

Functional Capacity Scale (FCS) in Nursing Practice

Skala Wydolności Funkcjonalnej (FCS) w praktyce pielęgniarstwa

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Abstract

In the medical practice of a neurological and neurosurgical nurse, the scoring scales are used for measuring the degree of damage (neurological deficit), for the functional assessment of a patient (motor abilities) and for the assessment of the patient's comfort (the effects the illness may have on psyche and the patient's social life).

Recent studies (in the field of neurological and neurosurgical nursing), assessing patient's condition during hospitalization, tend to focus on determining patient's functional capacity in the scope of self care. Self care is related to functional capacity which is patient's ability to act independently in satisfying basic life needs.

Based on rich experience of the Neurosurgery and Neurotraumatology Clinic in Bydgoszcz in the field of assessment of functional capacity in patients with nervous system disorders (subarachnoid hemorrhage, intracranial aneurysm, brain tumour and low back pain), a new scale (FCS) for assessment of these patients was developed. (PNN 2012;1(1):35-40)

Key words: functional capacity scale, neurosurgery, nursing

Streszczenie

W praktyce pielęgniarstwa neurologicznego, neurochirurgicznego skale punktowe (scoring scales), wykorzystuje się do pomiaru stopnia uszkodzenia (określenia deficytu neurologicznego), do oceny funkcjonalnej chorego (przede wszystkim określenia sprawności motorycznej) oraz do oceny jakości życia (aspekty psychosocjalne choroby).

Aktualne badania (z dziedziny pielęgniarstwa neurologicznego i neurochirurgicznego), oceniające stan chorego w okresie hospitalizacji skłaniają się do określenia stopnia wydolności chorego w zakresie samoopieki. Termin ten związany jest z wydolnością funkcjonalną, utożsamianą ze zdolnością do bycia niezależnym i samodzielnym w zaspakajaniu podstawowych potrzeb życiowych.

W oparciu o wieloletnie doświadczenia bydgoskiej Kliniki Neurochirurgii i Neurotraumatologii w ocenie funkcjonalnej chorych leczonych z powodu schorzeń układu nerwowego, zaprezentowana została skala przeznaczona do oceny wydolności funkcjonalnej (FCS) pacjenta z dysfunkcją układu nerwowego (krwotok podpajęczynówkowy, tętniak śródczaszkowy, guz mózgu, zespół bólowy kręgosłupa). (PNN 2012;1(1):35-40)

Słowa kluczowe: skala wydolności funkcjonalnej, neurochirurgia, pielęgniarstwo

Introduction

In the medical practice of a neurological nurse, the scoring scales are used for measuring the degree of damage (neurological deficit), for the functional assessment of a patient (motor abilities) and for the assessment of the patient's comfort (the effects the illness may have on psyche and the patient's social life) [1-5].

Scoring scales for functional outcome are usually universal and may serve for assessing the condition of other patients not only patients diagnosed with a neurological deficit. The Barthel Index (BI) [6] is the old-

est point scale assessing patients' functional capacity. It is used for assessment of patients with hemiparesis. Rankin Scale (RS) [7,8], Functional Independence Measure (FIM) [9,10], Glasgow Outcome Scale (GOS) [11,12], Functional Status Examination (FSE) [13,14] as well as Extended Glasgow Outcome Scale (GOSE) [15,16] and Karnofsky Performance Scale (KPS) [17] are the most common scales used for assessment of patients with nervous system disorders.

Functional Capacity Scale (FCS) was originally designed for functional assessment of patients in

the early period after intracranial aneurysm surgery [18,19]. However, it was also found useful for early post operative assessment of patients with other nervous system disorders.

Two elements significantly related to a post operative patient were taken into consideration during the process of the scale construction:

- characteristics of a post operative patient
- characteristics of the early post operative period

Based on the above mentioned assumptions, FCS allows the assessment of abilities of patients in a particular clinical condition, in the scope of functional outcome and patient's dependence on the nursing team. The deficit in the scope of a given marker is assessed. There are 12 markers in FCS: ambulation [1], alimentation [2], personal hygiene [3], physiological needs [4], life functions measurement –GCS [5], breathing [6], diagnosis [7], pre- and post surgical treatment [8], dressing and drainage [9], acuteness of pain [10], pharmacotherapy [11] and neuropsychological outcome [12]). On observing the patient, and using the markers of this scale, the patient may be ascribed to one of the four nursing groups. Group I (patient does not need assistance) (48 – 40 p.), group II (patient needs assistance) (39 – 31 p.), group III (patient needs significant help) (30 – 21 p.) and group IV (patient needs intensive care) (20 – 12 p.). The scale ranges from 12 to 48 points. Scoring 48 points signifies full functional capacity while scoring 12 points indicates that the patient has considerable functional deficit. Thus the higher the patient scores on the scale the better is their functional capacity. This scale is predominantly for use in the early postoperative period as does not contain any predictors of long term quality of life (e.g. 3, 6, 12 months). It does not contain any typical determinants of the assessment of a widely understood quality of life, which are included in scales such as: *Short Form-36* (SF-36) or *Sickness Impact Profile* (SIP), which assess psycho-social or occupational areas. Criteria and description of each group are shown in table 1 and 2.

Functional Capacity Scale is a typical numeric scale and its structure is similar to other scales which have been described in literature [2,4,6]. A study verifying the psychometric features of the Functional Capacity Scale shows that the scale is reliable and valid and therefore suitable for practical use [20].

The aim of the article was to present original research on FCS conducted by the team of the Neurosurgical and Neurotraumatology Clinic, Collegium Medicum in Bydgoszcz, Nicolaus Copernicus University in Torun, Poland, on patients with nervous system dysfunction (subarachnoid hemorrhage, intracranial aneurysm, brain tumor and spinal pain syndrome).

Functional Capacity Scale – author's original research

FCS was first used at the turn of 2002 and 2003 in a group of 128 patients operated on for subarachnoid hemorrhage resulting from intracranial aneurysm [21]. FCS, Glasgow Coma Scale (GCS) [22], Hunt-Hess Scale (H-H) [23] and Glasgow Outcome Scale (GOS) [11] were statistically analyzed. Statistically significant correlations were found between particular scales for GCS ($r_s=0,83$, $p<0,001$), for H-H ($r_s=0,84$, $p<0,001$) and for GOS ($r_s=-0,86$, $p<0,001$), which indicates that patient's consciousness level and clinical condition influence the final functional outcome in FCS and GOS.

Functional assessment scores for 12 FCS markers obtained in consecutive days after the operation were also statistically analyzed [24]. The study showed that the functional capacity of post operative patients improved with time, which was confirmed by statistical analysis ($p<0,001$). Most of the patients showed deficits in the scope of satisfying physiological needs and performing personal hygiene. In the early post operative period (day 1,3,6 and 9), most of the patients with intracranial aneurysm had considerable functional capacity deficit which resulted in dependence on the nursing team, family and carers. On the day of discharge (the final assessment) patients showed a small deficit in the scope of functional capacity.

In 2004 the researchers received a scientific grant from CM in Bydgoszcz (BW Nr: 59/2004) and conducted a study involving 94 patients, of whom 46 were operated on for brain tumor and 48 for intracranial aneurysm [25]. The aim of the study was to estimate if there is a correlation between the assessments of outcomes of surgical treatment of patients with brain tumor and intracranial aneurysm, from the clinical and nursing point of view. Statistically significant differences were found between the final outcomes of surgical treatment of patients with brain tumor and intracranial aneurysm. Patients with brain tumor had better results in the scope of functional capacity assessed using FCS. Other scales (H-H, GCS, GOS, KPS) and FCS were significantly correlated with one another ($p\leq 0,001$). The above mentioned scales should be used in the process of nursing care planning on the neurosurgical ward.

In 2005 a study involving 58 patients with degenerative changes in the spine was conducted [26]. FCS, FIR [4], Functional Independence Measure (FIM) [27] and Oswestry Low Back Pain Disability Index [28] were correlated. Statistical analysis showed statistically significant correlations between the scales, with the highest coefficient value between FCS and FIM ($r_s=0,52$, $p<0,05$).

Table 1. Functional Capacity Scale (FCS)

Care markers	Group I	Group II	Group III	Group IV
1. Ambulation*	4	3	2	1
2. Alimentation	4	3	2	1
3. Personal hygiene	4	3	2	1
4. Physiological needs	4	3	2	1
5. Life functions measurement – (GCS)	4	3	2	1
6. Breathing	4	3	2	1
7. Diagnosis	4	3	2	1
8. Pre- and post surgical treatment	4	3	2	1
9. Dressing and drainage	4	3	2	1
10. Acuteness of pain**	4	3	2	1
11. Pharmacotherapy	4	3	2	1
12. Neuropsychological outcome***	4	3	2	1

Note. *bed regimen (patient confined to bed) for Group III and IV patients

**unconscious patient (8-3 GCS), in the scope of this care marker he receives group IV

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Grading system:

Group I (patient does not need assistance) – 4 points

Group II (patient needs assistance) – 3 points

Group III (patient needs significant help) – 2 points

Group IV (patient needs intensive care) – 1 points

In the next study, functional capacity assessment was examined in the early post operative period in patients with brain tumor [29]. The aim of the study was to assess functional capacity of patients after brain tumor surgery, to estimate the deficit of functional capacity on the day of discharge from the ward and to look for correlations between particular scales used for the assessment of patients' condition. FCS was used for the early assessment of functional capacity in post operative patients. In order to compare the functional capacity and final outcome of surgical treatment Karnofsky Performance Scale, Functional Index „Repty”, and Glasgow Outcome Scale were also used. The patients showed deficits only in the scope of satisfying physiological needs, performing personal hygiene and acuteness of pain. Spearman rank correlation coefficient for correlation between FCS and FIR was high ($r_s=0,78$) and statistically significant ($p<0,001$), which might have resulted from the similarities in the structure of the scales. Components of FCS are similar to the components of FIR and both scales classify patients to four groups. For GOS ($r_s=-0,49$) and KPS ($r_s=0,56$), correlation coefficients were weaker, but also statistically significant ($p<0,001$).

In 2011 an article about functional capacity of patients in the early period after embolization of cerebrovascular malformations – preliminary findings was presented during 9th Quadrennial Congress of the European Association of Neuroscience Nurses (EANN) in Blankenberge, Belgium [30]. The aim of the study was to assess functional capacity of patients before and after the embolization of cerebral blood vessels mal-

formations in the aspect of nursing care. The research shows that on the day of admission to hospital patients had greatest difficulty performing hygienic activities ($p<0,0001$), satisfying physiological needs ($p<0,0001$) and consuming their meals ($p<0,004$). Headache ($p<0,002$) and poor psychological state ($p<0,0001$) manifesting itself through mild depression constituted other serious problems. After the surgery vast majority of patients were independent in terms of self-care ($p\leq 0,03$). Headache occurred in the case of 21% of patients and psychological state im-

proved only in 34% of patients, which shows that there is a major demand for care in this sphere.

Conclusions

Based on the study and literature it may be stated that FCS for assessment of functional capacity in patients with nervous system disorders:

- is a typical numeric scale constructed similarly to other scales described in literature,
- has got good validity and reliability and criteria accuracy,
- is a practical tool, which means it is easy to apply in clinical practice and enables monitoring of the patient's condition which helps to prepare the care plan for patients with nervous system dysfunctions,
- significantly correlates with other scales used for assessment of functional capacity in patients with subarachnoid hemorrhage, intracranial aneurysm, brain tumor and low back pain, which has been confirmed by our study.

Implications for Nursing Practice

The article shows the author's original results of the study on functional capacity of patients with nervous system disorders in the early post operative period, assessed using standard clinical scales as well as FCS, which determines deficits and need for care and nursing actions. A new tool – FCS – to be used in nursing practice is introduced.

Table 2. Functional Capacity Scale (FCS) – description of the tool

	Care markers	Group I (patient does not need assistance)	Group II (patient needs assistance)	Group III (patient needs significant help)	Group IV (patient needs intensive care)
1.	Ambulation*	Self-dependent	Needs help	Remains in bed, needs no help with changing position	Patient confined to bed, needs help with changing position
2.	Alimentation	Self-dependent	Needs help with solids, has no problems with liquid foods	Needs help with feeding (has a swallowing reflex)	Feeding through gastric tube or parenterally
3.	Personal hygiene	Self-dependent	Self-dependent but needs help outside bed	Needs help in bed	Requires bed bathing and skin care
4.	Physiological needs	Self-dependent	Needs help with getting to the toilet	Uses bedpans and urinals	Catheter, diapers or patient soils himself
5.	Life functions measurement – (GCS)	Basic parameters (pulse, arterial pressure, temperature, GCS) taken twice a day	Basic parameters (pulse, arterial pressure, temperature, GCS) taken more often than twice a day, pupils observation	Basic parameters (pulse, arterial pressure, temperature, GCS) taken more often than twice a day, pupils observation, measurement of ICP	Intensive Observation Sheet, heart action monitoring, measurement of ICP, CVP and vital processes, pupils observation, constant measurement of water and electrolyte balance
6.	Breathing	Regular, independent	With difficulty, no intubation tube, needs periodical suction	Intubated patient or after tracheotomy, needs suction	Patient on respirator
7.	Diagnosis	Basic, planned examinations (MR, angi-MR)	Constantly performed examinations	Constantly performed examinations and additional tests if necessary (CT, MR, RTG)	Full profile of intensive observation
8.	Pre- and post surgical treatment	Preparation as planned, no postoperative complications	Preparation of operation field, secured IV insertion site	Preparation of operation field, secured IV insertion site, central cannulation	Preparation of operation field, secured IV insertion site, central cannulation, measurement of ICP, vital processes and ventricular drainage
9.	Dressing and drainage	Dressings over the IV insertion site	Postoperative dressing	Postoperative dressing, drainage	Other dressings, sucking drainage
10.	Acuteness of pain**	Slight pain, analgesics given as necessary	Oral analgesics	Intramuscular, intravenous analgesics	Constant analgesic infusion
11.	Pharmacotherapy	Oral drugs	Oral, intramuscular and intravenous drugs	Intramuscular and intravenous drugs	Intravenous drugs only, administered through infusion pump, central cannulation
12.	Neuropsychological outcome***	Stable mood	Slightly elevated or lowered mood	Constant depression and tearfulness or long periods of elevated mood	Despair, deep apathy or inappropriate euphoric mood

Note: bed regimen (patient confined to bed) for Group III and IV patients

**unconscious patient (8-3 GCS), in the scope of this care marker he receives group IV

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Limitations to Study

The study shows only the results of early functional capacity, which influence the long-term outcome (e.g. after 3 months, one year or 3 years). Thus the results are starting point for assessment of long-term functional capacity. The study is also limited by the small sample of analyzed cases and it is necessary to continue the research to further verify practical use of the assessment tool as well as to draw precise conclusions. Finally, the results of the study cannot be compared to other authors' reports concerning early assessment (performed during hospitalization).

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