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THE USE OF STANDARDIZED ASSESSMENTS BY OCCUPATIONAL THERAPISTS IN THE MANAGEMENT OF THE UPPER EXTREMITY AFTER STROKE IN SOUTH AFRICA

Despina Phieros

A research report submitted in partial fulfillment of the requirements for the degree Masters of Science in Occupational Therapy to the Faculty of Health Sciences, School of Therapeutic Sciences, University of the Witwatersrand, Johannesburg

December 2015

Declaration

I, Despina Phieros, hereby declare that this research report, entitled "**The Use of Standardized Assessments by Occupational Therapists in the Management of the Upper Extremity after Stroke in South Africa"** is my own work and that any assistance obtained has been only in the form of professional guidance and supervision. No part of this research report has previously been submitted to any other research institution of higher learning or university. Where someone else's work was used, due acknowledgement has been given and references have been made accordingly to the requirements of the Faculty of Health Sciences at the University of the Witwatersrand. I claim complete responsibility for the conclusions drawn in this research study.

Signed …… Date.....

……..

Despina Phieros

Plagiarism Declaration



I _____ (Student number) _____ am a

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- I am aware that plagiarism (the use of someone else's work without their permission and / or without acknowledging the original source) is wrong.
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- I understand that the University of Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.

Signature: _____ Date: _____

In memory of dearest Granny Liz (Bat),

Stroke survivor and fighter

1931-2014

The author would like to express her thanks and gratitude to the following individuals whose contribution assisted in the completion of this research report and ultimately this Master's degree:

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Abstract

Occupational therapists worldwide are under pressure to provide evidence for the effectiveness of their intervention in managing stroke; with South African therapists facing additional challenges. In managing stroke, one of the most significant aspects the occupational therapists must focus on is the effects of the lesion on the upper extremity and how this has an influence on participation in occupations. The use of standardized upper extremity assessments can provide objective information and can guide the most effective intervention. The extent to which these are used in stroke rehabilitation in South Africa has not been explored until now. The results of this study depict how occupational therapists working in the neurological field are not making use of the available standardized upper extremity assessments. Their described barriers or limitations include: lack of time, resources and familiarity. There is a need for improved education and training regarding all aspects of standardized upper extremity assessments. Occupational therapists in all settings must start using standardized upper extremity assessments in practice to ensure they are joining the evidence based practice movement.

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Abbreviations

ADL – Activities of Daily Living

ARAT – Action Research Arm Test

AROM – Active Range of Motion

AMAT – Arm Motor Ability Test

BBT – Box and Blocks Test

CAHAI – Chedoke Arm and Hand Activity Inventory

CVA – Cerebrovascular Accident

DASH – Disabilities of the Arm, Shoulder and Hand

EBP – Evidence Based Practice

EBRSR – Evidence-Based Review of Stroke Rehabilitation

FCE – Functional Capacity Evaluation

FMA – Fugl-Meyer Assessment

HIV/AIDS - Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome

ICF – International Classification of Functioning, Disability and Health

MAS – Motor Assessment Scale

MDT – Multi-Disciplinary Team

NGO – Non-Governmental Organization

NHPT – Nine Hole Peg Test

OTASA – Occupational Therapy Association of South Africa

“OTs” – Occupational Therapists (focus group comment)

PROM – Passive Range of Motion

RMA – Rivermead Motor Assessment

ROM – Range of Motion

SA – South Africa

SSA – Sub-Saharan Africa

SULCS – Stroke Upper Limb Capacity Scale

WHO – World Health Organization

WMFT – Wolf Motor Function Test

Definitions

Activities of Daily Living – Activities oriented towards taking care of one's own body. These activities are necessary to living in the social world; they aid and underlie basic survival and well-being (1)

Evidence-Based Practice – "*the conscientious, explicit and judicious use of current best evidence to make decisions about the care of individual patients"(2).*

Neurological Rehabilitation – The process of educating the disabled person, involving them in decision making, planning and relevant goal setting to their current circumstances, so that they may participate and cope with family, friends, work and leisure as independently as possible (3). Neurological rehabilitation can assist the following cases: (i) people who will improve spontaneously, with almost full improvement over a short period – mild stroke, (ii) people who may improve steadily but not return to premorbid function – moderate stroke or traumatic brain injury, (iii) people who will not improve greatly and who will have residual disability, but may expect minimal progress – severe stroke or traumatic brain injury, (iv) people who will deteriorate slowly over time – Parkinson's disease or multiple sclerosis, (v) people who will unfortunately progress steadily and rapidly – motor neuron disease or malignant glioma (3).

Occupational Therapy – The therapeutic use of everyday life activities with individuals or groups so as to encourage participation in roles and situations in home, school, workplace, community and other settings. A therapy service geared towards the promotion of health and wellness to all those who have suffered illness, injury, disease, disorder, condition, impairment, disability, activity limitation or participation restriction (1)

Standardized Assessment - A test or evaluation with specific norms, standards and protocols. Testing and scoring procedures which are well defined and fixed and the interpretation involves the use of standardized norms (4).

Upper Extremity – The upper extremity can be defined as: the part of the human body - extending from the deltoid region to the hand; including the arm, axilla and shoulder (5).

Chapter One: Introduction

1.1 Introduction to the Study

The incidence of stroke in South Africa (SA) is increasing, and with improved medical management the number of survivors left with residual impairments and disability is on the rise (6, 7). Loss of movement or function in the upper extremity is a common impairment following a stroke and leads to dependence and disability (8, 9). Occupational therapists form part of the multidisciplinary team (MDT) treating stroke and have a major role in the rehabilitation of the upper extremity (10-12). In order to manage the increase in numbers of stroke patients, effective rehabilitation is crucial (13, 14).

In most professional work around the world, there are specific processes or protocols in place which direct the effectiveness with which the work is done. For occupational therapists this can be described as the occupational therapy process or the process of service delivery (1). This channels the occupational therapists' expertise and skills and enforces the adherence to specific standards and regulatory requirements. This process includes: evaluation, intervention and outcome selection and monitoring; it is dynamic in nature, allowing occupational therapists the opportunity to continually reassess and reflect on the outcomes of their intervention (1). As with any process it has to begin somewhere and in occupational therapy it begins with the significantly important step of evaluation or assessment, without which, a clear understanding of the patient would not be attained (1). Occupational therapists use their knowledge to select and interpret the appropriate assessments which will provide a rich picture of the patient and lead to the selection of the best treatment approach based on sound evidence (1). According to the Occupational Therapy Practice Framework: Domain & Process 2nd Edition, standardized assessments are preferred as, **the best assessment leads to best treatment (1).**

Although there is a process for service in place, a constant challenge for occupational therapists worldwide is providing evidence for the effectiveness of occupational therapy

interventions when treating the upper extremity post stroke. The recent emphasis on "Evidence-Based Practice" (EBP) is forcing a shift in the way we evaluate, decide upon, plan and execute treatment daily (2, 15-17). Thus, research and the evidence it provides must guide occupational therapy assessment and intervention. The choices made must be the best for the patient concerned and there must be supporting evidence to suggest this (15-17). However, most research is inconclusive and many comparative studies have been unable to select the better approach when assessing and treating the upper extremity following stroke. According to a systematic review published in 2003, another reason why it is difficult to describe the effectiveness of occupational therapy in the treatment of stroke is due to the variability of the assessments and interventions applied between occupational therapy settings and countries (10).

Occupational therapists must use standardized assessments in order to provide evidence of effective intervention and confirm progress as well as to assist in setting realistic and achievable goals with their patients (1). Yet, there are a number of barriers and obstacles for the occupational therapist in SA with regard to assessment tools and even with regard to the topic of evidence-based practice. Firstly, South African occupational therapists tend to employ assessment and intervention methods from foreign, western countries, without ensuring their effectiveness for the South African population (18). Secondly, time as a resource is scarce in the South African context, with the ratio of therapist to patient being significantly lower than western countries and the cases being quite complicated with the added influence of human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) in stroke (13, 18, 19). And thirdly, in many of the more rural areas and some urban areas the access to the internet, literary resources and even a library are difficult, never mind the access to standardized cognitive assessments (18). Lastly, there is a definite shortage of South African occupational therapy related research, as well as specific standardized upper extremity assessments developed specifically for the South African population (18).

The degree in which standardized upper extremity assessments are used amongst occupational therapists, in stroke rehabilitation, in SA is currently unknown. There are no guidelines available that suggest which standardized assessment is most beneficial or which ones are most appropriate. The opinions and beliefs of the South African occupational therapists with regard to the value and use of standardized assessments in the management of the upper extremity following stroke have never been explored, discussed or described.

This study will set out to explore the extent to which standardized upper extremity assessments are being used, the knowledge South African occupational therapists have about specific standardized upper extremity assessments and the factors that limit and facilitate their use in both the public and private sectors.

1.2 Statement of the Problem

Occupational therapists worldwide are under pressure to provide evidence of effective intervention (15, 20). Standardized assessments for upper extremity management after stroke can assist with both the proof and the efficacy of treatment methods selected; the degree to which South African occupational therapists make use of these assessments is unknown. There are no set guidelines or consensus regarding the best practice in terms of assessment when managing the upper extremity following stroke in SA and there is no current knowledge regarding the benefits and limitations to the use of these upper extremity assessments amongst South African occupational therapists treating people who have suffered stroke.

1.3 Purpose of the Study

The purpose of this study was to explore the thoughts and opinions of occupational therapists with regard to the knowledge, use, benefits of and limitations to the use of standardized assessments in the management of the upper extremity following stroke in SA. Following from this, this study will set out to inform occupational therapists regarding standardized upper extremity assessments which are currently available and nurture an

attitude towards EBP and the consistent use of standardized upper extremity assessments in the management of stroke.

1.4 Aim of the study

The aim of this study was to determine the current perceptions and use of standardized assessments by occupational therapists in the management of the upper extremity after stroke in SA.

1.5 Objectives of the study

The objectives of the study were as follows:

- To investigate the familiarity of occupational therapists regarding standardized assessments and establish which specific assessments are currently being used in the management of the upper extremity after stroke and how often, by using a survey.
- To identify the benefits perceived by the occupational therapists regarding the use of standardized upper extremity assessments in the management of the upper extremity after stroke, by using a survey.
- To establish perceptions with regard to the limitations and barriers in the use of standardized assessments by occupational therapists in the management of the upper extremity after stroke, by using a survey.
- To explore in detail the reasons for the above findings in terms of familiarity, frequency of use, benefits, limitations and barriers to the use of standardised upper extremity assessments by occupational therapists after stroke through the use of a focus group.

1.6 Justification of the Study

The study was justified, as there has been limited research into this particular topic in SA; specifically with regard to the use of standardized upper extremity assessments used in

stroke rehabilitation. Further research can be conducted using this study; specifically into the development of a South African specific upper extremity standardized assessment in stroke rehabilitation.

Chapter Two: Literature Review

2.1 Introduction

The literature review will begin with an overview of EBP and current research and how occupational therapy assessments play an important role in the dynamic process of the occupational therapy service. It will then take a look at stroke, the current situation in SA and how latest research describes the recovery of stroke; a link will be made here with regard to recovery and the need for excellent assessment. It will go on to describe the role of the occupational therapist when managing the various aspects of impairment following stroke with a specific focus on the upper extremity. Lastly, it will describe common assessments, found in the literature, which are used in the management of the upper extremity following stroke.

2.2 Evidence-Based Practice

In recent years there has been a drive toward encouraging occupational therapists to evaluate current literature and incorporate findings into their daily practice so as to enrich decision making and further improve the outcomes of their patients; EBP is imperative to the ongoing development of occupational therapy as a health profession (17, 21). EBP is defined as 'the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients (2). It is further described as the clinician's ability to use clinical experience together with external clinical information to provide the best treatment possible for each patient (2). It integrates what occupational therapists learn in daily practice, the patient's perceptions and experiences and good clinical research (21).

EBP is important as it informs occupational therapists on whether their treatment methods really work and guides the selection of the best assessment and treatment technique which has been proven effective (15, 17). EBP fuels clinical reasoning, provides a degree of accountability and assists in the provision of quality services while providing an accredited service for medical funders. The use of EBP can assist in making decisions about the cost effectiveness of certain treatment modalities as it keeps occupational therapists' knowledge

updated and improves their ability and skill in the use of the internet and other research tools (17). Furthermore, it gives MDTs a framework for problem solving and helps occupational therapists better communicate the benefits of treatment with their patients and the team (17, 22). Above all, EBP should motivate occupational therapists to contribute to current research (18).

As stroke patients form a large part of the occupational therapy caseload and there is a growing body of literature pertaining to stroke, the drive toward EBP in the rehabilitation of people who have suffered stroke is at a high (15). Research into methods of recovery following brain damage and stroke has enlightened us on not only the mechanisms of recovery and reorganization (neuroplasticity) but also on a number of principles important for effective plasticity (23). These principles guide intervention, but more importantly are influenced by the timing and method of effective assessment (23).

2.3 Assessment within the OT Process

Occupational therapists use a dynamic method of evaluation/assessment, intervention and outcome monitoring in their approach to patient care (1). Within this process it is recommended that standardized assessments be used wherever appropriate in order to ascertain objective information which can be used in the appropriate selection of the intervention approach (1). The use of standardized assessments is also encouraged so as to provide reliable and valid data which facilitates and rationalizes the need for occupational therapy intervention.

Evaluation involves the selection of specific and appropriate assessments for the individual patient and interpreting the assessment information adequately (1). Once this is complete the occupational therapist can set goals together with the patient and determine which methods will be employed to measure the outcomes of therapy intervention selected (1). Importantly, the outcome of evaluation is being able to outline an intervention approach based on the evidence and best practices (1). Ultimately, **effective assessment will lead to**

effective treatment; if the clearest picture of the patient is attained with all the specific detail required, it will direct the path toward the use of the most effective treatment methods.

Assessment plays such a vital role in stroke rehabilitation when considering some of the principles of experience-dependent neuroplasticity; where neuroplasticity is defined as the brain's ability to repair or reorganize itself in terms of connectivity, as well as, neural structure and function throughout life and following injury (23, 24). Firstly, the swift timing of the assessment in order to initiate treatment is important for 2 reasons: as without engaging in activity timeously, the neural circuits may worsen and, if left to develop their own compensation patterns of movement, the patient may be indirectly interfering with the reorganization in the brain responsible for improvement (23). Secondly, identifying the specific areas that require intervention is of utmost importance, as neural circuits strengthen with specificity of task performance (23). Lastly the importance of the intervention selected is based on assessment combined with the patient's needs, as without goal-directed motivation toward activity, neuroplasticity is not possible (23).

Quite a large topic in stroke literature at the moment is also the use of prognostic indicators on patient admission which can assist in determining their possible outcomes following a specific period of time or even rehabilitation (25, 26). These will be discussed further on in this review; however it is important to note here how accurate and specific assessment with the knowledge of these prognostic indicators can assist in identifying them on admission, can guide the selection of intervention and realistic goal setting.

If one is not familiar with the latest theory, with the evidence, the reality is that outdated methods of assessment together with old fashioned treatment techniques may be employed which could result in an injustice to the patient and in an overall negative outcome. More harm can be caused than good; without the identification of the specifics and the knowledge of neuroplasticity principles, more compensation can occur in the upper extremity rather than functional use; this could lead to the loss or degradation of the neural pathways and

ultimately could impact recovery (23) As mentioned above, neuroplasticity occurs throughout life and following any injury to the brain; stroke falls within this category. The next section of this literature review will discuss stroke in detail, from the basic definition to the current South African situation.

2.4 Stroke

2.4.1 Definition

A stroke or cerebrovascular accident (CVA) is, according to the World Health Organization (WHO) (27), an interruption of the blood supply to an area of the brain due to a clot/blockage in a blood vessel or a blood vessel rupture (27). A stroke caused by a ruptured blood vessel is called a haemorrhagic stroke while one caused by a clot is called an ischaemic stroke (28); the latter is responsible for 85% of strokes (28). Haemorrhagic strokes are normally caused by blood vessel abnormalities (28). Having a stroke has an impact on the rest of a person's life. The specific impairments that can occur following stroke can be specifically motoric in nature; such as loss of strength on one side of the body, loss of coordination or dexterity in the upper extremity, spasticity in the upper or lower extremity etc. One can also be affected in terms of cognitive and perceptual skills, speech and language, as well as visual abilities, not to mention the psychological impact the effects of the stroke can have on the individual. All these can influence independence in basic and complex daily tasks and leave the person dependent on others.

2.4.2 South African Situation

It is well recognised that stroke is one of the leading causes of death and disability in developing countries with 80% of stroke deaths occurring in developing countries (6). However, it is not only the fatality which is alarming, but also the increasing burden of care due to the reported 50% of stroke survivors who are left chronically disabled (29). In rural South Africa, the prevalence of stroke is 300 people in every 100 000 with 66% of these stroke survivors requiring assistance with at least 1 activity of daily living (ADL) (7).

The prevalence of stroke in rural SA has already reached that of the numbers in high income countries (30). Sub-Saharan Africa (SSA) is currently experiencing epidemiological transition; the types of sickness are slowly moving from those of infection, perinatal illness and poverty related diseases to more non-communicable diseases such as vascular disease; which implies that the prevalence of stroke will continue to increase (30). Stroke has become a major part of the occupational therapist's daily caseload and will continue to increase having a negative influence on the already strained ratio of occupational therapist to patient in SA (18).

HIV/AIDS has also had a significant influence on the increase in stroke prevalence in SA, as it adds to the risk of stroke as well as the complexity of the multi-diagnoses that accompany the patients (18, 19). HIV/AIDS related strokes are also found to have an earlier onset (19). In a study published in 2007 (19), the study population demographics included 6.2% HIV infected individuals with a mean age of 33.4 years while the mean age of the individuals not found to be HIV positive was 64 years (19). Of the HIV infected subjects, 91% were younger than 46 years which implies that the general HIV positive stroke patient is younger (19). The younger age implies that the roles in which these patients must return are more related to childcare and work as opposed to retirement. This, together with the complexity of their diagnoses brings with it a need for time, vast resources, evidence and above all in-depth assessments.

In summary, the prevalence of stroke in SA is high, as well as the mortality and with increased morbidity, so too is the burden of care. The epidemiological transition with HIV/AIDS at the foreground is having a substantial effect on the stroke numbers and the younger demographics, and there is a difference in stroke within our multi-ethnic society – the majority of our population tend to stroke earlier. Occupational therapists are treating stroke patients in all settings, and with the growing numbers and earlier onset it is imperative that treatment be effective in order to optimize recovery, limit the degree of residual disability and reintegrated this younger population back into society.

2.5 Recovery Following Stroke

There are no clear-cut time-frames or particular patterns of recovery that all people who have suffered from a stroke follow and only in recent research is there an indication as to the brain's incredible ability to restructure and reorganise itself following injury (24). New evidence suggests that the brain is in fact able to change in terms of its functionality, its structure and its connectivity throughout the lifespan and in response to neurological insult (24). This phenomenon is called neuroplasticity (24).

Recovery following any form of brain injury can take two different forms: spontaneous reorganization and training-induced recovery (24). The first, spontaneous reorganization normally occurs within the first three months following the stroke itself and entails the reversal of a number of factors including, mass effect, oedema, inflammation and the resolution of infiltration (24). Even the reperfusion of tissues can result in rapid spontaneous recovery following a stroke (24). If the individual is allowed certain experiences and early rehabilitation these may interact with the spontaneous factors and result in positive plastic changes (24). These experiences – goal-directed in nature together with the complexity in the environment and the repetition of demanding sensory rich tasks has been found to stimulate neuroplasticity (31); this describes training induced recovery (24).

Simply providing rehabilitation/training services is not enough, these services have to be based on sound evidence of the mechanisms or principles which promote neuroplasticity (23). A recent article has described 10 principles: (i) use it or lose it, (ii) use it and improve it, (iii) specificity of the task, (iv) repetition, (v) intensity, (vi) timing matters, (vii) salience, (viii) age is important (ix) transference, and (x) interference (23). The principles regarded as important in the management of the upper extremity post stroke with specific consideration given to thorough assessment will be discussed further.

Use it or lose it, as the name implies, means that if the upper extremity is not engaged in task performance for a period of time, the neural circuits will start to diminish (23). Use it and

improve it, suggests that task-directed action is better than simply moving the upper extremity (23). Specificity is described as acquiring a skill rather than just mere use, as this not only reorganizes the neural circuits but strengthens them as well (23). With regard to timing there are window periods in which the most recovery is noted, making it quite unfortunate if these pass by without intervention (23). And lastly, salience means that the task is intrinsically important to the patient which will motivate them to complete the task and aid in neuroplasticity (23). It is thus imperative that the upper extremity is assessed early so that the information gained from the assessment will aid in the selection of task-directed, specific activities which are important to the patient in order to have the greatest influence on the reorganization of the neural circuits (23).

With the rising numbers of young stroke patients and the above evidence suggesting that timing in the initiation of intervention, repetition of complex, skilled activity and salience will be beneficial towards recovery, the rise in costs of stroke care, treatment and management is evident (25). Occupational therapists need to provide the most effective yet efficient services to benefit the most number of patients possible (25). Besides simply initiating the precise assessments in good time, the use of reliable predictors of stroke outcomes is a necessity (25). These predictors found in the literature can assist with: formulating attainable goals, facilitating safe and effective discharges, providing realistic information to families together with adequate education and ensuring the correct recommendations are made with regard to the accessibility and adaptations of the home environment (25).

A critical review published in 1986 (32) describes a previous stroke, older age, urinary and bowel incontinence as well as visuo-spatial difficulties as negative prognostic indicators for functional outcomes following stroke (32). It was found that one could predict discharge functional outcomes based on initial functional outcomes, although the exact relationship here was unclear (32). In 1987 a study (33) set out to describe functional outcomes and recovery following stroke using the Barthel Index (33); 976 acute stroke patients were assessed as soon as they were diagnosed and referred to the research team, at three

weeks and again at six months (33). This study found that poor initial ADL functioning leads to an increased mortality and minimal to no functional recovery (33). Using a predetermined equation, this research study demonstrated that the patients who showed the most improvement after six months were initially continent, younger, had a higher Barthel Index score and showed difficulties with sitting balance (bizarre) (33). In this study, an assessment conducted at three weeks found that the patients who were again continent, younger, had higher Barthel Index scores, had more power in the arm and a higher IQ, were the patients who displayed the most improvements at six months post stroke (33).

Both the above studies showed greater overall improvement or functional outcome in younger patients making age a significant prognostic indicator. An article published in 1994 (34) described how younger patients showed greater benefit from stroke unit rehabilitation (34). In part, this could have been due to the extra diagnoses present in the older sample group such as, osteoarthritis and visual or auditory impairments not related to the stroke (34).

A critical review of literature published from 1966-1994 found the following prognostic indicators to be of relevance: disability on admission/level of functioning on admission, urinary continence, degree of motor paresis, age, level of consciousness in the first 48 hours following the onset of the stroke, orientation to time and place, the patient's functional ability following a recurrent stroke, sitting balance and the patient's social support network (25).

The above studies all depict indicators of functional recovery or outcome following stroke. It is however possible to gain functional ability without the recovery of the hemiplegic upper extremity, as patients use adapted techniques to overcome this. Therefore, one cannot assume that an increase in the functional outcome score relates directly to an improvement in upper extremity movement, strength and functional use. A study published in 2003 set out to explore the accuracy of early predictions of motor recovery in the hemiplegic upper extremity (26). This study focused on prognostic indicators which were specific to and were

linked to any improvement found in the upper extremity alone (26). This study found that one is able to make a prediction of the motor outcome at 6 months, as early as four weeks post onset of stroke (26). They found that the area of stroke: total anterior infarcts and right hemisphere strokes were related to poor upper extremity outcome (26). Visual involvement i.e. homonymous hemianopia, visual inattention and visual gaze difficulties were also linked to a negative upper extremity outcome (26).

A systematic review published in 2002 (35) found that the most important predictor of future upper extremity function was the initial motor score or grade of paresis assessed; the greater the paresis the poorer the outcome (35).

The above evidence indicates the place for prognostic indicators in stroke rehabilitation, as well as an introduction into the early use of specialized/standardized assessments to attain the specifics in the degree of upper extremity impairment. These studies suggest that occupational therapists are able to predict functional outcomes or upper extremity outcomes from an initial assessment. They are able to predict these as early as four weeks following the stroke simply based on initial motor scores or activity scores. The standardized upper extremity assessments will be able to identify the impairments which will now be discussed in detail.

2.6 Upper Extremity Impairment

A stroke can be a devastating event and can leave the individual with a great deal of residual impairment and loss of function (36). The most common of these impairments is hemiparesis or hemiplegia; mild weakness or paralysis on the side of the body opposite to the side of the lesion in the brain (36). It has been found that loss of upper extremity function persists in 45% of stroke patients and that an improvement in motor aspects of the upper extremity does not necessarily translate into improvements in functional use (9). The loss of upper extremity motor function contributes significantly to stroke-related disability and unfortunately there are many reports which emphasize the minimal recovery gained in severely affected

upper extremities (9, 37). The degree of functional recovery reported in the upper extremity varies in the literature, from studies which indicate that 5% of their population gained hand function after stroke to 52% of the population (37). It is a common conception that most recovery occurs within three months post stroke, however, a number of studies report significant improvement over one year post stroke (37). Challenges with regard to the management of the upper extremity have been found in the literature, from the use of outdated therapeutic interventions, to the focus on ADL performance and functional activity outcomes rather than motor recovery, to the adequate selection of assessment tools which will be sensitive to motor recovery rather than the adaptive response when a patient is forced to be functional (9, 37, 38).

2.6.1 Motor Impairments after Stroke

Stroke is characterized by a sudden onset in specific neurological signs related to the area in the brain in which the lesion or haemorrhage occurred. In the late 19th century, Hughlings Jackson, a neurologist, categorized the motor impairments arising from stroke into negative and positive features (39). Negative features were a loss of functions that previously existed, such as muscle strength and dexterity and the positive features were additional impairments such as spasticity and abnormal postures (39). Building onto these primary features were secondary impairments due to the amount of time it takes for a brain injury to improve and resolve, these secondary impairments included contractures or decreased muscle length, as well as decreased cardiovascular fitness (39).

2.6.1.1 Muscle Weakness

The Quick Reference Dictionary for Occupational Therapy (4) describes muscle strength as the degree of power that a muscle can produce against resistance by either objects or gravity (4). Loss of muscle strength or muscle weakness can be described as the inability to produce high levels of torque (39). Muscle weakness can be described as one of the most significant impairments to the upper extremity following stroke that directly influences functional use (37). According to clinical studies this is due to decreased motor unit

recruitment (37). In musculoskeletal conditions, this weakness can be a direct result of muscle atrophy, however in stroke; the weakness observed is due to the loss of descending excitation to the spinal segments which then results in the reduction of the amount of motor units activated (39). In the upper extremity the proximal muscles, those around the shoulder are found to be less severely affected than the distal muscles, those found at the hand and wrist (37). As a result, grip production, force and functional use are affected; the grip force production is slow and the stabilization is often weak and there is unequal force management and change (37). Furthermore, in a study published in 2004, it was reported that muscle weakness is a more significant contributor to loss of function than impairment in dexterity in the upper extremity post stroke (40).

2.6.1.2 Muscle Endurance

Muscle endurance can be described as the ability to sustain effort and resist fatigue (41). Muscle endurance refers the ability of a muscle or muscle group to sustain demanding activity (41). Muscle strength and muscle endurance are closely related; if the strength of a muscle or motor group improves, so will the endurance (41). It is well known that physical inactivity has an impact on the acceleration of aging and that inactivity following stroke can lead to overall deterioration (37). Literature describes how regular exercise in the elderly can improve cardiovascular fitness, muscle strength and general well-being (37); in a population where premorbid cardiovascular problems exist and can continue to be a risk factor for stroke, this is important. There have also been studies that link inactivity and overall low endurance following stroke with decreased self-esteem and motivation when patients are discharged home (37). Decreased endurance combined with the taxing effort of movement following hemiparesis can lead to poor outcomes (42). A study published in 1995 (42) described the role of aerobic fitness on the overall outcomes following stroke rehabilitation (42). In this study, the exercise group improved in their overall oxygen consumption, workload and the exercise time (42). They showed improved sensorimotor outcomes directly linked to improved aerobic capacity (42). Aerobic activity cannot be

overlooked during the rehabilitation process at both an inpatient and outpatient level, as inactivity will inevitably result in growing dysfunction and disability (37).

2.6.1.3 Loss of Dexterity

Dexterity can be described as the ability to separate, isolate or 'fractionate' movement required for skilled fine motor tasks (37). It entails being able to coordinate motor output so as to be able to perform tasks precisely and with speed (37); such as hand writing, keyboard typing, buttoning etc. The degree to which one can isolate the loss of dexterity with the loss of muscle strength is still unclear (37). With regard to the upper extremity however, if there is hemiplegia/paresis in the distal aspect of the arm, one can assume that dexterity will be affected. Loss of dexterity can be described as a negative feature following stroke and is said to be due to the lack of descending input on the motor neurons which are ultimately responsible for the coordination of motor unit activation (37).

2.6.1.4 Somatosensory Impairment

Loss of tactile (localization and discrimination of sensory input) as well as proprioceptive (joint position and movement sense) sensation, even the sensation of pain and temperature can be diminished or lost in the upper extremity following stroke (37). Up to 60% of stroke patients were recorded in a study having reported some form of somatosensory loss or fallout (43). This, according to experienced clinicians has an influence on the motor recovery of the upper extremity and its functional use in daily tasks (37); however it is still reported as an aspect/impairment which is poorly addressed during rehabilitation (37). In many instances, patients resort to one-handed/unilateral task performance with their unaffected upper extremities due to difficulties such as the inability to sense the pressure required when grasping objects, having objects fall out of their hands, not being able to sense of water is boiling hot (37). There have been a number of studies and case studies which describe how the coordination of motor output, the ability to sustain muscle force and the patient's spontaneous use of the upper extremity are all affected by decreased somatosensory feedback (37).

2.6.1.5 Hypertonicity & Spasticity

In recent literature there has been a shift in the belief that spasticity in the upper extremity following stroke is directly linked to functional disability (37); where spasticity is defined as a motor impairment which displays velocity-dependent increase in tonic stretch reflexes with exaggerated tendon jerk, due to the over excitability of the stretch reflex (8). Furthermore it is now believed that resistance to passive stretch could be due to intrinsic changes within the muscles themselves rather than simply reflex activity following stroke (8, 37). Muscle weakness and inactivity can cause stiffness and contracture; these secondary impairments can be termed as hypertonicity and can include shortening of the muscle tissue (37). Along with the old belief in spasticity being the direct cause of disability is that of the natural recovery of the upper extremity into patterns of movement or synergies – 'flexor and extensor synergies' (37). The more common, flexor synergy, is where the shoulder girdle is elevated and retracted, there is hyperextension, abduction and external rotation at the shoulder joint, flexion at the elbow and supination at the forearm (37). Many therapists still use these patterns as assessment and treatment methods which may lead to passive upper extremity therapy until active movement out of the synergies is noted (37). These patterns or synergies do not take muscle weakness and compensatory or adaptive responses to muscle imbalance into account as well as the common position an affected upper extremity is placed in for most of the day – 'resting in a minor flexor synergy on a pillow'- which can lead to muscle shortening (37). Yet another example of how outdated ideas and beliefs can hamper progress.

2.6.1.6 Motor Control

Motor control is the ability to regulate, govern and direct all the mechanisms responsible or necessary for movement (44). It is the person's ability to coordinate all the internal and external aspects that contribute to movement in order to produce a smooth and effective output (44). Movement happens as a result of the interaction between the individual/person, the task/activity and the environment (44).Within the individual one has to take into consideration the specific action they are performing or having difficulty performing, the way

their body is perceiving the movement, as well as the cognitive elements to movement such that lead to one's motivation to move (44). Motor control in not simply the ability to control a group of muscles to perform a task; the specifics of the task play a role, as well as the environment it is being performed in (44). Taken for granted on a daily basis is how upper extremity function and control plays a major role in our everyday lives, not only for hand function specific tasks, but also with regard to walking and mobility, balance reactions and protective responses (44). Impairment in motor control can further influence functional use of the upper extremity and hand function following stroke (44). Hand function can be broken down into reach, grasp and manipulation which can then be further split into the following components: (i) locating the target visually, (ii) reaching – moving the arm while being supported proximally, (iii) grasp – the formation of grip, grasp and release, (iv) in-hand manipulation (44). Each of these aspects can be affected following stroke.

2.6.1.7 Range of Motion (ROM)

There are two ways in which one can measure and describe range of motion in the upper extremity following stroke. (i) Passive range of motion (PROM) – this is the degree of motion present at each joint when moved by the therapist, (ii) active range of motion (AROM) – is the degree of motion present at each joint when the patient uses their own strength to move the upper extremity (41). AROM limitations in the upper extremity following stroke can be due to muscle weakness as mentioned above and not necessarily due to secondary impairments as a result of immobility (41). PROM impairments however can either be due skin, muscle and joint tissue shortening (hypertonicity due to weakness and inactivity), or due to oedema and pain (41). Occasionally one may find bony anylosis or myocytis osificans and fixed contractures – these can often lead to impairments in functional upper extremity use, specifically with regard to the reach, grasp and manipulation aspects of hand function (41). If an upper extremity is limited with regard to the full ROM within which it is required to move in for a given task, limitations in function may be noted.

As can be seen from the above literature, the upper extremity can be affected in many ways following a stroke. Impairments can be present from the onset of the stroke or may be as a result of prolonged immobility and inattention. The focus in many rehabilitation units, where time, as a resource is limited, is to simply focus on functional activity performance with the motor elements of the upper extremity suffering a huge injustice. Rapid assessment of the specifics is required so as to plan and initiate the best intervention possible to give the upper extremity a fighting chance. Occupational therapists are imperative members within any stroke rehabilitation MDT and have many important roles to perform as part of these teams (10-12). The roles of occupational therapists in stroke rehabilitation will now be discussed in detail.

2.7 The Role of OT and Importance in Stroke Rehabilitation

Occupational therapy interventions improve stroke outcomes and are thus a vital part of stroke rehabilitation (11). Stroke patients who are able to receive occupational therapy are found less likely to deteriorate and proceed to gain more independence in their daily activities and personal management tasks (11). Occupational therapy facilitates task performance through the improvement of performance skills or through the introduction and development of compensatory methods and techniques to overcome lost performance skills (10). The National Clinical Guidelines for Stroke from Denmark, the UK, Australia and the USA states that occupational therapy is a recommended part of early rehabilitation and should be included in all stroke units (17).

Reviews of the literature have found that a MDT approach is critical in stroke units and that occupational therapy is included within this MDT (12). A survey of trials conducted between the years 1985-2000 and found that most stroke units (67-100%) Occupational therapists formed part of the core MDT (12). This study also found that in 34-66% of stroke units occupational therapy intervention started early and consisted of an average of 40 minutes of therapy per patient per week day (12).

It is the occupational therapist's role in the MDT (specific to upper extremity therapy) to facilitate the patient's engagement in meaningful activities which will have a positive influence on secondary impairments and spasticity, activities which will improve muscle strength and endurance and improve joint range of motion where possible to all have an influence on functional activity performance (10). Through the use of meaningful activity and specific treatment guidelines the occupational therapist will aim to improve motor relearning and control and overall improve the use and dexterity in the upper extremity (10).

According to systematic review published in 2002 (10), and according to the International Classification of Functioning, Disability and Health (ICF), comprehensive occupational therapy intervention should include 6 areas, namely: (i) the training or sensory-motor functions, (ii) the training of cognitive functions and skills, (iii) the training of ADLs including dressing and grooming, as well as domestic tasks such as cooking, (iv) assistive device provision, advice and instruction, (v) the construction and provision of splints and slings, and (vi) the education of family members and/or caregivers (10).

Occupational therapists are encouraged to make use of specific guidelines to effective assessment and treatment which can be found in the Occupational Therapy Practice Framework: Domain and Process, 2nd Edition (Framework-II) (1). The 'Process' aspect of the framework covers the sequential yet dynamic approach which occupational therapists should use in the assessment and treatment of the patient (1). This process, as described above in paragraph 2.3, includes: evaluation, intervention and outcomes (1). To focus more on evaluation specific to stroke, the occupational therapist needs to assess the client's needs, their goals, concerns and ideas, following on from this the occupational therapist will select appropriate assessment tools, namely standardized assessments, to assess areas that have an influence on occupational performance and functional activity; which in many cases following stroke is the upper extremity (1). The standardized assessment chosen is in many instances dependent on time and resources, not necessarily on the effectiveness of the tool itself. The literature also describes how many standardized assessments have been

developed and used to assess the recovery of the upper extremity; however these are either time consuming, require costly equipment and/or are not sensitive to either motor changes or changes in functional performance and self-care. There has yet to be agreement as to which standardized assessment should be used as a standard in the assessment of the upper extremity post stroke.

2.8 Standardized Assessment

Occupational Therapists treating stroke patients are responsible for assessing components relevant to the intervention they provide. As mentioned above, these include assessing the patients' performance in daily activities as well as the impairments limiting their performance: spasticity and hypertonicity, muscle strength and endurance, ROM and motor control (36). According to Post-stroke Rehabilitation Clinical Practice Guidelines (45), it is recommended that **well validated and reliable standardized measures for assessment be used in both the acute and rehabilitation setting** in order to guide intervention decisions, standardize communication and monitor progress of each individual patient (45).

According the Evidence-Based Review of Stroke Rehabilitation (EBRSR) (46, 47), ongoing measurement and assessment of the effectiveness of one's intervention is at the core of good practice and provides the starting element to EBP (47). The EBRSR is a forum which attempts to consolidate literature available regarding stroke rehabilitation and provide evidence for the best possible clinical practice and stroke intervention (47).

There are a number of challenges that the EBRSR are faced with in their mission to establish standards and ideals for stroke rehabilitation (47). One of the most significant of these challenges is the absence of consensus regarding which specific measures or standardized assessments to use during the treatment of stroke survivors; a challenge that could also be found amongst occupational therapists in various settings of stroke rehabilitation (47).

The EBRSR therefore sets out, in their outcome measure review, to outline the most common standardized assessments or outcome measures used currently within stroke rehabilitation and to classify these measures based on their use and measurement qualities (47). To assist with this classification, the EBRSR aligned the measurement qualities of each assessment tool with the original model of the ICF established in 2001; most recently updated in 2014 (46-48).

Table 1 Standardized Assessments Involving the Evaluation of the Upper Extremity (motor recovery, sensory aspects and/or functional ability)

The Classification of Outcome Measures – ICF – Reviewed by the EBRSR (47)		
Body Structure (Impairments)	**Activities (Limitations to activity – disability)**	**Participation (Barriers to participation – handicap)**
*Fugl-Meyer Assessment	*Action Research Arm Test	Stroke Impact Scale
*Modified Ashworth Scale	*Box and Block Test	Stroke Specific Quality of Life
National Institutes of Health Stroke Scale	*Chedoke McMaster Stroke Assessment Scale	Canadian Occupational Performance Measure
Orpington Prognostic Scale	*Chedoke Arm and Hand Activity Inventory	EuroQol Quality of Life Scale
Canadian Neurological Scale	*Motor Assessment Scale	London Handicap Scale
Motor-free Visual Perception Test	*Nine-hole Peg Test	Medical Outcomes Study Short – Form 36
Montreal Cognitive Assessment	*Rivermead Motor Assessment - Rivermead Mobility Scale	Nottingham Health Profile
Mini Mental State Examination	*Wolf Motor Function Test	Reintegration to Normal Living Index
Line Bisection Test	Clinical Outcome Variables Scale	Stroke Adapted Sickness Impact Profile
Hospital Anxiety and Depression Scale	Barthel Index	
Geriatric Depression Scale	Berg Balance Scale	
General Health Questionnaire – 28	Functional Ambulation Categories	

Frenchay Aphasia Screening Test	Functional Independence Measure	
Clock Drawing Test	Frenchay Activities Index	
Behavioural Inattention Test	Rankin Handicap Scale	
Beck Depression Inventory	Timed Up and Go	

Past literature describes how the challenges facing the EBRSR may not necessarily be new challenges and that since the influx of development in standardized assessments, the frequency of standardized assessment use amongst occupational therapists has been somewhat impeded (49). The specific article published in 1987 discusses how the abundance of standardized assessments has proven a problem for occupational therapists with limited knowledge into which specific assessment would be best for their environment and their patients (49). The article explains a number of challenges regarding the clinical use of standardized assessments including the complexity at times of the assessment's format and instructions, the cost to the patient for the administration and interpretation of the assessment, as well as the cost to purchase the assessment in relation to its worth (49). In general, standardized assessment should be easy to administer and understand, should not take up too much time and must be appropriate to the population it was developed for (49).

A more recent study involving the perceptions of physiotherapists to the use of standardized assessments found the perceived problems to include: the assessments are confusing and difficult for the patients; take up too much of both the clinician's and patient's time and occasionally make the patients anxious (50). The standardized assessments can be difficult to interpret, are not culturally sensitive, are not relevant to the patients and do not help direct the plan of care (50). There can be significant language barriers and overall the physiotherapists found that the standardized assessments required more effort than what they are worth (50). There have been no studies found that assess the perceptions of occupational therapists or even South African occupational therapists regarding the use of

standardized assessments in general or more specifically standardized upper extremity assessments.

A number of the above assessments specific to the upper extremity will be described in detail below, as well as a few standardized upper extremity assessments not featured in the table.

2.8.1 Upper Extremity Standardized Assessments

2.8.1.1 Fugl-Meyer Assessment (FMA)

A number of early theorists described the recovery of the upper extremity in terms of a specific order or sequence in which the motor recovery may follow. The patterns of movement noted in these sequences were referred to as synergies and were described early on by Twitchell, Reynolds et al. and Brunnstrom (51). Bobath went further to describe the effects of postural instability on the functional ability and motor recovery of the limbs (51). The FMA takes these into account and includes a number of other aspects involved in the hemiplegic upper extremity. The following are included in the FMA: (i) Motor function and balance, (ii) Sensory qualities and (iii) PROM and the presence of joint pain (51). According to the synergistic theories in which the assessment is based, reflex action will precede voluntary movement (51). In each subtest, no reflex scores 0, partial reflex scores 1 and full reflex scores 2, until the individual is able to move out of the synergistic patterns (51). The FMA also includes a subtest on coordination and speed of the movement, whether there was a tremor or dysmetria present (51). It then moves on to the lower extremity, the speed and coordination of the movement here, balance in varying positions, then sensation (score 0 – anaesthesia, 1 – hypaesthesia and 2 for normaesthesia), and finally joint passive range of movement and any pain present (51). According to Strokengine, it takes about thirty to thirty five minutes to administer the full FMA and only twenty minutes when using only the motor subscale. The original article describes how the follow-up in the patients displayed very little divergence in testing and that this might have indicated how the rigid standardized procedure of the assessment and the decided scales provide little chance for error implying

that the procedure for assessment is reliable (51). A more recent study found the overall reliability of the FMA high (Intraclass, correlation coefficient - ICC=.96) (52).

2.8.1.2 Modified Ashworth Scale

The Modified Ashworth Scale is one which was created to measure and grade the resistance to passive stretch, or spasticity (53). It involves manually moving the limb through its range of motion and using an ordinal scale compiled by Ashworth to describe the resistance experienced (53). The original Ashworth Scale scores were as follows: 0 – normal muscle tone, 1 – a slight increase in muscle tone described as a 'catch' when the limb is moved, 2 – more significant increase in muscle tone, but the limb can be easily flexed, 3 – considerable increase in the muscle tone and 4 – the limb is rigid into either flexion or extension (53). The Modified Ashworth Scale includes a grade 1+ and different definitions which makes the scale more practical (53). The following describe the Modified Ashworth Scale: 0 – no increase in muscle tone, 1 – minimal increase in muscle tone felt as a catch and release at the end of range of motion when the limb is moved into flexion or extension, 1+ - slight increase in muscle tone felt as a catch and minimal resistance through the remainder (less than half) of the range or motion (ROM), 2 – marked increase in muscle tone through most of the ROM, however the limb is moved easily into flexion or extension, 3 – considerable increase in muscle tone, passive movement is difficult and 4 – the affected parts are rigid into flexion and extension (53). In a study set out to describe the interrater reliability of the Modified Ashworth Scale, the findings were that the reseachers agreed upon 86.7% of their ratings for 30 patients, thus the Kendall's tau correlation between the grades was .847 ($p < .001$) indicating a high degree of reliability (53).

2.8.1.3 Motor Assessment Scale (MAS)

The Motor Assessment Scale (MAS) was developed by Carr & Shepherd following their years of research and experience with a variety of other assessment tools (54). According to Carr & Shepherd, many assessments were too lengthy, some lacked an upper extremity element, and others had to be performed by the whole MDT whilst a number of them had no

scoring system (54). The idea that motor recovery was either based on synergistic movements or developmental sequences was not in line with Carr & Shepherd's ideas of motor recovery following stroke (54). The MAS was created to achieve the following: (i) be brief and easy to administer, (ii) have a high degree of interrater reliability, (iii) provide objectivity with regard to the results without the use of any expensive equipment, (iv) be expressed in terms that are easily understood by other health professionals, (v) produce a change in the score only if an actual change in the individual's performance is achieved, (vi) avoid duplication of information (vii) measure relevant everyday motor activities and (viii) measure the individual's best performance (54). The score sheet for the MAS includes 8 different items representing eight motor functions and includes one aspect relating to muscle tone (54). The eight motor functions include: supine to side lying, supine to sitting over the edge of the bed, balanced sitting, sitting to standing, walking, upper-arm functions, hand movements and advanced hand activities (54). Each item is scored on a seven point scale, from 0-6 where 6 is the optimal performance (54). Criteria for each point are given to assist the examiner in the scoring of observed performance (54). Test-retest reliability of the MAS was found by assessing fourteen patients at four week intervals. The MAS was found to be very reliable with an interrater correlation of .95 and a test-retest correlation of .98 (54).

2.8.1.4 Rivermead Motor Assessment (RMA)

According to Stroke Engine Assess (55), the RMA was developed in 1979 by Lincoln & Leadbitter in order to assess the motor performance of acute and chronic stroke patients (55). It was designed to be used in clinical practice and for research (55). The assessment consists of test items in three main subtests which are hierarchically ordered; gross motor functions (13 items) e.g. walking with or without an aid, leg and trunk movements (10 items) e.g. standing on one leg and flexing at the knee and arm movements (15 items) e.g. cutting theraputty (55). Each item is scored either 0 – no response/fail or 1 – response/pass. When 3 consecutive attempts to complete a particular item are failed it is assumed that the rest of the items in the subtest will not be achieved, therefore, not all aspects need to be

administrated (55). The maximum time the test should take is 45minutes, according to the developers (55). The equipment required includes: 20cm high block, pencil, volleyball, tennis ball, piece of paper, knife and fork, plate and container, beanbag, cord, putty, watch and chronometer and a non-slip mat (55). The RMA is only available in English (55). In the original study, the researchers had seven therapists score ten patients at four week intervals (55). They reported adequate test-retest reliability (r=.0.66) for the gross motor subtest and excellent reliability for the leg and trunk (r=0.93) and the arm subscales (r=0.88) (55).

2.8.1.5 Action Research Arm Test (ARAT)

The ARAT, according to Stroke Engine Assess (55) was developed by Ronald Lyle in 1981 to evaluate changes in the upper extremity function of individuals who are left with hemiplegia following cortical damage (55). The test assesses the individual's ability to handle and manipulate objects varying in size, weight and structure; therefore it is an arm-specific measure. Lyle adapted the Upper Extremity Function Test (UEFT) (55). The ARAT consists of 19 items which are grouped into four subtests: grasp, grip, pinch and gross movement. A score of 0-3 is given, with 3 indicating maximum success. According to Lyle, as the items in each subtest are hierarchically arranged from easy to difficult, the individual must be asked to perform the most difficult task first, if he/she succeeds and is scored a 3, a maximum score will be given to all preceding subtests (55). Both upper extremities are assessed, starting with the less affected side, and each item is timed (55). Originally, the ARAT required standardized equipment, even a specially designed table and chair with no arm rests; however today, one is able to compile test material by following the specifications (55). Other equipment includes: wooden blocks, cricket ball, two alloy tubes, a washer and bolt, two glasses, a marble, a ball bearing, a stopwatch and paper and pencil for the evaluator (55). These can all be ordered from the Netherlands. If all 19 items are administered, the test should take between 20minutes to complete (55). According to the original literature, test-retest reliability for the ARAT is excellent (Pearson correlation r=0.98) (55). This was found during the study of 20 individuals who had sustained some form of

cortical damage who were assessed at one week intervals by the same assessor under the same conditions (55). The inter-rater reliability in the same study was excellent too (Pearson correlation r=0.99) (55). In 1985 a study set out to compare the ARAT with the FMA in terms of validity and reliability; correlations were measured at two months and eight months using Spearman correlation coefficient (56). Excellent correlations were found ($p < 0.001$) (56).

2.8.1.6 Wolf Motor Function Test (WMFT)

Many standardized upper extremity assessments do not provide information which displays the link between the basis for treatment planning and the plan for the restoration of function (57). The WMFT quantifies upper extremity movement through timed single or multiple joint movements and functional activities (57). Each task progresses in complexity of the task, the movements required are arranged from proximal to distal joints, it assesses whole extremity movement and movement speed, and there are few tools required and only minimal training necessary (57). According to Stroke Engine Assess, the most commonly used version of the WMFT includes 17 items, the first six are timed functional tasks, tasks 7-14 are measures of strength and the rest involve the analysis of movement quality (55). The less affected arm is assessed first and the types of tasks include: simply placing the arm on the table – to flipping cards (55, 57). A score is give from 1-6 per item (55, 57). The equipment required includes: table, chair, side table, box, free weights, can, pencil, paperclip, checkers, cars, key lock with key, towel, basket and a dynamometer (55). The original literature compared the WMFT and the FMA (57). Both tests displayed agreement between the assessors at each session ($p < 0.001$) and the test scores were related for the affected upper extremity in individuals who had suffered stroke ($p < 0.02$) (57).

2.8.1.7 Chedoke McMaster Stroke Assessment Scale

The Chedoke McMaster Stroke Assessment Scale measures the physical limitations, impairments and disabilities that negatively influence the lives of individuals following stroke (58). It was developed by Gowland, Van Hullenar, Moreland, Vanspall, Barreca, Ward, Huijbregts, Stratford and Barclay-Goddard and describes motor impairment according to the

physical recovery stages first described by Twitchell and later Brunnstrom (58). The Chedoke McMaster Stroke Assessment Scale has an impairment inventory and an activity inventory (58). The impairment inventory groups individuals based on their stage of motor recovery and the severity of their physical impairments which assists when planning or selecting particular interventions and evaluating overall treatment outcomes (58). The activity inventory measures change in functional ability or activities (58). The impairment inventory consists of six areas or dimensions (recovery stage of the arm, hand, leg, foot, postural control and shoulder pain), each are scored on a seven point scale based on the stages of motor recovery and shoulder pain on the degree of pain present (55, 58). The activity inventory was originally called the disability inventory but was changed in 1999 when the WHO changed the terminology (55, 58). It is made up of 10 gross motor function aspects e.g. supine to side lying on strong side, and 5 walking aspects e.g. walking outdoors, several blocks (58). The activity inventory is scored on a 1-7 point scale taken from the FIM and is based on the amount of assistance required: 1 – Total assistance, 2 – The patient is trying (25%), 3 – moderate assistance is required and the patient is able to perform 50%, 4 – minimal assistance is required, the patient performs 75% of the task, 5 – only set-up or supervision is required, 6 – modified independence, the use of an assistive device and 7 – independence (58). The full assessment takes between 45-60 minutes to administer (55). According to the original study, intrarater, interrater and test-retest reliabilities were estimated and the reliability coefficients for the total scores ranged between 0.97-0.99 (58). The impairment inventory total had a correlation with the FMA ($r=0.95$, $p < 0.001$) and the previous disability inventory correlated with the FIM ($r=0.79$, $p < 0.05$) (55, 58).

2.8.1.8 Chedoke Arm and Hand Activity Inventory (CAHAI)

The CAHAI was also developed by Barreca et al, in 2004, as a complimentary measure to the Chedoke McMaster Stroke Assessment (55). This assessment is specifically aimed at upper extremity ability and includes daily functional tasks as part of the assessment (59). According to an in depth review by Stroke Engine Assess, there are three shortened

versions of the CAHAI; CAHAI-7, CAHAI-8 and CAHAI-9, which were all developed in 2006 (55). The original version consisted of 13 day-to-day functional tasks: (i) open a jar of coffee, (ii) dial 911, (iii) draw a line with a ruler, (iv) pour a glass of water, (v) wring out a wash cloth, (vi) fasten 5 buttons, (vii) dry your back with a towel, (viii) put toothpaste on a toothbrush, (ix) cut medium consistency putty, (x) clean reading glasses, (xi) zip up a zipper, (xii) place a container on a table and (xiii) carry a bag up a flight of stairs (55, 59). The CAHAI-7 includes the first seven, CAHAI-8 the first eight and the CAHAI-9, the first nine items (55). The scoring works similarly to that of the FIM describes above an each item is therefore awarded a score of 1-7 depending on the amount of assistance the individual required to perform the activity (55). This assessment does not test each upper extremity independently, but rather includes a section where the administrator records the position of the affected upper extremity during the execution of each functional task (55). According to the developers, the test should take between 16 and 25 minutes to administer (55, 59). The authors also offer a half-day training course on the test and a training DVD can be purchased directly from them and shipped to wherever required from Canada (55). The CAHAI is available in English, French, Hebrew, Italian and German (55). The developers of the CAHAI describe in an article published in 2005 how the interrater reliability of the CAHAI is excellent with an ICC of .98, in addition, they discuss the high correlations found between the CAHAI, the Chedoke McMaster Stroke Assessment Scale and the ARAT (1-sided, p=0.001) (55) .

2.8.1.9 Box and Blocks Test (BBT)

The idea behind the BBT originally stemmed from the work done by A. Jean Ayers and Patricia Holser Buehler with adults suffering from cerebral palsy (60). They would use a bowl with blocks in order to assess the manual dexterity of their patients (60). In 1957, Patricia Holser Buehler and Elizabeth Fuchs changed the equipment required and the way the test was presented to include a specific box with blocks instead of a bowl; this was then copyrighted (60). In 1985, Mathiowetz et al. established normative data on the BBT (60). The box and blocks used for the test have specific dimensions and are made of particular

material (60). The box is divided into 2 equal compartments and there are 150 blocks in the test (60). The box is placed lengthwise in front of the individual, at the midline and the compartment holding all the blacks is orientated closer to the upper extremity being tested (60). The unaffected upper extremity is tested first and each is given a 15 second trial period (60). The aim is to assess the number of blocks that can be transferred from one compartment to the next in 60seconds (60). There are standardized instructions which accompany the test (60). According to the norms established by Mathiowetz et al. a healthy male between 20-80 years of age can transfer an average of 77 blocks with the right upper extremity and 75 blocks with the left upper extremity (55). Healthy males over 60 years of age averaged 61-70 blocks (55). Healthy females between 20-80 years of age should average 78 blocks with the right upper extremity and 76 blocks with the left (55). Healthy females over the age of 80 years averaged 63-76 blocks (55). Interrater reliability was established during the original pilot study of the BBT, this was done by having two raters administer the same group of patients; a high correlation was found between the raters (r=1.000 – right hand & r=.999 – left hand) (55). Validity has been established by correlating the BBT with the Minnesota Rate of Manipulation Test; the result attained was r=.91 (55).

2.8.1.10 Nine-Hole Peg Test (NHPT)

The NHPT was developed as an inexpensive tool to measure finger dexterity or fine motor coordination (55). The NHPT was first developed and used by Kellor et al. in 1971 and as with the BBT above; normative data on the test was attained by Mathiowetz et al. in 1985 (55). The test consists of a board with a square of 9 holes on the one side, a shallow dish on the other and 9 pegs that fit into the holes. The unaffected upper extremity is assessed first and the dish is orientated towards the upper extremity being used with the board placed in front of the individual at their midline (55). Instructions are given to take pegs one by one and place them in the holes, once all nine have been placed, the individual has to remove each one by one and place them back into the shallow dish as fast as they can (55). According to the norms established by Mathiowetz et al. healthy adult males should be able to complete

the test in an average of 19seconds with the right upper extremity and 20.6 seconds with the left, healthy females completed the NHPT in 17.9 seconds with the right upper extremity and 19.6 seconds with the left (55). A study published in 1985 set out to describe the intra-rater reliability of the NHPT with 26 healthy young females; the subjects were assessed at one week intervals by the same rater (55). Using the Pearson correlation, the study found excellent correlation for the right hand (r = 0.69) and adequate correlation for the left hand (r = 0.43) (55). The same study found excellent agreement for interrater reliability (r = 0.97 – right hand and r = 0.99 – left hand) (55). In 1989 a study set out to explore the concurrent and predictive validity of the NHPT. It terms of concurrent validity, the study compared three assessments including the NHPT to the Frenchay Arm Test; the NHPT had the lowest sensitivity as 27% of the cases assessed were misclassified (55). It was also found that the NHPT conducted at one month post stroke was unable to predict outcomes at six months (55). Finally, in terms of construct validity, a study published in 1986 found that there is an excellent correlation between the NHPT and the Motricity Index (r = 0.82) (55).

2.8.1.11 Stroke Upper Limb Capacity Scale (SULCS)

The SULCS is one of the more recent assessment tools having been developed in 2011 by Houwink et al (61). Their concerns regarding other available assessments included: some assessments not being suitable for individuals with severe upper extremity impairments and other assessments including body function assessments (joint range etc.) together with upper extremity capacity or function assessments (61). Their unease related to the fact that upper extremity rehabilitation following stroke should focus on the assessment and treatment of the affected upper extremity's capacity to be involved in and perform daily activities (61). The SULCS was therefore created to assess the upper extremities capacity and capability to perform daily tasks (61). The test contains 10 items which can be related to daily tasks around the home; these items were decided on following widespread interviews with the relevant health professionals (61). The final version of the SULCS contains three items for proximal upper extremity capacity, without the use of the wrist, hand or fingers, four items for

upper limb use which requires basic hand and finger activity and four items which require fine motor dexterity within the hand and fingers (61). Each item is scored either 0 or 1: 0 – unable to perform the task and 1 – able to perform the task (61). It takes an average of six minutes to administer the SULCS and it is available online (61). The SULCS is reported to have a strong correlation to the ARAT (p = .91) and the Rivermead Motor Assessment (RMA) (p = .85) (61).

2.8.1.12 Jebsen-Taylor Hand Function Test (JHFT)

According to an in-depth review by Stroke Engine (55), the Jebsen-Taylor Hand Function Test was developed by Jebsen et al. in 1969 (55). This test can be called the Jebsen Hand Function Test (JHFT) or the Jebsen-Taylor Test of Hand Function (55). It was developed as a standardized tool to measure functional hand motor skills. The JHFT consists of seven items that set out to assess: fine motor skills, non-weighted functional skills and weighted functional skills (55). The items include: (i) writing a short sentence, (ii) turning over a 3x5 inch card, (iii) picking up small familiar objects, (iv) simulated feeding, (v) stacking checkers, (vi) picking up large lightweight cans and (vii) picking up large heavy cans (55). Scores are given per item based on the time it takes to complete the task; all items, excluding the writing should take under 10 seconds to perform and the full assessment takes between 15-45 minutes to complete (55). According to the review, Jebsen et al. established norms in 1969 with 300 healthy individuals (55). The test is initiated with the non-dominant hand (55). No standardized tools and materials are required however the following equipment needs to be used: wooden board, ballpoint pen, un-ruled sheets of paper, index cards, coffee can, paper clips, teaspoon, kidney beans, wooden checkers, empty cans and one pound full cans (55). The JHFT is available in English and Portuguese (55). A study published in 2010 found excellent intra-rater (ICC = 0.997) and interater (ICC = 1.0) reliability for the JHFT (55). According to Stroke Engine, there has not been a study to date that has measured the construct validity of the JHFT (55).

2.8.1.13 Arm Motor Ability Test (AMAT)

The AMAT was developed in 1987 by Kopp et al. It is an upper extremity specific assessment that tests the ability of the individual while performing daily activities (62). Activities included in the AMAT are: cutting (knife and fork), moving an object to your mouth, eating with a spoon, drinking from a mug, opening a jar, tying a shoelace, ability to use a telephone, wiping up spilt water, putting on a button up shirt/cardigan, putting on a T-shirt and being able to prop oneself up to reach a light switch or door (62, 63). According to a review of upper extremity ability assessments conducted in 2009 which compared the ARAT, the CAHAI and the AMAT, the AMAT is quite lengthy in terms of administration time (63). The review also noted that even though the CAHAI and the AMAT have similar test items, the AMAT takes longer to administer as one has to note the patient's functional ability, the quality of their performance, as well as the performance time taken (63). At the time of the AMAT's development, the interrater reliabilities were .95 and .99. The test-restest reliabilities were .93 and .99 and the correlations to the Motricity Index were .45 to .61 (62).

2.8.1.14 The ABILHAND

The ABILHAND was developed by Penta et al. in 1998 and is an interview based assessment which originally set out to assess the individual's perceived ability to perform both unimanual and bimanual tasks (64). It originally consisted of 57 items and assessed the individual's ability to perform the task irrespective of the methods which he/she may employ (55). The original version was altered as it was found that the stroke patients were able to perform the unimanual tasks, regardless of hand dominance (55). Therefore, a specific version was created for individuals who have suffered from stroke which includes only bimanual tasks and alternate unimanual tasks (cutting nails etc.) (55). The original version included a 4 level scoring system (impossible, very difficult, difficult and easy) whereas the stroke version only uses (impossible, any difficulty and easy) (55). The ABILHAND now includes 23 items from the most difficult i.e. hammering a nail and threading a needle to easy tasks i.e. unwrapping a chocolate bar and washing hands (55). The measure was developed initially for those with rheumatoid arthritis, then later stroke and systemic

sclerosis, it takes 10-30 minutes to administer and is available in French, English, Swedish, Dutch and Italian (55). The original developers reported high reliability of the ABILHAND in a sample of 103 stroke patient using Rasch analysis (Rasch separation reliability = 0.90) (64, 65).

2.8.1.15 Disabilities of the Arm, Shoulder and Hand (DASH)

The DASH resulted from the collaborative efforts of the American Academy of Orthopaedic Surgeons' (AAOS) Outcomes Research Committee and the Institute for Work and Health (IWH) (65). It was developed between 1995 and 1996 (65). The idea arose from the impact that health related quality of life (HRQOL) was changing the way health professionals were viewing injury and disease (65). A measure was needed to identify the impact of the whole upper extremity and all its symptoms on functional ability and performance (65, 66). During the development of the DASH, it was necessary to identify and select symptoms to be assessed as well as the functional tasks these symptoms affect (65, 66). Under the term symptoms, the developer selected: pain, weakness, stiffness and tingling/numbness. In terms of functional activity, these were divided into physical (house chores etc.), social (family care etc.) and psychological (self-image) (65, 66). An in depth review by Stroke Engine (55) describes the DASH as a self-report questionnaire that assesses physical functions and symptoms of the upper extremity (55). There are 30 items included in the questionnaire, as well as an optional work and sports/performing arts section (55). The individual is required to score the perception of their abilities or degree of symptom experience on a 5-point Likert Scale (55). The DASH is said to take only five minutes to administer with patients who have musculoskeletal impairments, however slightly longer with patients who have suffered from stroke (55). There is also a QuickDASH version which contains only 11 items as well as the optional work and sports/performing arts section (55). The DASH can be downloaded from the website for free and is available in a number of languages including South African English and Afrikaans and is currently in the process of being translated into Isi-Xhosa (55, 66). In terms of reliability of the DASH, the Cronbach

Alpha coefficient was above 0.9, which indicates good internal consistency. With the regard to longitudinal construct validity found in the original literature - ($p = 0.01$) (66).

In summary, there are a large variety of assessments available to use specifically in assessing the upper extremity following stroke. The above assessments also include the assessment of various aspects which limit function and use of the upper extremity after stroke, as well as self-reported questionnaires on the patients' personal experience and perception of their own abilities. None of these assessments have been developed in South Africa, and only few are available at no cost. All of the above tests are available in English and only one has been translated into another one of the 11 official languages in South Africa. A large number of the above tests require standardized equipment or simply a lot of equipment to administer as well as time, with some tests requiring as much as 45 minutes to complete.

Learning, understanding and applying standardized assessments can prove to be a method of gaining understanding into the positive outcomes of occupational therapy intervention, guiding therapy goal setting and problem solving, as well as contribute to research; it can nudge therapists towards EBP (67-71). However, therapists' use of these and their perceptions towards these are not encouraging (50, 67-72). Not many therapists make use of standardized assessments and those who do report that even though they improve the communication with patients and helped direct their care - they can be confusing and time consuming, as well as difficult to administer (50, 68, 70-72). With the opinion that the use of standardized upper extremity assessments can assist in the facilitation of EBP, one cannot exclude occupational therapists perceptions of the term EBP, as well as their perceptions towards its use, specifically in the context of SA.

2.9 Occupational Therapists Perceptions of EBP & the use of Standardized Assessments

According to a study published in 2001 (15), occupational therapists were found to use EBP to a minor degree. The types of EBP used were more related to experts' opinions and

working with experienced therapists rather than reading and analysing randomised control trials (15). The occupational therapists from the study reported that they gained their knowledge from their colleagues, post graduate courses and used treatment methods that appeared to work (15). Reviewing the literature and attaining a post graduate degree were of little importance (15). According to this study, factors that influenced the use of EBP included: its relevance to practice, basic knowledge about EPB and time (15). The conclusion to this study was that even though the occupational therapists reported that EBP was important, few of them possessed the skill to use it maximally; instead, they would choose intervention to suit their patients' needs and their level of skill (15).

When discussing the elements and perceptions of EBP within a South African context, there are a few things to consider. South African occupational therapists have been and are still guilty of simply applying foreign, western information and approaches regarding assessment and intervention without questioning the appropriateness of these to our population (18). A reason behind this could stem from the general lack of quality South African research available to validate and guide therapeutic processes (18). The great divide between the public and the private sectors is quite evident in SA. The public sector can be in many instances barren in terms of resources and basic access to the internet, and both sectors struggle with low ratios of therapists to patients; time becomes a precious commodity (18). Occupational therapists can also challenge the idea of EBP in that the South African occupational therapy undergraduate curriculum and training takes four full time years of holistic education; one would thereafter question the need to re-evaluate one's knowledge and training (18).

A study set out to describe American occupational therapists' perceptions of EBP in 1999, found three main themes to describe these perceptions towards EBP; these three themes included: EBP is looking for understanding, EBP is associated with research and EBP is a potential threat to the occupational therapist (16). In looking for understanding the occupational therapists described EBP as the processing of looking for the best intervention

for each individual patient (16). The occupational therapists in this study described EBP as either participating in a research study group to contribute new research topics or as reviewing and analysing current research (16). A number of the occupational therapists perceived EBP as threatening to their comfort and current confidence in practice, reporting that they felt it would confuse all the information learned at an undergraduate level (16). When applying this to the above South African take on this, EBP can disturb the routine ways in which things are done and in which assessment and intervention currently work in the SA context. It challenges the knowledge acquired through the difficult university years and can alter the view of the occupational therapy role in the assessment and treatment of stroke in SA.

Another study specific to EBP and the perceptions of American physiotherapists found that even though the therapists agreed that EBP was beneficial and improved patient outcomes, a major challenge outlined amongst older therapists was the knowledge, confidence and skill in the search and retrieval of evidence-based literature (22). According to this study, EBP is more easily used amongst younger therapists as the latest trend for undergraduate training facilities is to include EBP principles and research methods within the coursework (22).

When looking specifically at perceptions regarding standardized assessments, there are currently no South African based studies specific to stroke rehabilitation, however, a review of studies conducted in many other countries found that there is a general consensus among clinicians regarding the use of standardized assessments in practice. Clinicians agree that there is benefit to standardized assessments in patient care however the general use of these is low (50, 67-72). One of the main reasons behind this is that there is lack of knowledge regarding which types of assessments are most effective, the properties of these assessments and generally how to find these tools (67, 69-72). Other perceived barriers include lack of time and therapy space, lack of management support as well as being forced to make use of specific measures and assessments that are not always appropriate (50, 67, 69-72). A number of studies also describe that therapists develop habitual behaviours of not

using any standardized tools; they are comfortable with this and are unwilling to change these current behaviours (50, 69). Many clinicians report that they do not want to use lengthy assessments that require tons of equipment and material to be used (71).

In conclusion, occupational therapists and clinicians in general are aware of the importance of EBP and the use of standardised assessments, but not many of them are using them (22, 50, 67, 69-71). They report little knowledge and skill regarding both and even report EBP as threatening to their current practice (16, 22, 67, 70, 71). With limited time and resources, improving on this knowledge base and trying new methods gets ushered to the 'I'll get back to that' part of their brains. This can lead to the use of outdated methods of assessment and treatment which can ultimately be ineffective and result in a colossal waste of the already restricted time each patient is granted.

The use of standardized assessments as a mode for EBP is vital as it forms the basis of providing occupational therapists with objective information into the effectiveness of their daily intervention (1). As mentioned above, the EBRSR, reports that ongoing measurement and assessment of the effectiveness of one's intervention is at the core of good practice and provides the starting element to EBP (47).

2.10 Summary

Currently in South Africa we have an increasing number of stroke patients, these stroke patients are complex and younger and due to improvements in medical care and intervention are surviving and live with disability (18, 19, 30). As stroke includes a number of motor impairments namely: spasticity and hypertonicity, muscle weakness, decreased endurance, loss of dexterity and motor control and impairments in ROM (37, 41); it is imperative that accurate and measurable assessment be conducted so as to guide the most effective method of treatment (1).

To execute the most appropriate assessment and thereafter select the best treatment approach, occupational therapists need to understand what the prognosis is following stroke

and what the initial prognostic indicators are, as well as fully understand the principles of neuroplasticity which essentially requires fast action and specific treatment methods (23, 25). In order to get a clear picture of a patient and identify the relevant prognostic indicators, standardized assessments can be used. These standardized assessments can provide specific details, prognostic information, help set goals and provide realistic outcomes to rehabilitation (25). They can also provide the initial information used in the problem solving process to provide the most effective treatment possible in limited time afforded (25).

Many studies done outside SA describe how clinicians all agree that the use of standardized assessment and EBP are highly valuable to them and more so to the patient; however due to a number of factors they are not currently being used maximally (15, 16, 22, 50, 67, 69-72). The studies report that therapists are not confident with research and literature review, that they are not knowledgeable regarding specific assessments and their properties and that overall they lack time, space, support and the willingness to change behaviours (22, 67, 69-72). And, even though time and resources come up in international studies, for South African occupational therapists the issues relate to poor staff to patient ratios as well as simply no access to the internet or a library (18).

At the end of the day, the use of standardised assessments forms part of EBP. Whether South African occupational therapists use either is the crux of this study.

Chapter Three: Research Methodology

3.1 Introduction

This chapter describes the method employed in the execution of this research study. It will explain the design chosen, the methods of data collection and analysis, the population which was studied and will go on to describe the ethical considerations made.

3.2 Research Design

The study followed the mixed-methods research design and was carried out in two phases.

Phase one

This took the form of a descriptive study design and was executed via a survey using a questionnaire.

Phase two

Phase two of the study used an exploratory, phenomenological design executed through the use of a focus group. This part of the study set out to explore the opinions and beliefs of occupational therapists working in the field of neurological rehabilitation in and around Johannesburg within SA, regarding the use of standardized upper extremity assessments.

3.3 Population Studied

The population included occupational therapists who had worked or who, at the time of the study were working in the field of neurological rehabilitation, and who were registered with the Occupational Therapy Association of South Africa (OTASA).

3.4 Study Sample

The study sample was made up of those occupational therapists who completed the questionnaire.

3.4.1 Selection of Subjects

Phase one

The sample for the first part of the study included occupational therapists with neurological experience who were registered with OTASA. The sampling method used was convenience sampling. The information of those occupational therapists with a special interest in neurological rehabilitation was attained from OTASA and the survey was sent out via e-mail

to these clinicians. As this may have limited the study, the researcher also phoned public and private hospitals, as well as, private practices in and around Johannesburg and Pretoria and e-mailed questionnaires directly to the therapists practicing there.

Phase two

The second part of the study included occupational therapists who had answered the questionnaire/survey, had 2 or more years' experience in the field of neurological rehabilitation and whose contribution would diversify the information attained. The group was made up of occupational therapists with varying years' of experience, working in both the private and the public sector in and around Johannesburg. The sampling technique used here was purposive or judgmental sampling.

3.4.1.1 Inclusion Criteria

Phase one

This phase included occupational therapists who were OTASA members and who had worked in, or who, at the time of the study, were working in neurological rehabilitation in SA.

Phase two

These participants had to be occupational therapists who had completed the questionnaire, had 2 or more years' experience in the field of neurological rehabilitation and lived in and around the greater Johannesburg region.

Due to logistical reasons, focus group participants needed to be in the area accessible to the focus group venue.

3.4.1.2 Exclusion Criteria

Phase one

There were none.

Phase two

There were none.

3.4.2 Sample Size

Phase one

According to the OTASA database of members, there are 163 occupational therapists who have indicated that they work in the field of neurological rehabilitation. There were 76 responses gained in total on the electronic questionnaire, a 46.63% return rate. Of those subjects, 76 responded to half and 75 responded to the other half of the demographic section of the questionnaire, while there were varying responses to the second part. The results were calculated based on the number of respondents per question.

Phase two

There were five occupational therapists interested in participating in the focus group. One focus group was held, as data saturation was reached during the first focus group.

3.5 Research Technique

3.5.1 Research Procedure

Phase one

- The questionnaire was developed (Appendix A). This was an essential aspect to the study, as the researcher required the demographic information from the subjects which could not be attained from the focus group. It granted access to individual opinion on the basic information regarding standardized upper extremity assessments available to the study population. The assessments used in the questionnaire were found in the outcome measure chapter from the EBRSR (47), as well as on the Stroke Engine website (55).
- A pilot study of the questionnaire was carried out in order to recognize and address any unforeseen problems as well as validate the questionnaire. The questionnaire was sent electronically to five individual occupational therapists in the same way it would be sent to the study sample. These occupational therapists were asked to comment on the following: the time it took to complete, any grammar or spelling errors and any short-comings, they were also asked to make any suggestions regarding the method it was sent as well as suggestions which could improve the

survey. Relevant adjustments were made, according to the responses of the pilot study, in order to ensure that the questionnaire was effective and that it answered the questions related to the research requirements.

- Some of the changes made to the pilot questionnaire included adding in the question regarding what the therapists use in place of standardized upper extremity assessments, as well as finding out what they think are benefits to the use of these assessments. Changes were made regarding the number of years of practice (10-15years, 16-20years and over 20years) as well as changes made to the wording used in the multiple choice questions.
- The questionnaire was then sent out electronically to all occupational therapists with an interest and experience in neurological rehabilitation. These occupational therapists were all members of OTASA, working around SA, as well as those contacted telephonically in Johannesburg and Pretoria.
- The deadline for return of the questionnaire was emphasized, and frequent reminders were sent to the prospective participants from the various mailing lists.

Phase two

- The questionnaire above contained a section relating to the second phase of this study. The occupational therapists with the relevant criteria (those living in an around Johannesburg with two or more years' experience in neurological rehabilitation) were able to contact the researcher if they were available and interested in attending the focus group. They had to state whether they worked in the public or private sector in order to ensure that the focus group included occupational therapists from each sector.
- Each therapist who met the inclusion criteria was contacted to attend the focus group and a date and time which suited each member was selected. The group was held at a neutral venue.
- One focus group was held.

This section of the study provided the opportunity to explore the topic through discussion in a mixed group where the opinion of one therapist encouraged an idea within another. The information was shared and these mixed opinions and beliefs enriched the data received from the questionnaires.

3.5.2 Measurement Techniques

Phase one

- The researcher developed a questionnaire (Appendix A) for the purpose of collecting data for this study.

- The questionnaire was divided into two parts; the first contained questions relating to demographics and the second contained the bulk of the questions relating to standardized upper extremity assessments.

- The questionnaire included both multiple choice and open ended questions in order to receive both quantitative and qualitative information.

Phase two

- The questions used in the focus group were formulated based on the data that were gained from Phase one of the study (Appendix B).

- As the questionnaire revealed that the occupational therapists who participated in this study have a general familiarity of the term standardized upper extremity assessment but did not know very many of the assessments specific to the questionnaire, the first two questions arose: firstly, describe standardized upper extremity assessments (to provide more detail into the therapists' knowledge) and secondly which ones were the focus group familiar with.

- As the questionnaire only offered information regarding the frequency with which the assessments are used, it was necessary to ask the focus group more detail regarding why they make use of these standardized upper extremity assessments

and it was felt that this would lead to the fourth question regarding the facilitators or the benefits to the use of these assessments.

- Thereafter, following the basic information attained from the questionnaire, the focus group was asked to identify and describe any barriers or limitations to the use of standardized upper extremity assessments and in order to consolidate and enrich the information attained from the survey.

- Finally, a question that was not asked in the questionnaire but that could be drawn from the limitations, as well as from the poor responses regarding the frequency with which these assessments are used in practice; the members of the focus group were asked to provide suggestions that would improve the use of standardized upper extremity assessments in SA. This question was asked to also ascertain whether the answers correspond to those found in literature.

3.5.3 Data Collection

Phase one

- This study set out to describe the therapist, his/her demographic information, as well as their beliefs and ideas regarding standardized assessments.

- The questionnaire discussed above was used for data collection. The occupational therapists self-reported the required information.

- The data received was exported into Microsoft Excel. The data was then sorted into tables.

- As the survey was conducted electronically, the occupational therapists submitted it back to the researcher via the survey program.

- The questionnaires had to be completed and submitted before the given deadline.

Phase two

- The therapist's opinions and beliefs about standardized assessments used in the management of the upper extremity after stroke was further explored through the use of a focus group.

- Group research has in many instances shown that people tend to make decisions more readily within group context (73). This is also true with regard to occupational therapy research, where therapists are more likely to express opinions and together validate decisions in a context where opinions and beliefs are voiced and heard at the same time (73).

- The focus group was held at a convenient time for all participants and took place at a neutral venue. The room was chosen in a part of the building with the least distractions and the room was set out with the tables and chairs allowing for all members to sit around the same table. The audio recorder was placed next to the group table. There were five participants and the group was structured to take one hour.

- The members of the focus group each filled out a demographic questionnaire (Appendix C) that gave the researcher information regarding their years of experience and specific area of work so as to ensure that the inclusion criteria were met.

- The researcher facilitated the focus group through the use of predefined questions, welcomed the participants and opened the group by explaining the purpose of the study, specifically the focus group.

- The questions used in the focus group were predefined and structured as open ended questions relating directly to those asked in the survey; however requiring further emphasis and description.

- A second interviewer was present to assist in data collection and was responsible for documenting the verbal and non-verbal responses in writing.

- The verbal responses were recorded with the use of an audiotape.

3.6 Data Analysis

Phase one

- The data collected from this part of the study was greatly quantitative in nature and consisted of nominal and ordinal data. It was organized in a simple fashion using Microsoft Excel.

- Nominal and ordinal scales were used. Specific information was grouped together, e.g. all occupational therapists with 1 to 2 years' experience or all the occupational therapists who use standardized assessments daily.

- In this part of the study, simple descriptive statistics were used. Graphs and tables were utilized to group and describe the information attained.

Phase two

- Phase two was the qualitative part of the study and therefore data analysis occurred simultaneously during the data collection phase. This required skillful facilitation of the discussion in order to obtain rich data, recording observational notes and typing up the recorded information (74).

- All the recorded data was transcribed and proofed against the recorded and written information.

- The researcher used the following steps: familiarization, coding, identifying a thematic framework, indexing, charting and mapping and interpretation (74, 75).

- Familiarization included listening to and reading through all the data obtained repetitively in order to be immersed with the general ideas and information received (74). While listening to the information the researcher created a rough written version

of the information received in the order in which the focus group ran; question by question. The researcher would add to this rough outline each time the recording was listened to.

- From this, rough outline information was coded in terms of similar subject matter (76). This was done firstly by identifying and grouping information that was similar and then by using tables drawn up in Microsoft Word to manage the various groups of raw information.

- Each basic idea from the transcription was bulleted and highlighted into a colour that represented a specific idea i.e. Benefits, Limitations, Education etc. The information was firstly ordered into answers received from each question and then moved around to fit into groups of information with the same underlying idea (e.g. ‘occupational therapists are not well trained’ and ‘we need more courses’ – these both fall within the same notion of Education). From the management and organizations of the grouped ideas into the tables, themes arose. These themes were written in the form of memos in separate columns of the tables.

- Indexing involved highlighting and sorting out all the raw quotes in order to make comparisons and connections between them and charting involved lifting the quotes from their original context and placing them into the thematic groups within the drawn up tables into their own separate columns (74).

- Mapping and interpretation were carried out systematically by identifying relationships and links between quotes so as to place these within the thematic tables in line with the respective raw information that was at this point grouped according to themes (74). It was done in this manner so that the quotes could be easily accessed and used appropriately in the description of the results.

3.7 Ethical Considerations

Ethical clearance was obtained from the Human Ethics Research Committee of the University of the Witwatersrand. The ethical clearance certificate has been attached to the research report (Appendix D).

Phase one

- An information letter formed the introduction to the survey (Appendix E). This included all the information regarding the study, what was required of the participants and why the information is relevant and important.

- Confidentiality was assured and it was emphasized that there were no implications if the decision was made not to complete the survey or to withdraw ones survey completely from the study.

- Consent was assumed from those occupational therapists who answered and returned the survey.

Phase two

- With regard to the focus group, each participant in the survey was invited to participate in the group through the use of information in writing pertaining to the purpose of the study, the process of the focus groups, the requirements of each therapist and the way in which their information will be used, all within an information letter (Appendix F) they were given as they entered the venue.

- Once the focus group participants had read the information document, it was made clear that if they withdrew at that point, there would be no implications. Confidentiality was emphasized and the researcher did not make use of any names or identities in the study.

- Each therapist was required to give written consent to participate in the focus group (Appendix G), as well as informed consent for the focus group to be recorded (Appendix H). The recordings will be destroyed once the research is completed.

- It was stated clearly at the start of the group, that the occupational therapists may withdraw at any point and that there was to be no implications if they chose to do so.

Chapter Four: Results

4.1 Introduction

Chapter four presents the results of the study. As the study was conducted in two parts, the results will be presented as such. The results for phase one of the study will be described firstly in terms of the demographics of the study sample and then it will go on to illustrate and compare the survey results of the questionnaire. This information will be presented in the form of graphs and tables. The results for phase two will be presented through the use of themes which were drawn from the focus group.

4.2 Phase One Results

4.2.1 Sample and Methodology

Phase one was conducted using a questionnaire which was sent via e-mail through OTASA to all occupational therapists interested in the field of neurology. According to the database of OTASA members, there are 163 occupational therapists who have indicated that they work in the field of neurological rehabilitation. There were an overall 76 respondents to the questionnaire for this study, which is a 46.63% response rate. Of this sample, 75 occupational therapists answered 2 of the demographic questions, and 76 responded to the other two questions. The second part of the survey yielded varying numbers of responses per question. This is due to the nature of the questions, being partly multiple choice and open-ended, many respondents choice multiple answers, whereas some did not answer particular questions at all.

Part 1

- Q1: Years of experience - 76 respondents
- Q2: Area of clinical work - 76 respondents
- Q3: Types of stroke patients treated - 75 respondents
- Q4: Time period in which treatment is conducted - 75 respondents

Part 2

- Q1: Familiarity with the term standardized upper extremity assessment - 50 respondents.
- Q2: Familiarity to specific standardized upper extremity assessments - 51 respondents.
- Q3: Frequency of standardized upper extremity assessment use - 52 respondents.
- Q4: Other standardized upper extremity assessments - 18 respondents.
- Q5: Benefits of using standardized upper extremity assessments - 33 respondents.
- Q6: Limitations to the use of standardized upper extremity assessments - 50 respondents.
- Q7: Other limitations - 21 respondents.

In the section that follows, special attention must be paid to both the number of respondents who answered each question as well as the number of responses they yielded.

4.2.2 Demographics

The demographics attained from the study included information related to the occupational therapists' experience specifics. Information regarding their years of experience, the areas of neuro rehabilitation they work in and how often they are in contact specifically with patients who had suffered stroke. The demographics were required, as there were a number of studies, conducted outside SA, which described minor differences in the use of standardized assessments as well as methods to ensure EBP between younger and older therapists (22, 71), and in SA, a study conducted regarding EBP found that resources including access to libraries and internet were barriers for occupational therapists in rural, public sectors (18). Time with patients was also found to be a major barrier for most overseas therapists (67-69), and so the question regarding how long the stroke patients are treated for arose.

4.2.2.1 Years of Experience

There were 76 responses to this question in the questionnaire. There was no specification regarding which field the years of experience were attained in; however, the sample contained all occupational therapists with special interest in neurological rehabilitation. Table 2 presents the distribution of the respondents' years of experience.

Table 2 Clinicians' Years of Experience

Number of years	< 1 year	1-2 years	3-5 years	6-10 years	11-15 years	16-20 years	Over 20 years	Total
Respondents	11 (14.47%)	15 (19.74%)	25 (32.89%)	13 (17.11%)	6 (7.89%)	5 (6.58%)	1 (1.32%)	n=76

More than half of the respondents had less than 1 to 5 years of clinical experience. Of the respondents, 32.89% had 3-5 years' experience, 19.74% had 1-2 years' experience and 14.47% had less than 1 year of clinical experience.

4.2.2.2 Area of Clinical Work

Again, there were 76 respondents to this question. Of the respondents, 73 selected responses given, many selected more than one option; while three added in their own specific areas of work. Table 3 below displays the distribution of the study sample within the areas of current clinical work.

Table 3 Distribution of Study Sample within Clinical Work Areas

Work Settings	Number of Respondents per Selection	Sum of Total Responses for Each Choice Given
Multiple Choices Given		
Private Practice	13 (17.11%)	30 (28.85%)
Public Hospital	25 (32.89%)	26 (25%)
Private Rehab	8 (10.53%)	18 (17.31%)
Private Hospital	4 (5.26%)	11 (10.58%)
Public Rehab	1 (1.32%)	2 (1.92%)
Community	1 (1.32%)	3 (2.88%)
Medico legal & FCE	1 (1.32%)	11 (10.58%)
Other	3 (3.95%)	3 (2.88%)
Multiple Selections made by Respondents		
Private Practice & Medico legal & FCE	6 (7.89%)	
Private Hospital, Private Rehab & Private Practice	4 (5.26%)	
Private Rehab & Private Practice	3 (3.95%)	
Private Hospital & Private Practice	2 (2.63%)	
Private Hospital, Private Practice & Medico legal & FCE	1 (1.32%)	
Private Rehab & Medico legal & FCE	1 (1.32%)	
Private Rehab, Community & Medico legal & FCE	1 (1.32%)	
Public Rehab, Private rehab & Community	1 (1.32%)	
Public Hospital, Private Practice & Medico legal & FCE	1 (1.32%)	
Total	n=76	Responses = 104

*Functional Capacity Evaluation (FCE)

When taking only the responses into account, there were 30 responses, 28.85% of the total responses, indicating therapists' work in private practice and 26 responses, 25%, describing the therapists working in public hospitals. Of the three respondents who work in other settings, one of the respondents commented that he/she is a full time lecturer, another works for an NGO and the last one reported that he/she is currently a full time master's student.

4.2.2.3 Types of Stroke Patients Treated

There were 75 respondents who answered this question; a number of them selected more than one of the given choice answers. Table 4 illustrates the distribution of clinicians amongst the types of patients who have suffered stroke.

Table 4 Types of Patients being Treated

Types of Patients	Number of Respondents per Selection	Sum of Total Responses for Each Choice Given
Multiple Choices Given		
Acute Inpatients	24 (32%)	48 (40.34%)
Chronic Outpatients	13 (17.33%)	32 (26.89%)
Acute Outpatients	4 (5.33%)	24 (20.17%)
Chronic Inpatients	1 (1.33%)	15 (12.61%)
Multiple Selections Made by Respondents		
Acute Inpatients & Chronic Inpatients	8 (10.67%)	
Acute Inpatients, Acute Outpatients & Chronic Outpatients	4 (5.33%)	
Acute Inpatients, Chronic Inpatients & Acute Outpatients	3 (4%)	
Acute Inpatients & Acute Outpatients	2 (2.67%)	
Acute Inpatients, Chronic Inpatients, Acute Outpatients & Chronic Outpatients	2 (2.67%)	
Acute Outpatients & Chronic Outpatients	8 (10.67%)	
Acute Inpatients & Chronic Outpatients	5 (6.67%)	
Acute Outpatients & Chronic Inpatients	1 (1.33%)	
Total	n=75	Responses=119

The table depicts that most of the occupational therapists treat acute inpatients. There were a total of 48 responses, 40.34%, indicating the treatment of acute inpatients and 32 responses, 26.89% indicating the treatment of chronic outpatients.

4.2.2.4 Time Period in which Treatment is conducted

A total of 75 respondents answered this question. Table 5 displays the general time periods given to treat patients who have suffered stroke and the distribution of these periods amongst the occupational therapists.

Table 5 Treatment Periods

Periods	< 1 week	7-14 days	15 days - 6 weeks	6-12 weeks	3-6 months	6-12 months	> 1 year	Total
Respondents	6 (8%)	13 (17.33%)	10 (13.33%)	17 (22.67%)	14 (18.67%)	9 (12%)	6 (8%)	n=75

The responses indicate that 22.67% of the occupational therapists treat their patients for 6-12 weeks. A significant number, 38.67% of the sample treats their patients for periods of less than 6 weeks.

4.2.3 Survey

4.2.3.1 Familiarity with the Term Standardized Upper Extremity Assessment

There were 50 respondents to this question of the survey. Figure 1 below displays the results.

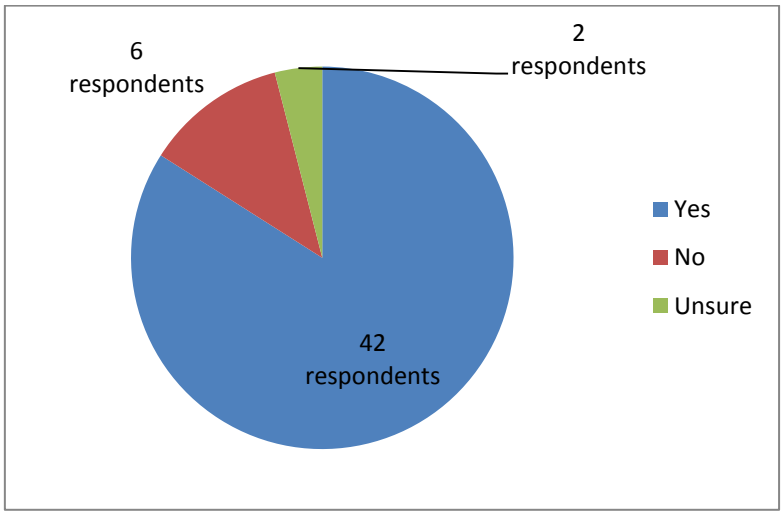


Figure 1 Familiarity with the Term Standardized Upper Extremity Assessment

This question revealed that 42 of the respondents, which are 84% of the sample who answered this question, were familiar with this term (standardized upper extremity assessment).

4.2.3.2 Familiarity to Specific Standardized Upper Extremity Assessments

The respondents were asked to select the degree to which they were familiar with 16 specific standardized upper extremity assessments found in the literature. The degrees ranged from very familiar to not familiar at all.

The table below describes the number of responses given to each answer selection (very familiar, familiar, vaguely familiar and not familiar at all) as well as the percentages of the sample for each answer in response to their familiarity with each standardized upper extremity assessment. The bar graph below is arranged from the most to the least familiar assessment amongst the subjects.

There were different numbers of respondents for each standardized assessment, and the bar graph below indicates the frequency based on the number of respondents for the particular assessment.

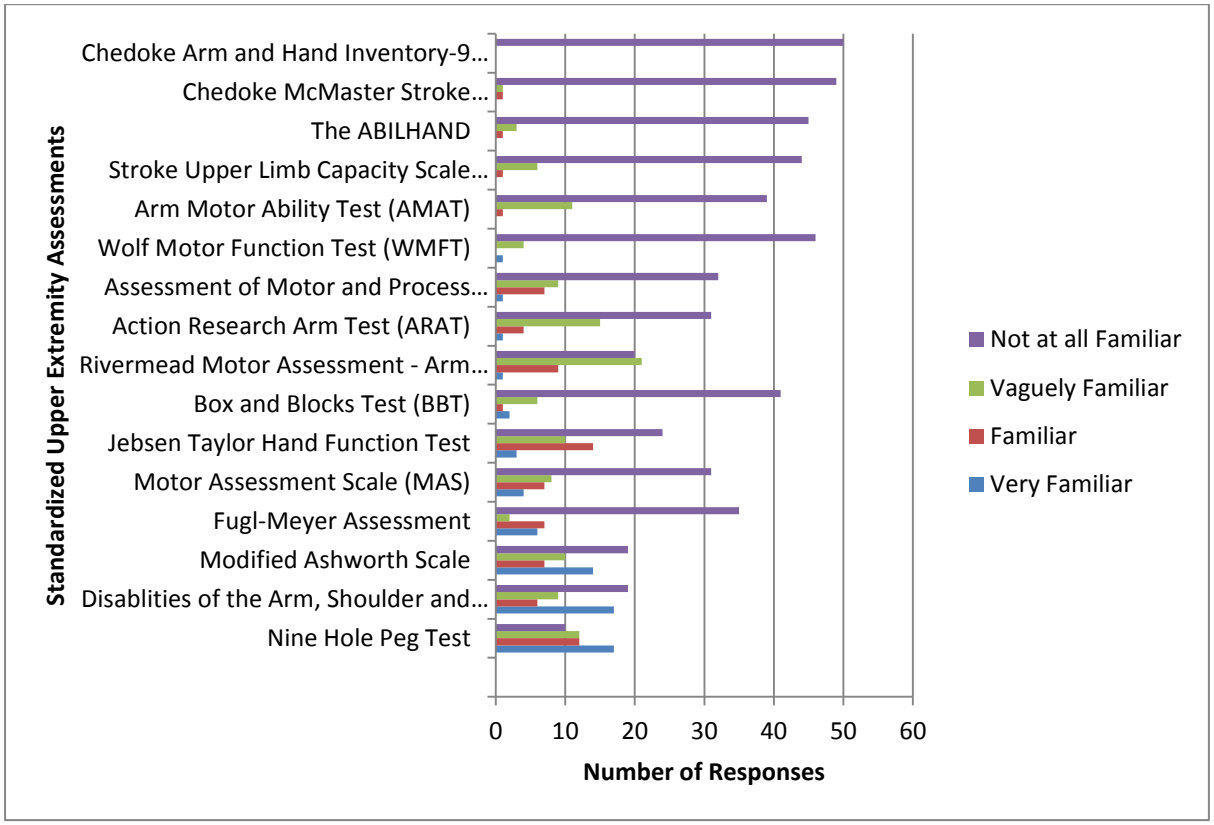


Figure 2 Familiarity to Standardized Upper Extremity Assessments

The four most familiar assessments to the sample group were the Nine Hole Peg Test, the Disabilities of the Arm, Shoulder and Hand (DASH), the Modified Ashworth Scale and the Fugl-Meyer Assessment. Of the total number of respondents (n=51), 17 (33.33%) found the Nine Hole Peg Test & the DASH to be very familiar. The four least familiar assessments were the Stroke Upper Limb Capacity Scale (SULCS), the ABILHAND, the Chedoke McMaster Stroke Assessment Scale and the Chedoke Arm and Hand Inventory-9 (CAHAI-9).

4.2.3.3 Frequency of Standardized Upper Extremity Assessment Use

The following question of the survey asked the subjects to express the frequency with which they use the above 16 standardized upper extremity assessments. The answer choices ranged from very often (weekly), often (monthly), not often (every 6 months) to never. Figure

3 below illustrates the results attained from the most frequently used to the less frequently used assessment.

There were different numbers of respondents for each standardized assessment, and the bar graph below indicates the frequency based on the number of respondents for the particular assessment.

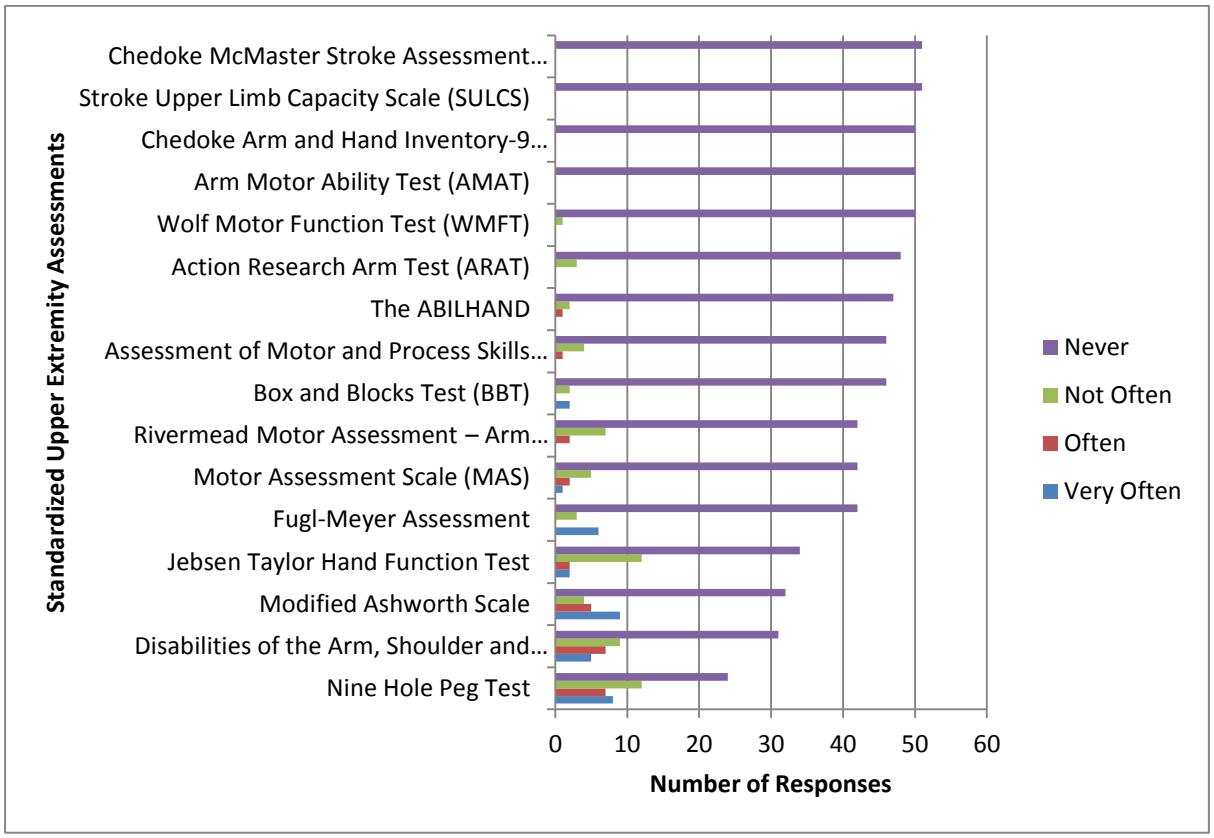


Figure 3 Frequency of Standardized Upper Extremity Assessment Use

The four most frequently used assessments were the Modified Ashworth Scale, Nine Hole Peg Test, the Fugl-Meyer Assessment and the Disabilities of the Arm, Shoulder and Hand (DASH).

4.2.3.4 Other Standardized Upper Extremity Assessments

The subjects were asked an open-ended question regarding any other standardized upper extremity assessments familiar to them that had been excluded from the above questions. There were a total of 18 respondents to this question; a number of these respondents

described more than one standardized assessment they are familiar with and use. The results have been tabulated below.

Table 5 Other Standardized Upper Extremity Assessments

Standardized Upper Extremity Assessments	Responses
Jamar Dynamometer	6 (19.3%)
Perdue Pegboard Test	3 (9.7%)
Workwell Assessments (UL)	2 (6.5%)
MODular Arrangement of Predetermined Time Standards (MODAPTS)	2 (6.5%)
Smith Hand Function Evaluation	2 (6.5%)
Valpar Component Work Samples (VCWS)	2 (6.5%)
Quality of Upper extremity Skills Test (QUEST)	2 (6.5%)
Complete Minnesota Dexterity Test	2 (6.5%)
Monofilaments for sensory testing	1 (3.2%)
EPIC Hand Function Sort	1 (3.2%)
Grooved Pegboard	1 (3.2%)
Chessington Occupational Therapy Neurological Assessment Battery (COTNAB) subtests	1 (3.2%)
PACT Hand Assessment	1 (3.2%)
I don't know or use any other assessments	5 (16%)
Total Number of Respondents	n=18
Total Number of Responses	31

The results display that six (19.3%) of the responses indicate that the respondents make use of the Jamar Dynamometer and three (9.7%) responses showed the familiarity of respondents with and their use of the Purdue Pegboard Test. There were five (16%) responses which indicate that some respondents answered that they do not know of or use any other assessments.

4.2.3.5 Benefits of using Standardized Upper Extremity Assessments

There were a total of 33 respondents to this question and again they provided responses that yielded a variety of answers leading to a total of 70 responses. The sample was asked to describe any benefits they have found to the use of standardized upper extremity assessments. Table 6 below display the findings.

Table 6 Benefits to the use of Standardized Upper Extremity Assessments

Benefits Described by Study Subjects	Responses
Allows one to monitor and track progress	19 (27.2%)
Can be used to measure outcomes of treatment	7 (10%)
Provides detailed baseline of functioning	6 (8.7%)
Provides quantitative proof of abilities	6 (8.7%)
Results can be compared to set norms	5 (7.2%)
Can assist in the motivation for increased length of stay (private sector)	4 (5.7%)
Can help to motivate patients	4 (5.7%)
Assists in guiding treatment and setting goals	3 (4.3%)
Can be used as prognostic indicators	3 (4.3%)
Provides concrete information to give feedback to patient and family	3 (4.3%)
Assists in the communication with the whole MDT	3 (4.3%)
Provides substantial information when report writing	3 (4.3%)
Can prove the effectiveness of treatment	3 (4.3%)
Easy and quick to administer	1 (1%)
Total Number of Respondents	n=33
Total Number of Responses	70

Of the 70 responses, 19 (27.2%) indicated that the respondents said that standardized upper extremity assessments are helpful in identifying whether progress has been made, and tracking this progress, seven (10%) of the responses described the standardized assessments as being useful in the measurement of outcomes to treatment and six (8.7%) of the responses indicated that the assessments provide a good baseline of abilities and functioning prior to initiating treatment and that the standardized assessments help to quantify functional abilities.

4.2.3.6 Limitations to the use of Standardized Upper Extremity Assessments

The subjects were asked to select the degree (affects me a lot, affects me a little, does not affect me that much, does not affect me at all) to which specific limitations have an effect on their use of standardized upper extremity assessments. The limitations included: time, resources, appropriateness and cultural sensitivity, language, interpretation of assessments, anxiety of the patients, cognitive difficulties of the patients and familiarity. The graph below

displays the results in order of the greatest to the least limiting factor. For each limitation, there were a total of 50 respondents.

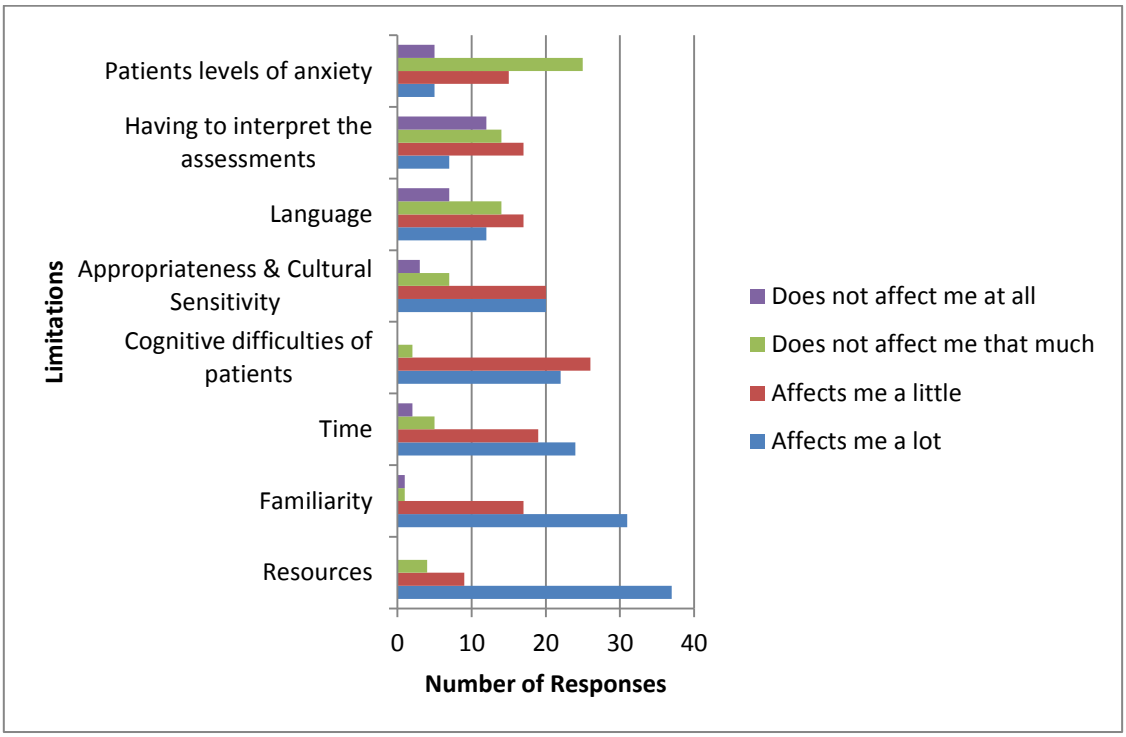


Figure 4 Limitations to the use of Standardized Upper Extremity Assessments (n=50)

The three greatest limitations to the use of standardized upper extremity assessments were found to be resources, familiarity and time. A large frequency of 74%, 37 therapists of the sample, selected resources as their greatest limitation, 62%, 31 therapists chose familiarity as their most limiting factor and 48%, 24 respondents from the 50 selected time. The three least limiting factors were found to be language, having to interpret the assessments and the patients' level of anxiety.

4.2.3.7 Other Limitations According to the Occupational Therapists

There were 21 respondents who answered the open-ended question regarding any other limitations the occupational therapists felt prevent them using standardized upper extremity assessments. These limitations were those not mentioned in the multiple choice question above. Some of the 21 respondents provided detailed responses that described more than one of the limitations illustrated in the table below.

Table 7 Other Limitations to the use of Standardized Upper Extremity Assessments

Other Limitations	Responses
Excluded from undergraduate training	3 (12.5%)
Cost	3 (12.5%)
Excluded from current protocols	3 (12.5%)
Not linked to function	2 (8.2%)
The availability of the assessments	1 (4.2%)
Poor follow-up attendance	1 (4.2%)
Lack of supervision from experienced occupational therapist	1 (4.2%)
Patients have limited funding	1 (4.2%)
Complexity	1 (4.2%)
Lack of Flexibility	1 (4.2%)
Having a licence to use the assessment	1 (4.2%)
Infection control issues regarding equipment	1 (4.2%)
No other limitations affect me	5 (20.7%)
Total Respondents	n=21
Total Responses	24

The three greatest limitations, the occupational therapists described, to the use of standardized upper extremity assessments were found to be the exclusion of assessment training during undergraduate studies, cost of the assessment material and the exclusion of the use of standardized upper extremity assessments from treatment protocols in various work settings.

4.3 Phase Two Results

4.3.1 Sample and Methodology

At the end of the questionnaire, the occupational therapists, with over two years' experience, living in and around Johannesburg were invited to participate in the focus group. They were asked to contact the researcher electronically and stated their years' of experience, as well as the sector in which they work, so as to ensure diversity within the group. There were five interested occupational therapists who met the criteria. The group was then held at a neutral venue at a time convenient for all members.

4.3.2 Demographics of Focus Group Participants

Table 8 Focus Group Demographics

Reference Name	Years' Experience	Area of Work	Setting
FGP-1	6 years	Rehabilitation & Outpatients	Public
FGP-2	10 years	Acute inpatient rehabilitation	Private
FGP-3	27 years	Management	Public
FGP-4	3 years	Acute inpatient rehabilitation	Private
FGP-5	8 years	Private Practice	Private

4.3.3 Theme one: We don't know what we have

The table below describes the first theme which came out strongly during the focus group; we don't know what we have. This theme arose from two central ideas, firstly that South African occupational therapists have to find standardized upper extremity assessments that are current, those that exist and will be suitable to their situation and secondly, that occupational therapists require more training to increase or further their knowledge into the assessments that are available, as well as the skill required to execute these assessments.

Table 9 Theme one: Codes and Quotes

Theme	Central Ideas	Codes	Quotes
1. Knowledge – We don't know what we have	CI.1.1 South African occupational therapists do not know what assessments	CD.1.1 Occupational therapists are not reading literature and are not producing research.	FGP-5 "I think (occupational therapists) OTs are just bad researchers in general."
		CD.1.2 South African	FGP-1 "I think our problem is

	are out there and are not using what they have to identify what will work in their context.	occupational therapists are not using tests to assess content validity.	that we don't have anything South African based, and that's where one of our biggest challenges come from, is that's done everywhere else, but it's not here. We haven't managed to get three tests together, use them and make a South African test that is more relevant for the kind of people who are here."
	CI.1.2 Occupational therapists need to use current standardized upper extremity assessments	CD.1.3 Adopt three or four assessments for different levels of upper extremity impairment.	FGP-4: "I think something that will facilitate use specifically in our environment is that on your assessment form, you have the prompts there and that maybe you select 3 assessments, one for very low functioning, then low functioning etc…"
		CD.1.4 Finding the right tools; the assessments that will work in the setting.	FGP-2: "I think you need to search for a test that will fit your situation." FGP-5: "I think it's finding the right tools, I think that's really the key, it's like at a rehab, management sitting down using experience taking into consideration the setting and the patients and saying this is the right tool for this place, at a government level, saying this is the right tool, outpatient rehab – this is the right tool. I think there's like so many tests out there, so many that we don't know that maybe have been devised for apraxic, aphasic patients, so it's just a matter of knowing what's out there."
	CI.1.3 Training and increasing one's knowledge on current assessments is imperative	CD.1.5 Training – public setting always has young therapists	FGP-3: "(we need) Training." "In our setting our therapists are new every year…"
		CD.1.6 Type of training is important– not just workshops. Having dynamic training on actual experience and having experienced therapists guide younger therapists. Practical training.	FGP-5: "Just on training, and it's something that came up in my research as well is the type of training, so it's not just about having workshops… but it's about doing the right kind of training so that experienced as well as inexperienced therapists are able to benefit from each other…having more dynamic training based on actual

			experience." FGP-3 "I think workshops should be a third lectures and 2 thirds practical because I think we sit in front of the power point far too much."
		CD.1.7 Undergraduate course – basics. Postgraduate learning– training in specific assessments	FGP-3: "I also think undergrad for me is a good basis, basics in everything, ah, and that your specialization, be it with a M or whatever the case might be, ah, or just plain workshops can happen after that." FGP-3: "I think they [undergraduate students] need to be aware, you know, that there is such a concept such as standardized tests for spinal, stroke, whatever the case might be…and if you have good clinical reasoning you will expand on that after qualification…hopefully."
		CD.1.8 Upper extremity assessment tools workshop would be beneficial.	FGP-4 "…I feel there is a gap, I meet neuro patients and I'm like, I do feel there is a gap, on what tools can I use, especially when we're writing reports…if a workshop was offered now, let's say a 'a review of upper limb assessment tools' I think there would be a lot of therapists there."
		CD.1.9 Occupational therapists are not well trained	FGP-3 "And I also think people are using tests when they're not well trained to use them."
		CD.1.10 You have to be trained and know it well.	FGP-2 "…you need to be trained on how to use it and you need to know it well. And, often they're quite complicated to start off with, once you know them well and you've done it with about 10 patients it will go much smoother but those first 10 patients you sit there reading, so it's taking you double, triple the amount of time and when you only have a maximum of a certain amount of time…in private we have 45 minutes or less."

The general feeling amongst the participants was that training at an undergraduate level is and must be very basic and general regarding standardized upper extremity assessment and that it is the occupational therapist's responsibility to further this education at a postgraduate level. The participants further discussed the idea of improving their knowledge of standardized assessments which are currently available as the feeling was that there could be one or two already accessible that would suit their specific needs and settings. In order to improve or facilitate the use of standardized upper extremities in general, the participants felt that more training is required.

4.3.2 Theme two: We don't know what we want

The next table displays the second theme which displayed cohesion of internal conflict amongst the group: we don't know what we want. The central idea leading to the theme was the struggle between functional assessments (self-care activities) vs. impairment based assessments (muscle strength, dexterity etc.). The participants seemed to each be faced with similar unresolved ideas as to which is more important regarding the upper extremity; the functional activities the patient can perform or the specific impairments the upper extremity has to overcome (muscle weakness, loss of dexterity, spasticity etc.).

Table 10 Theme two: Codes and Quotes

Theme	Central Ideas	Codes	Quotes
2. Conflict – We don't know what we want	CI.2.1 Functionality and functional assessment	CD.2.1 It should be what's important to the patient. Sometimes the patient just wants to be functional, regardless of what the arm can do	FGP-3 "I sometimes wonder what's important to the patient, because I think we're so stuck in the medical world and the more we say we're not the more I think we don't even know how deep we're in." FGP-3 "…Because it doesn't matter if my arm is not working as long as I can do what I want to do; the point being is, can I still get the work done with whatever is left of the arm."
		CD.2.2 Often, the assessment being used cannot be translated into actual	FGP-2 "…for example the strength one, if you use a dynamometer, it's great, you get… but he still can't

		functional ability.	functionally use that hand to open a button."
		CD 2.3 The standardized upper extremity assessments may not be function focused.	FGP-4 "…some of these tests are not functionally driven."
		CD.2.4 Functional activity is proof enough.	FGP-1 "I think if you base it on functional activities alone that's medical enough if the patient was not able to, to dress cause they were not able to use that hand but now are incorporating it in the activity, there's improvement, there's no standardized test, but the patient is engaging in the activity using that hand."
		CD.2.5 To overcome cognitive impairments it is suggested that one does functional assessment or a functional task first.	FGP-2 "You often then need to do more of a functional assessment or a functional task and then due the nature of them being functional individualized tasks or tool to that person it then is no longer standardized." FGP-2 "And then you general…can you put your shirt on and how long does it take you to put your shirt on? And, do you involve that arm or not?"
	CI.2.2 Impairment aspects & impairment based assessment	CD 2.6 Acute vs. chronic – acute patients are more concerned with just function and not the impairments related to the arm and function.	FGP-2 "…the patient that I saw in inpatients, where I was struggling to get them to use their affected arm in a task, they're like' I really couldn't care less about buttoning with this hand [affected upper extremity], I'm going to do my buttons with the other hand cause it's faster' [patient]…um, 8 months down the line…'I really want this hand to be buttoning' [patient]."
		CD. 2.7 Occupational therapists often overlook the upper extremity. Function can often lead to compensation; the specific impairments are also important.	FGP-4 "Functional activity doesn't take in for the trick techniques, you know, they're managing to do it, but the hand is not doing anything, you know, they've learnt how to do it, they're compensating, so I don't know, if you're looking specifically at upper limb function, that doesn't really say,

			like have they got the grasp, have they got the pinches, have they got the appropriate reach."
		CD.2.8 Function and impairment – using a variety or mix of assessments may be the answer.	FGP-2 "…in one sense you need to have more functional based tests and on the other hand you need to have the more impairment based, because that's where you, because of trick movements can actually fool the functional tasks, you actually need to look on impairments, you actually need to look on range and dexterity."

Throughout the focus group it was evident that the participants were battling with this underlying need to be focused on function and that standardized upper extremity assessments needed to be more functionally orientated instead of simply requiring the patient to,' lift their arm', 'make a fist' etc. However, as the group proceeded, so emanated the conflicting ideas relating to how early functional activity may lead to compensation and overall loss of upper extremity function, just as the principle of neuroplasticity states: Use it or lose it (23). This brought to the foreground the theme: we don't know what we want. The participants would relay between the need for more function versus the need for impairment based standardized upper extremity assessments.

4.3.3 Overall Findings

The focus group displayed how inadequate knowledge of current standardized upper extremity assessments could lead to perceptions regarding the barriers to the use of these assessments. The notion drawn from the group is that as a profession in SA, occupational therapists are still not confident in the assessments that have already been developed and what these standardized upper extremities should include; leading to the current situation occupational therapists' find themselves in – "If you don't know what you want, you end up with a lot you don't" – quote by Chuck Palahniuk, American Novelist.

An outcome of the group was that there is no current standardized upper extremity assessment specific to SA that takes language and culture into consideration, as well as the

working conditions. The group realized that occupational therapists need to use the available assessments more in order to assess their content validity to the South African population and that maybe the use of a combination of assessments may be the answer.

4.4 Conclusion of Results

The results of this research study found that South African occupational therapists are generally not aware of the available standardized upper extremity assessments and as a result, even though they find these assessments beneficial, they are not making use of these in practice. The therapists indicated that the lack of time, lack of resources and general lack of knowledge all have a significant influence on their use of these assessments. One of the findings from the focus group was that South African occupational therapists are craving education, both at an undergraduate and postgraduate level. They feel that if their knowledge regarding these assessments improved, their confidence will better and they will use these assessments more readily. The more South African occupational therapists use these assessments, the better they will become at using a combination of these assessments to gain a detailed picture of the patient and provide the best intervention possible.

Chapter Five: Discussion

5.1 Introduction

Chapter five, the discussion of the research findings, begins with an overview into the demographics of both the survey and the focus group participants. It then goes on to describe four main topics: the familiarity of standardized upper extremity assessments, their use in practice, the benefits to the use of standardized assessments, as well as the perceived limitations or barriers to standardized upper extremity assessment use; within the two main themes drawn from the focus group. Within these themes, the results from both the survey and the focus group will be reviewed and compared to current literature. Results from the survey will be emphasized by the findings of the focus group. Finally, the discussion ends off with a number of suggested facilitators to the use of standardized upper extremity assessments, the limitations of this particular study and the recommendations for future research.

5.2 Demographics

5.2.1 Demographics of the Survey Population

There were 76 occupational therapists who participated in phase one of the study. All 76 answered the demographic section of the questionnaire and 49-51 occupational therapists answered the survey section. Part two of the study included a focus group with five participants.

5.2.1.1 Years of Experience

Part one of the study, the survey, did not specify the number of years' experience required for the survey to be completed. When referring to table 1 in the results chapter, it was found that 67.1% of the survey population had 1-5 years of clinical experience, while 32.9% had six to over 20 years of experience. It must be noted that there was a wide variety of years' experience within the survey population and that there is no South African data available with which to compare these demographics. Within this population, the younger occupational therapists may have knowledge regarding standardized upper extremity assessments from

undergraduate studies still fresh in their minds whereas the more experienced population bears with it knowledge from work and practice. Literature describes latest undergraduate courses as displaying an increased inclusion of EBP principles and describes newer therapists as being more confident with regard to literature searches and the use of current knowledge which can be applied for both assessment and treatment (22, 71). The concern however with a younger neuro occupational therapy population is that they lack the years of experience in the application of the assessment and treatment of stroke in SA.

5.2.1.2 Areas of Work

The method in which this question was asked in the survey allowed for multiple answers from the survey population. The main idea behind the question was to depict the difference, if any, in human resources between the public and the private sectors. A substantial 67.32% of the multiple choice answers fell within the private sector of work, while 26.92% were marked as public sector work (refer to table 2 in the results chapter). This could simply display what the literature refers to as the lack of access to internet and basic resources experienced by public health occupational therapists in rural or semi-rural settings; as the survey was sent out electronically via the internet (18). There is no literature available that describes the occupational therapist distribution between the public and private health sectors. An interesting outcome from this question was the small 2.64% of the population who work in a public rehabilitation unit. There are in fact only three public health rehabilitation facilities in SA. This falls in line with the literature which describes the public sector as often providing unsophisticated methods of assessment and treatment to stroke patients in many rural or semi-rural settings due to fairly non-existent resources available to clinically assist the masses of patients being treated within district clinics (13, 14, 18).

5.2.2 Demographics of the Focus Group Population

5.2.2.1 Years of Experience

As there was a specification in the number of years' experience required in order to have taken part in the focus group, all of the members of the group had over three years'

experience. Four of the five focus group participants had six to 20 years of experience. This allowed for expert opinion and discussion around the outcomes of the survey.

5.2.2.2 Areas of Work

Of the five focus group members, two worked in public health care while three worked in private health care. Only one of the public occupational therapists was still a practicing clinician, while the second was more involved in management. This allowed for quite diverse opinion relating to the use of standardized upper extremity assessments found within the occupational therapy population in and around Johannesburg.

5.3 We Don't Know What We Have

5.3.1 Familiarity to and Frequency of Use of Standardized Upper Extremity Assessments

The occupational therapists, who took part in this study, in SA are not using the standardized upper extremity assessments available to them. They know the general term "standardized upper extremity assessment" but are not familiar with specific ones that can be used in measuring impairment and dysfunction in the upper extremity following stroke.

In both the survey and the focus group, the outcome regarding familiarity was similar. These South African occupational therapists have a general understanding of what standardized upper extremity assessments are. Described in Figure 1 of the results chapter, 84% of the survey population reported familiarity to this term and in the focus group, the participants were able to describe these assessments in depth. Their descriptions included: *"My understanding with standardized tests is that there is a lot of research that has also gone into it"* and *"With standardized tests it's measurable, and it's reliable and valid, so you always getting the same results for a similar condition, and so the nice thing for reports to the medical aid you can measurably say this person has improved by such a degree, if you can get a nice standardized test that is more functionally based than purely a score."* Another participant added *"In my understanding, standardized assessments allow you to evaluate and track a person's progress."* She also reported: *"It's standardized across many people, so you can use the same tool to assess functional level."* Clinician's basic knowledge of what

standardized assessments are and how they can benefit one in practice is found throughout the literature (50, 67, 69-71).

This basic understanding does not however have an influence on the specific upper extremity assessments used in the management of stroke and quite a significant finding was that a large number of the overall survey participants did not answer the questions relating to the familiarity and frequency of use of the available standardized upper extremity assessments. During the demographic section of the survey, there were 76 participants, whilst this number decreased to 49-51 participants at the start of the survey when the questions pertained to the specifics of standardized upper extremity assessments. Figure 2 in the results chapter depicts the only four standardized assessments which were very familiar to the survey population and one of these, the NHPT, was found to be one of the two assessments familiar to the focus group population. This clearly demonstrated the limitations in knowledge found amongst the occupational therapy population. The focus group participants emphasized this by stating that therapists are often not well trained in the use of the standardized upper extremity assessments available, that in SA, more training on these assessments is required, as well as the need to develop ones knowledge on existing assessment tools; this was found within central idea 1.3 (CI.1.3) and code 1.8 (CD.1.8) in the focus group results chapter. One of the focus group participants stated *"…I feel there is a gap, I meet neuro patients and I'm like, I do feel there is a gap, on what tools can I use, especially when we're writing reports…if a workshop was offered now, let's say a 'a review of upper limb assessment tools' I think there would be a lot of therapists there."*

This lack of knowledge resonates with the literature that describes clinician's levels of confidence and knowledge of specific standardized assessments as a definite barrier to their use (50, 67-72). The knowledge described in previous studies and reviews pertains to the knowledge of specific assessments' validity and reliability, having an understanding of which assessments would be the most beneficial to use, which assessments would be most applicable to the setting one is working in and simply, having the expertise relating to

sourcing the assessment materials and being skilled at the test administration (50, 67-72). Certain studies suggest that if the general familiarity of these assessments improved their use would improve (67, 72). And a number of studies reported that the knowledge and perceived value of standardized assessments was better amongst clinicians who had undergone post-graduate studies, such as a Master's degree (71, 72). Research into South African occupational therapists knowledge and understanding of current standardized upper extremity assessments used in stroke rehabilitation has never been conducted.

5.3.2 Occupational Therapist, the Researcher

A central idea 1.1 (CI.1.1) with its codes CD.1.1 and CD.1.2 describes the South African occupational therapy situation well. This study's population of occupational therapists in SA is not identifying the available assessments and making use of them in practice so as to establish whether they will work within the South African context. The South African occupational therapists, who took part in this study, are not searching for an answer to their myth that there are no available assessments out there appropriate for their specific circumstances.

The implication of this lack of knowledge cannot go unnoticed. Occupational therapists in SA cannot say that they are evidence based practitioners, treating people who have suffered stroke, if they are not up to date with current available standardized upper extremity assessments, as this would imply that they are using outdated and possibly ineffective methods of assessing patients which could ultimately affect the standard of treatment. They cannot report effective intervention if their assessments are not in line with current literature and if they are not objectively assessing the complex impairments which result from stroke; outdated assessment may lead to outdated treatment, some which may not even take neuroplasticity principles into account and will result in methods that could not work. In the upper extremity alone, impairments include: muscle weakness, decreased muscle endurance, hypertonicity and spasticity, range of motion impairments, motor control

difficulties, loss of dexterity and somatosensory impairments (37, 39, 41). **Ineffective assessment will result in ineffective treatment and injustice (1)**.

5.3.3 Occupational Therapists Need to Use These Assessments

Limited knowledge and familiarity directly impacts the degree to which one uses an assessment (50, 67, 69-72). The four most familiar standardized assessments were also the four most used assessments in phase one of this study (refer to figures 2 &3). The focus group's response to the frequency with which they use standardized upper extremity assessments also indicated that the use is poor - *"I probably would use the JAMAR about once a month"* Many of the group could not recall the last time they had made use of one and two of the members simply reported that they never use these in practice- *"…in inpatients over the last few months I haven't used a specific standardized test."* and *"…nothing"* was a response that came from one of the occupational therapists.

These results correlate with the literature. In one study conducted amongst physiotherapists in the United States of America (USA), 52% of the participants responded that they did not use standardized assessments in practice and 49% of them reported that they did not intend using them in the future (50). Many studies found that clinicians are not happy with change in their current behaviours and will simply continue to not use standardized assessments so as to keep their work behaviour the same. (69, 70) What is being implied here came out strongly in this research, that even though the occupational therapists fully understand the benefits to the use of standardized upper extremity assessments and they are able to identify why they are not being used and identify solutions to improve their knowledge, they do not actively pursue these suggested solutions e.g. CD. 1.3. Adopt three to four assessments and CD.1.4. Find an assessment to suit one's setting.

The consequences here are far reaching. Not only for neuro rehabilitation units but specifically with regard to occupational therapy as an essential part of the MDT. Recent literature emphasizes the need for EBP, the need for clinicians to objectively record and report on the effectiveness of their treatment techniques, the need for clinicians to be up to

date with regard to both assessment and treatment methods (15, 18, 20). EBP guidelines go as far as stressing that standardized assessments have to be used in practice (1, 47). However, the results from this study give quite a grim picture in terms of the current state of the occupational therapy profession in parts of SA; the South African occupational therapists who took part in this study do not know what standardized upper extremity assessments are available and they do not make use of them. In past years, standardized assessments were perceived as optional and applied only at the clinician's discretion (67, 68). This is no longer the case; standardized assessments must be performed routinely with every patient in order to objectively communicate the patient's progress, guide the most effective treatment plan and exhibit service impact and effectiveness of treatment given (1, 47). This sample of South African occupational therapists are at threat of being left behind in this drive towards EBP and if they are, it will be difficult for them to continue to justify the true benefit of occupational therapy in the treatment of stroke (10, 11).

This sample of South African occupational therapists is not expanding their knowledge into standardized upper extremity assessments, as they are not searching for a few and applying them in practice to assess their validity within the South African context. Central idea 1.2 (CI.1.2) describes this, for it is within the experience in which we learn; therefore occupational therapists must experience the use of these assessments. The codes (CD.1.3 and CD.1.4) describe how if occupational therapists select a few assessments and begin to apply them frequently with stroke patients, they will be able to gain a better idea regarding which assessments are effective, which assessments work well within their environments and with the types of patients seen and finally, is the content of the assessment appropriate for the South African stoke population. The use of the assessments will not only assist in the selection of the most useful assessments, but the outcome may in actual fact be that the use of a combination of assessments is more effective that simply using one. One of the focus group participants described this by saying: *"I think it's finding the right tools, I think that's really the key, it's like at a rehab, management sitting down using experience taking into*

consideration the setting and the patients and saying this is the right tool for this place, at a government level, saying this is the right tool, outpatient rehab – this is the right tool. I think there's like so many tests out there, so many that we don't know that maybe have been devised for apraxic, aphasic patients, so it's just a matter of knowing what's out there." Another expressed: *"I think you need to search for a test that will fit your situation."*

In exploring the options for effective assessment combinations one needs to remember the true complexity of stroke as a diagnosis. Occurring in the brain, it can affect the individual in a variety of ways in a simultaneous fashion. Specific to the upper extremity, one may experience, muscle strength and endurance deficits, loss of ROM, together with somatosensory impairment and loss of dexterity – one standardized assessment tool may not manage to describe all aspects clearly; the answer lies in the selection and combination of two to four assessments. Within code 1.3 in the focus group results tables, a focus group participant reported: *"I think something that will facilitate use specifically in our environment is that on your assessment form, you have the prompts there and that maybe you select 3 assessments, one for very low functioning, then low functioning etc…"* It is not only selecting assessments based on the level of functioning the upper extremity presents with, but ensuring that the clearest picture of the upper extremity is attained, from both an impairment and functional perspective.

5.3.4 Training

A significant outcome that can be drawn from this study is the general lack of knowledge and the need for training. Participants from the both the survey and the focus groups felt that there is a general lack of knowledge, understanding and training. Figure 4 in the results section above depicts how the survey population describes 'lack of familiarity' as one of the limitations to standardized upper extremity assessment use. Table 7 above presents that the survey population found the 'exclusion of standardized upper extremity assessments from undergraduate studies' as being another limiting factor.

A great central idea to theme 1: We don't know what we have, was CI.1.3: Training and increasing one's knowledge on current assessments is imperative. The focus group emphasized the need for training, the need for undergraduate training and postgraduate courses; the need to improve basic knowledge of the available standardized assessments, as well as how to use these assessments optimally. Within CI.1.3 was CD.1.7 with the following quotes: *"I also think undergrad for me is a good basis, basics in everything, ah, and that your specialization, be it with a M or whatever the case might be, ah, or just plain workshops can happen after that."* And *"I think they [undergraduate students] need to be aware, you know, that there is such a concept such as standardized tests for spinal, stroke, whatever the case might be…and if you have good clinical reasoning you will expand on that after qualification…hopefully."*

The lack of knowledge as a significant barrier has been found in a number of recent research studies with resulting recommendations relating to training and further education (67, 69-72). This training is recommended at both the profession-specific level, in the form of courses and at an organizational level, in the form of setting specific education (67, 69-72). The focus group went on to specify how courses should be presented in order for them to be of most benefit. CD.1.6 in the focus group theme tables, within the results chapter describes the need for dynamic and practical training*: "I think workshops should be a third lectures and two thirds practical because I think we sit in front of the power point far too much."* Many of the current research studies describe how clinicians who have recently undergone postgraduate training or degrees are more confident with simply searching for standardized assessments and finding literature regarding the assessments use, validity and reliability; these clinicians are more likely to make use of standardized assessments (71, 72).

In summary, this sample of South African occupational therapists lack knowledge of the standardized upper extremity assessments available to them. They may also, like clinician's from countries abroad lack knowledge regarding the assessment properties, requirements, execution, as well as the method one would employ to search for the assessment and

investigate it thoroughly (67, 69-72). No matter where the lack of knowledge lies, South African occupational therapists, according to this study, are in need of improved education and training. Undergraduate training facilities should re-evaluate the course content and include general standardized assessment information, methods and techniques, as well as specifics in the various areas of occupational therapy. If the answer specific to standardized upper extremity assessments for stroke patients lies within the combination of two to four assessments, these should be taught and practiced so that young occupational therapists leave university confident in their use. And, specifically in light of EBP, undergraduate training facilities should train students on literature searches and methods of using online databases and searching for strong literature so that they may be able to take responsibility in increasing their knowledge on current best evidence and use these search techniques to learn more about available standardized upper extremity assessments.

5.4 We Don't Know What We Want

5.4.1 So what is the Reason?

Based on the occupational therapists general understanding of the term 'upper extremity standardized assessments' or simply 'standardized assessments', they were able to describe a number of perceived benefits in using these assessments with patients who have suffered stroke. The most common benefits to the use of standardized upper extremity assessment, as described by the survey population in table 6, were that they allow one to monitor and track progress, they can be used to measure outcomes of treatment, provide detailed baseline of functioning and provide quantitative proof of abilities, the assessment results can be compared to set norms, can assist in the motivation for increased length of stay (private sector) and can help to motivate patients. These benefits described are similar to those documented in the literature (50, 70). In a study describing physiotherapists' perceived benefits, added to the above were that the use of standardized assessment can enhance practice marketing, enhance thoroughness and efficiency of physiotherapy assessment and improve patient outcomes (50). In a systematic review of allied health professionals' opinions regarding standardized assessment, the following benefits can be

added: they increase patients' understanding and knowledge and assist in making comparative assessments (67).

The focus group participants emphasized and consolidated the above responses and opinions. They also added that standardized upper extremity assessments are objective and eliminate emotions, and bias from the assessment. One of the participants shared this story: *"Try think of how you feel about your project and your emotional attachment to it; we had this very good therapist, she was seeing all these - I know this is off the point, but listen and it will demonstrate the point - she was seeing all these children with learning disabilities way over seven years old and I said 'you know, it's not going to be what (you expect)'she said 'no, no, no, they're all getting better'. She phoned me after six months and said 'I tested them all and none of them got better, they just got older, they're still behind.' She was convinced, because in heart she was doing the right thing. I think that can happen in strokes as well. We sometimes hear what we wanna hear and see what we wanna see."* Other benefits to the use of standardized upper extremity assessments that arose from the focus group included that they help to set goals with the patient and they assist in guiding younger therapists in assessment and in the identification of treatment objectives - *"It helps you set goals. I mean if the patient wants to do a specific task and they can't…you can use it as a motivation."*

The idiom **'**take the good with the bad' implies that in all things, one has to accept the pleasant as well as the unpleasant aspects of an item, event or situation. As with standardized upper extremity assessments, even though there are positive features mentioned above, there are also negative features, barriers or limitations to their use.

The survey population described time, resources and familiarity as the three most influential barriers/limitations to their use of standardized upper extremity assessments in Figure 4. The lack of familiarity to the assessments and the relationship of this to the use of standardized upper extremity assessments have been demonstrated in this study. 'Time' and' lack of resources' came out strongly in the focus group as well and correlates to one South African

study regarding the low occupational therapist to high patient number ratio and the lack of accessibility to internet and resources in rural parts of SA (18). A critical review of papers published in the United Kingdom and Ireland, the USA, Canada, Australia, New Zealand, Israel and the Netherlands found that 'the lack of time' was predominant in the theme of 'practical considerations' as barriers to the use of standardized assessment use (67). In actual fact, in almost all literature reviewed regarding the use of standardized assessments, tests or outcome measures amongst clinicians in a variety of countries, the lack of time as a barrier was evident (47, 64, 66-69). Clinicians find themselves having to juggle many aspects of patient care and report that including standardized assessments within this is almost impossible.

5.4.1.1 Lack of Time

When looking into the concept of time as a limitation to the use of standardized upper extremity assessments, there are a number of perspectives. Firstly, the length of time it takes to execute the assessment, this can in some instances take between 45-60 minutes, a full session (67). Secondly, the time it may take to score an assessment once completed (67). Thirdly, the time allowed per patient during a day and the frequency in which patients have access to occupational therapy services (67). With regard to the public sector, the ratio of occupational therapist to patient is very low and the accessibility of patients to clinics is quite poor (13, 18). This implies that a patient may stay at an inpatient facility for under a week and come for therapy once or twice a month as an outpatient. When these patients are treated, they may also only receive short sessions of therapy. One of the focus group participants working in the public sector described time as a limiting factor: *"…we don't have the space or the time to take that passion and spend an hour, there isn't an hour, we run therapy with five patients at the same time."*

In private settings time is usually governed by medical funders which occasionally only approve short periods of treatment or it is governed by daily productivity stats which depicts

the time of the day in which each therapist displayed productivity. With high patient loads, fitting full sessions into each day together with administration can be quite challenging.

What tends to occur in both situations is that assessment can be overlooked, as fitting in as much intervention as possible is always a therapist's prime objective. However, if one is not performing an in-depth assessment to begin with, is the intervention truly effective? (1) Occasionally, not having a definite plan prior to the patient's session can add to limiting time. If one is prepared with specific standardized assessments to be conducted within a particular period of time and if that is the prepared plan for the session, effective intervention can begin from session two which will inevitably eliminate the feeling that there is limited time. An idea which came from the focus group was to have selected specific assessments for your setting and to have these on your assessment form to cue the implementation.

5.4.1.2 Lack of Knowledge/Familiarity

This specific barrier has been described above, as it is directly correlates to the familiarity questions asked in both the survey and the focus group. The literature describes the lack of knowledge with regard to standardized assessments as not only being unaware of which assessments are available, but of having limited knowledge on administering and scoring the assessments, decreased understanding of the validity and reliability of the assessment tool as well as its applicability and utility for the population (67, 71, 72). Clinician's also report that they struggle to source the assessment and the tools and materials required for the assessment and they have difficulty selecting the best assessment to use (67, 71, 72).

5.4.1.3 Lack of Resources

When describing lack of resources one can either discuss it in terms of physically lacking the assessments and their tools and materials in the setting or the lack of monetary resource when drawing up a departmental budget. An idea drawn from both the survey and the focus group, was the concept that there is a cost involved in the purchase of the standardized upper extremity assessments which is seen as a barrier or limitation to their use - *"I don't*

know a lot about these standardized tests for stroke patients, but I know there is a cost involved."

When comparing these results with that of research conducted in countries abroad, the lack of resources mentioned within these studies pertained to the actual availability of the assessment as well as organizational policy or management support as a resource (67, 70, 71). A number of studies found that if there was high organizational priority as well as a company ethos towards the use of standardized assessment use, that this was a resource which could have a positive influence on the overall use of standardized upper extremity assessments (67, 71).

The barriers/limitations given as examples in the survey were specific to an American population, as there has not been a South African study into the perceptions of allied health professionals, into the use of standardized upper extremity assessments used in stroke rehabilitation; thus the South African occupational therapists were asked to describe barriers/limitations specific to them and their environments. Specific to SA, the four main limitations as described in table 7, are that standardized upper extremity assessments are excluded from undergraduate studies, the cost of the assessments is too great, they are omitted in current protocols and the tests are often not functional in nature. A member of the focus group described the lack of space in the facility in which she works as a significant barrier to the use of standardized upper extremity assessments; a barrier/limitation which did not arise within the survey. These barriers are not so different from the current literature coming out of many first world countries; their clinicians describe the following at barriers to the use of standardized assessments: lack of time, lack of knowledge, unfamiliarity with tests and their properties, the suitability of the tests to their patients, no support from management, being forced to use specific assessments, unavailability and limited space and a great reluctance for therapists to change their current behaviours (67-72) .

5.4.2 Function vs. Impairment – The Age-Old Battle

The above responses describe that a percentage of the survey population found that many of the standardized upper extremity assessments available are not functional in nature. This was a great talking point in the focus group from which central ideas were born; occupational therapists battle to decide between impairment and function when it comes to assessment; specifically within the nature of stroke and its complexity. There is this conflict between focusing on impairment which may at times shy away from function and aiming at function which can then lead to compensation. Occupational therapy strives to encourage the participation in activities, they are driven towards function and as such, CD2.3 arose with the following quote: *"…some of these tests are not functionally driven."* Occupational therapists want to see functional improvement, functional outcomes; they want to see that ADLs have improved and that the patient is participating in daily roles (10). CD.2.1 and CD2.4 within theme two in the focus group table describe how the patient may simply want to be functional - *"…Because it doesn't matter if my arm is not working as long as I can do what I want to do; the point being is, can I still get the work done with whatever is left of the arm."* and that at times a functional assessment may be enough - *"I think if you base it on functional activities alone that's medical enough if the patient was not able to, to dress cause they were not able to use that hand but now are incorporating it in the activity, there's improvement, there's no standardized test, but the patient is engaging in the activity using that hand."*

However, the other side of the coin is that one cannot view functional activity in isolation of the impairments. Specifically in stroke where there are a number of upper extremity impairments which have a direct influence on function. CI.2.2 and CD.2.7 describe the impairment aspect of the upper extremity with this quote: *"Functional activity doesn't take in for the trick techniques, you know, they're managing to do it, but the hand is not doing anything, you know, they've learnt how to do it, they're compensating, so I don't know, if*

you're looking specifically at upper limb function, that doesn't really say, like have they got the grasp, have they got the pinches, have they got the appropriate reach."

Again the conclusion can be drawn that a combination of assessments may be the most effective. The solutions may be to include one or two standardized upper extremity assessments which focus on function and one or two assessments which detail the impairment fallout. The quote describing CD.2.8 – function AND impairment - *"…in one sense you need to have more functional based tests and on the other hand you need to have the more impairment based, because that's where you, because of trick movements can actually fool the functional tasks, you actually need to look on impairments, you actually need to look on range and dexterity."*

5.4.3 Standardized Assessments are just Irreplaceable

In essence, the themes drawn from the focus group hold true "we don't know what we have" and "we don't know what we want". South African occupational therapists are overwhelmed; firstly, stroke as a disorder is complex in nature, there are not only the physical impairments which can occur simultaneously after one incident, but also the cognitive and language aspects, and in SA, the increase in HIV/AIDS vasculopathies adds a whole other aspect regarding socioeconomics and the roles patients have to return to (19). Secondly, the ratio of occupational therapists to stroke patients in SA is appalling and with the barriers described above, it is easy to fall into the trap of routinely scraping by and trying to manage the chaos (18). Having knowledge of the tests that are out there and their basic properties is a start. Finding a standardized assessment which requires inexpensive materials to compile can assist within the situations South African occupational therapists find themselves in. Identifying two to three standardized assessments which assess a variety of aspects, both impairment based (strength, endurance, hypertonicity & spasticity, somatosensory, motor control, ROM) and function based (ADLs, dexterity & hand function) and familiarizing oneself with the execution of these so as to shorten the implementation time can be seen as a solution. A few good combinations include the Modified Ashworth Scale to briefly assess

hypertonicity and spasticity, the SULCS to asses gross motor movements, motor control and muscle strength and the ARAT to assess finer tasks and dexterity; one could even replace the Modified Ashworth Scale and the Sulcs with the FMA-UE which includes the assessment of ROM and somatosensory functions.

If occupational therapy teams decide upon these assessments together and roll them out as a standard method of assessment with every stroke patient, objective findings will be attained which will guide the most effective method of treatment. If this behaviour becomes habitual, there will be new found time in the day-to-day chaos. There is no replacement or substitute for the use of a standardized assessment tool. It has been stipulated in the literature that standardized assessments must be used in practice, that they are preferred and that there is a drive towards their use for the benefit of patient care (1, 45, 50). Observation is simply not enough as it is not measurable and objectively descriptive. According to the Occupational Therapy Practice Framework: Domain & Process 2nd Edition, attaining reliable and valid information through the use of standardized assessment provides an optimum level of support to justify the ongoing need for occupational therapy (1).

5.5 What Do We Have & What Do We Want?

Many of the above barriers/limitations expressed above were based on the study samples' subjective opinions; however, the outcome of this study was that these occupational therapists are in fact not familiar with current standardized upper extremity assessments. A review of the literature may assist in finding truth behind the opinion. When tabulating and comparing the fifteen standardized upper extremity assessments used in this particular study, the following was found: six out of the fifteen assessments can be conducted in under ten minutes, the lengthiest assessment was the Chedoke McMaster Stroke Assessment Scale which can be conducted between forty five and sixty minutes; ten of the fifteen standardized assessments have a functional element to them or are completely based on the completion of functional activities; nine of the assessments are available online at no cost, while the remaining six are available to order (out of SA) at a cost. In terms of the tools

required, and the complexity of the assessments, three of the standardized assessments can be conducted with no equipment, as one is simply a manual test and the other two are questionnaires, three of the assessments require the use of specific standardized equipment which can be quite costly and nine can be compiled from everyday items, if the specifications of the assessments are followed.

Table 11 Standardized Upper Extremity Assessments Summarized

Assessment	Time to Administer	Availability	Equipment/Complexity
NHPT	No reported time – norms are under 25 seconds for each hand	Have to purchase and import the assessment	Standardized equipment
Modified Ashworth Scale	2 minutes	Free – text books	No equipment required Basic manual assessment
BBT	2-5 minutes	Instructions are free online	Standardized equipment
DASH	5 minutes	Free online	Questionnaire
SULCS	6 minutes	Free online	Simple everyday objects Easily followed instructions
ABILHAND	10-30 minutes	Free online	Questionnaire – interview style
Jebsen-Taylor Hand Function Test	15-45 minutes	Have to order the instructions	Can create the test from everyday objects Easily followed instructions
MAS	15-60 minutes	Free online	Simple everyday objects Easily followed instructions
ARAT	20 minutes	Have to purchase assessment from the Netherlands	Everyday objects if you follow the specifications
CAHAI	20-25 minutes	Free online	Simple everyday objects can be used Easily followed instructions
WMFT	30 minutes	Free online	Simple everyday objects for most of the test A dynamometer is required to measure grip strength
FMA	30-35 minutes – full 20 minutes – motor aspect	Free online	Simple everyday objects Need to have an understanding of basic impairment tests

RMA	45 minutes	Free online	Simple everyday objects Easily followed instructions
AMAT	45 minutes	Can be purchased at a cost of $25	Simple everyday objects Easily followed instructions
Chedoke McMaster Stroke Assessment Scale	45-60 minutes	Have to purchase and import the assessment	Simple everyday objects can be used

The results from both the survey and the focus group may underline one of the biggest barriers/limitations to the use of standardized upper extremity assessments in parts of SA; the occupational therapists from this study do not typically review research related to standardized upper extremity assessments used in stroke rehabilitation, they are not familiar with available standardized upper extremity assessments and are not confident in their knowledge to execute assessments available. It was evident from the above study that reading standardized assessment literature, or applying the current assessments available is not being done in practice. Occupational therapists in SA are using their perceived barriers and limitations as excuses to exclude them from daily clinical practice, and the less they use them, the less they know about them.

The implication of this is the credibility of what South African occupational therapists do. If there is limited knowledge into standardized upper extremity assessments and limited use; how can one justify the need for occupational therapy in SA and further describe occupational therapy practices as being evidence based? South African occupational therapists need to find literature to support their assessment and intervention and they need to specifically find or develop standardized upper extremity assessments that overcome their context specific limitations. EBP is the order of the day, and we are not even on the menu.

What needs to be done in SA is that undergraduate facilities need to train the occupational therapy students on firstly, the significance of EBP, and secondly, the importance of detailed, objective standardized assessment and its relation to effective treatment (1). Students need to be exposed to the variety of assessments available in assessing the upper extremity

following stroke and be guided to select combinations that work to assess all aspects of the upper extremity. Students must also be encouraged from first year on how to identify valuable research and where to find it; literature has indicated that this has already begun (22). At a postgraduate level, OTASA should begin the search for training courses that are practical in nature and that include the sharing of knowledge, specifically with regard to the standardized upper extremity assessments available. This information was attained from the focus group - CI.1.3 in the focus group results table discusses training on standardized assessment and CD.1.6 talks about the type of training with the following quote: *"Just on training, and it's something that came up in my research as well is the type of training, so it's not just about having workshops… but it's about doing the right kind of training so that experienced as well as inexperienced therapists are able to benefit from each other…having more dynamic training based on actual experience."* Current literature talks about training as being multi-facetted in nature. The training required needs to firstly include knowledge of available tools; a study published in 2012 explains this so well – the less knowledge clinicians have about available tools, the more likely they are to stay with familiar assessment methods and remain with their belief that appropriate standardized assessments do not exist (71). Training and education then need to cover the importance and value of using standardized assessments and this must come from an organizational level which applies external pressure on clinicians (67). Training needs to be setting specific, based on needs found within each setting, but also need to cover the selection, search methods and administration of available tests, as well as cover the reliability and validity of the assessments (67, 69).

It is about creating and embracing an ethos of wanting to do the best one can for the patient in the most efficient way possible; a culture in which assessment cannot occur without the use of standardized assessments. In current literature it has been found that clinicians are more likely to make use of standardized assessments in companies where the organization or therapy team encourage the use of these assessments, provide support and make the

assessment tools readily available and listed on assessment forms as part of company policies (67, 71). In order to develop this culture, occupational therapists must also be involved in the decision making regarding which assessments will best work in their settings and with the patients they treat (67).

To start this company culture, the focus group formulated the idea that current standardized assessments need to be used more and that each individual or occupational therapy team should thereafter decide upon and select the assessments that will work within their specific environment. CI.1.2 in the focus group results table describes the need for occupational therapists to make use of these assessments with CD.1.4 describing that this will lead to the identification of the most effective tools - *"I think you need to search for a test that will fit your situation."* And again: *"I think it's finding the right tools, I think that's really the key, it's like at a rehab, management sitting down using experience taking into consideration the setting and the patients and saying this is the right tool for this place, at a government level, saying this is the right tool, outpatient rehab – this is the right tool. I think there's like so many tests out there, so many that we don't know that maybe have been devised for apraxic, aphasic patients, so it's just a matter of knowing what's out there."* Once this selection has been made, the assessments should be made visible to the therapists and should be encouraged from a protocol perspective; i.e. the assessment protocol includes the use of one or two specific assessments for each appropriate patient. Here it must again be emphasized that due to the complexity of stroke and its presentation (37, 39), as well as the element of assessing both impairment and function, it is unlikely that just one assessment can do it all, and so, it is recommended that a combination of assessments be used to address all aspects and assess the upper extremity in detail.

In conclusion, it is not the lack of standardized upper extremity assessments that poses a problem with regard to the South African occupational therapists use of these, but rather the occupational therapists' lack of knowledge. It is the responsibility of each and every occupational therapist in SA treating stroke to start using a combination of standardized

upper extremity assessments available to them, even if it means simply searching on Stroke Engine to find them. They then need to identify two to three assessments that when used complement one another and assess all aspects responsible for upper extremity disuse. After finding these assessments and initiating their application, the occupational therapists will identify the functionality, the cost of the materials, the specific equipment required and execution time and find the best ones for the setting. The occupational therapists must then start using these for each and every new admission, have the assessment information present on the assessment forms to prompt the use of the tool and the recording of the scores. Occupational therapists must take responsibility for building their profession and nurturing the philosophy that **STANDARDIZED** upper extremity assessment in the only way! A complex disorder such as a stroke which affects the physical, cognitive and language abilities of a person, their daily activity performance and their role fulfilment, requires objective, standardized assessment so as to prompt the most appropriate and effective treatment.

5.6 Limitations of the Study

The greatest limitation to this particular study was that although the sample size for the survey was greater than the size which was required based on a 22% survey return rate, the demographics of the sample showed a much greater response from private sector occupational therapists. This implies that the information cannot be generalized to the occupational therapists over all of SA. This could have been due to the method of survey distribution; via the internet, which limited the responses from the public sector, as many facilities in rural areas do not have access to the internet.

Secondly, as the method chosen for sample selection was convenience sampling, only those therapists registered with OTASA, as well as those contacted telephonically at public and private sector hospitals and practices in the Johannesburg and Pretoria region, made up the study sample. Their responses could therefore not be completely generalised to the occupational therapy population in SA.

A final limitation to this study was the time allowed for the research project completion which influenced the ability for focus groups to be held in widespread areas across SA. As a result only one group was held for occupational therapists in and around Johannesburg. Even though all of the information attained from this one group consolidated the information found in the survey, focus groups from a number of areas would have allowed for greater unity in the information.

5.7 Recommendations for Future Research

A recommendation based on the above limitation includes a variation in the method of survey distribution. Future studies should include paper-based surveys which can be completed as an interview or over the phone, as well as questionnaires sent via the post. Based on the second limitation, if time and budget allow, a future study can hold focus groups in the various provinces of SA.

Secondly, regarding the sampling method, hospitals and practices in both the public and private sectors in each province of SA, should have been included, so as to be able to truly generalise the findings.

It is recommendation is that a future study should be conducted making use of only qualitative information. In that way, more focus groups can be held with the possible inclusion of occupational therapists from the different provinces of SA. The time allocated for the study will then be concentrated on these focus groups and not on both a survey and focus group data collection.

Chapter Six: Conclusion

6.1 Introduction

Chapter 6 will summarize the information attained from this study and make necessary recommendations so as to inform the readers accordingly.

6.2 Summary of Findings

In summary, the findings from both the survey and the focus group are that occupational therapists from this study who are from parts of SA understand the term standardized upper extremity assessment but are not familiar with the current standardized upper extremity assessments available to them. As a result, they do not make use of the wide variety of standardized assessments available when measuring the components of the upper extremity and instead make use of ADL participation or simply clinical observations.

Occupational therapists in SA are able to identify and discuss the benefits to the use of standardized upper extremity assessments and are able to describe these as they are described in current literature (50). They report that these assessments can assist in tracking progress, in setting goals and providing evidence for the effectiveness of intervention (50). The study population also described these assessments as being used to compare abilities to set norms, they provide objective information and can assist in communication between rehabilitation team members, as well as assist in motivating for increased length of hospital stay based on this objective information (50).

Even though the South African occupational therapists are aware of the benefits to the use of standardized upper extremity assessments, their perceived barriers and limitations to their use outweigh the positive aspects. According to occupational therapists in SA they do not have time to utilize these assessments in practice and also lack the resources to use these. They also report that their lack of knowledge influences their use of these assessments negatively. These perceived barriers and limitations are very similar to those found in current literature conducted in first world countries (50, 67, 69-71).

6.3 Overall Findings

The limitations to standardized upper extremity assessment use described by South African occupational therapists are not fully justified when researching a number of assessments available – in terms of time and cost required. Thus the conclusion drawn is that South African occupational therapists treating people who have suffered from stroke do not regularly review current stroke assessment literature, are lacking training and basic knowledge regarding standardized upper extremity assessments and are therefore not using these assessments to find the truth. This has great implications regarding the standard of treatment which is given to patients following generalized assessments, as well as the degree to which occupational therapy as a discipline in the country is embracing EBP.

The need for education and further training cannot be overlooked and from this study, one can formulate practical post-graduate courses and training methods which could be of benefit to occupational therapists in SA. This training can take place in the form of imparting specific assessment knowledge and practical use as well as include methods of performing literature searches and retrieving current standardized assessment knowledge. Standardized upper extremity assessment combinations can also be assessed and presented as ideas within training programs.

Occupational therapists must be inspired to take control of this situation from both the bottom up and the top down, from clinicians to management and from organization to employees respectively. This is a challenge which needs to be accepted, all occupational therapists treating people who have suffered from stroke must start using assessments they find to experience them first hand and assess their content validity to the South African population, as well as their clinical utility within each therapist's setting. This is non-negotiable, for the benefit of each and every stroke patient and future of the occupational therapy discipline's credibility.

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Appendix A

Questionnaire

Study Title: Standardized Assessments used by Occupational Therapists in the management of the Upper Extremity after Stroke in South Africa.

Please tick the most appropriate box and fill in the requested information where necessary. If you have never worked in the field of neurological rehabilitation please tick the appropriate box in the first question and send back. If you have worked or are currently working in neurological rehabilitation please continue.

Part 1

Demographics

1. I have been practicing in the field of neurological rehabilitation for:

Less than 1 year	1-2 years	3-5 years	6-10 years	11-15 years	16-20 years	Over 20 years

2. I am currently working in:

A private hospital	A public hospital	A private rehabilitation unit	A public rehabilitation unit	In the community	A private practice	Medico-Legal & FCE

3. I see the following patients, affected by stroke, most days:

Acute Inpatients	Chronic Inpatients	Acute Outpatients	Chronic Outpatients

4. How long on average do you treat patients for?

Less than a week	7-14 days	15 days - 6 weeks	6-12weeks	3-6 months	6-12 months	More than a year

Part 2

Survey

5. Are you familiar with the term standardized assessment in terms of upper extremity management?

Yes	No	Unsure

In order to ensure that there is no confusion with regard to standardized upper extremity assessments, I have included a definition.
Standardized assessments according to the Quick Reference Dictionary for Occupational Therapy include testing and scoring procedures that are specifically defined and the interpretation of these tests requires the use of particular norms. They are measures that assess the affected upper extremity's ability to perform functional tasks. A list of these assessments includes:

- Action Research Arm Test (ARAT)
- Wolf Motor Function Test (WMFT)
- Motor Assessment Scale (MAS)
- Rivermead Motor Assessment (RMA) – Arm Function Subtest
- Stroke Upper Limb Capacity Scale (SULCS)
- Jebsen Taylor Hand Function Test
- Arm Motor Ability Test (AMAT)
- Chedoke McMaster Stroke Assessment Scale
- Chedoke Arm and Hand Inventory-9 (CAHAI-9)
- Nine Hole Peg Test (NHPT)
- Modified Ashworth Scale
- Disabilities of the Arm, Shoulder and Hand (DASH)
- Assessment of Motor and Process Skills (AMPS)
- Fugl-Meyer Assessment (FMA)
- Box and Blocks Test (BBT)
- The ABILHAND

6. Are you familiar with any of the mentioned measures?

Standardized Assessments	I am very familiar with the assessment and its use	I am familiar with the assessment	I vaguely know of the assessment	I do not know the assessment at all
Action Research Arm Test (ARAT)				
Wolf Motor Function Test (WMFT)				
Motor Assessment Scale (MAS)				
Fugl-Meyer Assessment (FMA)				
Rivermead Motor Assessment – Arm Function Subtest				

Stroke Upper Limb Capacity Scale (SULCS)				
Jebsen Taylor Hand Function Test				
Arm Motor Ability Test (AMAT)				
Chedoke McMaster Stroke Assessment				
Chedoke Arm and Hand Inventory (CAHAI-9)				
Nine Hole Peg Test (NHPT)				
Modified Ashworth Scale				
Disabilities of the Arm, Shoulder and Hand (DASH)				
Assessment of Motor and Process Skills (AMPS)				
Box and Blocks Test (BBT)				
The ABILHAND				

7. Do you use or have you used any of these assessments and how often?

Standardized Assessments	Very often (weekly)	Often (Monthly)	Not often (every 6 months)	Never
Action Research Arm Test (ARAT)				
Wolf Motor Function Test (WMFT)				
Motor Assessment Scale (MAS)				
Fugl-Meyer Assessment (FMA)				
Rivermead Motor Assessment – Arm Function Subtest				
Stroke Upper Limb Capacity Scale (SULCS)				
Jebsen Taylor Hand Function Test				
Arm Motor Ability Test (AMAT)				
Chedoke McMaster Stroke Assessment				

Chedoke Arm and Hand Inventory (CAHAI-9)				
Nine Hole Peg Test (NHPT)				
Modified Ashworth Scale				
Disabilities of the Arm, Shoulder and Hand (DASH)				
Assessment of Motor and Process Skills (AMPS)				
Box and Blocks Test (BBT)				
The ABILHAND				

Do you know of or use any other standardized upper extremity assessments not mentioned above (please specify) and include how often you use these?

_____
_____
_____
_____

8. Of the standardized assessments you make use of, could you please place 5 into order of priority or preference. If possible could you add a reason for your choice?

1.
2.
3.
4.
5.

9. What in your opinion are the benefits of using the above standardized assessments in the management of the upper extremity following stroke?

_____
_____
_____

10. There are a number of limitations with regard to the use of standardized assessments in the management of the upper extremity after stroke. Please tick the box you feel most strongly about with regard to each mentioned limitation.

Limitation	Affects me a lot	Affects me a little	Does not affect me that much	Does not affect me at all
Time				
Resources				

Familiarity				
Appropriateness & cultural sensitivity				
Cognitive difficulties of patients				
Patients levels of anxiety				
Having to interpret the assessments				
Language				

Are there any other limitations that you feel impact your use of standardized assessments in the management of the upper extremity after stroke?

_____
_____
_____
_____

11. What do you use in place of standardized assessments in the management of the upper extremity following stroke?

_____
_____
_____

Appendix B

Focus Group Questions – 01/10/2014

1. Are you familiar with the term standardized upper extremity assessment? How would you describe this?
2. Which standardized upper extremity assessments are you familiar with?
3. How often do you use these assessments and for what specific purpose would you say you use them?
4. What in your opinions are facilitators to the use of standardized upper extremity assessments?
5. What in your opinions are barriers to the use of standardized upper extremity assessments?
6. What do you feel could be done to encourage or improve the use of these assessments in practice?

Appendix C

Focus Group Participant Questionnaire

Title of the study: The use of Standardized Assessments by Occupational Therapists in the Management of the Upper Extremity after Stroke in South Africa.

Name:_____

Number of years' experience:_____

Current work situation (outpatient/home visits/rehab/acute):_____

_____

Public or Private setting:_____

E-mail address:_____

Appendix D

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Ms Despina Phieros

CLEARANCE CERTIFICATE	**M120922**
PROJECT	The Use of Standardized Assessments by Occupational Therapists on the Management of the Upper Extremity after Stroke in South Africa
INVESTIGATORS	Ms Despina Phieros.
DEPARTMENT	Department of Occupational Therapy
DATE CONSIDERED	28/09/2012
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 14/11/2012 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Juliana Freeme

DECLARATION OF INVESTIGATOR(S)
To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

University
of the Witwatersrand,
Johannesburg

Department of Occupational Therapy

7 York Road, Parktown, 2193 South Africa • Telegrams 'Witsmed' • Tel: +27-11-717-3701 • Fax: +27-11-717-3709
e-mail: Leilane.Mackay@wits.ac.za

Information Letter - Questionnaire

Hi, my name is Despina Phieros. I am a student at Wits and am currently completing a Master's degree in occupational therapy. Part of the degree involves a research study. The title of the study is:

Standardized Assessments used by Occupational Therapists in the Management of the Upper Extremity after Stroke in South Africa.

Introduction

The study sets out to explore the beliefs, opinions and perceptions of the South African OT with regard to the knowledge and use of standardized assessments in the management of the upper extremity after stroke. The study intends to find the limitations as well as the facilitators to the use of standardized assessments. The study also aspires to find any differences in these facilitators or limitations between the public and private sector.

Procedure of study

The study will be executed in two parts or phases. This is phase one of the study. I would like to invite you to participate in this study. Simply complete the questionnaire and return. By completing the questionnaire, you have given your informed consent.

If you are have been working in the field of neurological rehabilitation for 2 or more years, live in and around Johannesburg and are interested in participating in the focus groups for phase 2 of the study, please pay specific attention to the end of the questionnaire.

Confidentiality

All efforts will be made to ensure confidentiality. Remember that you will be participating at your own free will. There will be no penalties for not completing the questionnaire.

Contact details

For further information / reporting of study related to adverse events please contact the Wits Occupational Therapy department on 011 717 3701 or the Secretary of the ethics Committee, Anisa Keshav (011) 717 1234 if you have any complaints or problems.

Yours sincerely,

Despina Phieros

Occupational Therapist

083 513 0715

dezphieros@gmail.com

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Johannesburg

Department of Occupational Therapy

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e-mail: Leilane.Mackay@wits.ac.za

Information Letter – Focus group participants

Hi, my name is Despina Phieros. I am a student at Wits and am currently completing a Master's degree in occupational therapy. Part of the degree involves a research study. The title of the study is:

Standardized Assessments used by Occupational Therapists in the Management of the Upper Extremity after Stroke in South Africa.

Introduction

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Procedure of study

The study will be executed in two parts or phases. Phase one of the study has already been completed and I would like to thank you for your contribution. Phase two of the study is being conducted through the use of focus groups.

I would like to invite you to participate in this focus group. It entails an organized discussion of your perceptions and ideas regarding standardized upper extremity assessments. The information received from the focus group will then be transcribed and the themes drawn from the discussion will be sent to you via e-mail in order to ensure that your opinions were adequately described.

Confidentiality

The focus group will be recorded using an audiotape, with your permission, and there will be a second researcher present. All efforts will be made to ensure confidentiality. Remember that you will be participating at your own free will. You are under no obligation to stay through the group and are free to leave at any point without fear of any form of penalty.

Contact details

For further information / reporting of study related to adverse events please contact the Wits Occupational Therapy department on 011 717 3701 or the Secretary of the ethics Committee, Anisa Keshav (011) 717 1234 if you have any complaints or problems.

Yours sincerely,

Despina Phieros

Occupational Therapist

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e-mail: Leilane.Mackay@wits.ac.za

Informed Consent

I, _____ (full name) hereby consent to be a participant in the focus group: **Standardized Assessments used by Occupational Therapists in the Management of the Upper Extremity after Stroke in South Africa.**

I consent to the researcher:

- using the results found in the study (excluding my name)

I am aware that my participation in the study is voluntary and that I may withdraw at any stage.

Signed _____

Date_____ Place_____

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e-mail: Leilane.Mackay@wits.ac.za

Informed Consent Form for audio recording

I, _____ (full name) hereby consent to be a participant in the focus group: **Standardized Assessments used by Occupational Therapists in the Management of the Upper Extremity after Stroke in South Africa**.

I consent to the researcher:

- Audio taping the focus groups

I understand that the audio recording will be transcribed and the recording will be stored until the research is completed. Once the research is complete the recording will be destroyed.

Signed _____

Date_____ Place_____