Psychometric Properties of the Functional Independence Measure (FIM) in Iranian Patients With Traumatic Brain Injury

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Abstract

Background: The functional independence measure (FIM) is a practical tool for the evaluation of motor and cognitive independence, which has been validated in different languages; its Persian version has not been studied so far.
Objectives: In this cross-sectional study, the validity, reliability, and replicability of FIM for Iranian patients with traumatic brain injuries (TBIs) were determined.
Patients and Methods: Forty patients with acute TBI that were hospitalized in emergency ward for evaluation of inter-rater reliability for the test replicability and 185 sub-acute TBI patients that were in the neurosurgery ward of Poursina educational hospital in Rasht were selected in the assessment of other psychometric indices by the consecutive sampling method. The tests used include the FIM for measuring motor and cognitive functioning, the Barthel Index for measuring physical disability, the mini mental state examination (MMSE), and questions on the physical dimension of quality of life in the short form health survey (SF-36) were used. Statistical analyses were performed using Intraclass correlation coefficient (ICC), Cronbach's Alpha and Pearson correlation coefficients, independent t-tests, and hierarchical regression analyses.
Results: The inter-rater reliability was acceptable on admission and at discharge (ICC = 0.779 to 0.895). The internal consistency of FIM and its subscales were excellent ($\alpha \geq 0.97$). The results for criterion validity by adjusting the values of GCS on admission and at discharge showed that the FIM motor dimension could predict a significant proportion of the variance of Barthel index scores; and the physical health components of quality of life and overall physical component of SF-36 (PCS) and FIM cognitive dimension could predict a significant proportion of the variance of MMSE scores (all P < 0.05). FIM and its subscales were correlated with the above variables in expected directions (all P < 0.01). In known-groups validity, patients with physical trauma and cognitive impairment obtained lower motor (t = 2.09, P = 0.038) and cognitive (t = 3.36, P < 0.0001) FIM scores compared to the groups with no physical trauma or cognitive impairment.
Conclusions: This Persian version of the FIM can be used as a valid, reliable, and replicable instrument for research and rehabilitation purposes in TBI patients.

Keywords: Traumatic Brain Injury, Psychometrics, Disability Evaluation, Cognition

1. Background

Patients who survive traumatic brain injuries (TBIs) often suffer from high levels of physical, cognitive, and behavioral symptoms that can severely affect their quality of life (1). The majority of TBI survivors are young and at active working age; thus, long-term disabilities can reduce their participation in social activities and cause high social and economic costs. These patients are often referred to rehabilitation centers to reduce their level of morbidity, improve their functional outcomes such as daily activities, and facilitate their transition from medical centers to home environments and access to self-care (2). The lifetime costs of TBI are high, and the influence of an effective treatment for this devastating disorder is economically remarkable not only for the patients' families but for society and the overall health care system (3).

One of the most widely accepted tool for measuring the outcome and disability of hospitalized patients and rehabilitation centers is the functional independence measure (FIM). It is the most useful instrument for measuring a patient's performance and the effectiveness of a rehabilitation program; it evaluates daily activities, extensively covering cognitive and motor domains (4). This instrument was devised to solve the problem of the long-term absence of a single method for disability assessment and for creating unified data based on rehabilitation outcomes. FIM is the product of the American association of