**Kingdom of Saudi Arabia**
**Ministry of Education**
**Majmaah University**
**Deanship of Postgraduate Studies**
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**Physical Therapy and Health Rehabilitation Department**

# Cross-Cultural adaptation and validation of the Arabic version of Rivermead **Mobility Index** for patients with Stroke

A Thesis Submitted in the Partial Fulfillment of the Requirement for the Master degree of Science in Physical Therapy- Neuro Track

**By**

**Haifa Mohammed Aladwani**

University Identification Number:
**421203828**

**Supervisor**

**Dr. Mohamed Kotb Seyam**
**Assistant Professor**
**College of Applied Medical Sciences**

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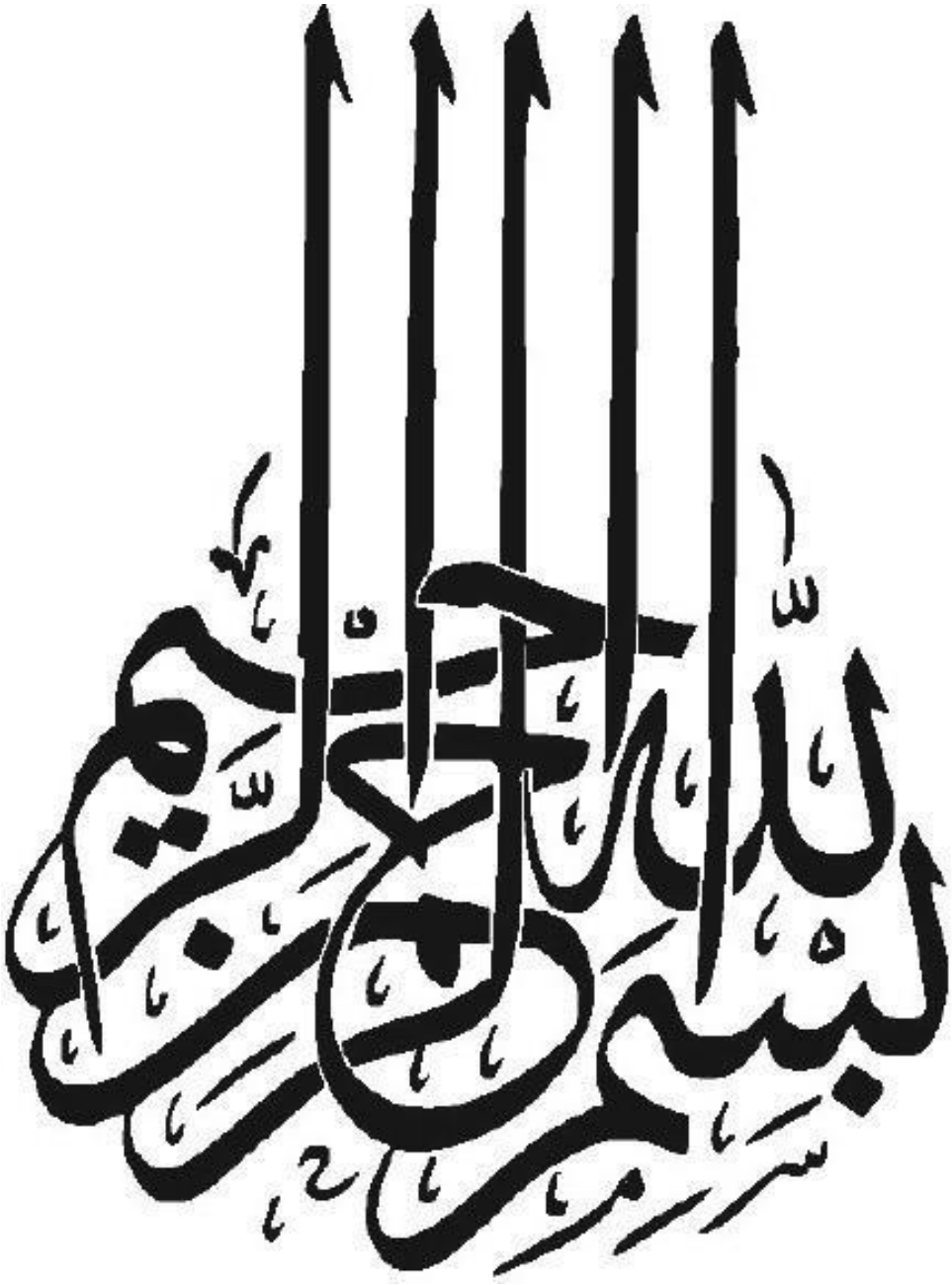
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# Abstract

**Background**: Following a stroke, individual could experience changes in their sensation and motor abilities, for stroke patients, mobility disability has a negative impact on their everyday tasks and overall quality of life; therefore, mobility is an important outcome in stroke rehabilitation. The Rivermead Mobility Index (RMI) is a tool used to evaluate functional mobility (e.g., walking, balance, and transfer) in neurological disorders patients The Rivermead Mobility Index has not been translated into Arabic language and not been validated in Saudi Arabic patients. **Objectives:** To translate and cross-culturally adapt Rivermead Mobility Index (RMI) from original English version into Arabic version and to evaluate validity and reliability of RMI Arabic version for patients with stroke in Saudi Arabia. **Methods**: The process of translation and cross-cultural adaptation of Rivermead Mobility Index in the current study was according to Beaton guidelines, which contained the following stages: forward translation, synthesis, backward translation, expert committee review to make the pre-final Arabic version, pre-testing (Piloting)and validation. One hundred fifty participants with stroke completed the RMI-Arb version and pervious translated Arabic version of berg balance scale (BBS-Arb),140 participants evaluated at baseline and after one week to assess the test-retest reliability. Data analysis included construct validity, test-retest reliability, and internal consistency. **Results**: 150 participants enrolled (59.31± 9.44 years old). The construct validity assessed using Spearman's rank-order correlation coefficient test, total score of RMI-Arb and BBS-Arb found to be positive and strong correlation (*rho* = 0.8866) ($p < 0.001$). Cronbach's alpha of RMI-Arb was ($\alpha$=0.95), that showed excellent internal consistency for total score of RMI-Arb. Also, test-retest reliability was excellent for the overall RMI-Arb, the Intraclass correlation coefficient (ICC) was (0.996) with a 95% confidence interval (CI) from (0.99-0.912). There was no ceiling effect for the RMI-Arb. **Conclusion**: Our findings confirmed the RMI Arabic version is a reliable and valid measure to evaluate mobility disability for patients with stroke, these findings may offer information that is helpful in the choice of RMI-Arb for the population of Arabic-speaking healthcare professionals and academic researchers.

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# LIST OF ABBREVIATIONS

- RMI Rivermead mobility inex
- BBS Berg balance scale.
- BI Barthel Index.
- GBD Global burden of disease
- EMG Electromyography.
- HTN Hypertension.
- FRT Functional research Test.
- DM Diabetes Mellitus.
- TCT Trunk control test.
- TUG Time up to go.
- DGI Dynamic Gait Index.
- WHO World health organization.

CHAPTER 1

# INTRODUCTION

## 1.1. Introduction:

Stroke is defined as a vascular origin condition that lasts longer than 24 hours and is clinically manifested by evidence of generalized or localized cerebral function impairments (Cholewicki et al., 1997). Following a stroke, individual could experience changes in their sensory-motor functions, in addition to low muscle power, hardness, involuntary movement and decrease in physical state. These disabilities may make it more difficult for a person to perform daily activities including walking, climbing stairs, and taking care of themselves (Teixeira et al., 2000). Globally, prevalence of stroke has increased in last decade ,it's the leading cause of acquired adult disability and the second most common cause of mortality in high-income countries (Warlow et al., 2011). Stroke affects 112 to 223 per 100,000 persons in high-income nations, compared to 73 to 165 per 100,000 in low-income nations (Feigin et al., 2009). Stroke incidence rate increasing with age, whereas male and female aged 45-74 had a higher incidence rate of stroke globally (Barker-Collo et al., 2015). The literature shows stroke prevalence have increased over the years in Middle East countries and the incidence rate in 2000-2014 was 22.7-250/ 100,000 population per year. Additionally, the Kingdom of Saudi Arabia there were 29 stroke cases per 100,000 persons every year (Alqahtani et al., 2020). Mobility is described by the world health organization (WHO) as the ability of a person to move about freely and effectively, because it is such an important characteristic for living a self-sufficient life, many patients regard its loss following a stroke as a major shortcoming (Chiou & Burnett ., 1985). For stroke patients, mobility limitation has a negative impact on their everyday tasks and overall quality of life, wherefore attempts to enhance mobility are an important aim of stroke

rehabilitation (Lennon&Johnson., 2000). An accurate (reliable) assessment of ability is required to evaluate the mobility performance of individual with stroke and to identify changes after therapeutic interventions to control mobility impairment (Hsueh et al., 2003). The Rivermead Mobility Index (RMI) is a technique used to evaluate mobility disability in disability in neurological disorders patient, which is a critical aspect of functionality. It is increasingly used internationally for research among patients because it is an easy and quick assessment that may be done anywhere, whether at work, at home, or elsewhere, it also has the right psychometric properties (Collen et al., 1991). In the current study, the Rivermead mobility index has not been translated and cross-culturally adapted int Arabic language and are unable to function properly in the Kingdom of Saudi Arabia (KSA). Therefore, the aim of this study was to translate, cross-culturally adapted, and validate the RMI into Arabic for patients stroke in Saudi Arabia.

## 1.2. **Motivation of the thesis**:

The rising number of stroke cases around the world necessitates a strategy for preventing stroke and dealing with stroke prognosis approaches. Early rehabilitation will have an impact on the result of people who have had a stroke. To our knowledge, only the original version of RMI has been used in Saudi Arabia, hence it is critical to measure the adapted RMI questionnaire to ensure that the adapted question keeps the original version's measuring properties. As a result, a correct Arabic translation of RMI could aid health professionals in assessing and following up on their patients.

## 1.3. Objectives of the study:

- To translate and cross-culturally adapt the Rivermead mobility index (RMI) from original English version into an Arabic version in Saudi Arabia.
- To evaluate the validity and reliability of Rivermead mobility index (RMI) as a tool for assessing patients post stroke in Saudi Arabia.

## 1.4. Hypothesis:

The study hypothesis was the Null hypothesis states RMI-Arb version will not be a valid and not reliable measure and the Alternative hypothesis state the RMI-Arb version will be a valid and reliable measure.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Pathology of stroke:

A stroke is a sudden interruption of the blood supply to the brain. The term "apoplexy," which has been around since the Hippocratic literature, was utilized by the doctors. " Rapid onset of symptoms consistent with localized or global damage of cerebral function that last for more than 24 hours or ending in death and have no evident etiology other than of vascular origin", according to the World Health Organization in 1970 ", was considered a stroke (Aho et al., 1980). A stroke happens when a blood clot obstructs blood flow to the brain, the results are damage to or death of brain tissue. Stroke, sometimes known as a brain attack, occurs when blood supply to part of the brain is cut off or when a blood vessel in the brain bursts. (American Stroke Association et al., 2016).

There are five subtypes of stroke according to causation agents: Ischemic stroke, Hemorrhagic stroke, Transient Ischemic Attack (Mini-Stroke), Brain Stem Stroke and Cryptogenic Stroke. Most stroke are caused by a blockage in largest branch of carotid arteries as know (middle cerebral artery). The middle cerebral artery is most often blocked during a stroke. Both the right and left halves of brain considered to be separate hemispheres, the anterior circulation is made up of the internal carotid arteries, whereas the posterior circulation is provided by the vertebral basilar arteries. A stroke can cause one or all the following impairments (sensory impairments, paralysis or weakness, speech and understanding language problems), depending on which parts of the cerebrum are damaged (American Stroke Association et al., 2016). Scientists have identified five signs that may indicate a stroke is occurring: balance loss or dizziness suddenly, sudden loss of vision, face numbness or

weakness (face drooping), arms or legs weakness, speech difficulty or confusion. All these symptoms tend to occur on one side of the body. (Lalu et al., 2022).

**2.2 Stages of a stroke:**

- Stage 1: Flaccidity.
- Stage 2: Spasticity Appears.
- Stage 3: Increased Spasticity.
- Stage 4: Decreased Spasticity.
- Stage 5: Spasticity Continues to Decrease.
- Stage 6: Spasticity Disappears and Coordination Reappears.

**2.3 Description of the stroke condition:** Brain impairment brought on by a stroke may have an immediate effect on how the arm feels and moves. The following symptoms may appear as a result of impairment to the sensory cortex, motor cortex (cerebral cortex), subcortical regions, or cerebellum.

- Loss of motor control, which makes it hard or impossible to create movement on purpose and affects coordination in the fingers, hands, and arms.
- Deficits in proprioception and sensory perception, which lessen limb movements. The reduced range of motion makes the muscle, connective, and neurological tissues more susceptible to changes, which may lead to several secondary concerns, such as the following.
- Muscle shortening (also known as "contracture") and muscle weakness (also known as "paresis").
- Spasticity, a hardening of muscle contraction and impairment of sensory and motor capacity due to the loss of connection of

underused brain networks.

- Shoulder subluxation, a momentary partial dislocation of the shoulder joint brought on by rotator cuff muscle weakness and a lack of motor control.
- Pain, a frequent consequence that is frequently brought on by shoulder subluxation but is also frequently linked to the musculoskeletal alterations brought on by immobility. Many ADLs become challenging due to these deficits, especially those that require fine finger movements and coordination between both upper limbs. The propensity to utilize the undamaged limb more frequently over time while ignoring the injured limb results in learnt non-use (Taub et al ., 2006). Stroke can negatively affect mood and cognitive function, further reducing functional capacities, and arm motor disability itself can have an impact on wellbeing. Participation in society is subsequently reduced as a result of the loss of meaningful activities.

## 2.4 Etiology and Risk factors:

There are two categories of stroke risk factors: The first category is the non-modifiable, which include the constant or unaltered, such as the person's age, gender, and race. Second category of the risk factors are the changeable or modifiable. These include high blood pressure, smoking habits, physical activity, and eating patterns (Boehme et al., 2017). According to research, hypertension is the most controllable risk factor for stroke, increasing stroke risk globally (Abate et al., 2019). Due to increased exposure to risk factors and inability to pay for the high cost of stroke care, the issue is made worse when low socioeconomic disadvantaged groups experience stroke compared to developed population classes (Patne et al., 2016).Significant

disparities in the incidence of key risk factors were seen according to race across the population's subtypes because understanding the pathophysiology of stroke and how it relates to genotype is essential for providing patients with the proper management and care (Al-Hashel et al., 2016). For instance, black people were more likely to have HTN and (DM) than white people (Owolabi et al., 2013).

## 2.5 Epidemiology of stroke:

Stroke is a neurological disorder which is the second leading cause of death worldwide, after cardiac arrest. It is predicted to remain unchanged until 2030 (World Health Organization ., 2013). Despite the fact that there are many different forms of stroke, there is one thing that all stroke survivors have in common in terms of their results. Disabilities that necessitate partial or long-term care are reported. The dilemma becomes even more acute when considering the enormous socioeconomic burden on such palliative diseases. Poor socioeconomic status, for example, is one of the primary factors influencing stroke and its results. Some of the most well-known researchers in the world assessed the effects of socioeconomic factors and concluded that unfavorable economic conditions are linked to higher stroke severity, more strokes, and an earlier age at which strokes occur (Wu S. H., 2013).

According to studies, there was an apparent fall in stroke age (10% decrease) and morbidity (30% decrease) between 1990 and 2015 because of national and worldwide influence on neurological disorders (Feigin et al., 2017). According to a different study, the age-standardized rates of global stroke prevalence and mortality grew by 3% and reduced by 33%, respectively, showing the emergence of a global stroke epidemic (Virani et al., 2020) the nature

of this disease in relation to the global burden of disease (GBD).

## 2.6 Stroke Worldwide:

Stroke is the leading cause of acquired adult disability and the second most common cause of mortality in high-income countries (Warlow et al., 2011).This affects 112 to 223 per 100,000 persons in high-income nations, compared to 73 to 165 per 100,000 in low-income nations (Feigin et al., 2009). 795,000 Americans experience a stroke each year (Go 2013), 110,000 do so in England, and 15,000 do so in Scotland (Pollock et all., 2013). About 80% of stroke survivors have motor disability, which often limits movement of one side of the body's face, arm, or leg (Langhorne 2009). According to (Kwakkel et all., 2003) only 50% of stroke survivors who initially had a plegic (paralyzed) upper limb recovered any functional upper limb function by the end of six months, and among those who initially had arm impairment, 50% still had problems with arm function four years later (Lai et al., 2002), Motor deficits of the upper limbs (the arm, hand, and/or fingers) are commonly chronic and incapacitating (BROEKS et al., 1999). Arm function is crucial for many daily tasks, especially for intimate ones including feeding, dressing, and grooming (Sveen et al., 1999). Arm motor deficit one year after stroke is linked to anxiety, a poorer sense of subjective well-being and health-related quality of life (Morris et all., 2013)(Wyller et all., 1997).

## 2.7 Epidemiology of stroke in Saudi Arabia:

A recent study that was published in 2020 by Al Qahtani found that stroke is one of the main causes of mortality and morbidity in Saudi Arabia. Stroke prevalence have increased in Kingdom of Saudi Arabia there were 29 stroke cases per 100,000 persons every year. It was recommended that a national stroke registry be

established despite the percentages being lower than those reported in other high-income countries in order to track and enhance the healthcare services provided to stroke survivors (Alqahtani et al., 2020).

## 2.8 Clinical presentations of stroke:

It is commonly known that people who have had a stroke are prone to imbalance (Kerber et al., 2006) As previously stated, the relationship between trunk muscles and stroke has been discovered as a key predictor of effective prognosis. It is well recognized that hemiplegic patients' trunk muscles, as well as their strength, become involved. The weakness of the trunk flexors and extensors, which results in a loss of strength and power in hemiplegic patients, is measured by isokinetic dynamometric testing. Studies show that chronic hemiplegic patients are weaker and less powerful than their healthy counterparts. The power of the extensor and flexor muscles was reduced by 64 percent and 88 percent in several research publications after a stroke (Tanaka et al., 1998) compared to normal muscles.

The results, on the other hand, are not the same, and there are differences in the outcomes. For example, when examining the strength of the trunk rotational muscle about trunk impairment and asymmetry, it was discovered that despite minor rotary muscle impairment in the hemiplegic side, no significant differences were revealed (Tanaka et al., 1997) Using a hand-held dynamometer as a primary evaluation instrument, the weakening in the lateral body flexor muscle was evident in the hemiplegic side compared to the normal side in a series of additional research (Bohannon et al., 1995). Further studies using EMG revealed that stoke alters the position of

the axial-lateral and posterior-anterior trunk muscles during lower limb flexion procedures, demonstrating that significant trunk muscle involvement does occur (Kavcic N. a., 2004). Similarly, it was found that a decrease in lateral muscle activity resulted in a delay in action beginning and, as a result, a decrease in synchronization and activation of the connected muscle pairs when using TCT to examine the involvement of the trunk muscles as reported by Colin and Wade (Horstman et al., 2008). The results revealed that the latissimus dorsi muscle, as well as the hemiplegic side's external oblique muscles, were damaged, and that there was a strong positive association with other related tests such as the Barthel Index (Dickstein et all., 2004) Abnormal EMG activity has also been recorded for muscles, particularly the rectus abdominus, which is thought to be a significant compensating mechanism in hemiplegia patients.

Furthermore, no discernible change in flexion power was found when the flexor muscles of the trunk were investigated dynamically (Messier et al., 2004), despite a reduction in lower limb weight bearing capability. A study of trunk kinematics revealed that hemiplegic patients' unstable motions around the pelvic girdle resulted in difficulties walking.

## 2.9 Effects of stroke on the limb's muscles:

Hemiparesis, which is frequent in persons who have had a stroke, can last for years, and impede one's ability to function. For instance, it has been proposed that the failure of muscles to provide the required forces after a stroke may be caused, at least in part, by an increase in stretch reflex excitability (Levin et al., 2000). Stroke patients may have functional problems because of muscular weakness that is primary mechanisms and whereas secondary

mechanisms include spasticity and disuse. Some research on the prevalence of primary weakness has revealed that it manifests differently in different muscle groups, upper and lower limbs, and proximal and distal segments. Furthermore, the muscular strength plays a significant role on functional ability in functional recovery after stroke. Despite extensive research on neuroplasticity and the remodeling of brain networks during stroke recovery, the muscular processes which contribute to muscle weakness remain largely unknown. (Newham DJ et al., 2001). The nervous system tells a muscle to move, the amount of force it makes depends on the state of the muscle. This is where the mechanical properties of muscle play a very important role in creating force. The length-tension relationship and the force-velocity relationship of muscles show how the length of a muscle and how fast it shortens affect how much force it can put out. The relationship between length and tension shows that muscles use less force when they are shorter than when they are longer (or the angle–torque connection across a joint where several muscles act to produce a net torque) (Paterson et al., 2007).

The equation between force and velocity shows that the force produced by shorter contractions decreases as velocity increases, whereas the force provided by extending contractions just slightly changes as velocity increases. In ageing muscles, sarcopenia (a decrease of an increase in fat mass and skeletal muscle mass) occurs (Paterson et al., 2007). Sarcopenia is hypothesized to be accelerated by inactivity or immobilization; after two weeks of inactivity, muscle mass and strength both drop (Christense et al., 2008). Following a stroke, a person is more likely to spend more than half their waking hours in bed, because of the damage caused by the stroke and decreased mobility, the paretic muscles and, to a lesser extent, the

non-paretic muscles will experience a loss in muscle mass (Bernhardt T et al., 2004). In ageing research, muscle mass reduction correlates with force limitations, so we may anticipate similar outcomes after a stroke. In fact, in 2010 a systematic review was done by Coralie English and his colleagues to find researches that studied on post-stroke changes in skeletal muscle mass (English C et al., 2010), In patients who suffered a stroke at least six months before, when compared to non-paretic muscle, the lean tissue mass of paretic muscle in patients' upper and lower limbs was significantly lower than that of non-paretic muscle. However, because of heterogeneity in outcome measures, characteristics, and measurement timing, the results of longitudinal studies that looked at changes in muscle mass over time could not be pooled for this systemic review (English C et al., 2010). By examining the relationship between stroke and age-related sarcopenia as well as additional crucial architectural changes that take place after a stroke, such as modifications to the examining how changes to pennation angle, fiber and tendon length impact force production.

The purpose of this systematic review was to investigate how post-stroke changes in muscle size, muscle fiber length and orientation, and tendon length affect angle-torque and force-velocity connections for force generation. These connections are essential for performing functional everyday activities such as walking, climbing stairs, and using a computer. Specifically, the review was investigated how these changes affect angle-torque and force-velocity connections (English C et al., 2010).

## 2.10 Assessments tools after stroke:

The success of rehabilitation depends mainly on the tools which are used to evaluate the patients muscle functions after stroke. Several tests were reported to evaluate the muscle functions post stroke. When treating patients, rehabilitation clinicians need to be able to quantify their condition and their progress. The use of standardized measurement scales is one technique to achieve such quantification. Although many facets of a patient's performance can be assessed, mobility is very important (Chiou & Burnett ., 1985). During rehabilitation the physical therapists routinely examine the dorsiflexion passive range of motion (PROM) for ankle in stroke patients who had decrease in ankle joint movement due to spasticity and they can use Biodex Dynamometer as measurement tool of ankle joint range motion in patients with stroke (In-Gui Jung et al., 2015). Mobility is one of many scales that includes or focuses on it, the Berg Balance Scale (BBS), Functional Reach Test (FRT), Barthel Index (BI), Canadian Neurological Scale (Cote et al., 1985), the Expanded Disability Status Scale (EDSS), Hauser Ambulatory Index (AI) are some of the commonly used tools for evaluation of patients post stroke, Moreover the Physiotherapy Functional Mobility Profile (PFMP), Functional Mobility Assessment Tool (FMAT), and Rivermead Mobility Index (RMI) are measures of mobility (Hauser et al., 1983) (Collen et al., 1991). The Rivermead Motor Assessment Gross Function Scale contains 38 number of items to assess the functional mobility after stroke (e.g., gait, balance, and transfers) and was developed in response to its shortcomings. Its developers wanted to develop a simple method for determining mobility impairment so that rehabilitation specialists could record the results of treatment (Collen et al., 1991).

**Rivermead Mobility Index (RMI):** Rivermead Mobility Index (RMI) is a tool Published in 1991 by Collen, Wade, Robb and Bradshaw and used to evaluate mobility disability in neurological disorders patients, which is a critical aspect of functionality (e.g., walking, balance, and transfer) in neurological disorders patients. It is increasingly used internationally for research among patients because it is a simple and quick assessment that can be completed at home, at work, or in any institution, and it also has appropriate psychometric properties, the English original version study findings confirm the RMI's validity and reliability as a measure of body mobility in individuals who have suffered a stroke or a head injury. RMI includes a variety of activities, from turning over in bed to running, and consists of a sequence of 14 questions and one direct observation. 14 of these items are scored through the patient's self-report (1 for a "Yes" answer and 0 for a "No" answer). Item 5, standing without support for 10 seconds, was the only directly observed item, the examiner asked each item and observed whether item 5 was carried out or not. Total scores were determined by summing the points for all items, with higher scores indicating better mobility performance and a score of "0" indicates inability to carry out any of the activities on the measure. RMI original English version was assessed the inter-observer reliability on 23 patients (stroke patients =9, head injury n=13 and 1 patient had problem after neurosurgery, the mean age was 43.5 y, and according to (Collen et al., 1991) reliability calculated using Bland and Altman Technique

was excellent (Coefficient of reliability = 2.0/15), it is trustworthy up to a maximum of 2 points (out of 15). (Collen et al., 1991) study used the Ber Balance Scale to measure the RMI's validity, it revealed that the RMI and the Berg Balance Scale have excellent correlation (r = 0.67). Concurrent measurements of mobility utilizing gait speed and endurance as well as standing balance were used to test its validity as a gauge of mobility following head damage and stroke. A scale is formed by the RMI. It is brief, straightforward, therapeutically applicable, and usable both in a hospital and at home (Collen et al., 1991). By randomly selecting 25 of the 115 ambulatory patients and having them walk the distance five times during the same day, the standard deviation of the five measurements was then divided by the mean value to get the walking time variability, also the test-retest variability within one patient was computed. Despite its high variability (20 +/- 8 %), gait speed timed over 10 meters was just as responsive as the AI, detecting changes in 16.5% among these ambulatory individuals (AI in 15.6%). Increased use of the RMI and Gait speed timed over 10 meters is warranted for the purposes of assessing impairment and monitoring the efficacy of physiotherapy in assisting people with MS to walk more independently (Vaney et al., 1996).

**Berg Balance Scale (BBS):**

The BBS was published and created by berg in 1989 to measure older persons' balance quantitatively and appears to be a valid measure and has acceptable reliability (Berg et al., 1989). The BBS is a 14-item scale that statistically assesses balance and fall risk in older community-dwelling individuals using direct performance evaluation. The scale takes 10 to 20 minutes to complete and assesses

the patient's capacity to remain balanced while standing stationary or moving around for a set period. A score of zero indicates incapability, whereas a score of four indicates independent item completion. All the items are ranked on a scale from zero to four. Out of a possible 56 points, a total score is determined. A score between 0 and 20 indicates poor balance, 21 to 40 indicates good balance, and 41 to 56 indicates great balance. The BBS assesses the balance's static and dynamic components. Clinicians find the BBS to be an appealing measurement due to how simple it is to administer; all that is needed is a chair, a timer, a ruler, and a step, and no specific training. However, it should be underlined that only medical experts who are knowledgeable about the safe mobilization of stroke patients should give the BBS (Blum et al., 2008).

## 2.11 Previous Translation of Rivermead mobility index RMI:

### RMI into Turkish language:

The Turkish version of RMI published in 2007 and 112 elderly people were evaluated from two different settings, one was a primary health care center, and the other was the elderly living institution. The results for the Turkish version showed high test-retest reliability ($r=0.98$) ($p< 0.001$) and KR-20 reliability ($r=0.91$) ($p<0.001$) values, statistically significant known-groups validity ($p < 0.001$), and a positive correlation between RMI score and Brief Disability Questionnaire-BDQ score ($r=0.66$) ($p<0.001$) for the Turkish version. The internal consistency was measure by using the KR-20 reliability. Conclusion: The Turkish RMI version appears to be a valid and reliable indicator of elderly people's mobility impairment (AKIN et al., 2007).

**RMI into Italian language**:

In 2003, Franchignoni et al were recruited 73 stroke inpatients (40 males and 33 females, mean age was 67 years) receiving rehabilitation were examined first time at admission and second time after five weeks. The construct validity of RMI Italian version was analyzed through correlations with other instruments that were as follow: Functional Independence Measure (FIM), leg' section of the Motricity Index (MI-leg) and Trunk Control Test (TCT). Italian version stated that the RMI's Cronbach's alpha was 0.92. The item-to-total correlation coefficients (rrb), which were all p 0.003, varied from 0.36 to 0.83. Except for individuals with a five-item cognitive subscale (cognFIM), at both time points (first time and second time) all correlations between RMI results and the other tools were significant ($r \geq 0.49$, all $p < 0.0001$). The effect size was 0.89 and the difference in RMI scores across the testing period was statistically significant (sign test: $z = 7.1$, $p < 0.0001$). The repeatability coefficient was 0.95 at first time and at second time was 0.93, and the scalability coefficients were both 0.67, internal consistency, construct validity, and responsiveness of the RMI have all been verified by psychometric testing. There are, however, a couple of minor issues to be aware of: first, an adverse effect of RMI in patients admitted to subacute rehabilitation after a stroke and second, the item of "bathing" that appears to be susceptible to cultural and environmental circumstances. Additionally, the scaling criteria were met by RMI; however, the item hierarchy does not coincide with the one that was initially intended. The RMI should not be considered as a scale that is arranged in a hierarchical ranked scale but rather as a summed index that possesses ordinal characteristics. (Franchignoni et al., 2003).

**RMI into Brazilian language**:

In 2010, The Rivermead Mobility Index (RMI) assessment tool was cross-culturally adapted and validated for use with 95 stroke patients (male n = 56 and females n =39).in the Brazilian cultural setting and in Brazilian Portuguese by the Brazilian version. Independent bilingual translators translated the RMI into Portuguese and back into English while maintaining the psychometric properties of the original scale. A test and a retest were conducted after the creation of the final version, separated by a week. The results were excellent in terms of sensibility values, specificity values, and reliability. Cronbach's alpha was high reliability (0 to 1.000), the Internal consistency score was high (0.963 - 0,999) ($p<0.001$). As a conclusion of their study, researchers have reached the conclusion that the RMI-BR, which is the Brazilian translation of the RMI, is a valid, accurate, and sensitive tool for the evaluation of stroke patients in Brazil. (Pavan et al., 2010).

**RMI into German Language**:

(Schindl et al., 2000) recruited 197 patients with stroke in acute phase (n= 46) and chronic phase (n=151), the results were strong interrater reliability and significant ($r$=0.98, $P$<0.0001) for both group and the construct validity were good and significant correlation between RMI-G and the 10-m walk time in acute phase and good correlation between RMI-G and Functional Independence Measure (motor-FIM) in chronic phase, all participants assessed at admission and five week later. The German version of the RMI seems to have good psychometric properties for assessing people' levels of mobility impairment following acute and chronic stroke, according to the findings of the researchers.

**RMI into Danish language**:

A Danish version of RMI by (John Wiley & Sons ., 2013) recruited 40 outpatient with Multiple sclerosis**.** The results of Danish version showed high reliability Coefficient alpha (0.91) and construct validity was (>0.7) strong correlation with Barthel Index (BI) and Expanded Disability Status Scale (EDSS), but there was (0.2-0.5) a weak correlation with number of falls.

**RMI into Dutch language:**

By (Roorda et al., 2008) the RMI was finished for stroke patients who were Dutch (n = 200) and English (n = 420). The combined Dutch-English data set (coefficient H = 0.91), the Dutch data set (coefficient H = 0.93), and the English data set (coefficient H = 0.89) all had outstanding uni-dimensionality and monotone homogeneity model fits. There was no discernible difference in item functionality between the Dutch and the English RMIs. The Dutch RMI's intra-test reliability was outstanding (coefficient = 0.97). The Dutch RMI and Dutch Barthel Index showed a good association in a subset of patients (n = 91) (Spearman's correlation coefficient: 0.84). The Dutch RMI has strong intra-test reliability and construct validity and enables reliable international Dutch-English comparisons (Roorda et al., 2008). Another study looked closely at the Modified Rivermaid Mobility Index's inter-rater reliability, validity, and responsiveness. To research validity & responsiveness, patients who met the inclusion criteria were evaluated using RMI, MRMI, & STREAM on three separate times, i.e., on the $15^{th}$, $30^{th}$, & $90^{th}$ day. Three measures were evaluated by two physical therapists who were blind to each other's results in order to explore interrater reliability. They discovered that the three mobility measures were quite effective at spotting alterations that occurred before 90 days had passed from the stroke's start (14 to 30 days, SRM

BORDER="0">1.14; 30 to 90 days, SRM0.83;) The medians of the weighted statistics for each RMI, MRMI, and STREAM item were 0.81 (0.37 to 0.94), 0.83 (0.47 to 0.9), and 0.89 (0.55 to 0.89), respectively, demonstrating generally satisfactory interrater agreement on the item level. In comparison to RMI, it can be said that MRMI is a genuine, trustworthy, and sensitive metric (Ganvir S. e., 2011) (Ganvir, 2008).The ability to walk independently one month following a stroke may be predicted by MRMI on day three of admission (Shum et al., 2014). Face content validity was verified in subsequent tests using 42 physiotherapists present at a symposium on stroke care and a consensus exercise. Two raters were chosen at random from a group of eight physiotherapists to evaluate 30 patients in two settings: an elderly care facility and a stroke rehabilitation center, every one of the patients was hospitalized, and they had all suffered a stroke during the previous month and a half. This allowed the researchers to assess both inter-rater and test-retest reliability. A total of sixteen patients with acute stroke had their response measured by comparing their results upon admission and after being discharged. The results showed that the modified RMI is sensitive to changes (effect size = 1.15), stable when evaluated twice (paired t-test = 0.732; p = 0.47), the reliability was high (ICC= 0.98, $p<0.001$), and the internal consistency was great (Cronbach's alpha = 0.93). These findings demonstrate that different raters, regardless of expertise, can produce comparable outcomes when utilizing the Modified RMI to evaluate patients with acute stroke. However, the overall difference must be greater than 4.5 points (degree of measurement error at 95% confidence level) (Lennon et al., 2000).

# CHAPTER 3

# METHODOLOGY

## 3.1 Study design and participant characteristics

Formal permission to translate and culturally adapt the Rivermead Mobility Index was obtained from original developer the Professor Deric Wade in February 2022 and the formal permission was obtained from the original developer of pervious translated Arabic version of berg balance scale (BBS) to examine construct validity of the RMI questionnaire new Arabic version (RMI-Arb).

The present study is a cross cultural investigation of the adaptations necessary to validate into an Arabic version of the Rivermead Mobility Index (RMI-Arb) that had been previously applied to the English version, for utilize individuals with stroke and among the health providers in the kingdom of Saudi Arabia. The RMI questionnaire was translated in accordance with Beaton recommendations (Beaton et al., 2000).These recommendations include forward translation, backward translation, synthesis, expert committee analysis to create a draft version, and preliminary pilot testing (Beaton et al., 2000).

## 3.2 Instruments:

### Description of Rivermead Mobility Index:

The primary instrument used in the study was Rivermead Mobility Index (RMI), the RMI quantifies the mobility function using 15 items covers a range of activities from turning over in bed to running; 14 of these items are scored through the patient's self-report (1 for a "Yes" answer and 0 for a "No" answer). Item 5, standing without support for 10 seconds, was the only directly observed item, the examiner asked each item and observed whether item 5 was carried out or not. Total scores were determined by summing the points for all items, with higher scores indicating better mobility

performance and a score of "0" indicates inability to carry out any of the activities on the measure.

**Berg Balance Scale Arabic version (BBS-Arb):**

The BBS was published and created by berg in 1989 to measure older persons' balance quantitatively and appears to be a valid measure and has acceptable reliability, BBS is a 14-item scale that statistically assesses balance and fall risk in older community-dwelling individuals using direct performance evaluation (Berg et al., 1989). Berg Balance Scale Arabic version was created in 2015 and BBS-Arb version shows high validity and reliability with elderly assessment (Alia et al., 2015).

### 3.3 Study setting:

The study was conducted in Rehabilitation Hospitals in King Fahad Medical City and Sultan Bin Abdulaziz Humanitarian City which had specific physiotherapy center for the neurology patients for a period of 6 months (from May/2022 to October/2022).

### 3.4 Study participants:

This study recruited a sample a sample size of 150 participants with stroke based on guidelines for the respondent-to-item ratio ranged from 10:1 (150 respondents for a 15-item questionnaire) (Tsang et al., 2017). All patients clinically diagnosed with Stroke confirmed based on CT scan or MRI.

**3.5 Inclusion Criteria:** Participants ranged in age from 42 to 84 and both of gender, had hemiplegia due to a stroke that was either acute or sub-acute (occurred within the preceding 6 months) and they undergo physical therapy sessions , were aware, could read and understand Arabic language.

**3.6 Exclusion Criteria:** We were excluded participants with major CNS-affected pathologies other than stroke such as traumatic brain injury and traumatic spinal cord injury, cognitive deficit, and visual problems.

**3.7 Data Collections Methods:**

Participants with stroke were recruited from Rehabilitation Center, those who underwent physiotherapy sessions and informed consent was obtained from all participants before participation, first we collected the demographic data (Gender, Age, affected hemiplegia, duration of condition (in months), and Mini-Mental State Exam *(*MMSE*)* was performed to test the cognitive function. After that participants were filled out the translated RMI questionnaire new Arabic version and pervious translated Arabic version of berg balance scale (BBS), The Arabic version of the BBS have been found to be valid and reliable (Alia et al., 2015). Participants who had regular follow-up they asked to re-fill the RMI questionnaire again after one week. Moreover, From the 150 participants, 140 were agreed again after one week to fill out the newly translated RMI-Arb questioner. The participation time for first time was15-20 minutes and the second time were 5-10 minutes.

**3.8 Procedure:**

**Cross cultural adaptation:**

The process of translation and cross-cultural adaptation of Rivermead Mobility Index (RMI) in the current study was according to guidelines of cross-cultural adaptation recommended (Beaton et al., 2000), which contained the following stages. (1) Forward translation, the original RMI version was translated into Arabic and this translation carried out by two bilingual translators whose native language is Arabic and are fluent in English. One of the translators

(First Translator T1) was a physiotherapist who specialized in medicine, and the other (Second Translator T2) was an English instructor. (2) Synthesis: following the completion of the two translator's translations, the convened to discus and create on a single final Arabic translation of RMI questionnaire that was (T12).(3) Backward translation; this time, two bilingual English and Arabic professionals, one of whom was a physiotherapist and the other an English teacher, performed the back-translations (BT1 and BT2) from Arabic to English, by returns the questionnaire to its original language, this is a validation procedure to ensure that the translated version contains the same item content as the original version. (4) A committee of experts was established to review the questionnaire. The expert group made changes to the pre-final Arabic version after comparing the two translated versions—from English to Arabic and from Arabic to English—with the original text. (5) Before being administered to the study's actual participants, the revised, final Arabic RMI questionnaire underwent pre-testing (piloting), (6) finally validation was done.

**Ethical consideration:**

The central Institutional Review Board from King Fahad Medical City (NO: H-01-R-012) and Sultan Abdualaziz Humanitarian City (71/MSc/2022) gave its approval to the protocol. The study samples were selected according to inclusion and exclusion criteria. An informed consent form was given to the participants to sign, who were then given a thorough explanation of all the test stages before the RMI test was conducted on each subject and measurements were taken. In our investigation, there were no possible dangers for participants. Participants are free to stop answering questions at any moment and without giving a reason.

### 3.9 Data analysis:

The Measurable Bundle for the Social Sciences (SPSS) program form 24 was used to analysis the data (SPSS 24, IBM, Armonk, NY, joined together States of America). Mean ± Standard deviation (SD) and frequencies, were used to separately total the attributes and perceptions of quantitative variables and subjective variables' characteristics. The scores from the instrument were examined for normality of distribution using the two nonparametric tests that are one sample Kolmogorov-Smirnov test and the Shapiro-Wilk test. Internal Consistency for RMI-Arb was examined using the Cronbach's alpha. Cronbach's alpha (CA) is a measure of internal consistency and CA values normally range between 0 and 1 (0 represent no internal consistency) and (1 represent to perfect internal consistency). Test-retest reliability of RMI-Arb was calculated using intraclass correlational coefficients (ICCs) and 95 percent confidence intervals (CIs). ICCs under 0.40 were deemed low, between 0.40 and 0.70 were deemed moderate, between 0.70 and 0.90 were deemed significant, and values above 0.9 were deemed remarkable. Spearman's coefficient correlation test was used for to analysis between nonparametric data, The validity score for the same construct should be more than >0.7. The validity is still regarded as acceptable or suitable even if the spearman score is between 0.4 and 0.7. SEM (Standard errors of measurements) was used to identify the test agreement, which was then categorized into four categories: very excellent (>5%), good (5%–10%), dubious (10%–20%), and negative (>20%) (Ostelo et al., 2004).The statistical significance level was set at 0.05 (with $p < 0.05$ serving as the cutoff) (Terwee et al., 2007).

# CHAPTER 4
# **RESULTS**

**Results:**

A total of 161 patients with stroke of less than six months (male and female) were invited to participate in this study. Of these patients ,6 patients did not respond, 4 patients with cognitive deficit and one patient had visual problem. the remaining 150 patients met the inclusion criteria. All of them from Rehabilitation Centers of two major Hospital in Riyadh. The data concerning the patients' age, gender, side of lesion, type of stroke and duration of stoke have been collected at the start of the study. 150 participants completed both Arabic versions of RMI-Arb and BBS-Arb at baseline, while 140 participants complete the RMI-Arb questionnaire again after one week to evaluate the test- retest reliability.

The data that was recorded from the patients who participated in the study and who successfully completed the procedure has been collected, statistically analyzed, and is provided under the following topics.

i. **Results of Participant's demographic data.**
ii. **Result of Internal Consistency of the RMI-Arb.**
iii. **Result of Test-retest Reliability of the RMI-Arb.**
iv. **Result of Construct Validity of the RMI-Arb.**
v. **Result of Floor and Ceiling effects of the RMI-Arb.**

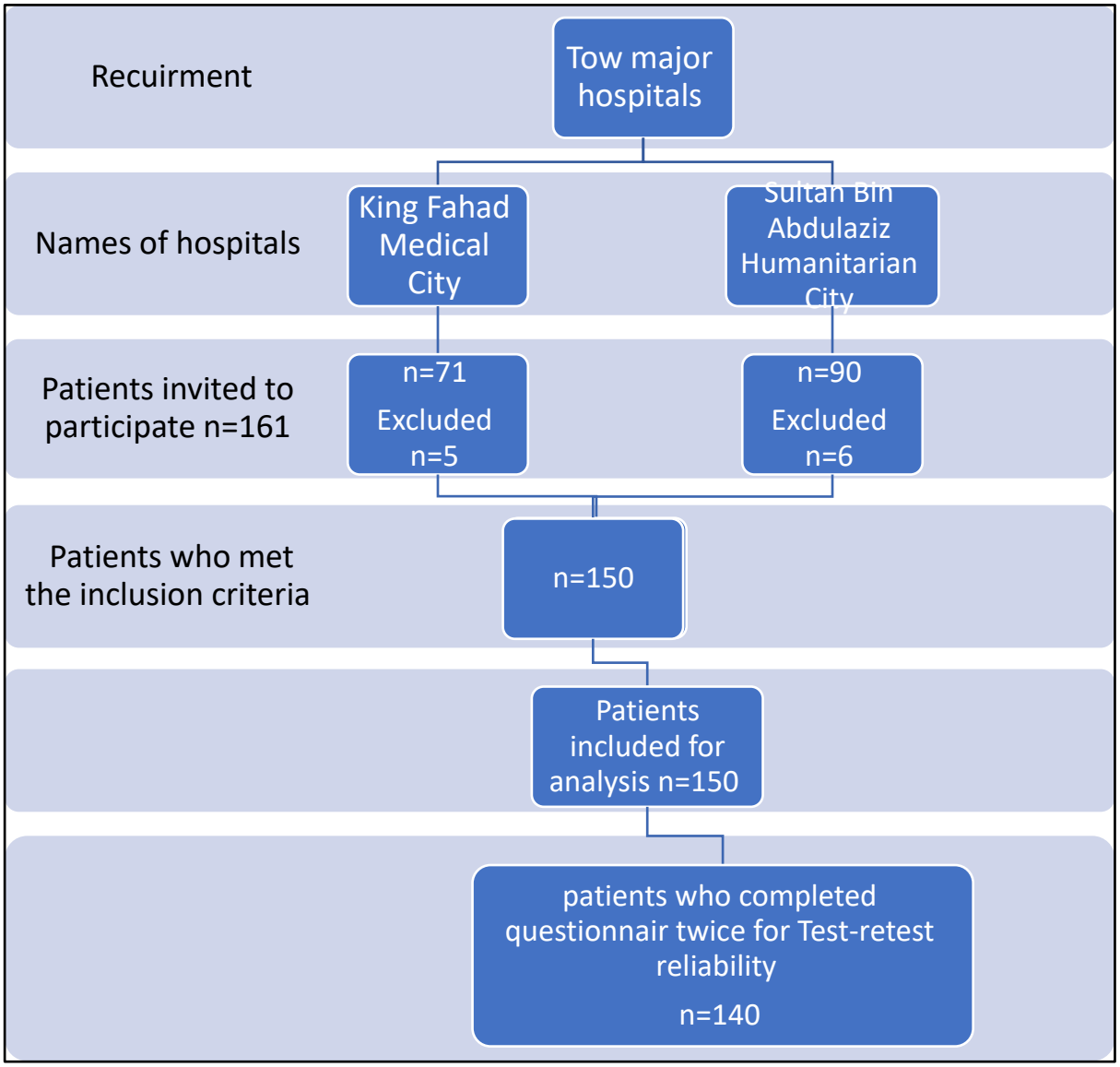



**Figure 1:** Flow Chart of Patient Enrollment

### 4.1 Participant's demographic data:

As noticed from Table 1, Figures 1, 2 and 3 demonstrate the demographic characteristics of the participants. The RMI-Arbbb was administered to a population of 150 subjects. Their Mean ± Std of age was (59.32± 9.45). Gender distribution within study sample revealed that, there were 49 females (32.7%) and 101 males (67.3%). Side of stroke showed that; there were 69 patients (46%) had right side stroke, while the other 81 patients (54%) had left side stroke. The type of stroke revealed that there were 23 patient of

hemorrhage stroke type while 127 patients were of ischemic stroke type. The mean duration for stroke was (3.3 ± 1.82 months), with maximum value of 6 months and minimum values of one month.

**Table 1:** The demographic characteristics of the Participants:

| Variable | Value |
|---|---|
| **Age** (Mean & SD) | 59.32± 9.45 |
| **Gender** | **n (%)** |
| Male | 101 (67%) |
| Female | 49 (33%) |
| **Side of stroke** | **n (%)** |
| Right side | 69 (46%) |
| Left side | 81 (54%) |
| **Types of stroke** | **n (%)** |
| Hemorrhage | 23(15%) |
| Ischemia | 127 (85%) |
| **Duration of stroke (in month)** (Mean & SD) | 3.3±1.8247 |

**Table 2:** Participants mean and median of RMI-A and BBS-A:

The Mean ± Std for RMI-A was 6.491± 4.587 and their berg balance scale (BBS) was 20.214±18.4165.

| Variable | Value |
|---|---|
| RMI-A | 6.491± 4.587 (Mean ±SD) |
| Berg balance Scale (BBS) | 20.5±20.41 (Median ±IQR) |

**Figure 2:** Distribution of male and female

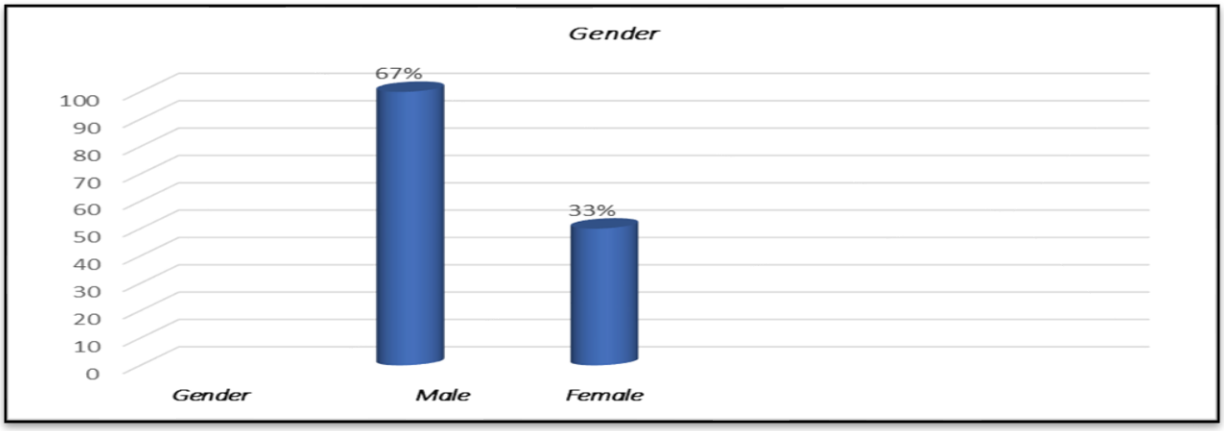



**Figure 3:** Distribution according to side of the stroke.

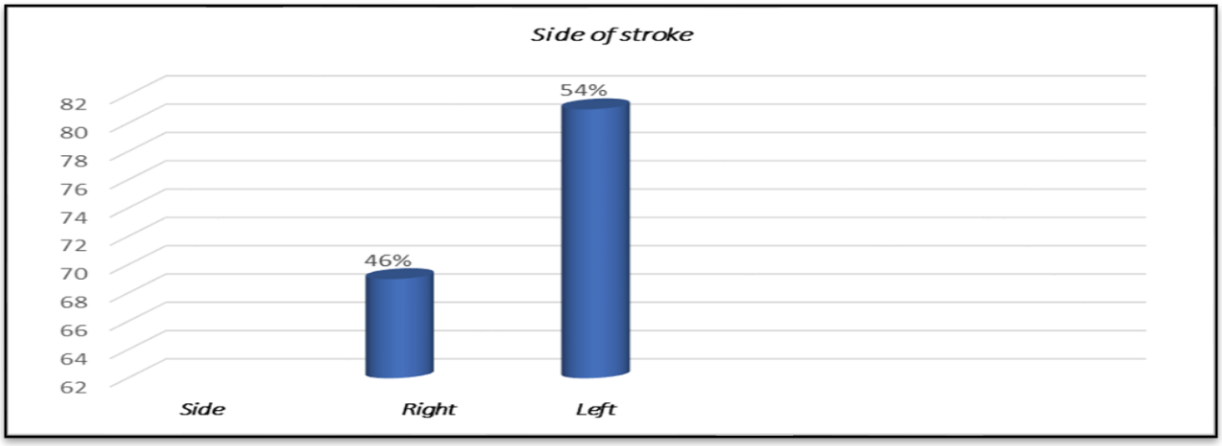
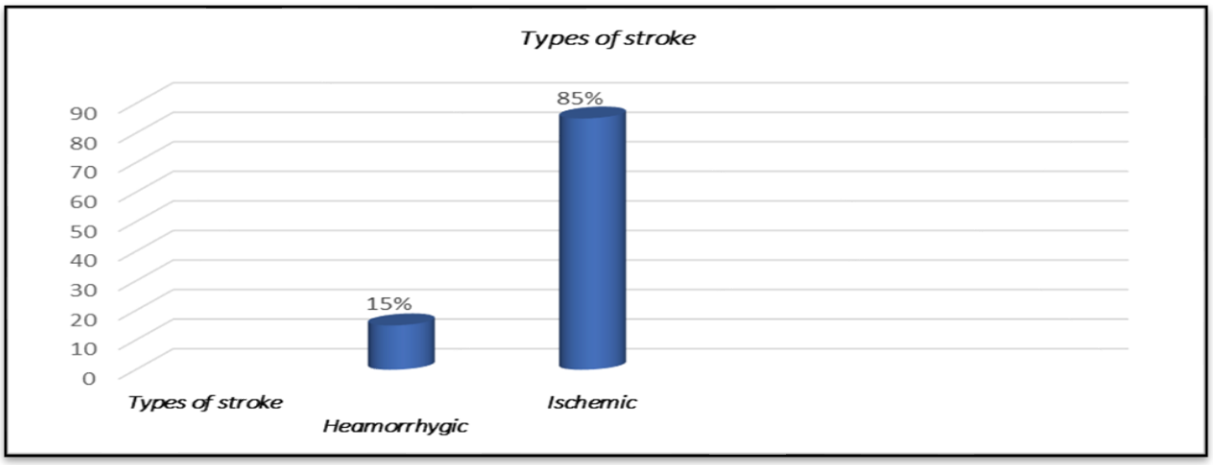



**Figure 4**: Distribution according to type of the stroke.



## 4.2 Reliability

### Test-Retest reliability

The test-retest reliability was evaluated from 140 patients who completed the newly questioner RMI-Arb after one week from first assessment and was found to be excellent**.**

Test-retest reliability for RMI was measured using the ICC, the value of an ICC between 0 and 1, The intraclass correlation coefficient (ICC) values for the 15 parameters were ranging between 0.7926 and 0.98390. For the total was (ICC= 0.996, P= 0.001) which indicate excellent test- retest reliability. ICC, CI 95%, SEM, MSe, MSb values related to test-rest reliability are presented. Table 3 demonstrated the intraclass correlation coefficient (ICC) for test-retest agreement of the RMI-Arab version**.**

**Table 3: Intraclass correlation coefficient (ICC) for test-retest agreement:**

| | **MSe** | **MSb** | **ICC** | **CI 95%** | **SEM** |
|---|---|---|---|---|---|
| **Parameter 1** | 0.016117 | 0.136264 | 0.8817 | 0.911-0.799 | 0.0808 |
| **Parameter 2** | 0.005102 | 0.316905 | 0.98390 | 0.99-0.899 | 0.0585 |
| **Parameter 3** | 0.005051 | 0.27551 | 0.98166 | 0.99-0.887 | 0.09165 |
| **Parameter 4** | 0.01958 | 0.41414 | 0.9527 | 0.98-0.891 | 0.0654 |
| **Parameter 5** | 0.0050 | 0.4898 | 0.931 | 0.957-0.854 | 0.06189 |
| **Parameter 6** | 0.01958 | 0.46196 | 0.9576 | 0.98-0.891 | 0.0959 |
| **Parameter 7** | 0.0099 | 0.4515 | 0.978 | 0.998-0.899 | 0.0952 |
| **Parameter 8** | 0.0287 | 0.35075 | 0.918 | 0.944-0.821 | 0.0738 |
| **Parameter 9** | 0.0040 | 0.4065 | 0.990 | 0.99-0.912 | 0.05608 |
| **Parameter 10** | 0.0193 | 0.4001 | 0.99517 | 0.99-0.912 | 0.06636 |
| **Parameter 11** | 0.0184 | 0.452 | 0.9592 | 0.98-0.891 | 0.07384 |

| | | | | | |
|---|---|---|---|---|---|
| **Parameter 12** | 0.0234 | 0.332 | 0.9285 | 0.977-0.800 | 0.07380 |
| **Parameter 13** | 0.0261 | 0.2917 | 0.9105 | 0.944-0.821 | 0.05608 |
| **Parameter 14** | 0.0262 | 0.2875 | 0.908 | 0.945-0.876 | 0.0730 |
| **Parameter 15** | 0.02080 | 0.1003 | 0.7926 | 0.877-0.700 | 0.0633 |
| **Total** | 0.115517 | 36.8511 | 0.996 | 0.99-0.912 | 0.7211 |

MSe: Mean square errors ; MSb :Mean square value; ICC: intraclass correlation coefficient; CI: Confidence interval; SEM: standard error of measurement.

### 4.3 Internal consistency:

The internal consistency of the RMI-Arb analyzed by the Cronbach's α test and the value of Cronbach's α was (α=.95), that showed the test had excellent internal consistency. The Cronbach's α tell about internal consistency ranges from 0-1. Table 3**:** demonstrated the internal consistency of the RMI Arabic version.

**Table 3: Internal consistency:**

| Cronbach's Alpha | N of Items |
|---|---|
| α= 0.95 | 15 |

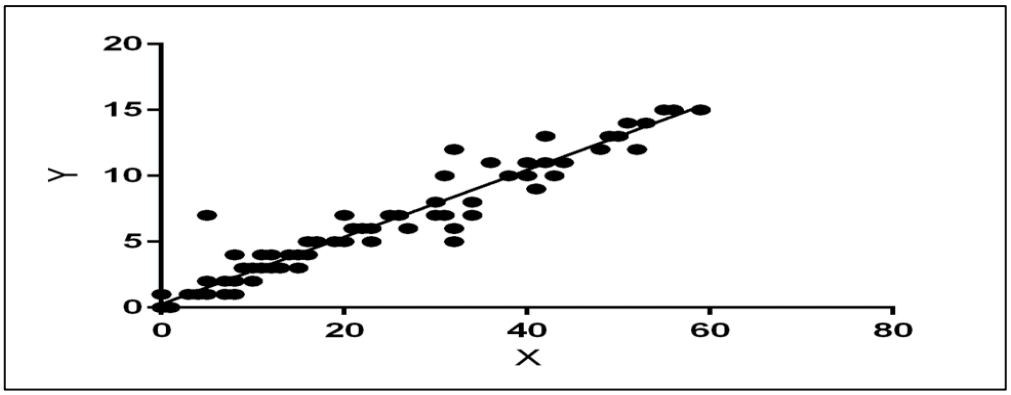
### 4.4 Construct Validity:

To examine the construct validity of the RMI-Arb, A Spearman's rank-order correlation coefficient test was used. The total score of RMI-Arb and BBS-Arb found to be positive and strong correlation (*rho* = 0.8866) (p< 0.001). Table 5 demonstrate the RMI-A construct validity.

**Table 5: Spearman rank coefficient for validity:**

| | | | **Berg Balance Scale Arabic version (BBS-Arb)** |
|---|---|---|---|
| **Spearman's rho** | **RMI-A** | Correlation Coefficient | **+0.8866** |
| | | Sig. (2-tailed) | **P< 0.001** |
| | | **N** | **150** |

**Figure 4:** Linear regression correlation between BBS and RMI-A:




X line represent the BBS values, whereas Y line represent RMI –A values.

**4.5 Floor and ceiling:** There was no ceiling effect and floor for the RMI-Arb total score because no participants reached the highest score. Also, no flooring effect was found since the percentage of participants who scored the lowest score for RMI-Arb did not exceeded 15% of all participants**.**

**Table 6: Floor and ceiling effects.**

| **RMI-Arb questionnaire** | **Floor %** | **Ceiling %** |
|---|---|---|
| **Total** | ≤9 | ≤6 |
| | | |

# CHAPTER 5:
# **DISCUSSION**

## 5. DISCUSSION

Initially, there were few straightforward outcome measures that focused on mobility impairment and allowed therapists or researchers to evaluate therapeutic success. Therefore, the RMI was developed as a quick and straightforward method of evaluating a patient's mobility function in a clinical environment with neurologically impaired individuals seen in any clinical setting (hospital or home), with the goal of assessing disability. We refer to the RMI as a development of that assessment because it contains nine items from the Rivermead Motor Assessment Gross Function (RMA-GF) subscale, as well as questions that cover a broader range. International articles have discussed the application of the RMI to assess mobility (Green et al., 2001) (Forlander et al., 1999). Additionally, it's being adapted and translated into other languages so researchers from different countries may compare their study results. (Franchignoni et al., 2003). The literature recommended ,its use should increase in order to assess mobility in both clinical settings and academic (Rossier et al., 2001) (Bohannon et al., 1995). Therefore, a comprehensive statistical evaluation of the criteria and characteristics of the measure was necessary to confirm whether the RMI maintains the psychometric properties.The objective of this study was to translate the Rivermead Mobility Index into Arabic language, culturally adapt the RMI-Arb version in Saudi Arabia, evaluate the validity and reliability of the questionnaire and determine whether the psychometric qualities of the RMI-Arb are genuine.

One hundred-fifty participants were included in the population to

whom the RMI-A was given. Their average age was 59.32 years, standard deviation was ± 9.45 years, 101 (67.3%) of them were men, 81 (54%) of the subjects had left-sided stroke, 127 (84 %) of the patients had ischemic strokes, and the average number of months since the stroke was diagnosed was 3.3 ± 1.82 months.

150 CVA patients who were attending Saudi Arabian rehabilitation facilities were studied using the RMI in Arabic. In contrast, the Italian version examined 73 stroke inpatients, the Turkish version evaluated 112 elderly people, the Brazilian version evaluated 95 stroke inpatients, Danish version examined 40 outpatients with multiple sclerosis (MS), 197 stroke patients in German version and the Dutch version examined 200 stroke patients.

The result of RMI-Arb test-retest reliability was excellent**.** The total intraclass correlation coefficient (ICC) score for test-retest reliability was (0.996) which was similar to test-retest reliability for RMI original version which reliability calculated using Bland and Altman Technique was excellent (Collen et al., 1991). Previous studies support the present study by found the similar value of test- retest reliability, RMI-Italian version used rank biserial correlation coefficients that was r =0.92 (Franchignoni et al., 2003),RMI-Brazilian version was high reliability (between 0.963 and 0.999 ,$p<0.001$), Danish version was (0.93) (Roorda et al., 2008) (Pavan et al., 2010) , and German ($r$=0.98). The results for the Turkish version showed high test-retest reliability coefficient (r=0.98) and KR-20 reliability (r=0.91) (p0.001) values (AKIN et al., 2007). RMI versions'indicating high reliability between the test-retests. Such levels of reliability are similar to those found by Franchignoni et al. (Franchignoni et al., 2003) and Rooda et al (Roorda et al., 2008). , who found in their work on the validation of the RMI into

Italian and Dutch a Cronbach Alpha coefficient of 0.93 and 0.97 respectively, an indication of excellent reliability. All the sub items of the RMI-A demonstrated that the values for ICC for all RMI-A items were (ICC>0.70) which was acceptable to be used for population measurements. Moreover, the ICC values for total test-rest reliability of the RMI- A were more than (ICC>0.90) which indicate high acceptable values for individuals use.

The result of Internal consistency of the RMI test in the current study was identified by coefficient alpha (Cronbach's alpha) which totally was ($\alpha$ = 0.95) which means that the internal consistency of RMI-Arb is highly significant (all the items are perfectly correlated with one another). While the values suggested high internal consistency as compared to Dutch version which was assessed with coefficient p (p= 0.97) . Furthermore, the Cronbach's alpha coefficient was 0.999 (p<0.001) in Brazilian version and Cronbach's alpha coefficient 0.92 in Italian version which indicated to excellent internal consistency, in Turkish version, the internal consistency examines by KR-20 reliability coefficient which was (r=0.91) (p <0.001) values. Construct validity was examined using Spearman's coefficient correlation between scores of RMI-Arb and BBS-Arb, which interpreted as flows: the correlation coefficients of 0.1 should be considered as small correlation, 0.3 as moderate correlation, and 0.5 as large correlation. (Tsang et al., 2017).The Spearman correlation between the RMI-Arb and the BBS-Arb was found to be (*rho* = 0.8866) (p< 0.001), showing that the RMI-A has positive and strong construct validity. This result was similar with previous findings in RMI original English version (Collen et al., 1991) study used the Ber

Balance Scale to measure the RMI's validity, it revealed that the RMI and the Berg Balance Scale have excellent correlation (r = 0.67). Similarly, the Italian, German, Danish, Brazilian and Turkish versions' construct validity was examined and reported excellent correlation between the RMI and the Barthel index, Berg Balance Scale, 6-minte Walk Test, Functional Independence Measure (FIM), Trunk Control Test and Brief Disability Questionnaire-BDQ**.** Additionally, (Hsieh et al., 2000) this study assessed validity and responsiveness of the Rivermead Mobility Index in stroke inpatients, and they were found the spearman correlation between the RMI, and the BBS was high correlation **(**Spearman $r = 0.77$, $p < 0.001$).

In the present study, our option was to validate the RMI-A just for stroke patients, given that the majority of international studies found recommended and use RMI for such patients including the validations into other languages (Franchignoni et al., 2003), studies are still needed to verify that the RMI's characteristics maintain with patients of various illnesses that present a loss of mobility , despite the fact that other researchers have suggested it might be useful for such disorders. Rossier and Wade's study excluded chronic stroke patients, but we think the RMI-A might be used with this population as well. According to (Rossier et al., 2001),the RMI may not accurately describe patients' mobility in the early stages of stroke disorders, particularly those with severe impairments. In a study involving 308 patients, Antonucci (Antonucci et al., 2002) concluded that the RMI is a trustworthy and sensitive tool for the evaluation of stroke patients during hospitalization as well as for treatment before and after in rehabilitation programs. Limitations: In this research, first limitation was we not examined the responsiveness property of

RMI-Arb. Another limitation was that the inter raters' reliability of the measures was not examined. Recommendations: The Arabic version of RMI can be recommended to use for Arabic language speakers' health professionals andscientific researchers. Future studies should examine the responsiveness property of RMI-Arb to evaluate ability of instrument to detect mobility function changes over time during post stroke rehabilitation and can be conducted to explore better quantitative methods using RMI in terms of evaluating mobility rehabilitation in CVA patients.

## 6. Conclusion

In conclusion, the RMI-Arb demonstrated the similar properties for the original English, German, Italian, Brazilian and Turkish RMI. The results of our study supported the RMI-Arb reliability and validity. Therefore, it is recommended that the RMI- Arb can be used to assess the mobility disability due to acute cerebrovascular accidents. These findings of the result provide valuable information which would be useful for the Arabic-language speaker’s population both among the health providers, scientific researchers, and the patient’s population.

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# Appendices

## Apendice-1 SultanBin Abdulaziz Humitarian City IRB

P.O. Box 64399 Riyadh 11536 Saudi Arabia
Telephone: 96611 562 0000 Fax: 96611 562 0236

مدينة سلطان بن عبدالعزيز للخدمات الإنسانية
SULTAN BIN ABDULAZIZ HUMANITARIAN CITY

05 June 2022

**Ms. Haifa Aladwani**
**Master of Science in Physical Therapy**
**Majmaah University**
**E-mail: haifam210@gmail.com**
**0558546664**

**Dear Ms. Haifa Aladwani,**

I would like to bring to your kind attention that your study entitled **"Cross-Cultural adaptation and validation of the Arabic version of Rivermead Mobility Index for patients with Stroke"** with study code **71/MSc/2022, has been approved by the Institutional Review Board of Sultan Bin Abdulaziz Humanitarian City dated 02 June 2022.**

For you to receive the official approval letter and can start with your study, you will find the attached **Invoice Number 37/2022** for IRB review cost. Kindly settle the payment and send us a notification through research@sbahc.org.sa with the bank transaction. It will be non-refundable after the study review.

Please do not hesitate to contact us in case of any doubt or clearance required from our side.

Yours Sincerely,

**Prof. Khalid Al-Rubeaan**
Director, Research and Scientific Center
Sultan Bin Abdulaziz Humanitarian City

# Apendice-2 King Fahad Medical City IRB

مدينة الملك فهد الطبية
King Fahad Medical City

IRB Registration Number with KACST, KSA: H-01-R-012
IRB Registration Number with OHRP/NIH, USA: IRB00010471
Approval Number Federal Wide Assurance NIH, USA: FWA00018774

April 3, 2022
**IRB Log Number: 22-094E**
Department: External - Alartawiah General Hospital / Majmaah University - Physical Therapy-Outpatient
Category of Approval: EXEMPT

Dear Haifa Mohammed Aladwani,

I am pleased to inform you that your submission dated February 28, 2022 for the study titled **'Cross-Cultural adaptation and validation of the Arabic version of Rivermead Mobility Index for patients with Stroke'** was reviewed and was approved according to ICH GCP guidelines. Please note that this approval is from the research ethics perspective only. You will still need to get permission from the head of department or unit in KFMC or an external institution to commence data collection.

We wish you well as you proceed with the study and request you to keep the IRB informed of the progress on a regular basis, using the IRB log number shown above.

Please be advised that IRB for administrative purposes requires that you submit a progress report on your research every 6 months. You are required to submit any manuscript resulting from this research for approval by IRB before submission to journals for publication.

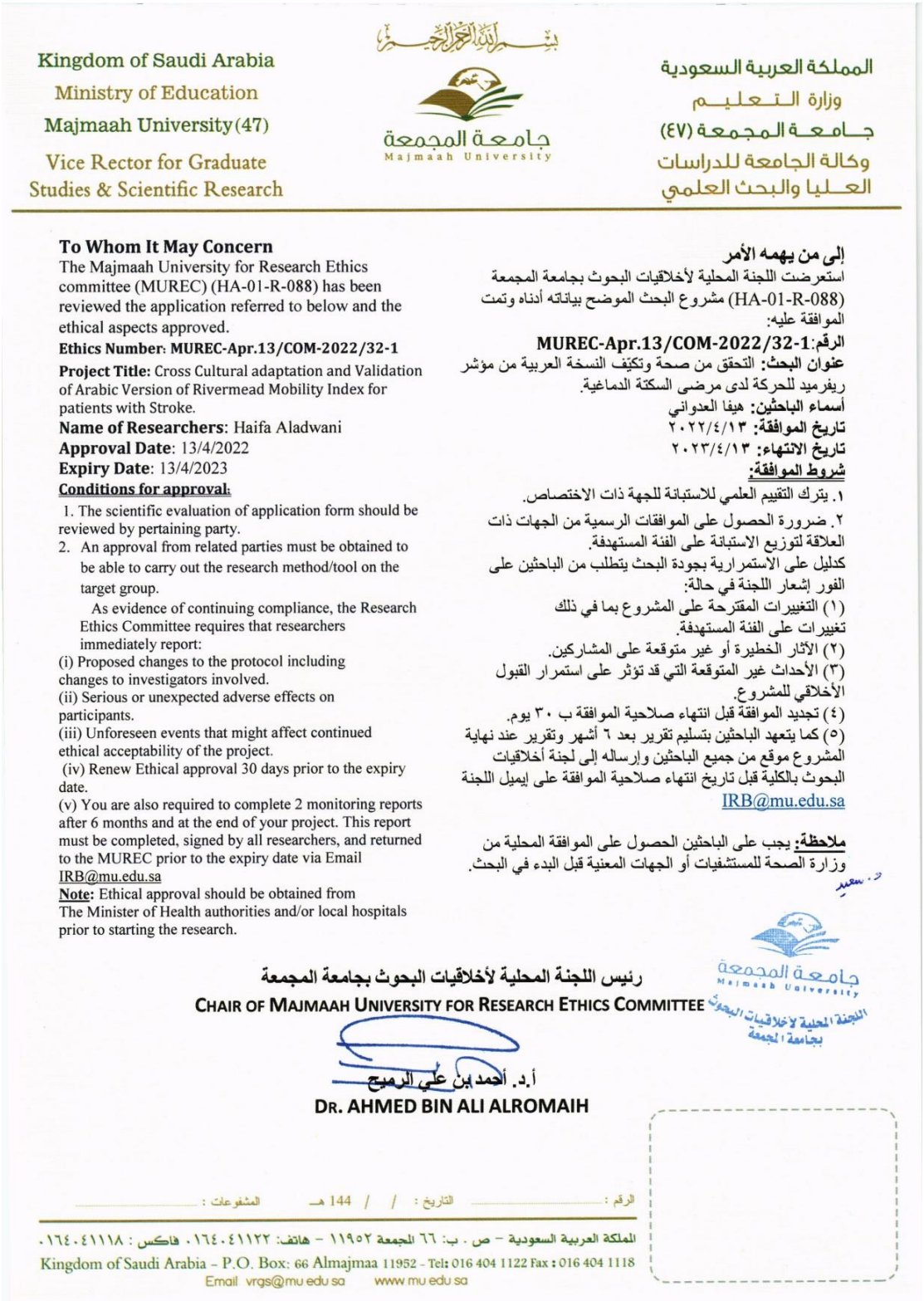
As a researcher you are required to have current and valid certification on protection human research subjects that can be obtained by taking a short online course at the US NIH site or the Saudi NCBE site followed by a multiple choice test. Please submit your current and valid certificate for our records. Failure to submit this certificate shall a reason for suspension of your research project.

Sincerely yours,

Institutional Review Board
Approved
03 APR 2022

***Dr. Hussam Sakkijha, FCCP, FACP, Diplomat, ABSIM***
Chairman Institutional Review Board--IRB
Consultant, Critical Care, Pulmonary & Sleep Medicine
Adult ICU Department
Critical Care Services Administration
King Fahad Medical City
P.O. Box. 59046, Riyadh 11525
Kingdom of Saudi Arabia
(+966) 11 288 9999 Ext: 15789
Mobile #: 053-941-7297 / E-mail: hsakkijha@kfmc.med.sa

# Apendice-3 Majmaah University IRB



Kingdom of Saudi Arabia
Ministry of Education
Majmaah University (47)
Vice Rector for Graduate Studies & Scientific Research

بسم الله الرحمن الرحيم

جامعة المجمعة
Majmaah University

المملكة العربية السعودية
وزارة التعليم
جامعة المجمعة (٤٧)
وكالة الجامعة للدراسات العليا والبحث العلمي

**To Whom It May Concern**

The Majmaah University for Research Ethics committee (MUREC) (HA-01-R-088) has been reviewed the application referred to below and the ethical aspects approved.

**Ethics Number: MUREC-Apr.13/COM-2022/32-1**

**Project Title:** Cross Cultural adaptation and Validation of Arabic Version of Rivermead Mobility Index for patients with Stroke.

**Name of Researchers:** Haifa Aladwani

**Approval Date:** 13/4/2022

**Expiry Date:** 13/4/2023

**Conditions for approval:**

1. The scientific evaluation of application form should be reviewed by pertaining party.
2. An approval from related parties must be obtained to be able to carry out the research method/tool on the target group.

As evidence of continuing compliance, the Research Ethics Committee requires that researchers immediately report:

(i) Proposed changes to the protocol including changes to investigators involved.
(ii) Serious or unexpected adverse effects on participants.
(iii) Unforeseen events that might affect continued ethical acceptability of the project.
(iv) Renew Ethical approval 30 days prior to the expiry date.
(v) You are also required to complete 2 monitoring reports after 6 months and at the end of your project. This report must be completed, signed by all researchers, and returned to the MUREC prior to the expiry date via Email IRB@mu.edu.sa

**Note:** Ethical approval should be obtained from The Minister of Health authorities and/or local hospitals prior to starting the research.

**إلى من يهمه الأمر**

استعرضت اللجنة المحلية لأخلاقيات البحوث بجامعة المجمعة (HA-01-R-088) مشروع البحث الموضح بياناته أدناه وتمت الموافقة عليه:

**الرقم: MUREC-Apr.13/COM-2022/32-1**

**عنوان البحث:** التحقق من صحة وتكيّف النسخة العربية من مؤشر ريفرميد للحركة لدى مرضى السكتة الدماغية.

**أسماء الباحثين:** هيفا العدواني

**تاريخ الموافقة:** ٢٠٢٢/٤/١٣

**تاريخ الانتهاء:** ٢٠٢٣/٤/١٣

**شروط الموافقة:**

١. يترك التقييم العلمي للاستبانة للجهة ذات الاختصاص.
٢. ضرورة الحصول على الموافقات الرسمية من الجهات ذات العلاقة لتوزيع الاستبانة على الفئة المستهدفة.

كدليل على الاستمرارية بجودة البحث يتطلب من الباحثين على الفور إشعار اللجنة في حالة:

(١) التغييرات المقترحة على المشروع بما في ذلك تغييرات على الفئة المستهدفة.
(٢) الآثار الخطيرة أو غير متوقعة على المشاركين.
(٣) الأحداث غير المتوقعة التي قد تؤثر على استمرار القبول الأخلاقي للمشروع.
(٤) تجديد الموافقة قبل انتهاء صلاحية الموافقة ب ٣٠ يوم.
(٥) كما يتعهد الباحثين بتسليم تقرير بعد ٦ أشهر وتقرير عند نهاية المشروع موقع من جميع الباحثين وإرساله إلى لجنة أخلاقيات البحوث بالكلية قبل تاريخ انتهاء صلاحية الموافقة على إيميل اللجنة IRB@mu.edu.sa

**ملاحظة:** يجب على الباحثين الحصول على الموافقة المحلية من وزارة الصحة للمستشفيات أو الجهات المعنية قبل البدء في البحث.

جامعة المجمعة
Majmaah University
اللجنة المحلية لأخلاقيات البحوث بجامعة المجمعة

**رئيس اللجنة المحلية لأخلاقيات البحوث بجامعة المجمعة**
**CHAIR OF MAJMAAH UNIVERSITY FOR RESEARCH ETHICS COMMITTEE**

**أ.د. أحمد بن علي الرميح**
**DR. AHMED BIN ALI ALROMAIH**

الرقم : ..... التاريخ : / / 144 هـ المشفوعات : .....

المملكة العربية السعودية – ص . ب: ٦٦ المجمعة ١١٩٥٢ – هاتف: ٠١٦٤٠٤١١٢٢ فاكس : ٠١٦٤٠٤١١١٨
Kingdom of Saudi Arabia – P.O. Box: 66 Almajmaa 11952 - Tel: 016 404 1122 Fax : 016 404 1118
Email vrgs@mu.edu.sa www.mu.edu.sa

# Apendice-4 Consent form

| | |
|---|---|
| **لجنة أخلاقيات المهنة**<br>**نموذج الموافقة على الدراسات المعفاة (استبيان أو مقابلة)** | وزارة الصحة<br>مدينة الملك فهد الطبية<br>King Fahad Medical City |

التحقق من صحة وتكيّف النسخة العربية من مؤشر ريفرميد للحركة لدى مرضى السكتة الدماغية

يُطلب منك المشاركة الطوعية في استطلاع دراسة البحث هذا. وهدف هذه الدراسة هو **ترجمة مقياس ريفرميد للحركة من نسختها الأصلية إلى اللغة العربية وتحديد مصداقية وثبات النسخة العربية عن طريق تقييم الحركة والقدرات الوظيفية (مثل المشي والتوازن والتنقل) بعد السكتة الدماغية وانشاء استبانة عربية ذات خواص قياسية جيدة.** ونتوقع 150 مشاركة على الأقل في هذا الاستطلاع في مركز التأهيل بمدينة الملك فهد الطبية .

بموافقتك على المشاركة، ستشمل مشاركتك إكمال استطلاع.. إذ أن مدة المشاركة المرة الأولى: 15-20 دقيقة وفي المرة الثانية 3-5 دقائق . ولك الحق بعدم الإجابة عن بعض أو جميع الأسئلة. حيث إنه لن يتم الإفصاح عن اسمك في استطلاعك المكتمل، ولن تُجمع أي معلومات تعريفية كجزء من هذا الاستطلاع.

سيتم الإجابة على أي أسئلة لديك. ويحق لك ترك الاستطلاع في أي وقت قبل إنهائه. ولن يؤثر هذا على رعايتك الصحية في حال إكمالك للاستطلاع أو لا. حيث لا يوجد أي مخاطر معروفة عند مشاركتك. ولا يُتوقع أي مصلحة مباشرة من مشاركتك.

إذ أن المعلومات قد تساعد مقدمي الخدمات الطبية والمرضى في فهم النسخة العربية الجديدة من المقياس في المستقبل . ولن يُكلفك هذا إلا وقتك، ولن يُدفع لك أي مبلغ لمشاركتك في هذا الدراسة.

لن يطّلع على المعلومات التي قدمتها إلا فريق الدراسة حيث ستبقى مجهولة الهوية. وستُلخّص بيانات المستجوبين في تقارير.

يمكنك الحصول على مزيد من المعلومات من الباحث الرئيس هيفاء العدواني. وإن كان لديك أسئلة تتعلق بحقوقك كمشارك في البحث، يمكنك الاتصال بمكتب لجنة أخلاقيات المهنة في مدينة الملك فهد الطبية على الرقم ٩٩٩٩-٢٨٨(٠١١) تحويلة ٢٦٩١٣.

يشير إكمالك لهذا الاستطلاع على موافقتك الطوعية على المشاركة. من خلال المشاركة في الاستطلاع، فأنت تعطي الإذن للباحث باستخدام معلوماتك لأغراض بحثية.

شكراً لك

| | |
|---|---|
| **اسم الباحث الرئيس أو الباحث** | هيفاء محمد العدواني |
| **التوقيع والختم** (إن وُجد) | Stamp |
| **العنوان** | طالبة ماجستير في جامعة المجمعة |
| **رقم التواصل** | 0558546664 |

**توقيع المشارك:** **التاريخ:**

## Apendice-5 RMI Arabic version:

### مؤشر الحركة ريفيرميد

**نظرة عامة:**
مؤشر الحركة Rivermead هو أداة قياس لفقدان الوظائف المتعلقة بحركة الجسم. يقيس قدرة المريض على تحريك جسده. لا يقيس كيفية إدارة المريض على كرسي متحرك، أو القدرة الوظيفية للمريض عند الحاجة إلى مساعدة شخصية. تم تطويره للمرضى في مركز ريفيرميد لإعادة التأهيل في أكسفورد بإنجلترا الذين تعرضوا لإصابة في الرأس أو سكتة دماغية.
**التعليمات:**
يُطرح على المريض الأسئلة الخمسة عشر التالية ويتم ملاحظته وهو ينفذ السؤال 5. يتم تسجيل نقطة واحدة لكل إجابة بـ "نعم". لاحظ أنه يجب تنفيذ معظم التعليمات بدون مساعدة شخصية.

| الرقم | الموضوع والسؤال | النقاط نعم = 1 لا = 0 |
|---|---|---|
| 1 | **التقلب في السرير:** هل تستطيع ان تتحرك من جهة ظهرك إلى جانبك بدون مساعدة؟ | |
| 2 | **من حالة الاستلقاء إلى الجلوس:** وانت مستلقي على السرير، هل تستطيع النهوض والجلوس على حافة السرير دون مساعدة؟ | |
| 3 | **توازن الجلوس:** هل تستطيع الجلوس على حافة السرير دون أن تمسك بالسرير لمدة ١٠ ثوانٍ؟ | |
| 4 | **من الجلوس إلى الوقوف:** هل تستطيع الوقوف من على الكرسي خلال أقل من ١٥ ثانية وتستطيع الوقوف في مكانك لمدة ١٥ ثانية، مستخدما يديك و/ أواي مساعدة اخرى إذا لزم الأمر؟ | |
| 5 | **الوقوف دون دعم:** (اطلب من الشخص الوقوف) لاحظ هل يستطيع الوقوف لمدة ١٠ ثوانٍ دون أي مساعدة | |
| 6 | **التنقل:** هل تستطيع الانتقال من السرير إلى الكرسي والعكس دون أي مساعدة؟ | |
| 7 | **المشي في الداخل:** (بمساعدة إذا لزم الأمر): هل تستطيع السير مسافة ١٠ أمتار بمساعدة إذا لزم الأمر، ولكن بدون مساعدة احتياطية؟ | |
| 8 | **السلالم:** هل تستطيع صعود مجموعة متواصلة من درجات السلم دون مساعدة؟ | |
| 9 | **المشي بالخارج:** (أرض مستوية): هل تستطيع ان تتجول بالخارج، على الأرصفة، بدون مساعدة؟ | |
| 10 | **المشي بالداخل** :(بدون مساعدة): هل تستطيع التحرك بالداخل مسافة ١٠ أمتار بدون جبيرة أو أي وسيلة مساعدة أخرى (بما في ذلك الأثاث أو الجدران)؟ | |
| 11 | **التقاط الأشياء من الأرض:** هل تستطيع السير لمسافة خمسة أمتار، والتقاط شيء ما من الأرض، ثم المشي مرة أخرى دون مساعدة؟ | |
| 12 | **المشي بالخارج** :(أرض غير مستوية): هل تستطيع السير على أرض غير مستوية (عشب، حصى، رمال، إلخ) بدون مساعدة؟ | |
| 13 | **الاستحمام:** هل تستطيع الدخول والخروج من حوض الاستحمام أو الدش وغسل نفسك دون إشراف او مساعدة؟ | |
| 14 | **من الأعلى إلى الأسفل أربع خطوات:** هل تستطيع الصعود والهبوط أربع خطوات دون استخدام العصا، ولكن باستخدام المساعدة إذا لزم الأمر؟ | |
| 15 | **الركض:** هل تستطيع الركض لمسافة ١٠ أمتار في مدة اربع ثواني دون أن تتعثر (المشي سريعاً، من غير تعثر مقبول)؟ | |
| **المجموع** | **مؤشر الحركة Rivermead** = إجمالي النقاط (عدد النقاط لجميع الأسئلة) كلما زادت النتيجة الإجمالية، كانت الحركة أفضل. | |

# Apendice-6 RMI original version

**The Rivermead Mobility Index**

Name: _____

| Topic and Question: | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Day** | | | | | | | |
| **Month** | | | | | | | |
| **Year** | | | | | | | |
| **Turning over in bed:** Do you turn over from your back to your side without help? | | | | | | | |
| **Lying to sitting:** From lying in bed, do you get up to sit on the edge of the bed on your own? | | | | | | | |
| **Sitting balance:** Do you sit on the edge of the bed without holding on for 10 seconds? | | | | | | | |
| **Sitting to standing:** Do you stand up from any chair in less than 15 seconds and stand there for 15 seconds, using hands and/or an aid if necessary? | | | | | | | |
| **Standing unsupported:** (Ask to stand) Observe standing for 10 seconds without any aid | | | | | | | |
| **Transfer:** Do you manage to move from bed to chair and back without any help? | | | | | | | |
| **Walking inside:** (with an aid if necessary): Do you walk 10 meters, with an aid if necessary, but with no standby help? | | | | | | | |
| **Stairs:** Do you manage a flight of stairs without help? | | | | | | | |
| **Walking outside:** (even ground): Do you walk around outside, on pavements, without help? | | | | | | | |
| **Walking inside:** (with no aid): Do you walk 10 meters inside, with no caliper, splint, or other aid (including furniture or walls) without help? | | | | | | | |
| **Picking up off floor:** Do you manage to walk five meters, pick something up from the floor, and then walk back without help? | | | | | | | |
| **Walking outside:** (uneven ground): Do you walk over uneven ground (grass, gravel, snow, ice etc) without help? | | | | | | | |
| **Bathing:** Do you get into/out of a bath or shower and to wash yourself unsupervised and without help? | | | | | | | |
| **Up and down four steps:** Do you manage to go up and down four steps with no rail, but using an aid if necessary? | | | | | | | |
| **Running:** Do you run 10 meters without limping in four seconds (fast walk, not limping, is acceptable)? | | | | | | | |
| **Total** | | | | | | | |

# Apendice-7 BBS Arabic version

**مقياس بـيرغ للتوازن (Translated Arabic BBS)**

| | |
|---|---|
| الاسم:..... | التاريخ:..... |
| المكان:..... | المقيّم:..... |

| | وصف البنود | العلامة (0-4) |
|---|---|---|
| 1. | الانتقال من الجلوس الى الوقوف | ..... |
| 2. | الوقوف دون مساعدة | ..... |
| 3. | الجلوس دون مساعدة | ..... |
| 4. | الانتقال من الوقوف إلى الجلوس | ..... |
| 5. | الانتقال | ..... |
| 6. | الوقوف مع إغماض العينين | ..... |
| 7. | الوقوف مع تلاصق القدمين | ..... |
| 8. | الوصول للإمام مع مد الذراع | ..... |
| 9. | التقاط شيء من الأرض | ..... |
| 10. | الدوران للنظر إلى الخلف | ..... |
| 11. | الدوران 360 درجة | ..... |
| 12. | تناوب وضع القدم على درجة | ..... |
| 13. | الوقوف مع وضع قدم واحدة إلى الأمام | ..... |
| 14. | الوقوف على قدم واحده | ..... |
| | **المجموع** | ..... |

**تعليمات عامه:**

الرجاء قم بتمثيل كل مهمة أو أعطي التعليمات حسب المكتوب. عند تدوين العلامة، الرجاء تسجيل أدنى استجابة لكل بند.

في معظم البنود، يطلب من الشخص المحافظة على الوضعية المعطاه لمدة محددة من الزمن. و بشكل تدريجي يتم خصم نقاط أكثر إذا:

- لم يصل الشخص الى متطلبات المدة الزمنية أو المسافة.
- أداء الشخص للأنشطة بحاجة إلى إشراف.
- قام الشخص بلمس جسم خارجي كدعم أو تلقي مساعدة من قبل المقيّم.

على الأشخاص أن يفهموا أنهم يجب أن يحافظوا على توازنهم أثناء قيامهم بالمهام. و يترك حرية اختيار أي قدم يمكن الوقوف عليها أو المسافة التي يمكن الوصول إليها للشخص المعني بإنجاز المهمة.

الأدوات اللازمه للاختبار هي: ساعة توقيت أو ساعة تحتوي على عقرب الثواني و مسطرة أو أي مقياس يحتوي الأطوال الآتية (5، 5 .12 ، 25 سم) و كرسي بارتفاع مناسب للفحص وإما درجة أو مقعد لاستخدامه في البند رقم 12.

**1.** الانتقال من الجلوس الى لوقوف:
التعليمات: الرجاء قم بالوقوف. حاول أن لا تستخدم يدك للمساعدة.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على الوقوف بدون استخدام اليدين و الثبات معتمدا على نفسه | قادر على الوقوف معتمدا على نفسه باستخدام اليدين | قادر على الوقوف باستخدام اليدين بعد عدة محاولات | يحتاج لمساعدة بسيطة للوقوف أو الثبات. | يحتاج لمساعدة متوسطه أو كبيرة للوقوف. |

**2.** الوقوف دون مساعدة:
التعليمات: الرجاء قم بالوقوف لمدة دقيقتين دون الإمساك بشيء.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على الوقوف بشكل آمن لمدة دقيقتين | قادر على الوقوف لمدة دقيقتين مع إشراف. | قادر على الوقوف لمدة 30 ثانية دون مساعدة | يحتاج لعدة محاولات للوقوف لمدة 30 ثانية دون مساعدة | غير قادر على الوقوف لمدة 30 ثانية دون مساعدة |

إذا استطاع الشخص الوقوف لمدة دقيقتين بدون مساعدة ، ضع علامة كاملة للجلوس دون مساعدة. و انتقل إلى البند رقم 4.

**3.** الجلوس والظهر غير مسنود والأقدام على الأرض:
التعليمات: الرجاء قم بالجلوس مع ثني اليدين لمدة دقيقتين.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على الجلوس بشكل آمن و محكم لمدة دقيقتين | قادر على الجلوس لمدة دقيقتين تحت الإشراف | قادر على الجلوس لمدة 30 ثانية | قادر على الجلوس لمدة 10 ثوان | غير قادر على الجلوس دون مساعدة لمدة 10 ثوان |

**4.** الانتقال من الوقوف إلى الجلوس:
التعليمات: الرجاء قم بالجلوس.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| يجلس بشكل آمن مع استخدام بسيط لليدين | يتحكم بالنزول باستعمال اليدين | يرتكز بظهر ساقيه على الكرسي ليتحكم بالنزول | يجلس معتمدا على نفسه و لكن لا يتحكم بالنزول | يحتاج إلى مساعدة للجلوس |

**5.** الانتقال:
التعليمات: الرجاء انتقل من الكرسي إلى السرير و من ثم بالعكس. مرة باستخدام كرسي له مسند للذراع و مرة أخرى باستخدام كرسي بدون مسند للذراع

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على التنقل بشكل آمن مع استخدام بسيط لليدين | قادر على التنقل بشكل آمن مع حاجة أكيدة لاستخدام اليدين | قادر على التنقل مع إرشادات لفظيه و/أو إشراف | يحتاج شخص واحد للمساعدة | يحتاج إلى شخصين للمساعدة أو الإشراف ليكون بأمان |

**6.** الوقوف بدون مساعدة مع إغماض العينين :
التعليمات: الرجاء أغمض عينيك و قف ثابتا لمدة عشر ثواني.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على الوقوف لمدة عشر ثواني بشكل آمن | قادر على الوقوف لمدة عشر ثواني مع إشراف | قادر على الوقوف لمدة ثلاث ثواني | غير قادر على ابقاء العينين مغمضتين لمدة 3 ثواني لكنه يبقى آمن | يحتاج مساعدة للحماية من السقوط |

**7.** الوقوف بدون مساعدة مع تلاصق القدمين:
التعليمات: ضع قدميك بشكل متلاصق و قف بدون الإمساك بشيء.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على إبقاء قدميه متلاصقتين بشكل مستقل و الوقوف لمدة دقيقة بشكل آمن | قادر على إبقاء قدميه متلاصقتين بشكل مستقل و الوقوف لمدة دقيقة مع الإشراف | قادر على إبقاء قدميه متلاصقتين بشكل مستقل لكن غير قادر على الثبات لمدة 30 ثانية | يحتاج مساعدة لبلوغ الوضعية لكنه قادر على الوقوف لمدة 15 ثانيه و القدمين متلاصقتين | يحتاج مساعدة لبلوغ الوضعية و غير قادر على الثبات لمدة 15 ثانيه |

**البنود التالية يتم أدائها من وضع الوقوف بدون مساعدة**

**8.** الوصول للإمام مع مد الذراع:
التعليمات: أرفع ذراعك حتى زاوية 90 درجه. مدّ أصابعك وأوصلهم للأمام لأبعد مسافة ممكنه.
(يقوم الفاحص بوضع المسطرة على طرف أصابع الشخص عندما تكون الذراع بزاوية 90 درجه. يجب أن لا تلمس الأصابع المسطرة أثناء مدها للأمام. النتيجة المسجلة هي المسافة المقطوعه بالاصابع حين يصل الشخص الى أقصى انحناء للأمام)

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| يستطيع الوصول للإمام بثقة لمسافة تزيد عن 25 سم | يستطيع الوصول للإمام لمسافة تزيد عن 12 سم | يستطيع الوصول للإمام لمسافة تزيد عن 5 سم | يستطيع الوصول للإمام لكن يحتاج لإشراف | يحتاج لمساعدة لحمايته من السقوط |

**9.** التقاط شيء من الأرض:
التعليمات: قم بالتقاط الحذاء الموجود على الأرض أمام قدميك.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على التقاط الحذاء بشكل آمن و سهل | قادر على التقاط الحذاء لكن بحاجه لإشراف | غير قادر على التقاط الحذاء لكنه يصل لمسافة تبعد (2–5) سم عن الحذاء، و يحافظ على توازنه بشكل مستقل | غير قادر على التقاط الحذاء و يحتاج لإشراف أثناء محاولته | لا يستطيع المحاولة أو يحتاج مساعدة لحمايته من السقوط |

**10.** الدوران للنظر إلى الخلف:
التعليمات: أدر القسم العلوي من جسدك للنظر إلى الخلف من فوق كتفك الأيسر. أعد الكرّة للجهة اليمنى.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| ينظر للخلف من كلتا الجهتين و ينقل وزنه بشكل جيد | ينظر للخلف من جهة واحدة فقط، أما الجهة الأخرى فتظهر اقل نقل للوزن | يلتفت للجانبين فقط لكن يحافظ على التوازن | يحتاج للإشراف عند الدوران | يحتاج للمساعدة لحمايته من السقوط |

**11.** الدوران 360 درجه:
التعليمات: قم بالدوران دوره كاملة.استرح. ثم قم بالدوران دوره كاملة في الاتجاه العكسي.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على الدوران 360 درجه بشكل آمن بأقل من 4 ثواني لكل جهة | قادر على الدوران 360 درجه بشكل آمن لجهة واحدة فقط بأقل من 4 ثواني | قادر على الدوران 360 درجه بشكل آمن لكن ببطء | يحتاج لإشراف قريب أو توجيهات لفظية | يحتاج لمساعدة أثناء الدوران |

**12.** نقل الوزن أثناء الوقوف بدون مساعدة (استعمل درجة او مقعد بارتفاع 15 سم)
التعليمات: ضع كل قدم بالتناوب على الدرجة. استمر حتى تلامس كل قدم الدرجة 4 مرات.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على الوقوف بشكل مستقل و آمن. و يكمل 8 خطوات في 20 ثانيه | قادر على الوقوف بشكل مستقل و يكمل 8 خطوات في أكثر من 20 ثانيه | قادر على إكمال 4 خطوات بدون مساعدة لكن مع إشراف | قادر على إكمال أكثر من خطوتين و يحتاج لمساعدة بسيطة | يحتاج لمساعدة لحمايته من السقوط أو غير قادر على المحاولة |

**13.** الوقوف بدون مساعدة مع وضع قدم واحدة إلى الأمام :
التعليمات: ضع أحد القدمين أمام الأخرى مباشرة. إذا كنت تشعر أنك لا تستطيع وضع قدمك مباشرة أمام الأخرى،حاول أن تخطو للأمام بحث أن كعب قدمك الأمامية تكون متقدمة على أصابع القدم الأخرى.

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على وضع قدم أمام الأخرى مباشرة بشكل مستقل و الثبات لمدة 30 ثانية | قادر على وضع قدم أمام الأخرى بشكل مستقل و الثبات لمدة 30 ثانيه. | قادر على أخذ خطوة صغيرة للأمام بشكل مستقل و الثبات لمدة 30 ثانيه | يحتاج مساعدة ليأخذ خطوة لكن يستطيع الثبات لمدة 15 ثانية | يفقد التوازن أثناء أخذ الخطوة أو الوقوف |

**14.** الوقوف على قدم واحده:
التعليمات: قف على قدم واحدة طالما تستطيع البقاء دون الإمساك بشيء (لا يجب ثني الركب أثناء الوقوف)

| 4 | 3 | 2 | 1 | صفر |
|---|---|---|---|---|
| قادر على رفع ساقه بشكل مستقل و الثبات أكثر من 10 ثواني | قادر على رفع ساقه بشكل مستقل و الثبات من 5 – 10 ثواني | قادر على رفع ساقه بشكل مستقل و الثبات 3 ثواني أو أكثر | يحاول رفع ساقه ولا يستطيع الثبات لمدة 3 ثواني لكن يبقى واقفا بشكل مستقل | لا يستطيع المحاولة أو يحتاج مساعدة لحمايته من السقوط |

المجموع النهائي ..... (العلامة العظمى = 56)

المملكة العربية السعودية
وزارة التعليم
جامعة المجمعة
عمادة الدراسات العليا
كلية العلوم الطبية التطبيقية
قسم العلاج الطبيعي والتأهيل الصحي

# التحقق من صحة وتكيّف النسخة العربية من مؤشر ريفرميد للحركة لدى مرضى السكتة الدماغية

رسالة مقدمة لاستكمال متطلبات الحصول على درجة الماجستير في العلاج الطبيعي
مسار العلاج الطبيعي لحالات الجهاز العصبي

إعداد:
**هيفاء محمد العدواني**
الرقم الجامعي:
**421203828**

المشرف :
**د. محمد قطب صيام**
أستاذ مساعد
كلية العلوم الطبية التطبيقية

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## نبذة مختصرة

المقدمة: بعد السكتة الدماغية، يمكن للفرد أن يواجه تغييرات في الإحساس والقدرة الحركية، وبالنسبة لمرضى السكتة الدماغية، فإن الإعاقة الحركية لها تأثير سلبي على مهامهم اليومية وجودة الحياة بشكل عام؛ وبالتالي فإن القدرة على الحركة نتيجة هامة في إعادة التأهيل بعد السكتة الدماغية. مؤشر ريفرميد للحركة هو أداة تستخدم لتقييم الحركة والقدرات الوظيفية (مثل المشي والتوازن والتنقل) في مرضى الاضطرابات العصبية، يتكون من من ١٤ سؤالًا وملاحظة مباشرة واحدة، ويقيس مجموعة متنوعة من الإجراءات، بما في ذلك الاستدارة في السرير للقيام بسرعة. **الأهداف:** ترجمة مؤشر ريفرميد للحركة وتكييفه ثقافياً من النسخة الإنجليزية الأصلية إلى النسخة العربية وتقييم صلاحية وموثوقية النسخة العربية من مقياس ريفريمد للحركة لمرضى السكتة الدماغية في المملكة العربية السعودية. **الطريقة**: عملية الترجمة والتكيّف الثقافي لمؤشر ريفرميد للحركة في الدراسة الحالية وفقًا لـإرشادات بيتون، والتي تضمنت المراحل التالية: الترجمة مسبقة، وتوليف، وترجمة رجعية، ومراجعة من قبل لجنة الخبراء لعمل النسخة العربية قبل النهائية، والاختبار المسبق (التجريبي) والتحقق من صحته. أكمل مئة وخمسون مشاركًا مصابًا بالسكتة الدماغية النسخة العربية من مؤشر ريفرميد للحركة والنسخة العربية المترجمة السابقة من مقياس بيرغ للتوازن، تم تقييم المشاركين في البداية وبعد أسبوع واحد. تضمن تحليل البيانات صلاحية المقياس، وموثوقية الاختبار- وإعادة الاختبار، والاتساق الداخلي. **النتائج:** تم تسجيل ١٥٠ مشاركا (٥٩,٣١ ± ٩,٤٤ سنة). تم تقييم صلاحية البناء باستخدام اختبار معامل ارتباط ترتيب رتبة سبيرمان، ووجد أن النتيجة الإجمالية لـ مؤشر ريفرميد للحركة العربي ومقياس بيرغ للتوازن كانت إيجابية ولها علاقة قوية (القيمة الاحتمالية = ٠,٨٨٦٦) (≤٠,٠٠٠١). وكان معدل ألفا كرونباخ من مؤشر الحركة ريفر ميد قد بلغ (٠,٩٩٦) والذي أظهر اتساقاً داخلياً جيداً جداً لإجمالي درجات مؤشر ريفرميد للحركة العربي. أيضاً كانت موثوقية إعادة الاختبار ممتازة بالنسبة لـ مؤشرريفرميد العربي الإجمالي، وكان معامل الارتباط الداخلي قد بلغ ٠.٩٩٦ بفاصل ثقة ٩٥٪ من ٠.٨٧٧ إلى ٠.٩٩٩. **الخلاصة**: أكدت النتائج التي توصلنا إليها صلاحية وموثوقية النسخة العربية لمؤشر ريفرميد للحركة لمرضى السكتة الدماغية وقد تقدم هذه النتائج معلومات مفيدة في اختيار مؤشر ريفيرميد العربي للسكان النطاقين باللغة العربية من متخصصين في الرعاية الصحية وباحثين أكاديميين.

## Translation and cultural adaptation

| Original RMI items | Synthesized items |
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| Turning over in bed: Do you turn over from your back to your side without help? | **التقلب في السرير:** هل تستطيع ان تتحرك من جهة ظهرك إلى جانبك بدون مساعدة؟ |
| Lying to sitting: From lying in bed, do you get up to sit on the edge of the bed on your own? | **من حالة الاستلقاء إلى الجلوس**: وانت مستلقي على السرير، هل تستطيع النهوض والجلوس على حافة السرير دون مساعدة؟ |
| Sitting balance: Do you sit on the edge of the bed without holding on for 10 seconds? | **توازن الجلوس**: هل تستطيع الجلوس على حافة السرير دون أن تمسك بالسرير لمدة ١٠ ثوانٍ؟ |
| Sitting to standing: Do you stand up from any chair in less than 15 seconds and stand there for 15 seconds, using hands and/or an aid if necessary? | **من الجلوس إلى الوقوف:** هل تستطيع الوقوف من على الكرسي خلال أقل من ١٥ ثانية وتستطيع الوقوف في مكانك لمدة ١٥ ثانية، مستخدما يديك و/ أواي مساعدة أخرى إذا لزم الأمر؟ |
| Standing unsupported: (Ask to stand) Observe standing for 10 seconds without any aid | **الوقوف دون دعم:** (اطلب من الشخص الوقوف) لاحظ هل يستطيع الوقوف لمدة ١٠ ثوانٍ دون أي مساعدة |
| Transfer: Do you manage to move from bed to chair and back without any help? | **التنقل:** هل تستطيع الانتقال من السرير إلى الكرسي والعكس دون أي مساعدة؟ |
| Walking inside: (with an aid if necessary): Do you walk 10 meters, with an aid, if necessary, but with no standby help? | **المشي في الداخل**: (بمساعدة إذا لزم الأمر): هل تستطيع السير مسافة ١٠ أمتار بمساعدة إذا لزم الأمر، ولكن بدون مساعدة احتياطية؟ |

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| **Stairs:** Do you manage a flight of stairs without help? | **السلالم:** هل تستطيع صعود مجموعة متواصلة من درجات السلم دون مساعدة؟ |
| **Walking outside:** (even ground): Do you walk around outside on pavements, without help? | **المشي بالخارج**: (أرض مستوية): هل تستطيع ان تتجول بالخارج، على الأرصفة، بدون مساعدة؟ |
| **Walking inside:** (with no aid): Do you walk 10 meters inside, with no caliper, splint, or other aid (including furniture or walls) without help? | **المشي بالداخل** :(بدون مساعدة): هل تستطيع التحرك بالداخل مسافة ١٠ أمتار بدون جبيرة أو أي وسيلة مساعدة أخرى (بما في ذلك الأثاث أو الجدران)؟ |
| **Picking up off floor:** Do you manage to walk five meters, pick something up from the floor, and then walk back without help? | **التقاط الأشياء من الأرض:** هل تستطيع السير لمسافة خمسة أمتار، والتقاط شيء ما من الأرض، ثم المشي مرة أخرى دون مساعدة؟ |
| **Walking outside**: (uneven ground): Do you walk over uneven ground (grass, gravel, snow, ice etc) without help? | **المشي بالخارج** :(أرض غير مستوية): هل تستطيع السير على أرض غير مستوية (عشب، حصى، رمال، إلخ) بدون مساعدة؟ |
| **Bathing:** Do you get into/out of a bath or shower and to wash yourself unsupervised and without help? | **الاستحمام:** هل تستطيع الدخول والخروج من حوض الاستحمام أو الدش وغسل نفسك دون إشراف او مساعدة؟ |
| **Up and down four steps:** Do you manage to go up and down four steps with no rail, but using an aid if necessary? | **من الأعلى إلى الأسفل أربع خطوات:** هل تستطيع الصعود والهبوط أربع خطوات دون استخدام العصا، ولكن باستخدام المساعدة إذا لزم الأمر؟ |
| **Running:** Do you run 10 meters without limping in four seconds (fast walk, not limping, is acceptable)? | **الركض:** هل تستطيع الركض لمسافة ١٠ أمتار في مدة اربع ثواني دون أن تتعثر (المشي سريعاً، من غير تعثر مقبول)؟ |