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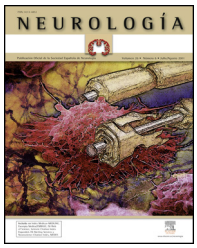

ORIGINAL ARTICLE

Functionality predictors in acquired brain damage☆

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KEYWORDS
Functionality;
Acquired brain injury;
Hemispheric specialisation;
Right hemisphere;
Left hemisphere;
Functional independence

Abstract
Introduction: Most individuals who have survived an acquired brain injury present consequences affecting the sensorimotor, cognitive, affective or behavioural components. These deficits affect the proper performance of daily living activities. The aim of this study is to identify functional differences between individuals with unilateral acquired brain injury using functional independence, capacity, and performance of daily activities.
Method: Descriptive cross-sectional design with a sample of 58 people, with right-sided injury ($n = 14$ TBI; $n = 15$ stroke) and left-sided injury ($n = 14$ TBI, $n = 15$ stroke), right handed, and with a mean age of 47 years and time since onset of 4 ± 3.65 years. The functional assessment/functional independence measure (FIM/FAM) and the International Classification of Functioning (ICF) were used for the study.
Results: The data showed significant differences ($P < .000$), and a large size effect ($d_r = 0.78$) in the cross-sectional estimates, and point to fewer restrictions for patients with a lesion on their right side. The major differences were in the variables 'speaking' and 'receiving spoken messages' (ICF variables), and 'Expression', 'Writing' and 'intelligible speech' (FIM/FAM variables). In the linear regression analysis, the results showed that only 4 FIM/FAM variables, taken together, predict 44% of the ICF variance, which measures the ability of the individual, and up to 52% of the ICF, which measures the individual's performance. Gait alone predicts a 28% of the variance.

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Conclusions: It seems that individuals with acquired brain injury in the left hemisphere display important differences regarding functional and communication variables. The motor aspects are an important prognostic factor in functional rehabilitation.

PALABRAS CLAVE
Funcionalidad;
Daño cerebral adquirido;
Especialización hemisférica;
Hemisferio derecho;
Hemisferio izquierdo;
Independencia funcional

Predictores de funcionalidad en el daño cerebral adquirido

Resumen
Introducción: La mayoría de las personas que han sobrevivido a un daño cerebral presentan secuelas que afectan a componentes sensoriomotores, cognitivos, emocionales o conductuales. Estos déficits repercuten en la correcta ejecución de actividades de la vida diaria. El objetivo de este estudio es identificar diferencias funcionales entre personas con daño cerebral adquirido (DCA) unilateral, mediante la independencia funcional, la capacidad y la realización de las actividades cotidianas.
Método: Diseño transversal descriptivo con una muestra de 58 personas con lesiones derechas ($n = 14$ TCE, $n = 15$ ECV) e izquierdas ($n = 14$ TCE, $n = 15$ ECV), diestros, con una media de edad de 47 años y una media de 4 ± 3.65 años de evolución. Las medidas utilizadas fueron la FIM FAM y la CIF.
Resultados: Los datos apuntan hacia la existencia de diferencias significativas ($P < 0.000$) y un elevado tamaño del efecto ($d_r = 0.78$) en las estimaciones transversales, otorgando una menor restricción en la participación en las personas con lesión derecha. Las diferencias más destacadas se encuentran en las variables ''recepción de mensajes hablados'', ''escritura'' y ''habla inteligible''. Al hacer una regresión lineal, los resultados muestran que solo 4 variables de la FIM FAM predicen, en su conjunto, un 44% la variancia de la CIF que mide la capacidad del individuo y hasta un 52% de la CIF que mide la realización del sujeto. Tan solo la marcha predeciría un 28% de la variancia.
Conclusiones: Se sugiere que las personas con DCA en el hemisferio izquierdo presentan importantes diferencias en variables funcionales y de la comunicación. Los aspectos motores representan un gran factor pronóstico para la rehabilitación funcional.

Introduction

Acquired brain damage (ABD) is defined as an injury to the brain that occurs unexpectedly. The most recent data from Spain's National Statistics Institute[1] show that there are 420,064 people with ABD living in Spain. A high percentage of cases (78%) were caused by stroke. Most patients who have survived an ABD present consequences affecting the sensorimotor, cognitive, affective, or behavioural components. These deficits directly affect occupational performance of activities of daily living (ADL).[2] The patient's normal activities will not be carried out in the same way, and participation in these activities is reduced and may cease entirely. Therefore, one of the main targets of rehabilitation is achieving as much patient independence as possible, in both the home and community settings.

Some of the most frequently described impairments arising from unilateral brain injury are aphasia, apraxia, and right-sided motor limitations due to left hemisphere damage (LHD), and left-sided visuospatial impairments, hemineglect, and motor impairment due to right hemisphere damage (RHD).[3–5] These deficits have unequal effects on a person's daily activities. Both lesions cause emotional and affective consequences. Titus et al.[6] studied performance of ADL, although in a small selected sample ($n = 25$) from one hospital including patients with cerebrovascular disease (CVD). Their performance was compared to results from patients with LHD and RHD. Both patient groups displayed deficits in the performance of ADL without any statistically significant differences between the two. However, results did show that deficits in patients with RHD mainly affected visuospatial perception, whereas patients with LHD had performance deficits. In 2011, a study conducted at the University of New Mexico[7] included a control group of healthy adults ($n = 63$) and a patient group with CVD in 2 subgroups by location: RHD ($n = 16$) and LHD ($n = 30$). Results for the LHD group showed aphasia as well as decreased independence; these patients needed more time to complete the task and their motor performance was poorer than the RHD group's. Both groups showed cognitive and motor impairments, but these were more pronounced in the LHD group. However, this study presents significant limitations, such as the context for performing functional tasks, which is far from real world. This factor might negatively impact performance by any of the groups.

As Bausela mentioned, Goldberg and Costa[8] consider that the left hemisphere is more able to apply previously acquired codes, that is, completing tasks that are familiar or acquired, as in the case of ADL. From this, we extrapolate that a fully functioning left hemisphere can enable greater