

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KMCH ETHICS COMMITTEE MEMBERS LIST

S. No	Member Name	Designation	Representation	Designation To The Institution	Gender
1.	Dr.M.S. Thamizharasi	Retired Senior Civil Surgeon, Tamil Nadu Govt service	Chairperson	None	F
2	Dr. Devdas Madhavan	Consultant Urologist	Member Secretary	Consultant Urologist	M
3	Dr. V.Rajamani	Consultant Rheumatologist & Physician	Clinician	Consultant Rheumatologist & Physician	M
4	Dr.K. Senthilkumar	MD-Pharmacology Pharmacologist	Basic Medical Scientist	None	M
5	Dr.N. Selvarajan	Consultant Anaesthesiologist	Clinician	Consultant Anaesthesiologist	M
6	Dr. Sangita S.Mehta	Consultant Pathologist	Clinician	Consultant Pathologist	F
7	Dr. S.Madhavi	Principal	Member	Principal, KMCH college of Nursing	F
8	Dr. K.S.G.Arul Kumaran	Professor	Basic Medical Scientist	Professor, KMCH college of Pharmacy	M
9	Dr.K.S. Selvanayaki	Tamil Nadu Institute of Urban Studies (State).	Social Scientist	None	F
10	Mr. C.Tamil Selvan	VP-Materials	Convener	VP-Materials	M
11	Mr. T.C.Dinamani	Legal Advisor	Legal Expert	None	M
12	Mr.R.Krishnamoorthy	Priest	Theologist	Priest	M
13	Mr.K. Beno Micheal	Self-Employee	Lay person	Self-Employee	M

Dr.Devdas Madhavan,
Member Secretary
Ethics Committee
Kovai Medical Center and Hospital

ETHICS COMMITTEE

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03rd January, 2018

Ref: RC/001/2018

To

Mrs.Sujata Missal,M.Sc(OT), PGDR (OT),
Principal
KMCH College of Occupational Therapy,
Avinashi Road,
Coimbatore-641014,
Tamilnadu, India.

Dear Mrs.Sujata Missal,

The dissertation work titled **"Safety Predictors in Performance of Activities of daily Living in Patients with Parkinson's Disease"** presented by **Ms.Merin Babu,** 2nd year Master of Occupational Therapy under your guidance was discussed at Research Committee held on 09.12.2017 and unanimously decided to give permission to carry on the study at **Kovai Medical Center and Hospital Ltd, Coimbatore**, India.

Thanking you

Yours faithfully,

DR V.KUMARAN
03/01/2018
Head of the Institute/ Dean

Dr. V. KUMARAN MS., MCh.,
DEAN
Kovai Medical Center and Hospital
Coimbatore - 641 014 Tamil Nadu

Enclosure: Composition of Research Committee

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KMCH RESEARCH COMMITTEE MEMBERS LIST

S:NO	NAME	DESIGNATION
1	Dr.V.Kumaran	Head of the Institute/Dean
2	Dr. V.Arul Selvan	Guide
3	Dr.Deepak.T	Basic Science Faculty
4	Dr.V.Ganesh	Statistician
5	Dr.Pankaj Mehta	Member
6	Dr.Arul Selvan.V	Member
7	Dr.K.S.Rajkumar	Member
8	Dr.N.Selvarajan	Member
9	Dr.Rajendran.K	Member

DR.V.KUMARAN
03/01/2018
Head of the Institute/Dean

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Tamilnadu, India.

Dear Mrs.Sujata Missal,

The dissertation work titled **"Safety Predictors in Performance of Activities of daily Living in Patients with Parkinson's Disease"** presented by **Ms.Merin Babu,** 2nd year Master of Occupational Therapy under your guidance was discussed at Research Committee held on 09.12.2017 and unanimously decided to give permission to carry on the study at **Kovai Medical Center and Hospital Ltd, Coimbatore**, India.

Thanking you

Yours faithfully,

DR V.KUMARAN
03/01/2018
Head of the Institute/ Dean

Dr. V. KUMARAN MS., MCh.,
DEAN
Kovai Medical Center and Hospital
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Enclosure: Composition of Research Committee

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3	Dr.Deepak.T	Basic Science Faculty
4	Dr.V.Ganesh	Statistician
5	Dr.Pankaj Mehta	Member
6	Dr.Arul Selvan.V	Member
7	Dr.K.S.Rajkumar	Member
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MASTER CHART

NAME	AGE	SEX	SCOPA	AES	UPDRSMENTAL	UPDRSMOTOR	BEDMOBILITY	STAIRUSE	TOILET MOBILITY AND MANAGEMENT	ORALHYGEINE	BATH TUB AND SHOWER MOBILTY	TRIMMINGNAILS	DRESSING	SHOPPING MONEY MANAGEMENT	BILL PAYING BY CHECK	CHECK BOOK BALANCING	MAILING BILLS	TAKING OUT GARBAGE	TELE-PHONE USE	MEDICATION MANAGEMNT	CHANGING BED LINENS	OBTAINING CRITICA LINFORMATION	OBTATAINING CRITICAL INFORMATION	FLASH LIGHT REPAIR	SWEEPING	INDOOR WALKING	HOME SAFETY	PLAYING BINGO	OVEN USE	STOVE TO PUSE	USE OF SHARP UTENSILS	CLEAN-UP AFTER MEAL PREPRATION
ramagnan	78	1.00	13.00	17.00	11.00	42.00	0.83	0.00	0.00	1.00	0.00	0.85	0.00	0.10	0.23	0.00	0.00	0.27	0.00	0.50	0.00	0.00	0.25	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vellayan	65	1.00	7.00	18.00	12.00	56.00	0.00	0.00	0.00	0.20	0.00	0.15	0.00	0.10	0.00	0.00	0.00	1.00	0.00	0.40	0.00	0.00	1.00	1.00	0.33	0.00	0.00	0.00	0.50	0.00	0.75	0.00
sarojamm	68	2.00	11.00	17.00	12.00	56.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00
rajammal	70	2.00	9.00	17.00	16.00	56.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
kevanan	67	1.00	18.00	17.00	12.00	44.00	0.66	0.00	0.00	2.00	0.00	0.13	0.35	2.00	2.00	0.00	0.20	1.00	0.68	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.25	0.77	1.00	0.28	0.00	0.00
ravi	77	1.00	14.00	18.00	12.00	46.00	0.83	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
balan.p	68	1.00	14.00	18.00	14.00	43.00	0.00	0.00	0.00	2.00	0.00	1.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
jenotha	60	1.00	20.00	20.00	7.00	40.00	2.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.40	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00
ramaswam	78	1.00	14.00	18.00	15.00	50.00	1.00	0.00	1.00	1.76	1.00	1.00	0.00	1.00	1.00	1.77	1.00	2.00	0.00	1.60	0.00	1.00	1.00	1.00	0.60	0.00	0.00	0.00	0.50	0.37	0.05	0.00
krishnam	60	1.00	18.00	20.00	9.00	30.00	1.83	0.00	1.25	2.69	1.00	1.00	0.77	1.00	1.75	1.80	1.00	0.63	2.00	1.00	0.50	2.00	0.27	1.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.83
pravathi	70	2.00	18.00	18.00	12.00	48.00	0.66	0.00	1.25	1.00	1.00	2.00	0.33	0.45	2.00	1.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.66	0.00	0.00	0.00	1.00	1.00
shanmu	62	1.00	20.00	18.00	8.00	32.00	2.00	1.00	1.25	1.00	2.00	0.71	1.00	1.00	1.00	0.25	1.00	0.37	2.00	1.00	0.50	2.00	2.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	2.00	1.00
Bhageon	69	1.00	18.00	20.00	11.00	42.00	1.00	0.00	1.00	2.00	1.00	0.00	1.00	12.00	0.33	2.00	0.00	0.14	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
Ethivajo	72	1.00	22.00	18.00	8.00	28.00	2.00	2.00	2.00	2.00	2.00	1.00	2.00	2.00	2.00	1.00	0.85	2.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	0.85	2.00	2.00	0.00	1.00
Thiyanta	70	1.00	22.00	18.00	6.00	20.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.50	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Muthuswa	65	1.00	18.00	18.00	8.00	40.00	0.83	0.00	0.00	1.00	0.00	2.00	1.00	2.00	0.00	1.00	0.00	2.00	0.00	1.40	0.16	0.00	2.00	2.00	0.66	0.00	0.00	0.00	0.00	0.00	1.00	0.00
Thangara	65	1.00	13.00	21.00	9.00	42.00	0.00	0.00	0.00	1.76	0.00	2.00	0.00	1.00	0.25	0.70	0.00	0.14	0.00	1.60	0.00	0.00	1.00	1.00	1.00	0.00	0.00	1.50	0.00	0.00	1.00	0.00
Palanisw	70	1.00	15.00	20.00	10.00	42.00	1.00	0.00	1.25	1.26	1.00	1.00	0.77	0.50	0.75	1.00	1.00	0.63	2.00	1.00	0.50	2.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
Kaliyapp	60	1.00	16.00	21.00	12.00	37.00	0.00	0.00	0.33	1.00	0.00	1.00	0.26	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Joseph	68	1.00	15.00	18.00	11.00	42.00	0.66	0.00	0.00	1.00	0.00	1.00	0.21	0.00	0.00	0.00	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00
Ramakris	70	1.00	10.00	18.00	10.00	56.00	0.83	0.00	0.00	1.00	0.00	0.00	0.13	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.50	1.00	1.00	0.00	1.50	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Saraswat	68	2.00	11.00	20.00	15.00	56.00	0.00	0.00	0.27	0.68	1.00	0.00	0.12	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.75	1.00	1.00	0.00	1.00
Paravath	70	2.00	10.00	18.00	12.00	56.00	0.10	0.00	0.55	0.20	1.00	1.00	0.10	1.00	1.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.86	1.00	0.00	0.93	1.50	0.00	1.00	0.00	0.00
Balan	68	1.00	18.00	20.00	12.00	52.00	1.00	1.00	1.00	2.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.15	0.00	0.00	0.00	0.00	0.00
Lakshmi.	65	2.00	15.00	20.00	8.00	35.00	0.83	1.00	1.00	2.00	1.00	1.00	0.00	0.50	1.75	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.23	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Bhargeon	76	1.00	15.00	20.00	11.00	56.00	0.25	0.00	1.00	1.00	1.75	1.00	0.33	0.00	1.00	0.00	0.00	0.23	1.00	0.00	1.00	0.00	0.00	0.30	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Ganeshan	72	1.00	15.00	22.00	12.00	40.00	0.18	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00
Ethiraj	72	1.00	15.00	22.00	10.00	47.00	0.15	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Perumal	80	1.00	14.00	21.00	12.00	45.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ramakris	68	1.00	14.00	20.00	12.00	52.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Raman	68	1.00	16.00	20.00	12.00	48.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Kuppuswa	67	1.00	18.00	20.00	9.00	42.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Parmashe	70	1.00	14.00	21.00	6.00	44.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00