

Assessment tools of disability status after stroke

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ABSTRACT

Stroke is the second leading cause of death worldwide. The global incidence of stroke has increased in recent years, although low and middle-income countries have been heavily affected. Because of the complicated and diversified physical and emotional disruption, stroke survivors are likely to face a variety of difficulties in daily life activities. Because of the wide impact of a stroke on all body structures and functions, there is no gold standard instrument to evaluate impairment and all elements of recovery after a stroke, and there is no single scale that can capture all the effects of a stroke. The International Classification of Impairments, Disability, and Handicaps (ICIDH) categorized the consequences of the diseases into three categories: impairment, disability, and handicap. Using the biopsychosocial model in 2001 WHO defines and classifies disability by using International Classification of Functioning Disability and Health (ICF). The ICF divides the impairment into three categories: body function and structure, activity, and participation. This article aims to review the most important tools that are reliable and valid in assessing the disability left after a stroke: The National Institute of Health Stroke Scale (NIHSS), Barthel index (BI), The modified Rankin scale (mRS), Instrumental activities of daily living (IADL), Glasgow outcome scale (GOS), The Functional Independence Measure (FIM), The World Health Organization Disability Assessment Schedule (WHODAS 2.0). The WHODAS 2.0 questionnaire is validated in several countries and it would be useful to be validated, also, in our country.

Keywords: stroke, disability, scale, score, daily living, neurologic deficits

INTRODUCTION

Stroke is the second leading cause of death and is responsible for 11% of death worldwide [1]. In recent years, the incidence of stroke has increased globally, but the most affected countries were those with low and middle level of income [2]. Because of the complicated and diversified physical and emotional disruption, stroke survivors are likely to face a variety of difficulties in daily life activities. The

changes that occur after stroke may have different grades of reversibility. For individual goal-setting and therapeutic approach planning, it is critical to measure the impact of stroke on body functioning using specific assessment scales and measures [3]. Long-term disability in stroke survivors is highly prevalent and functional outcome is related with the grade of depression, cognitive impairment, lower education, older age, and history of stroke. To de-

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Article history:

Received: 14 September 2022

Accepted: 20 September 2022

crease disability, proactive management includes adequate depression approach, secondary stroke prevention, and an appropriate rehabilitation strategy must be considered [4].

There is no gold standard instrument to evaluate impairment and all aspects of recovery after a stroke and there is no single scale that can capture all the impacts of a stroke because of the extensive impact of the stroke on all body structures and functions [5].

IMPORTANCE OF DISABILITY EVALUATION

Assessing the disability that a particular condition causes is important in a population in order to assess the burden of disease, to help allocate resources and to design the provision of services [6]. The definition of disability has evolved throughout times, moving from a biomedical and social paradigm to a biopsychosocial model [7].

The International Classification of Impairments, Disability, and Handicaps (ICIDH) had been developed by the World Health Organization (WHO) in 1970, and it categorized the consequences of the diseases into three categories: impairment, disability, and handicap [8]. Impairment refers to any loss or abnormality of psychological, physiological, or anatomical structures or functions. Disability refers to any constraint or lack of ability to conduct an activity (due to an impairment) or difference in how a human being is viewed as normal. Handicap refers to any disadvantage a person faces because of a disability or impairment that limits or prevents the capacity to do a job or has typical social and cultural implications [8].

Using the biopsychosocial model in 2001 WHO defines and classifies disability by using International Classification of Functioning Disability and Health (ICF) and is referred as *“a difficulty in functioning at the body, person, or societal levels, in one or more life domains, as experienced by an individual with health condition in interaction with contextual factors”*. The ICF divides the impairment into three categories: body function and structure, activity—a term used to describe a person’s entire range of activities (formerly disability), participation—aspects of one’s life in which he or she is involved, has access to, and faces societal opportunities or barriers (formerly handicap) [9].

The following can be detected using the ICIDH classification in stroke: neurologic impairments (deficits such as hemianopsia, aphasia, limb paresis, gait imbalance, or sensory loss), disabilities (loss of ability to perform daily tasks like eating, dressing, and bathing due to physiological deficits), and handicaps (impact of deficits and disabilities on social participation such as employment).

The impact of a stroke must be considered in terms of all three dimensions (body, activity participation), all items must be measured because focusing on just one can be misleading. For example, if a patient has a paralyzed hand, we have a motor impairment if we simply evaluate the deficit in bodily dimension, but with compensatory treatment, the same patient could have no disability (able to dress, eat, and bathe) if he utilizes the unimpaired hand or prostheses. If the same individual was a truck driver, he might be allowed to return to work if he drives a modified car (no handicap), but if he was a watchmaker, he might not be able to (social handicap). As a result, the impact of a neurologic impairment on quality of life varies greatly depending on the circumstances [10].

MEASUREMENT TOOLS THAT ARE RELIABLE AND VALID FOR ASSESSMENT OF STROKE

The National Institute of Health Stroke Scale (NIHSS) is the most widely used measure for assessing and predicting the severity of impairment caused by acute and subacute stroke, as well as survival and functional recovery and is a valuable tool for initial assessments of patients with stroke. Because the first clinician to examine the patient with stroke in an emergency room is rarely a neurologist, it is important that NIHSS can be used effectively by all types of health-care providers after only a few hours of training with high reliability and validity. NIHSS is not an ideal measure of functional outcome after stroke because it is not related to the ability of the patient in compensating for the neurological deficit [5]. The NIHSS score is also part of the evaluation that determines whether a patient is a candidate for intravenous thrombolysis and/or mechanical thrombectomy for reperfusion therapy [10]. Other scales that assess the impairment include the European Stroke Scale, which is designed to evaluate patients with stroke involving the territory of the middle cerebral artery, the Canadian Neurological Scale, which is faster than the NIHSS but misses many stroke-related impairments, and the Scandinavian Stroke Scale, which has good to excellent reliability in assessing arm and leg weakness, dysphasia, gait, orientation, facial palsy, and consciousness and has been validated for retrospective use [11-13]. In addition to scales that measure impairment there are also scales that measure specific neurologic deficits and have been validated in stroke patients. Motor impairments Motor Assessment Scale, balance- Berg Balance Scale, arm/hand functioning- Research Action Arm Test, mobility- Rivermead Mobility Index, aphasia- French Aphasia Screening test, cognition- Montreal Cognitive Assessment [14-19].

Depression has been reported to be common following a stroke, and as a result, it is an aspect that

can slow down the recovery process. There are various scales that can be used to assess depression, including the Beck Depression Inventory and the Hamilton Depression Scale, the latter of which is used in aphasic patients and is observational rather than patient related [20].

Barthel index (BI), The modified Rankin scale (mRS), Instrumental activities of daily living (IADL) are frequently used to assess aspects of disability following a stroke, such as activity and participation, and can be used to guide rehabilitation strategies, while the stroke impact scale (SIS) was created to assess participation and to measure the patient's level of perception of their own illness [21]. The Functional Independence Measure (FIM) can be used to assess a stroke patient's functional result, as well as the "burden of care" for the caregiver, whether it be a spouse, family, or institution.

The BI is a scale that evaluates ten basic components of self-care (grooming, dressing, toilet use, feeding, bowel and bladder care) and mobility (transfers, ambulation, stairs climbing), all are parts of everyday life activities. Mahoney and Barthel published it in 1965. The scale evaluates 10 parameters, and the score varies between 0 and 100. Lower scores indicate greater dependency and score 100 indicate a normal person that is fully independent in physical functioning. BI is probably the most utilized score functioning for neurologic patients that arrive in rehabilitation services. After an exchange, it is thought that a patient with a score below 61 should be cared for in a foster home [22]. Although items addressing bowel and bladder continence are gathered through history, the other items are obtained by observation of patients in a variety of tasks [23]. According to this method of assessing, patients who obtained scores more than 60 following rehabilitation programs were more likely to be active in their homes and communities. The BI can be used to estimate the efficacy of rehabilitative therapy because it can be used repeatedly to assess patient improvement over time. The BI's interrater reliability is outstanding, according to a comprehensive study and meta-analysis [24]. BI could be beneficial when research patients are unable to return for direct follow-up assessments because of its excellent reliability, even with telephone assessments [25].

Rankin Scale was created in 1957 and updated in 1988 and since then the modified version or mRS has been used to assess disability after a stroke and it measures independence rather than performance in specific tasks. This scale tries to merge the WHO components according to disability defined by the three ICF principles: body function, activity, and participation. The scale is made by seven different grades. 0 means there are no symptoms, 5 means significant disability, and 6 means death. The mRS

allows for a simple and quick assessment of the impact of a patient's stroke on their activities and involvement in social situations. Domains such as cognition, language, visual function, emotional impairment, and pain, as well as other sources of disability such as a hip fracture, are not directly quantified [26,27].

IADL scales attempt to bridge the gap between handicap and disability. They're made to assess a patient's ability to live independently in their own home and to document their ability to accomplish a variety of tasks (cooking, home management, recreation etc). There are several IADL scales available, but the Frenchay Activities Index was designed exclusively for stroke patients [28]. The Frenchay Activities Index is a valuable tool for assessing functional status after a stroke. The questionnaire is simple to complete and only takes a few minutes [29].

Glasgow outcome scale (GOS) was published in 1975 by Jennet and Bond is another scale used to assess outcomes after acute brain damage (head injury and nontraumatic acute brain illnesses). GOS results are received once a survey is conducted and has the advantage of not requiring a formal procedure [22,30]. GOS differs from mRS in that it does not distinguish between patients with favourable outcomes (complete recovery from minimal disability). This scale divides the patients in five categories: 1 means good recovery, 4 means persistent vegetative state and 5 means death. In most stroke patients, the GOS and the mRS are correlated [10].

The Functional Independence Measure (FIM) is similar to BI for assessing the basic quality of daily living activities in people with impairments, but it is more valid, its utility was accepted in 1986 [22,31]. The FIM consists of 18 factors that are used to evaluate how much assistance is required for a person with a disability to carry out basic daily activities safely and successfully. Self-care, sphincter control, transfers, locomotion, communication, and social knowledge are all covered in the basic set of competencies [32].

DISCUSSIONS

The World Health Organization Disability Assessment Schedule (WHODAS 2.0) was developed by WHO in 2010 and is a tool for assessing health and disabilities before and after therapeutic intervention and was developed from ICF principles. It is a generic assessment instrument that can measure health and disability in a population or in clinical practice to design and monitor the impact of health and health related interventions. It includes seven versions which differ in length and mode of administration. WHODAS 2.0 have six domains: cognition,

mobility, self-care, getting along, life activities, participation, the full version has 36 questions and the short version 12 questions, and the answers provide the patient status during the previous 30 days. Unlike tools that subjectively measure quality of life (the sense of satisfaction with the performance of a person performing a particular task), WHODAS 2.0 measures patient functionality (performance seen objectively in a particular activity) [33].

WHODAS 2.0 is a health and disability assessment instrument that is directly tied to the ICF ideas. Many diseases, including mental, neurological, and addiction disorders, are treated with the instrument. It's brief, straightforward, and easy to maintain, and it may be used in both clinical and general populations [34].

According to our knowledge, the Romanian version of WHODAS 2.0 is not yet adept and validated, but several countries have validated and adept the use of this tool to measure impairment. In 2016 a

Conflict of interest: none declared

Financial support: none declared

review resumed that WHODAS 2.0 has been used in 94 countries, translated into 47 languages and dialects and used in 27 areas of research [35]. WHODAS 2.0 is a reliable and valid instrument for measuring disability and components of activities and participation in stroke survivors [7].

CONCLUSIONS

The evolution in the assessment of disability and in the evaluation of the prognostic of the patients has evolved; from a biomedical and social model towards to the biopsychosocial model. The remarked tendency is to a more integrative approach that is centred on the patient as a whole, not only by the grade of disability, but, also, by its social integration and its capability to be reintegrated in the work field. The WHODAS 2.0 questionnaire is validated in several countries and it would be useful to be validated, also, in our country.

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