

Screening of cognitive functions
Evaluation of methods and their applicability in neurological rehabilitation

Akademisk avhandling

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av
Caisa Hofgren

Fakultetsopponent
Docent Aniko Bartfai
Rehabiliteringsmedicin, Institutionen för Kliniska vetenskaper, Danderyds Sjukhus,
Karolinska Institutet, Stockholm

Avhandlingen är baserad på följande artiklar:

- I. **Hofgren C**, Esbjörnsson E, Aniansson H, Sunnerhagen KS. Application and validation of the Barrow Neurological Institute Screen for Higher Cerebral Functions in a control population and in patient groups commonly seen in neurorehabilitation. *J Rehab Med* 2007;39: 547-553.
- II **Hofgren C**, Esbjörnsson E, Lundgren-Nilsson Å, Sunnerhagen KS. A comparison between two screening instruments for cognitive function: parallel reliability and linking to the ICF of the Barrow Neurological Screen for Higher Cerebral Functions (BNIS) and the Mini Mental State Examination (MMSE). *Submitted*.
- III **Hofgren C**, Björkdahl A, Esbjörnsson E, Sunnerhagen KS. Recovery after stroke: cognition, ADL function and return to work. *Acta Neurologica Scand* 2007;115: 73-80.
- IV **Hofgren C**, Lundgren-Nilsson Å, Esbjörnsson E, Sunnerhagen KS. Two years after cardiac arrest; cognitive status, ADL function and living situation. *Brain Injury* 2008; 22(12): 972-978.



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Caisa Hofgren, Institute of Neuroscience and Physiology/Rehabilitation Medicine, The Sahlgrenska Academy at the University of Gothenburg, Göteborg, SWEDEN

Abstract

Assessment of cognitive functions is of great importance in neurological clinical settings as well as in rehabilitation. A cognitive screening test is short and comprehensive and can be used in various situations. The Barrow Neurological Institute Screen for Higher Cerebral Functions (BNIS) is a screening method developed for identifying cognitive dysfunction.

The aims of the thesis were (1) to evaluate the psychometric properties of the BNIS and (2) to explore similarities and differences between the BNIS and the Mini Mental State Examination (MMSE) and (3) to use the BNIS in a clinical context and examine patients with different diagnoses commonly seen in neurorehabilitation.

Material and Methods: The BNIS was used in patient populations and also in a control population of healthy adults. Parallel assessments with the BNIS and the MMSE were used and a linking of the BNIS and the MMSE to the WHO International Classification of Functioning, Disability and Health (ICF) was performed. In two follow-up studies the results from the cognitive screening (BNIS) were related to evaluations of neurological status, ADL ability, housing and return to work.

Results: BNIS showed good construct validity as a significant difference (total score and all subscales) between healthy controls and patients was found. A concordance between BNIS and MMSE was shown (Goodman-Kruskal gamma: 0.724, $p \leq 0.0005$), but also evidence that BNIS better discriminated patients who had high (≥ 27 p) scores on MMSE. BNIS was linked to 34 and MMSE to 26 categories of the ICF. Patients with stroke showed a recovery of cognition and ADL function, but 83% still had cognitive dysfunction and 20% were dependent in personal ADL after one year. At three years after discharge 20% had returned to work. Among patients surviving a cardiac arrest 95% had evidence of cognitive dysfunction two years after onset. Sixty-four percent were living in their own home.

Conclusion: The BNIS significantly discriminated between neurological patients and controls. Patients who scored above cut-off on MMSE were better differentiated on BNIS. Cognitive function, assessed with BNIS, was related to ADL function when stroke patients and patients with anoxic brain injury were assessed. Mostly an association between cognition and return to work also was found.

Keywords: cognition, cognitive screening, ADL, stroke, brain damage, ICF, return to work