

**RAPID REPORT**

# Traumatic brain injury and justice-involved men in Canada: strategies and implications

Matthew S. Johnston<sup>1</sup>, Rosemary Ricciardelli<sup>1,\*</sup>

<sup>1</sup>Fisheries and Marine Institute, Memorial University of Newfoundland, St. John's, NL A1C 5R3, Canada

**\*Correspondence**

ricciardell@mun.ca;  
rose.ricciardelli@mi.mun.ca  
(Rosemary Ricciardelli)

**Abstract**

Recent longitudinal evidence reveals how sustaining a traumatic brain injury (TBI) increases risk for criminal justice involvement, including incarceration for serious or chronic offending (*i.e.*, violent crime). In 2016, researchers from Correctional Service Canada (CSC) found between 01 July 1997 and 31 March 2011, the incidence of incarceration was higher among federally sentenced incarcerated people with prior TBI; in their sample, both men and women with TBI were approximately 2.5 times more likely to be incarcerated than men and women without TBI. More research is needed to understand how TBI may be related to neurodiversity and shape pathways to criminal justice system involvement, particularly among men who do not identify as White; for example, in 2020/2021, Indigenous men made up 32% of male admissions to federal custody in Canada. Engaging 11 reports produced by CSC which examine rates of TBI and other related factors among incarcerated people, as well as select international literature on TBI and the criminal justice system, our rapid report seeks to explicate the potential relationship between TBI, neurodiversity, and men as evidenced among federally incarcerated men in Canada. Policy, training, education, future areas of inquiry and practical implications for correctional services are discussed.

**Keywords**

Traumatic brain injury; Neurodiversity; Incarcerated people; Correctional Service Canada; Mental health

## 1. Introduction

In the current article, we examine the high prevalence of traumatic brain injury (TBI) among federally incarcerated populations in Canada, particularly men, and based on existing data, make recommendations for Correctional Service Canada (CSC) to consider concerning practice, training, education and future research. We argue the relationship, likely based in endogeneity, has largely been omitted from scholarship and consideration, and thus our intention is to increase knowledge and consideration of the relationship between TBI and incarceration.

The estimated global lifetime prevalence of a TBI is 3.49%, yet in terms of admissions to federal custody in Canada, the prevalence of sustaining at least one TBI has been estimated to be 5.2% among men and women [1]. TBI is a major cause of long-term disability and death, with broad additional effects that include behavioural changes and cognitive impairment [2–4]. Some behavioural consequences of TBI may include aggression and impulsivity, both increasing risk for people to become involved with the criminal justice system [5]. This risk is substantiated by data showing the lifetime prevalence of TBI among residents of prisons is substantially higher than prevalence in the general population [6, 7], including in Canada

[8, 9]. For example, in their review of administrative health records obtained from a cohort of 1.418 million young adults (aged 18–28 years) living in Ontario, Canada who were followed from a period of 1997–2011, as well as records of incarceration history obtained from CSC, researchers found the incidence of federal incarceration (sentence of two or more years) was significantly higher among people with prior TBI when compared to those without a prior TBI [1]. Both men and women who sustained a TBI were approximately 2.5 times more likely to be incarcerated than men and women who had not sustained a TBI [1].

More research is required to examine how TBI may shape criminal justice system involvement, particularly among men who do not identify as White (*e.g.*, Indigenous), as in 2020/2021, Indigenous men comprised 32% of male admissions to federal custody in Canada [10]. Engaging 11 CSC produced reports, each examining rates of TBI and other co-morbidities among incarcerated people, as well as international literature on TBI within the criminal justice system, our rapid report explicates the potential relationship between TBI, neurodiversity, and men as evidenced among federally incarcerated men in Canada. We find TBI is under-recognized as a leading mental health disorder instigator among federal prisoners in Canada and

practical and programmatic responses to this phenomenon have been limited.

## 2. TBI, neurodiversity, and impacts on the criminal justice system: international perspectives

Consistent with other presentations of neurodiversity (e.g., Autism, Attention Deficit Hyperactive Disorder (ADHD)), TBI too is considered a form in itself although also associated with other forms of neurodiversity [11]. Neurodiversity, an umbrella term, refers to how people experience and interact with the world in different ways that are neither “right” nor “wrong”, and thus should not be understood as cognitive “deficits” [12]. The neurodiversity social justice movement challenges the medical model’s discourses and is premised on the idea that neurodivergent individuals do not have mental health “disorders” or inferior ways of thinking, but rather they think differently [13]. Though people are marked by variation in neurocognitive functioning, only some forms of neurocognitive functioning are considered “normal” or neurotypical; many others forms become subject to censure, discrimination or pathologization [13]. Proponents of neurodiversity tend to view society as at fault for labelling neurodiverse people as “disordered” requiring a “cure” and for structurally implementing discriminatory obstacles in societies that inhibit neurodiverse acceptance, inclusion, and growth [14].

The politics of neurodiversity and critical disability studies movements remain a praxis for situating and engaging non-conforming identities and ways of being and thinking that tend to encounter discrimination across areas of today’s world [15]. Those experiencing TBI continue to be over-represented in prisons and criminal justice systems; places that tend to exacerbate rather than mitigate the cognitive, behavioural and social harms that can accompany TBI [16]. In reviewing studies on the history of TBI among prison populations largely in Australia, Europe and the United States, researchers found prevalence rates of the history of TBI ranging from 9.7%–100%, with an average of 46% in a total prison population of 9342 [16]. Here, most were men with the average age of 37 [16]. High rates of TBI among a sample of justice-involved women ( $n = 38$ ) in New Zealand were also found at 94.78% [17]. While this study could not discern if criminogenic risk could be determined from the presence of TBI alone [16], other researchers found justice-involved military veterans experiencing TBI and other risks factors (*i.e.*, Posttraumatic Stress Disorder) were at a greater risk for recidivism, including rearrest, revocation and re-conviction [18]. These findings were likely aggravated by how veterans may be particularly avoidant of services and resources that may aid with rehabilitation, despite fear of mental health stigma and social reprisal [19]. In their study of rearrest post release from prison among a cohort sample of incarcerated people in Indiana who were screened using the Ohio State University Traumatic Brain Injury Identification instrument, two researchers found people with TBI were more likely to recidivate sooner than those without TBI [20].

Regarding prison outcomes and management, one study exposed a statistically significant association between TBI and

the increased usage of correctional medical/psychological services (including crisis intervention services), higher recidivism rates, higher rates of in-prison rule infractions, and lower rates of chemical dependency treatment completion [21]. These authors recommended correctional systems consider TBI in the design of prison systems, policies and procedures, and directed future research to “move beyond research that, to date, has focused primarily on prevalence rates and associations between TBI and various selected variables of interest” [21]. To improve the continuity of care and correctional outcomes, they also recognized the need for correctional systems to focus on program development intended to encompass outcome data associated with targeted TBI interventions, including training and education of staff across multiple disciplines and occupational categories [21]. Optimistically, researchers recently found improvements among 50 adult incarcerated men in New Zealand, who had experienced at least one TBI in their lifetime, resulting from their use of calming and distraction strategies learned in a combined Cognitive Behavioural Therapy/Mindfulness Based Stress Reduction Intervention program [22]. We caveat, however, improvements were not sustained at the 12-week follow up assessment [22].

## 3. TBI and related factors in Correctional Service Canada: what we know

CSC has documented the mental health plight of men serving federal sentences in Canada. Researchers identified how, in a sample of 1110 incarcerated men, over 70% met criteria for at least one major mental health disorder (mood, psychotic, substance use, anxiety, eating, pathological gambling, anti-social personality and borderline personality disorders), a much higher statistic when contrasted to the national average of 12.4% in the Canadian general population [23]. Other CSC studies found a decline in the prevalence of mental health disorders with age (lower among men 55 years or older) [24]. One researcher reported the highest prevalence rates among incarcerated men for Axis 1 mental health disorders across Atlantic, Ontario and Pacific Regions were for alcohol and substance use disorders, with rates of diagnoses ranging from 43%–60% [25]. The same study also found over 40% of federally sentenced incarcerated men met the criteria for a mental health disorder diagnosis beyond substance misuse or antisocial personality disorders [25]. In the Prairie Region, one study found federally incarcerated men had elevated rates of alcohol and substance use disorders, as well as anxiety disorders, and 39% of the sample met the criteria for a diagnosis of a mental health disorder other than substance abuse or antisocial personality disorders [26].

CSC’s national mental health survey of 1110 incoming federally sentenced men with Axis 1 mental health diagnoses also had concurrent diagnoses for substance use and personality disorders [27]. These men experience the worse correctional outcomes and highest rates of functional impairment in comparison to incarcerated people without these diagnoses [27]. Earlier, researchers found a diagnosis of a mental health disorder among 202 incarcerated people (185 men) contributed to poorer correctional outcomes (*i.e.*, more minor and major institutional charges, more transfers to voluntary and involun-

tary segregation, more reconviction) when risk factors, age, and substance misuse were controlled—and in light of 61% of the sample having completed a correctional program [28]. This is only slightly lower than the rate of completion for incarcerated people without a mental health diagnosis [28]. Together, these findings implied both effective mental health treatment and interventions, that directly target criminogenic need factors, are needed to improve correctional outcomes and to curb violent, aggressive, anti-social, emotionally reactive and impulsive behaviour in institutional and community settings [28].

Other research conducted by CSC found incarcerated people of colour with concurrent mental health and substance use disorders, both men and women, have comparable outcomes to federally sentenced incarcerated people of all ethnicities with similar mental health disorders [29]. Incarcerated people of colour with substance use problems (whether alone or with concurrent mental health disorders) had more federal sentences, more prior involvement with criminal courts, more returns to custody, and higher rates of institutional charges than incarcerated people with a substance use disorder alone or with neither type of disorder [29]. In terms of treatment and intervention, Farrell MacDonald *et al.* [30] identified 30.4% of incarcerated men and women had an active psychotropic medication prescription (45.7% women; 29.6% men), but there were no practical differences in the prevalence of prescription among Indigenous and non-Indigenous incarcerated people.

Back in 2010, in a study commissioned by CSC, researchers explored the potential link between TBI and substance misuse, given substance misuse exacerbates the brain impairment resulting from the original TBI or TBI incidents [31]. Reviewing the literature, they and other researchers found the coexistence of both substance misuse and TBI were well documented in correctional systems across international jurisdictions [31–33]. Other studies reviewed confirmed the high rate of TBI among adult incarcerated people; for example, one United States study cited found 25%–87% of incarcerated people reported experiencing a TBI [34], and in Australia, one study reported 82% of incarcerated people reported a history of TBI, with 43% of participants reporting four or more occurrences [35]. At the time of publication, researchers believed TBI and associated substance misuse were linked to reduced impulse control and aggressive tendencies that play a role in violent and disruptive behaviour, and thus may increase risk of involvement in criminal activities [31, 32, 36]. Other behavioural challenges associated with TBI, such as attention and memory deficits, irritability, anger control, or impulsivity, were found to affect incarcerated people's motivation to engage in rehabilitative and correctional programming [37], strongly suggesting more research is needed to advance the understanding of rehabilitative and programmatic needs among incarcerated people with TBI.

Stewart *et al.* [38] assessed the prevalence of intellectual challenges—which broadly refer to impairment of mental abilities that affect adaptive functioning—among 4396 federally sentenced men in Canada, finding 2.8% of men scored below 70 Intelligence Quotient (IQ), average rates roughly comparable to those in the general population. In this sample, 7.3% of federally sentenced men also scored in the borderline range

(70–79) [38]. There was an association between lower IQ scores and lower educational achievement, unstable employment, substance abuse and symptoms of ADHD [38]. Specifically, incarcerated men with lower IQ had higher overall criminal risk and criminogenic need ratings than those in the unimpaired group [38]. Lower IQ was also associated with more transfers to segregation units and institutional charges, and a lower probability of obtaining discretionary release, suggesting men in federal custody with lower IQs require assistance with educational and employment training and other aspects of community/institutional integration and functioning [38].

Their findings are consistent with other studies, one of which over a 14-month period between 2006 and 2007, studied all incoming incarcerated men at the Regional Reception and Assessment Centre in the Pacific Region of Canada [39]. Researchers revealed 25% of incoming men had some level of cognitive challenge (21% non-Indigenous and 38% Indigenous) [39]. Lower educational achievement, unstable employment history, learning disabilities, and ADHD were also found to be significantly associated with the presence of cognitive challenges and more admissions to segregation units, though level of cognitive challenge was not found to be associated with returns to custody due to offence [39]. While a link from lower IQ to neurodiversity more broadly was examined in this literature (ADHD), more research is needed to examine the potential association between intellectual challenges and TBI among incarcerated population. Some research finds TBI of any severity in early childhood is associated with lower IQ scores that may persist several years postinjury, when compared to typically developing children [40].

#### 4. Discussion and conclusion

Although much of the current analyses of reports center on federally incarcerated men in Canada, our findings may be suggestive of a need to study incarcerated people—men, women, and those identifying as gender diverse—internationally, including the provincial and territorial correctional systems in Canada regarding TBI and neurodiversity. We recognize the prevalence of TBI globally is 3.49% versus the indisputably higher rates in the federal men prison population internationally [1, 6, 7], including an estimated TBI prevalence of 5.2% among federally incarcerated men and women populations in Canada [1]. This finding is a tragedy.

We found the behavioral consequences of TBI, which may include aggression and impulsivity, increase risk of involvement in criminal justice systems and poorer correctional outcomes—as relevant to the current article—for federally incarcerated men (but also women) in Canada [1]. Still, there is an incredible theoretical and empirical void in knowledge concerning how TBI affects and is experienced by incarcerated people. The qualitative dearth of studies on this topic means voices are missed that could untangle the experiences, social contexts and nuances shaping experiences with TBI in criminal justice systems. Thus, we do encourage CSC to commission a qualitative study on TBI among incarcerated people and to encourage a study that extends beyond prevalence. Realistically, our analyses of CSC reports

and gray literature suggest knowledge is limited on TBI at CSC, but the research is preliminary—moving little beyond the complex nexus of how TBI is influenced by so many other mental health factors. Thus, TBI's impacts need to be unpacked qualitatively and quantitatively, centralizing the voices of incarcerated people with TBI, to improve recidivism, institutional behaviour, programmatic goals, and so forth.

Although social justice and critical disability studies movements challenge the medical model's view of impacts of TBI, there are realities that require redress to help incarcerated people with TBI succeed at release and within the society that is prison. More understanding and insight are required that reduces the associated stigma tied to TBI and mental health and instead provide the necessary support to people as a preventative measure to further support people with TBI (even before they experience incarceration or become criminalized). Such actions and knowledge may help reduce the stigma of the label of “disorder”—with disorder recognized as a cluster of symptoms creating intense or persistence distress that, when experienced, can lead to a diagnosis and, as such, may require intervention and treatment [41]. Effective intervention and treatment may help reduce the rates of recidivism among released formerly incarcerated people with TBI [20]. We believe such actions may also reduce the use of correctional/medical services among incarcerated people, rates of in-prison rule infractions, and decrease dependency on chemical treatment while increasing completion of such programming. Said differently, TBI must be centralized in prison programming, design, structures and innovations.

We advocate for more training for correctional staff on TBI, from security to healthcare employees. Moreover, we suggest correctional services also look at more treatment interventions and practices for incarcerated people with TBI, including Cognitive Behavioural Therapy and Mindfulness Based Stress Reduction, which has been found to be partially effective in select jurisdictions (but not with long term impacts that remained at the 12-week reassessment) [21]. Much work and collaboration are necessary in terms of programming for incarcerated people with TBI, and those without (to help them understand the impacts of TBI among other incarcerated people), and for prison staff in all areas of employment. More specifically, one recent scoping review explored the availability and extent of rehabilitation for individuals with TBI who intersect with the criminal justice system and found, across international jurisdictions, opportunity to integrate rehabilitation for justice-involved people, “specifically through TBI screening to facilitate access to appropriate and individualized interventions, including strategies to address TBI impairments; education to increase TBI awareness; and roles and service that link individuals to relevant supports across the continuum of care and CJS (criminal justice system) involvement” [42]. Supports and interventions should also offer direct, one-to-one support for people that are tailored to their needs and continuously reviewed as part of their correctional plan, as well as plan for post-release by liaising with healthcare professionals, correctional staff, and other relevant agencies and resources in the community [42].

We also highlight additional areas for research inquiry, particularly on the rates of and experiences with TBI among

incarcerated people of colour [42] and regarding the endogeneity within the relationship between TBI and incarceration. We recognize these populations, racialized or being with TBI, are over-represented in the prison population [43] and require focused and isolated study in their own right, with treatment interventions and programs that meet their diverse needs and reflect on their own experiences. We also suggest future research examine the relationship between TBI and incarcerated veterans, an area beyond the scope of the current article, but requiring directed attention due to increased prevalence potentially of TBI in armed forces populations [18]. More research is also required with a focus on responses to TBI among incarcerated people, such as the role of trauma-informed practice and responsiveness [42].

Of course, our study is limited. We did not conduct our own research, instead relying on the reports provided from CSC and gray literature. Other limitations include a lack of full unpacking of the realities of people in prison with TBI and an exclusion of the experiences and prevalence of TBI among women who are imprisoned. We also did not approach this research using a systematized approach to review the literature, as again, the available literature in this area in Canada is slightly dated, and remains heavily focused on examining prevalence of TBI, and less focused on the social underpinnings and policies and programs that could address TBI in criminal justice systems as well as the endogeneity between TBI and incarceration. We do not believe a systematic approach to reviewing the literature would have provided us with any more detail than a targeted search of the literature, accompanied by information and reports provided by CSC. Still, much of the findings the current article relies on is generated by self-report survey data, which can pose problems for populations with low literacy, among other epistemological and methodological challenges that accompany criminological quantitative research in general [44, 45]. Other methodologies, frameworks and research designs are needed to further unpack this area of inquiry.

In light of these limitations, overall, our study sheds significant light on (1) the necessity for understanding TBI among federally incarcerated populations in Canada and beyond in greater complexity and depth; (2) the urgency of criminal justice systems across the globe to devise evidence-based action plans, policies and procedures, and further research to respond to the needs of justice-involved populations experiencing TBI; and (3) the importance of understanding correctional staff education and training needs given their duty remains to provide care, custody, and control to the diverse incarcerated populations they serve [46].

## AVAILABILITY OF DATA AND MATERIALS

Not applicable.

## AUTHOR CONTRIBUTIONS

MSJ and RR—contributed to the design of this study, conducted searches, screened studies, evaluated the quality of the paper, and drafted the manuscript. All authors read and



approved the final manuscript.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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