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Research Paper

Factors associated with return to work in men and women with work-related traumatic brain injury

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Abstract

Background: Symptoms that persist subsequent to a work-related traumatic brain injury (wrTBI) influence the ability to return to work (RTW) and indicate areas of functional disability, as classified in the International Classification of Functioning, Disability and Health (ICF) framework.

Objective: The purpose of this study was to describe the relationship between RTW status and ICF framework domains in men and women with a wrTBI.

Methods: A retrospective chart review of 209 consecutive workers with TBI (mild TBI: 71.8%; mean age: 40.2 ± 11.1, men: 71.3%) was conducted. Workers were assessed during the chronic post-injury phase, at the neurology service of a large rehabilitation hospital in Ontario, Canada in 2003. Frequency distributions were calculated and chi-square tests performed.

Results: At the point of assessment, 78.0% of workers were in receipt of disability benefits, while the remainder had returned to work on a full- or part-time basis. Significant differences were observed in the Body Functions and Structures domain of the ICF model, specifically clinical diagnoses of depression, anxiety, pain disorders; self-perceived cognitive disturbance, and certain psychosocial factors ($p < 0.05$), between workers who had returned to work and those who had not. When stratified according to sex, these associations remained significant only in men.

Conclusions: The factors outlined above should be subject to further TBI research, as indicators for RTW. The lack of significant findings in women warrants further exploration of variables within the physical and social environmental domains of the ICF.

Keywords: Occupational injury; Head trauma; Sex differences; Occupational outcomes

Traumatic brain injury (TBI), defined as "an alteration in brain function, or other evidence of brain pathology, caused by an external force," is a global health issue.[1,2] It affects over 10 million people annually, surpassing the prevalence of several other significant disorders, such as human immunodeficiency virus and multiple sclerosis, combined.[2] The leading causes of TBI are falls, being struck by an object, and motor vehicle accidents.[3] The short- and long-term consequences of a brain injury of any severity can be heterogeneous and complex, impeding the physical, cognitive, and psychosocial status of those affected and reducing their participation in all areas of life (i.e., family, social, and productive activities).[4–6]

In Ontario, a review of the Ontario Trauma Registry revealed that there was a 12.4% increase in the incidence of work-related TBI (wrTBI) between 1993 and 2001.[6] More recently, the 2013 statistical report generated by the Workplace Safety and Insurance Board (WSIB) in Ontario found that the number of injuries coded as "concussion" increased from 0.6% in 2002 to 3.3% in 2013, and in injuries classified according to body part, the proportion of

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injuries that affected the cranial region increased from 1.9% in 2002 to 4.2% in 2012 across all industrial sectors.[7,8] These injuries influence the injured worker's capacity to return to any employment subsequent to reaching a plateau in recovery, which has a direct impact on the vocational and financial stability of those injured.[6,9–11] It also affects social security, due to loss of productive activity and long-term disability.[12,13] Therefore, return to work (RTW) is one of the most important outcomes following a TBI.[12,13]

Due to the heterogeneity of TBI, it has been difficult to study the determinants of vocational outcomes across injury severities.[12] Among the numerous studies that have examined the predictors for RTW subsequent to TBI, consistently reported indicators for RTW included sociodemographic (i.e., age at the point of injury), injury-related (i.e., mechanism of injury), and psychosocial (i.e., depression, relationship with work peers, and social adaptive skills) factors.[5,14–16] On the other hand, variables that remain unclear as indicators for RTW include sex, level of education, and prior history of neurological or psychiatric disorders.[15–17] In a previous study, a model featuring education, extracranial injury, and levels of post-concussion symptoms (i.e., depression, pain) as predictors of full return to work at 6 months post-injury has been proposed.[18] In addition, Nolin and Heroux observed a relationship between the number of self-perceived symptoms and RTW following TBI.[19] Finally, public insurance or litigation involvement has been reported to be a predictor of RTW in those with mild TBI (mTBI).[15,20] More recently, the Transforming Research and Clinical Knowledge in TBI have begun to validate three existing models of outcome prediction following an mTBI.[21] Researchers reported that the existing predictive models were not able to predict outcomes in mTBI and pointed to the need for more studies to better understand the role of different factors in RTW after TBI.[21]

Literature exploring sex differences in TBI outcomes is limited. In particular, women's traditional inequalities and disadvantages in access to and control of resources resulted in the present scarcity of data on women, in particular women with TBI. An awareness of how outcomes vary or are similar by sex is critical to support more rigorous, more ethical, and more innovative rehabilitation interventions. This view is evident in the recent series of international policy statements, which call for a systematic incorporation of sex in research, analysis, and implementations of findings.[22,23] With respect to TBI, men are more likely to sustain TBI relative to women across all age groups, and exhibit higher rates of TBI-related hospitalization and emergency department attendance.[24] In addition, Farace and Alves reported that women present with lower rates of postinjury survival and poorer overall functional outcomes relative to men.[25] Colantonio and colleagues studied individuals with wrTBI and found that the factors that impacted daily functioning differed between sexes; sensitivity to noise and sleep disturbances exerted a greater impact on functioning in men, while women reported lack of initiative and need for supervision as the most burdensome issues.[26]

The World Health Organization's International Classification of Functioning, Disability and Health (ICF) outlines disability as a complex construct with three dimensions: Body Structure and Function (and impairment), Activity (and activity restrictions), and Participation (and participation restrictions).[27] Employment is a major constituent of the ICF Activity and Participation domain; therefore, RTW is a key TBI component and outcome measure.[14,27] To date, studies have identified a number of diverse factors have been associated with successful RTW status following wrTBI[28]; these factors include, but are not limited to, age at the point of injury, severity of TBI, educational level, pre- and postinjury occupational status, presence of depression and anxiety, and sex.[28,29] However, there is a lack of a comprehensive framework and terms used to examine these factors with respect to RTW after TBI.[28] Despite the recommendation to use the ICF as a tool to examine this topic, there is a paucity of systematic studies conducted to examine the factors associated with RTW within each domain of the ICF framework.[28] Therefore, the aim of this study is to examine the relationship between RTW status and factors within the domains of the ICF framework (i.e., Body Structure and Function, Activity and Participation) through a sex lens. Based on previous research findings, we hypothesized that: (1) associations would exist between RTW and the Body Structure and Function domains of the ICF; (2) RTW status would be associated with the Activity and Participation domain of the ICF; and (3) the associations between RTW status and variables within the domains of the ICF framework would be subject to sex differences.

Methods

Study population and design

The study was approved by the ethics committee at the institution with which the authors were affiliated. The study complied with the principle of the Declaration of Helsinki. A retrospective chart review was conducted and included a consecutive sample of workers referred to the neurology service at a hospital by the Workplace Safety and Insurance Board (WSIB), for assessment in 2003. Since 1998, the neurology service has had a contractual agreement with WSIB to provide expert diagnostic opinions, recommendations for treatment, and continued case management for workers who have or are suspected to have sustained a head injury at work and have not returned to work within 3 months. The majority of head injury referrals are classified as "mTBI/concussion" according to the following criteria: loss of consciousness for 30 min or less, an initial Glasgow Coma Scale score of 13–15, and posttraumatic amnesia for no more than 24 h.[30]