Work-related Traumatic Brain Injury

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Improvement of Quality of Life of Adults with Acquired Brain Injury (ABI)

Collaborative Links:
- Local
- Provincial
- National
- International

Intervention Studies

ABI in the Population

Providers

Consumers / Caregivers

Trainees, staff

Gender Issues

Knowledge Transfer

Aging with TBI
Definition of TBI

“An alteration in brain function, or other evidence of brain pathology, caused by an external force…”

Brain Injury Association of America
Acquired Brain Injury

TRAUMATIC
- Open
- Closed

NON-TRAUMATIC
- Anoxia
- Aneurysms
- Brain Tumors
- Encephalitis
- Meningitis
- Metabolic Encephalopathy
- Stroke with Cognitive Disabilities
Traumatic Brain Injury

More common than breast cancer, spinal cord injury, HIV / Aids and multiple sclerosis combined
Traumatic Brain Injury Statistics

International Brain Injury Association:

- Leading cause of death and disability for persons under age 50.
- Injuries to the brain are among the most likely to result in death and permanent disability.

Canadian Institute for Health Information:

- Direct costs - 151.7 million
Consequences of TBI

- **Cognition**: concentration, memory, judgment, communication.
- **Movement abilities**: strength, coordination, balance.
- **Sensation**: tactile sensation, special senses such as vision.
- **Emotion**: instability, impulsivity, mood
- **Work**: can lead to profound disruption in lives of workers.
TBI and Employment

• Associated with lost wages, unemployment and disability.

• Traumatic brain injury represents a large number of serious or fatally injured workers.

• Approx. half of all Canadian workplace fatalities involve a brain injury (Tricco et al., 2006).

• Work related TBIs in Ontario are
Work Related TBI
Rationale

• Wide range of study on various aspects of severe and fatal WrTBI, but a paucity of research that includes all levels of severity

• WrTBI can lead to some of the longest layoffs and highest claim costs, and rehabilitation of victims has proven to be difficult.

• WrTBI is an often overlooked occupational health issue.
Examining Occupational Traumatic Brain Injury in Ontario

Funded by the Ontario Neurotrauma Foundation
Work Related TBI

Aim

• To examine factors associated with WrTBI that can assist stakeholder organizations with better prevention and treatment of WrTBI.

• To examine WrTBI outcomes across all severity levels.

• To examine factors and likelihoods associated with different mechanisms of injury, industry sectors, severity of injury, and economic burden with regard to claim costs.

• To present these findings to, and work with those organizations and individuals that can assist with prevention of WrTBI (Colantonio et al., 2010).
Over 1500 Ontario WSIB claims that were internally coded by the WSIB as either ‘intracranial injury’ or ‘concussion’ examined.

1006 eligible, exclusions due to miscoding or insufficient medical information.

Data abstraction and analysis.
Demographic
- Age
- Gender
- Occupation

Injury
- Mechanism of injury
- Part(s) of body injured
- Severity of injury
- Claim and health care costs
- Lost time from work
Limitations of Data

- WSIB covers only 70% of workforce.
- 'Head' codes only, 'Multiple' codes not examined.
Work Related TBI

RESULTS
Significantly higher percentage of females when compared to studies focusing on more serious injuries.
WrTBI and Gender – Percentage of Male and Female Workers by Age Groups

- Opposite trends in age groupings - younger males and older females.
- p-value = 0.02
WrTBI and Age
WrTBI and Age – Mechanism of Injury

• ‘Struck By/Against’ most common injury type.

• Older workers most likely to be injured in a fall.

• Younger workers more likely to be injured by ‘Struck By/Against’.

• p <0.001
WrTBI and Age – Time of Injury

- All age groups most likely to be injured during the morning hours.
- Older workers suffering the most afternoon injuries.
WrTBI by Month of Injury
Mechanism of Injury

- Most common injury types: ‘Struck By/Against’ and ‘Falls’.

Falls considerably more likely to occur in winter.

P-value < 0.0001
Factors Associated With Over 2 Months Lost Time

• Older age
• Speak French or languages other than English
• Work in construction industry
• Paid by commission / piecework
Factors Associated With Higher Total Costs

- Older age
- Male
- Work in construction industry
- Paid by commission / piecework
- Injury to multiple parts of body
- Injured in a fall
Risk Factors for WrTBI

Men

- Working full time in construction, primary industry, trades and transport.
- Younger.
- More likely to be struck by or against object. Likely to be more seriously injured.
- Incur higher claim costs and longer layoffs.
Risk Factors for WrTBI
Women

• Working in government services, business and finance, sales and service.
• Older.
• More likely to be injured in a fall.
• Higher skill level overall than that of men.
• Likely to be injured in winter.
• Less seriously injured.
• Incur lower claim costs and shorter layoffs.
Recurring trends that may be insignificant statistically, but are nonetheless noteworthy:

• Home care / long term nurses, police officers, and teachers being assaulted.

• Home care nurses, drivers and letter carriers slipping on icy terrain.

• Office workers and machine operators striking their head against workstation/machine.

• Tradesmen and general labourers falling from scaffolds, ladders and truck beds.

• Younger workers being involved in motor vehicle crashes.
WrTBI In Construction

Colantonio et al., 2009
Rationale

- Work related brain injuries in construction sector lead to some of the highest claim costs and longest layoffs due to injury.

- Wide range of study on WrTBI, but none focusing on the construction industry in Canada.

Aim

- To provide a more in-depth examination of WrTBI in the construction industry across all levels of injury severity.
WrTBI In Construction

Method

• WSIB claim files from 2004-05 examined.

• Focus only on TBI claims from one of WSIB’s construction rate groups.

• Descriptive, bivariate, and multivariate analyses performed.
WrTBI In Construction

RESULTS
• Most injuries occurring in the summer months.
• Second peak in October, possibly due to pressure to complete jobs before the difficult winter months.
## WrTBI In Construction

<table>
<thead>
<tr>
<th>Hours</th>
<th># of TBIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00-9:59</td>
<td>21</td>
</tr>
<tr>
<td>10:00-10:59</td>
<td>21</td>
</tr>
<tr>
<td>11:00-11:59</td>
<td>24</td>
</tr>
<tr>
<td>12:00-12:59</td>
<td>9</td>
</tr>
<tr>
<td>13:00-13:59</td>
<td>19</td>
</tr>
<tr>
<td>14:00-14:59</td>
<td>14</td>
</tr>
<tr>
<td>15:00-15:59</td>
<td>22</td>
</tr>
<tr>
<td>16:00-16:59</td>
<td>6</td>
</tr>
<tr>
<td>17:00-17:59</td>
<td>8</td>
</tr>
</tbody>
</table>

- TBI most likely to occur in the morning.
- Second peak in the late afternoon.
WrTBI In Construction

Mechanism of injury by age group in construction

- Younger workers more likely to be struck by/against object.
- Older workers more likely to be injured in a fall.
WrTBI In Construction – Job Type

- Most helpers / labourers younger.
- Other types – more experienced tradesmen.
• Those under 45 years of age significantly more likely to be injured in the morning.

• Those over 45 years old exhibit similar risk throughout the day, with a mild peak in the late afternoon.
WrTBI In Construction – Risk Factors

• Early in work week.
• Morning hours.
• Summer months and October.

Older Workers
• Fall type injuries.
• Experienced tradesmen.

Younger Workers
• Struck by / against injuries.
• Trades helpers and labourers.
Conclusion

• Rates of WrTBI in Ontario have doubled from 1996 to 2004 according to WSIB numbers.
• WrTBI is one of the most costly and damaging injury types.
• Strong age and gender related patterns.
• Risk factors identified for various industry sectors and job types.
• Grand scope for prevention of WrTBI.
Future Endeavors

• Transfer findings to stakeholder organizations in order to better prevent injuries.

• Identify and examine other aspects of WrTBI in order to assist with and build upon current research.
Future Directions

Please assist us by posing any questions or making any comments you might have.

- What prevention strategies should be employed?
- What areas of WrTBI should be explored in the future?
- Which practical solutions can be drawn?
- How does this research harmonize with your goals as a stakeholder organization?
- What kind of work can be done to achieve the greatest tangible results?
Mild to Moderate Work-related Traumatic Brain Injury: A Pilot Study


University of Toronto, Toronto Rehabilitation Institute-UHN (TRI), DRDC Toronto, Laurentian University, Lakehead University, Toronto Western-UHN, Infrastructure Health & Safety Association, Public Services, Health & Safety Association, Ontario Network of Injured Workers Group
What are the individual, social and environmental factors associated with successful return to work for persons who have sustained a Work-related Traumatic Brain Injury (WrTBI)?
Methods

• Retrospective cohort design/ telephone interview

• Participants were recruited from a consecutive non-random sample of individuals who:
  – Had sustained a mild to moderate WrTBI.
  – Were referred to the Neurology Services specialty clinic at TRI by the Ontario WSIB.
  – Underwent a comprehensive assessment by the Neurology Assessment team and were discharged between 2007-2009.
Most Common Perceived Factors that Facilitated RTW (unpublished preliminary results)

<table>
<thead>
<tr>
<th>For RTW Only (n=25)</th>
<th>% Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support of Family/Friends</td>
<td>92</td>
</tr>
<tr>
<td>Support of Treatment Providers</td>
<td>80</td>
</tr>
<tr>
<td>Job Modifications/Employer Accommodation/Gradual Return (modified hours)</td>
<td>76</td>
</tr>
<tr>
<td>Medications</td>
<td>72</td>
</tr>
<tr>
<td>Partial Recovery from Injury</td>
<td>72</td>
</tr>
<tr>
<td>Support of Co-workers</td>
<td>68</td>
</tr>
<tr>
<td>Workplace Commitment to Health and Safety</td>
<td>64</td>
</tr>
<tr>
<td>Support of TRI Neurology Team</td>
<td>56</td>
</tr>
<tr>
<td>Early Contact from Employer</td>
<td>48</td>
</tr>
<tr>
<td>Access to RTW Planners/Coordination</td>
<td>44</td>
</tr>
<tr>
<td>Supervisor Trained in RTW Planning</td>
<td>44</td>
</tr>
</tbody>
</table>
### Barriers for RTW/Reasons for Not Returning to Work

<table>
<thead>
<tr>
<th>Reason</th>
<th>Combined (n=51): %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty thinking and concentrating</td>
<td>92</td>
</tr>
<tr>
<td>Fatigue/reduced tolerance and endurance</td>
<td>92</td>
</tr>
<tr>
<td>Pain</td>
<td>84</td>
</tr>
<tr>
<td>Headaches</td>
<td>83</td>
</tr>
<tr>
<td>Sleep Disturbance</td>
<td>81</td>
</tr>
<tr>
<td>Dizziness or balance problems</td>
<td>79</td>
</tr>
<tr>
<td>Emotional/psychological issues</td>
<td>73</td>
</tr>
<tr>
<td>Weakness</td>
<td>71</td>
</tr>
<tr>
<td>Physical impairment</td>
<td>65</td>
</tr>
<tr>
<td>Job is too physically demanding</td>
<td>63</td>
</tr>
<tr>
<td>Ability to communicate</td>
<td>50</td>
</tr>
<tr>
<td>Weight gain</td>
<td>42</td>
</tr>
<tr>
<td>Unsupportive employer</td>
<td>37</td>
</tr>
<tr>
<td>Transportation difficulties</td>
<td>31</td>
</tr>
<tr>
<td>Job has changed or no longer exists</td>
<td>25</td>
</tr>
<tr>
<td>Unsupportive coworkers</td>
<td>19</td>
</tr>
</tbody>
</table>
Discussion

Findings suggest that after mild to moderate TBI, RTW may be facilitated through the use of job modifications, effective communication with employers, and any strategies that may positively impact on the TBI survivors' emotional well-being, and cognitive abilities.
Next Steps

• More research on accommodations for persons with cognitive disability

• Larger scale study across sectors

• Intervention studies/innovations using technologies?
American Congress of Rehabilitation Medicine
International Task Force on
Girls and Women with ABI

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Girls and Women with TBI blog
www.yojajhealth.blogspot.ca
ABI Dataset

First population based data set capturing continuum of care for both traumatic and non-traumatic brain injury
Research Informed Theatre

Based on focus groups with consumers, family members and health care providers

AFTER THE CRASH, performed by the Ruckus Ensemble: www.ruckusensemble.com
iDAPT: Innovative Technology for People in Challenging Environments
Geoff Fernie, PI.
Thank You

Thanks to everyone for attending!

The findings of this study do not reflect the reviews of the Toronto Rehabilitation Institute or the Workers Safety and Insurance Board.