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The Functional Independence Measure and the Functional Assessment Measure (FIM + FAM) as an effective tool for the evaluation of functional status in stroke rehabilitation. A review

The Functional Independence Measure and Functional Assessment Measure (FIM + FAM) is an effective, efficient, and objective tool for tracking changes in the motor, cognitive, and psychosocial functions of patients over the entire treatment and rehabilitation period. It is estimated that in the Czech Republic (CR), stroke is the third most common cause of death and the most common cause of adult disability. To develop faster, better, and more cost-effective stroke treatments and reduce or mitigate functional losses and restrictive situations, it is very important that patients be objectively evaluated, relative to their functional abilities, as soon as possible after a stroke. A critical part of stroke treatment is to calculate the length of in-hospital treatment and estimate the length of the rehabilitation period after the stroke. Contemporary methods for evaluating and analyzing a patient's condition are based on test results and evidence.

The FIM offers a more sensitive rating scale compared to BI due to the presence of cognitive items and is used worldwide for assessment during the acute stage of the disease. Thus, it is an efficient instrument for setting therapy goals and evaluating the effects of rehabilitation. Not only can it assist the therapist in clinical decision making, but it also functions as a tool for evaluating rehabilitation outcomes. Based on this test, short-term and long-term rehabilitation plans can be determined. At the end of the rehabilitation process, assessing the patient's functional condition helps to predict the specific long-term rehabilitation services the patient will need as they return to society and regain their quality of life.

Key words: stroke, functional status assessment, rehabilitation, functional degree of independence and functional status assessment rate, FIM + FAM.

Any illness, injury, or other health impairment represents not only a change in the life of the patient but also for the whole society. Cerebrovascular events (strokes) are one the commonest diseases in the world and significantly impact health and quality of life. It is one of the five leading causes of death and disability in the modern world. The age-standardized incidence rate of strokes in Europe ranges from 95 to 290/100,000 per year, with 1-month case-fatality rates ranging from 13 to 35 %. Approximately 1.1 million Europeans suffer a stroke each year [3]. Stroke rates in Eastern European countries are higher compared with Southern European countries [3]. In the EU, the total economic cost related to strokes in 2015 was 45 billion Euros. Strokes have a negative impact on the socio-economic status of populations all over the world and dramatically affects the patient's

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quality of life [12]; in fact, it is rapidly becoming a pan-European medical, social, and economic crisis.

It is estimated that in the Czech Republic (CR), stroke is the third most common cause of death and the most common cause of adult disability. Therefore, treatment and prevention of stroke are primary tasks for and the healthcare system in general [5, 6]. The global aim to reduce mortality rates has led to the ever-increasing funding of stroke facilities in the CR. Accordingly to the 2006 Helsingborg Declaration on European Stroke Strategies [12], the overall goals of stroke management, to be achieved by 2015, were that all stroke patients in Europe would have access to a continuum of care from organized stroke units in the acute phase to appropriate rehabilitation. The WHO has defined rehabilitation as a set of measures that assist individuals who experience or are likely to experience disability, to achieve and maintain optimal functioning and interaction with their environments [18]. It is essential that people with functional limitations remain in or can return to their home or community, live independently, and participate in education, work, and civic life.

To develop faster, better, and more cost-effective stroke treatments and reduce or mitigate functional losses and restrictive situations, it is very important that patients be objectively evaluated, relative to their functional abilities, as soon as possible after a stroke. A critical part of stroke treatment is to calculate the length of in-hospital treatment and estimate the length of the rehabilitation period after the stroke. Contemporary methods for evaluating and analyzing a patient's condition are based on test results and evidence. Emphasis is primarily placed on the need to measure treatment effectiveness and therapeutic interventions provided to patients. Another requirement is that clinical practice should be founded on evidence-based medicine [1, 14]. One of the ways to support evidence-based stroke treatment and rehabilitation is to use standardized tests such as the Functional Independence Measure (FIM™) and the Functional Assessment Measure (FAM) to track changes in the functional status of patients during treatment [1].

Stroke care starts in the hospital with the stroke diagnosis, followed by treatment in a stroke unit and early rehabilitation. Acute stroke care, involving skilled nursing care, and specialist rehabilitation are the core aspects of a comprehensive stroke unit, and treatment in such facilities provides the most effective means for reducing mortality rates and disabilities in stroke patients. It also involves a multidisciplinary rehabilitation team that develops a post-acute stroke care map and provides continued rehabilitation and medical care after discharge from the hospital [1].

A measuring tool for inpatient rehabilitation needs should meet the requirements of reliability and validity; it should be specific, feasible, and well applicable in clinical practice [15, 23—25]. It must consider the full range of potential disabilities, not just physical disabilities. Disability measures such as the Barthel Index (BI) [5] and the FIM have been widely used in the context of strokes. However, those measurements almost entirely focus on the physical function of patients and lack any assessment of cognitive and psychosocial functions [5, 8, 18, 19].

The FIM scale assesses both physical and cognitive disability [11]. This scale focuses mainly on the burden of care, i.e., the level of disability indicates the burden of caring for them. The FIM, combined with the FAM test [22], expands the eighteen-item FIM assessment by another twelve items, creating a 30-item scale referred to as the FIM + FAM assessment. It assesses the level of physical disability and communication, psychosocial adjustment, and cognition of the patient (Figure).

The original FAM test was developed in California for measuring disability in those with brain injuries. It was designed to supplement the shortcomings of the FIM since it better reflected the functional condition of patients [6]. In 1996, the UK FIM + FAM users group produced a UK version of the test that improved the objectivity of scoring. This scale was last modified in 1999 [16]. The UK FIM + FAM now forms the principal outcome measure for specialist rehabilitation of patients with complex disabilities worldwide [20]. Its assessment of cognitive and psychosocial functions provides a more comprehensive measurement of the patient's functional status [15]. The FIM + FAM is optimized to detect changes in the patient's functional state over time, especially in the early stage of rehabilitation and during outpatient rehabilitation [28].

As mentioned, the UK FIM + FAM uses a 30-item scale. Nine items address basic self-care, seven items address transfers and mobility, six items address communication, and nine items address cognitive and psychosocial function [2]. FIM items are designed to assess the following motor dysfunctions: Eating, Grooming, Bathing, Dressing Upper Body, Dressing Lower Body, Toileting, Bladder, Bowel, and Bed, Chair, Wheelchair transfer, Toilet transfer, Tub/Shower transfer, Locomotion, and Stair climbing. FAM expands FIM's Motor items to include Swallowing, Car Transfers, and Community Mobility. Swallowing disorders may prolong hospitalization and rehabilitation time, so it is important that swallowing be assessed as part of the patient's condition [14]. Car Transfers and Community Mobility are not important relative to inpatient rehabilitation, but they are crucial for socialization and adaptation to activities of daily living. Communication is assessed relative to Reading, Writing, and Speech intelligibility, which were added to the original FIM items (Comprehension and Expression). Cognitive and psychosocial assessments (Social Interaction, Problem Solving, and Memory) include Emotional Status, Adjustment to Limitations, Leisure Activities, Orientation, Concentration, and Safety awareness. Emotional Status identifies the frequency and severity of mood swings (i.e., depression, anxiety, euphoria, and frustration) and assesses the ability of patients to take

FUNCTIONAL INDEPENDENCE MEASURE™ AND FUNCTIONAL ASSESSMENT MEASURE
Brain Injury

Scale:
7 Complete Independence (timely, safely)
6 Modified Independence (extra time, devices)
5 Supervision (cuing, coaxing, prompting)
4 Minimal Assist (performs 75% or more of task)
3 Moderate Assist (performs 50%-74% of task)
2 Maximal Assist (performs 25% to 49% of task)
1 Total Assist (performs less than 25% of task)

(Patient Stamp)

	SELF CARE ITEMS	Adm	Goal	D/C	F/U
1.	Feeding				
2.	Grooming				
3.	Bathing				
4.	Dressing Upper Body				
5.	Dressing Lower Body				
6.	Toileting				
7.	Swallowing*				
	SPHINCTER CONTROL				
8.	Bladder Management				
9.	Bowel Management				
	MOBILITY ITEMS (Type of Transfer)				
10.	Bed, Chair, Wheelchair _____				
11.	Toilet _____				
12.	Tub or Shower _____				
13.	Car Transfer* _____				
	LOCOMOTION				
14.	Walking/Wheelchair (circle)				
15.	Stairs				
16.	Community Access*				
	COMMUNICATION ITEMS				
17.	Comprehension-Audio/Visual (circle)				
18.	Expression-Verbal, Non-Verbal (circle)				
19.	Reading*				
20.	Writing*				
21.	Speech Intelligibility*				
	PSYCHOSOCIAL ADJUSTMENT				
22.	Social Interaction				
23.	Emotional Status*				
24.	Adjustment to Limitations*				
25.	Employability*				
	COGNITIVE FUNCTION				
26.	Problem Solving				
27.	Memory				
28.	Orientation*				
29.	Attention*				
30.	Safety Judgement*				

*FAM items

	Admt	Date	D/C	Date		Admt	Date	D/C	Date
RN	_____	_____	_____	_____	ST	_____	_____	_____	_____
PT	_____	_____	_____	_____	PSY	_____	_____	_____	_____
OT	_____	_____	_____	_____	REC	_____	_____	_____	_____

Figure. *FIM+FAM form*

responsibility for their emotional behavior [26]. The last FAM item, Safety Awareness, assesses the ability of patients to anticipate potential hazards, identify risks, plan, avoid impulsivity, and measures responses in the event of danger or emergency [26].

After active rehabilitation, it is crucial to assess the level of independence the patient has achieved regarding activities of daily living. Therefore, it is advisable to use the extended activities of daily living (extended ADL) module, which reflects the needs of a person in the home environment. The module contains six items focused on dealing with everyday life challenges: Meal preparation, Laundry, Housework, Shopping, Home Finances, and Work and Education [26].

The UK FIM + FAM uses a seven-point scale, with scores ranging from 1 (total assistance) to 7 (complete independence), which is used to evaluate the 30 items described above. Based on the numerical assessments, the level of assistance required, the individual's level of independence, the need for adaptive devices, the percentage of a given task completed successfully, and the need for a compensatory aid can be determined [1].

Patients scoring 7 pts. (complete independence) and 6 pts. (modified independence) do not require assistance.

Patients scoring 5 pts. (supervision/set-up) require only stand-by assistance or verbal prompting or slight assistance.

Patients scoring 4 pts. (minimum contact assistance, performs > 75 % of tasks) require incidental hands-on help only.

Patients scoring 3 pts. require moderate assistance (subject performs more than half of tasks 50—74 %).

Patients scoring 2 pts. require maximum assistance (performs between 25 % and 49 % of tasks)

Patients scoring 1 pt. (performs less than 25 % of tasks or is unable to perform the task at all) require total assistance.

A total score is obtained by summing the scores of Total Motor Subscore (16—112), Total Cognitive Subscore (14—98), and Total EADL (6—42). Scores should be evaluated by the multidisciplinary team using the published scoring manual.

The UK FIM + FAM test is conducted twice, initially 3—10 days after admission (admission score) and within three days of discharge from the rehabilitation program (discharge score). The control or follow-up evaluation takes place within 80 to 180 days after the end of the program. The assessment takes approximately 20—30 minutes, depending on the capabilities of the patient and the experience of the team [8, 21, 27].

FIM™ is a trademark of the Uniform Data System for Medical Rehabilitation (UDSMR). Any usage of the FIM requires a license agreement with the UDSMR. The UDSMR offers annual licenses to health care facilities to use the FIM instrument and data collection software. The license includes a detailed manual, user manual, software for computer evaluations, and an online course for two evaluators [5, 27]. The UDSMR offers many training options, such as training courses and training via video conferences. After training, evaluators need to pass the accreditation exam. To use the FIM to assess a patient's functional self-sufficiency, the UDSMR requires that at least two facility evaluators pass the accreditation test [27]. The UDSMR also offers a wide range of products and services for uniformly documenting the severity of a patient's disability and rehabilitation outcomes [27]. The FIM (version 5.2) has been used to assesses the functional skills of patients for over seven years and is used in 17 rehabilitation programs. The LIFEware System measures function in adult rehabilitation outpatients. AlphaFIM provides a method of assessing patient disability and functional status in acute care and allows estimates of the patient's expected condition at discharge and the duration of care [27]. The FAM test, including training material, is freely available on the Internet from the Center for Outcome Measurement in Brain Injury (COMBI) website (http://tbims.org/combi).

Contemporary clinical practice demonstrates an increasing demand for measures of end results to evaluate the effects of treatment and rehabilitation interventions in stroke patients [3]. BI focuses primarily on motor function and is an insensitive tool for evaluating cognitive and psychosocial functions in stroke patients. However, it can be helpful in setting therapeutic goals in the acute phase of the disease but does not provide full data for interventions in the subsequent phases of rehabilitation. The FIM offers a more sensitive rating scale compared to BI due to the presence of cognitive items and is used worldwide for assessment during the acute stage of the disease. Thus, it is an efficient instrument for setting therapy goals and evaluating the effects of rehabilitation. However, the FIM + FAM version of the test has improved objectivity relative to the scoring system. Not only can it assist the therapist in clinical decision making, but it also functions as a tool for evaluating rehabilitation outcomes. Based on this test, short-term and long-term rehabilitation plans can be determined. At the end of the rehabilitation process, assessing the patient's functional condition helps to predict the specific long-term rehabilitation services the patient will need as they return to society and regain their quality of life.

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Функціональний ступінь незалежності та ступінь оцінки функціонального стану (FIM + FAM) як інструмент оцінки функціонального стану при реабілітації після інсульту. Огляд літератури

Точна оцінка ефективності лікування і реабілітації має вирішальне значення для розробки належних і ефективних методів лікування інсульту. Вимірювання функціональної незалежності та функціональної оцінки (FIM + FAM) — це ефективний, дієвий і об'єктивний інструмент для відстеження змін рухових, когнітивних і психосоціальних функцій пацієнтів протягом усього періоду лікування і реабілітації. За оцінками, в Чеській Республіці (ЧР)

інсульт є третьою за частотою причиною смерті і найчастішою причиною інвалідності дорослих. Щоб розробити кращі і більш економічні методи лікування інсульту та зменшити або пом'якшити функціональні втрати, дуже важливо, щоб пацієнти були об'єктивно оцінені щодо їхніх функціональних можливостей. Важливою частиною лікування інсульту є розрахунок тривалості стаціонарного лікування та оцінка тривалості періоду реабілітації після інсульту. Сучасні методи оцінки та аналізу стану пацієнта засновані на результатах тестів і доказах. FIM пропонує більш чутливу шкалу оцінок порівняно з BI через наявність когнітивних елементів і використовується у всьому світі для оцінки під час гострої стадії захворювання. Отже, це ефективний інструмент для постановки терапевтичних цілей і оцінки результатів реабілітації. Він не тільки може допомогти терапевту в прийнятті клінічних рішень, а й також функціонує як інструмент для оцінки результатів реабілітації. На основі цього тесту можуть бути визначені короткострокові і довгострокові плани реабілітації. В кінці процесу реабілітації оцінка функціонального стану пацієнта допомагає спрогнозувати конкретні довгострокові реабілітаційні плани, які будуть потрібні пацієнту для його повернення в суспільство і відновлення якості життя.

Ключові слова: інсульт, оцінка функціонального статусу, реабілітація, функціональний ступінь незалежності та оцінка функціонального статусу, FIM + FAM.

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Функциональная степень независимости и степень оценки функционального статуса (FIM + FAM) как эффективный инструмент оценки функционального статуса при реабилитации после инсульта. Обзор литературы

Точная оценка эффективности лечения и реабилитации имеет решающее значение для разработки надлежащих и эффективных методов лечения инсульта. Измерение функциональной независимости и функциональной оценки (FIM + FAM) — это эффективный, действенный и объективный инструмент для отслеживания изменений двигательных, когнитивных и психосоциальных функций пациентов на протяжении всего периода лечения и реабилитации. По оценкам, в Чешской Республике (ЧР) инсульт является третьей по частоте причиной смерти и самой частой причиной инвалидности взрослых. Чтобы разработать лучшие и более экономичные методы лечения инсульта и уменьшить или смягчить функциональные потери и ограничительные ситуации, очень важно, чтобы пациенты были объективно оценены относительно их функциональных возможностей. Важной частью лечения инсульта является расчет продолжительности стационарного лечения и оценка продолжительности периода реабилитации после инсульта. Современные методы оценки и анализа состояния пациента основаны на результатах тестов и доказательствах. FIM предлагает более чувствительную шкалу оценок по сравнению с BI из-за наличия когнитивных элементов и используется во всем мире для оценки во время острой стадии заболевания. Таким образом, это эффективный инструмент для постановки терапевтических целей и оценки результатов реабилитации. Он не только может помочь терапевту в принятии клинических решений, но также функционирует как инструмент для оценки результатов реабилитации. На основе этого теста могут быть определены краткосрочные и долгосрочные планы реабилитации. В конце процесса реабилитации оценка функционального состояния пациента помогает спрогнозировать конкретные долгосрочные реабилитационные планы, которые потребуются пациенту для его возвращения в общество и восстановления качества жизни.

Ключевые слова: инсульт, оценка функционального статуса, реабилитация, функциональная степень независимости и оценка функционального статуса, FIM + FAM.

ДЛЯ ЦИТУВАННЯ

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