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ORIGINAL ARTICLE

Prevalence and Predictors of Personality Change After Severe Brain Injury

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Abstract

Objectives: To investigate the prevalence of personality change after severe brain injury; to identify predictors of personality change; and to investigate whether personality change is associated with distress in family members.

Design: A longitudinal study of personality change.

Setting: Rehabilitation unit.

Participants: The study sample was composed of 22 pairs of patients with traumatic brain injury or nontraumatic brain injury (N = 22) and their significant others (SOs).

Interventions: Not applicable.

Main Outcome Measures: An SO completed the observer version of the NEO Five Factor Inventory rating the patient at discharge from hospital and 1 year after injury. The SOs were also asked to complete the anxiety and depression scales of the Symptom Checklist-90-Revised, rating their own emotional condition and health-related quality of life (HRQOL) as assessed by the 4 mental scales of the Medical Outcomes Study 36-Item Short-Form Health Survey.

Results: Of the sample, 59.1% experienced personality change after acquired brain injury, and the most dominant changes were observed in the personality traits of neuroticism, extraversion, and conscientiousness. Changes in neuroticism were most often observed in patients with frontal or temporal lesions. Generally, personality changes in patients were not associated with more distress and lower HRQOL in family members; however, change in patient agreeableness was associated with lower HRQOL on the role limitations-emotional scale.

Conclusions: Personality change was observed in most patients with severe brain injury. Change in neuroticism was associated with frontal and temporal lesions. Generally, personality change was not associated with more distress and lower HRQOL in SOs.

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It is well recognized by many clinicians working in rehabilitation that personality change is frequent and often disabling after severe brain injury. However, little research has investigated the frequency and extent of personality changes after brain injury. Several articles have described postinjury personality changes,[1-4] but few have investigated personality change using objective and valid personality measures. Only 3 studies[5-7] were identified that actually compared pre- and postmorbid personality after brain injury, and no studies investigated how personality change affects the immediate family.

Kurtz et al[6] used the NEO Personality Inventory-Revised (NEO-PI-R) and found a significant decrease in extraversion based on ratings completed by a significant other (SO) within 30 days after injury and 6 months after injury. A similar methodology was adapted by Tate,[7] who used the Eysenck Personality Questionnaire-Revised. Tate asked SOs to complete preinjury personality assessments about 8 weeks after traumatic brain injury (TBI) and at 2 follow-up assessments: 6 and 12 months postinjury. Follow-up assessments showed a significant increase on neuroticism and a nonsignificant decrease on extraversion. A more recent study has reported preliminary results using the NEO Five Factor Inventory (NEO-FFI), a short version of the NEO-PI-R. An SO completed the preinjury assessment 3 months after TBI and a

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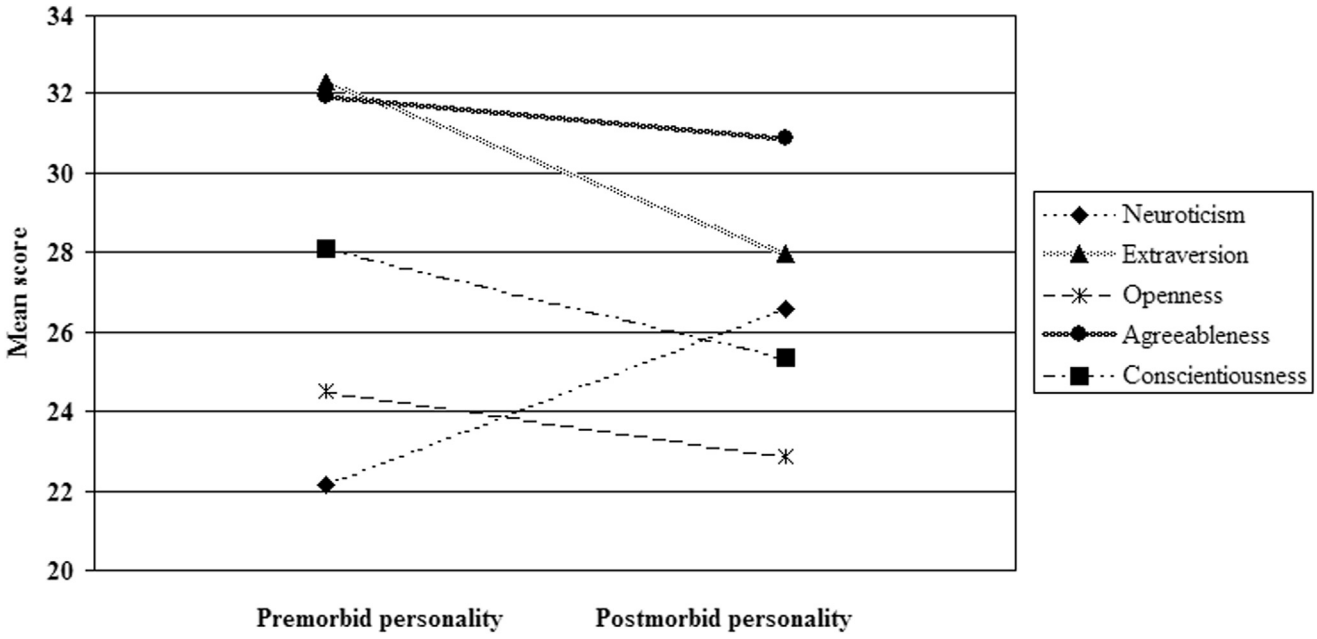

Fig 1 Pre- and postmorbid personality. Mean changes on the pre- and postmorbid ratings are shown.

follow-up assessment at 12 months after injury. The authors reported a decrease from baseline to 12 months postinjury on the extraversion and openness scales, but this decrease was not statistically significant after controlling for multiple comparisons.[5]

All conducted studies were based on relatively small samples. The assessments were conducted with different time intervals after the injury and included patients with mild to severe injuries.

Personality change is often reported by family members,[1-4] and studies have indicated that neurobehavioral or personality change in patients with brain injury is distressing for families,[8-11] resulting in emotional distress, burden, strain, and impaired quality of life.[8-14] Despite these commonly reported complaints, it has not been possible to identify studies that have used objective personality assessment to investigate the association between personality change in the patient and the emotional condition of SOs.

Because of the limited research conducted on personality changes after brain injury, the aim of the present study was to investigate the prevalence of personality change after severe brain injury. The second goal was to identify predictors of personality change. Finally, we aimed to analyze whether personality change is associated with distress in family members 1 year after injury.

Based on the scarce research literature, clinical experience, and anecdotal reports, we investigated the following hypotheses: (1) change in personality structure would be reported for most patients, predominantly on the traits of extraversion and neuroticism; (2) personality change would be associated with TBI etiology; (3) personality change would be associated with frontal and/or temporal lesions, and (4) SOs of patients with personality changes would be more distressed and have lower quality of life 1 year after injury.

List of abbreviations:

HRQOL	**health-related quality of life**
NEO-FFI	**NEO Five Factor Inventory**
NEO-PI-R	**NEO Personality Inventory-Revised**
RCI	**Reliable Change Index**
SF-36	**Medical Outcomes Study 36-Item Short-Form Health Survey**
SO	**significant other**
TBI	**traumatic brain injury**

Methods

Procedure

SOs of patients with severe brain injury admitted for subacute rehabilitation consented to participate in a longitudinal study. (Details are thoroughly described elsewhere.[15]) All patients had a severe TBI or non-TBI indicated by a Glasgow Coma Scale score in the range of 3 to 9 after ending sedation. Patients were discharged from rehabilitation at a mean of about 4 months after injury, and the SOs were asked to complete ratings of the patient's personality at this time and 1 year after injury. At the follow-up assessment, the SOs also completed measures of their own anxiety, depression, and health-related quality of life (HRQOL).

The Committees on Biomedical Research Ethics of the Capital Region of Denmark and the Danish Data Protection Agency approved this study.

Participants

The study sample comprised 22 pairs of patients with TBI or non-TBI and their SOs. The SOs completed the pre- and postinjury NEO-FFI, Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36), and Symptom Checklist-90-Revised. The SOs had a mean age of 49.7±12.8 years and were mostly women. Most patients were men with a mean age of 43.6±22.35 years (table 1).