




# Implementing Interventions for Women and Youth with Traumatic Brain Injury at Transition from Custodial Settings: A Call to Action

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**Abstract:** Traumatic brain injury (TBI) is a serious public health concern and overrepresented among justice-involved populations. An emerging area of research focuses on the complex, interrelated and unmet health and social needs of justice-involved women and youth with TBI. Evidence of these needs continues to grow, yet the health and justice systems continue to underperform in supporting the health and social care of justice-involved women and youth. This commentary is a call to action to begin to redress these gaps. We first provide an overview of the needs of women and youth with TBI that affect their transition from custody to community, including those related to victimization, trauma, mental health, substance use, and homelessness. We then highlight the current gaps in knowledge and practice with respect to interventions for women and youth with TBI at transition from custody. The available evidence for the impact of interventions on people with head injury who are justice-involved is sparse, especially studies of interventions focused on women and youth. We conclude with a call for implementation science studies to support translation from research to practice, emphasizing that researchers, practitioners, policy makers, and women and youth at transition should collaborate to develop, implement, and evaluate accommodations and interventions for TBI. To have meaningful, positive impacts on the systems that serve these women and youth, interdisciplinary service delivery approaches should aim to prevent, raise awareness, identify, and provide timely support and services for the varied needs of women and youth with TBI in transition.

**Keywords:** traumatic brain injury, criminal justice system, women, youth, reentry

## Introduction

Traumatic brain injury (TBI) is a serious public health concern,<sup>1</sup> and a leading cause of disability and death worldwide.<sup>2,3</sup> This type of injury can result from an external force such as a blow to the head (eg, assault), a fall, a motor vehicle collision or a sports-related injury.<sup>1</sup> TBI is known to be associated with challenges in four domains: cognition (eg, attention, memory, executive function including reasoning and information processing); communication (eg, thinking, reading, writing, and social interaction); emotion (eg, heightened/blunted emotional responses); and behavioral regulation (eg, impulsive behavior).<sup>4</sup>

Such challenges can increase both vulnerability for, and consequences of, criminal justice involvement for people with TBI.<sup>5-17</sup> While TBI has a global lifetime prevalence of 8%,<sup>18</sup> the prevalence of TBI among people who experience incarceration is considerably higher, ranging from 36% to 88%.<sup>19-21</sup> TBI is associated with earlier and more frequent criminal justice system contact<sup>22-25</sup> and a higher number of convictions over one's lifetime.<sup>22</sup> Upon release, TBI history is associated with increased risk of reoffense, rearrest and reincarceration.<sup>26-29</sup>

An emerging area of research focuses on associations between gender, age, and other intersecting status characteristics with criminal justice involvement. The lifetime prevalence of TBI among justice-involved women and youth is

high, ranging from 42–79% and 16–72%, respectively.<sup>20,30–35</sup> Among children and youth, TBI is associated with increased risk of academic problems,<sup>36</sup> negative peer influence<sup>37</sup> and involvement in criminal activity,<sup>25</sup> particularly among youth with multiple injuries. Compared with justice-involved men with TBI, justice-involved women with TBI have higher rates of past sexual abuse and current TBI symptoms.<sup>34,38</sup> Women are more likely than men to have sustained TBI prior to first criminal offence.<sup>34,39</sup> They are more likely to be involved in violent crimes and to have lasting disability associated with their TBIs.<sup>40</sup>

The impact of TBI highlights the need for interventions aimed at accommodating and supporting people with TBI who are justice-involved. Reentry programs, in particular, represent an important opportunity to provide individuals returning to community with the care and support required to break the cycle of criminal justice involvement.<sup>41–43</sup> And yet, a recent scoping review of interventions for people with TBI who are entangled with the criminal justice system found few interventions focused on TBI and limited research on identification and accommodation of TBI.<sup>44</sup> Care is fragmented, and accommodations are often not specific to the needs of people with TBI.

Notably, there remain significant gaps in knowledge and practice regarding the distinct needs of women and youth with TBI.<sup>20</sup> Women and youth who are justice-involved experience complex and interrelated and unmet health and social needs. Evidence of these needs continues to grow, yet the health and justice systems continue to underperform in supporting the health and social care needs of justice-involved women and youth. Alongside this is a systematic lack of awareness of TBI and associated health and social needs among staff within the criminal justice sector. This results in under-identification of people with TBI leading to their needs being unaccommodated and untreated.<sup>44–46</sup>

Women and youth occupy a minority position in the criminal justice system and experience considerable vulnerability.<sup>47,48</sup> The separation of mother and child due to imprisonment has dire consequences for families. Moreover, the World Health Organization centers women and youth as special populations within their Prison Health Framework.<sup>49</sup> As such, the purpose of this commentary is threefold: (1) to provide an overview of the needs of women and youth with TBI that affect transition from custody to community; (2) to highlight the current gaps in knowledge and practice with respect to interventions for women and youth with TBI at transition from custody; and (3) to call for implementation science studies to support translation from research to practice.

## Unmet Needs of Women and Youth with TBI That Affect Transition from Custody

Key aspects of unmet need for women at incarceration that affect transition from custody include homelessness, substance use, mental health challenges, and early life and adult experiences of trauma.<sup>50–58</sup> This includes a high prevalence of violent victimization, which is also a common cause of TBI among women in prison.<sup>32,40,59</sup>

Youth in prison face a set of complex needs similar to women, including increased challenges with mental health and substance use disorders, risk of victimization, and childhood trauma.<sup>50,60–62</sup> Given their relative young age, the nature of their disability, and the high rates of co-occurrence with other difficulties (eg, learning disabilities, communication challenges, and emotional issues), they also face educational exclusion and vocational disadvantage, as well as time with child services.<sup>61</sup> Youth, in particular, with TBI face additional issues with behavioral control which may set them on a pathway to lifelong patterns of criminal justice involvement.

For both youth and women, reconviction rates are high – for example, around one in five young people aged under 21 and women in the UK are reconvicted within three months of release.<sup>63</sup> This indicates an imperative to offer intervention and support to reduce this risk. We know that a significant number of young people desist from crime as they mature, but for others criminal behavior continues through adult life. Release from prison may be a crossroads towards their future life path and an opportunity to provide support and education that may increase the likelihood of desistance.<sup>64</sup> Moreover, mental health problems, including anxiety and hopelessness, are of concern among youth with a history of TBI and should be considered for interventions at discharge.<sup>64,65</sup> Youth involved with the justice system, with and without TBI, have higher rates of homelessness and substance use problems and often are unable to work due to disability.<sup>66</sup> For women with TBI, pathways to crime often have associated experiences of relationships with intimate partners that are marked by violence and substance use.<sup>67,68</sup>

## Interventions for Women and Youth—at Transition from Custody

Available evidence for the impact of interventions for people with head injury who are justice-involved is sparse, especially at the point of transition from custody to community and research that is specifically focused on women and youth. Some studies note that little or no intervention is provided for people with head injury in prison. This is a particular issue for women and young people who are justice-involved.<sup>64,65</sup> Women in prison have a very high prevalence of multiple health problems that tends to be higher than in men<sup>69,70</sup> and this includes disability and poor outcomes associated with head injury.<sup>40,71</sup> Youth that are incarcerated can be at a crossroads in their involvement in criminal justice, with some becoming persistent in criminal involvement and others desisting as they reach maturity, and there is opportunity here to intervene and support desistance.<sup>64</sup>

A recent systematic review by de Geus et al<sup>72</sup> and a scoping review by Chan et al<sup>44</sup> summarize interventions for people with TBI in criminal justice and forensic settings. Some key issues are highlighted, including the need for screening for TBI, an important role for education of people with TBI in the criminal justice system and staff who work with them, the feasibility of introducing programs and a need to further consider demographic issues including gender and ethnicity. The scoping review by Chan et al<sup>44</sup> does not deal with the effectiveness of interventions. We repeated the literature search carried out by de Geus et al<sup>72</sup> updating this to November 2023 and included studies on all ages (they restricted to age 18 and over). This revealed one additional paper on psychoeducation about head injury.<sup>71</sup> The review by de Geus et al<sup>72</sup> notes a need for stronger study designs using comprehensive and well-validated measures to assess life history of TBI and outcomes of interventions. There is also an issue of insufficient power to detect statistically significant effects in several studies where sample sizes are modest. A further key issue is evidence of cost-effectiveness and feasibility of interventions in relation to health and forensic services. Both are crucial to consider if there is to be widespread development of sustainable services. Existing studies broadly consider interventions for problems with mental health, cognitive function or behavior, and more holistic approaches such as link-working. They indicate the extent of the evidence base, some promising areas for development, and the limited research on interventions for women and juveniles.

Link-worker programs may be of particular relevance to transition given their capacity to work across custody and community and aim to reduce reoffending and improve productive activity.<sup>73–77</sup> Prison link workers act as support persons for people with head injury who are in or at transition from prison. They support people to engage with substance use, mental health support, primary care, probation and parole appointments by, for example, providing reminders and accompaniment. They also support people to manage risks related to transition to community such as overdose and treatment non-compliance. They can incorporate personal and employment support, networking to leisure interests, health and social services, education and interventions for people involved in the criminal justice system. They may be cost-effective, given the potential to use staff trained specifically as link-workers for TBI rather than relying on more generically trained professional staff. However, the evidence for the effectiveness of link-working for TBI is limited, and there is need for further study. There are five papers on link-working cited in the reviews. Four of these papers pertain to women or youth and provide a useful description of link-working and its development and include illustrative examples but do not evaluate outcomes statistically or comprise small samples without comparators or use of controls.<sup>73–76</sup> A fifth paper used interventions similar to link-working, in a study on 67 adult males in a transitional housing unit in a maximum-security prison in the US.<sup>78</sup> Those with a history of TBI and below average performance on cognitive tests were transferred to the transition project (Neuro Resource Facilitation). About half had their first TBI in childhood or adolescence. The intervention included making connections with brain injury services, brain injury education and counseling, resource identification, advocacy, transportation training, case management and linking with resources and the development of compensatory strategies for community living. By the end of the two-year project, about half were employed or in training and only seven had been reincarcerated.<sup>78</sup> There was no comparator or control for the intervention, and it is not clear how long individuals had been on release from custody at the end of the project. However, the proportions who were employed, who desisted and who remained in the community are higher than would generally be expected, hence the findings are encouraging. These studies are positive about the potential use of link-working which may lead to better outcomes for people, including those in transition from prison to community. Interestingly, a recent evaluation of a link worker prison and probation program in South Wales, United Kingdom, that used a pre-post design without a comparator group shows reduced anxiety and depression among male participants.<sup>77</sup>

Given that the number of studies on link-working and TBI in the justice system is small, it is perhaps worth considering evidence for effectiveness of link-working more broadly. A recent systematic review by Kiely et al<sup>79</sup> summarized eight studies on 6500 adults with complex needs (not TBI) in community settings of which five were randomized control trials (RCT). In seven studies, the majority of participants were female. Evidence for improvement in health-related quality of life or mental health was not found overall, although there were positive changes in self-ratings of health. There are issues here in relation to intensity and duration of inputs, which varied across studies and were not always well reported. It may be that a link-worker model might be more effective for specific health conditions such as TBI. While link worker programs may show promise, the evidence is not conclusive and overall, a need for more research using more powerful methodology is indicated.

Five papers consider behavioral or psychological interventions in samples of adult males involved in the justice system, some of whom had TBI. A recently published RCT compared assessments before and after 10 sessions of combined Cognitive Behavioural Therapy and mindfulness on symptom complaints, coping skills and behavior with waiting list controls. Participants were people in prison with a history of at least one TBI. Self-reported increases in use of calming and distraction techniques were found pre- to post-treatment but were not maintained at 12-week follow-up. The sample size was small, especially at follow-up, when there may have been insufficient power to detect change. Differences in other outcomes were not significant, including in self-report of “post-concussion” symptoms and numbers of prison infractions.<sup>80</sup> Two studies took place in rehabilitation facilities using a simple single-case design on a total of four cases,<sup>81,82</sup> and in one that used a single group, pre-post intervention design, only 2/13 participants had a definite history of TBI.<sup>83</sup> Finally, a recent paper by Buchan and McMillan<sup>71</sup> indicated that a single session of psychoeducation about risks and effects of head injury to groups in prison resulted in significant improvements in knowledge pre-to-post intervention and at four-week follow-up.

In addition to the above, Chan et al<sup>44</sup> discuss 12 studies that note the occurrence of TBI in their samples and may refer to involvement in the criminal justice system, but do not describe interventions. These are of little utility in defining and moving towards implementation of an evidence-based service for people with TBI who are involved in the criminal justice system.

In overview, although there has been growing interest in relationships between TBI and involvement in the criminal justice system over the past two decades,<sup>25</sup> there remains a dearth of studies that evaluate the effectiveness of interventions. This is particularly the case for young people and women. There is a need for more studies on interventions that aim to facilitate a smooth transition from prison to community, reduce recidivism and enhance productivity. Studies in the UK and US on link worker schemes for TBI show signs of promise in this regard given the focus on bridging between prison and community with the potential to develop support and engage with other agencies including health and social services, criminal justice and employment. It is also worth considering interventions for stress, mood-related problems, and anxiety, which are very common; and among incarcerated women and juveniles are more prevalent in those with a history of TBI.<sup>40,64</sup> Cognitive therapy based guided self-help models might be scalable and economic, although there are no studies on people with TBI, and work on effectiveness is needed.<sup>84</sup>

## Call to Action

With increasing evidence and awareness of the unique vulnerabilities and needs of women and youth with TBI transitioning from custodial to community settings, stakeholders have a unique opportunity to contribute to translational research to improve services and outcomes. Specifically, service providers, policy makers, researchers, and women and youth at transition ought to collaborate to develop, implement, and evaluate accommodations and interventions for TBI. To have meaningful, positive impacts on the systems that serve these women and youth, interdisciplinary service delivery approaches should aim to develop prevention strategies, raise awareness, and provide timely supports and services for the varied and unique needs of women and youth with TBI in transition. Critically, women and youth at transition should be involved as key collaborators in all stages of developing, implementing, and refining service delivery approaches.

To ensure women and youth with TBI have access to TBI-sensitive services and accommodations at transition, increasing awareness of TBI and TBI-related concurrent needs such as substance use, mental illness, and history of trauma is essential and would rationalize the need for TBI-sensitive supports and services. Education should target any group that intersects with the justice system, including the people with TBI who are justice-involved. While educating

on-the-ground service providers is critical, raising awareness of TBI with administrators and policy makers will fully enable the implementation of services and accommodations. There is also a need for integrated and interdisciplinary training to break down existing silos between health, public health and criminal justice systems. With little to no awareness of neurodisabilities in general, and TBI specifically among professionals and the general public, women and youth with TBI will not be identified in custody or at transition from custody.

As service providers and policy makers consider the creation and provision of TBI-sensitive supports for women and youth at transition, a holistic approach is needed to reduce re-entry into the justice system. While not exhaustive, domains of need that require specialized approaches for women and youth with TBI include: substance use, trauma, intimate partner/domestic violence, mental health, and cognitive and communication difficulties. Overarchingly, trauma-informed and gender-sensitive care practices<sup>85–88</sup> should be utilized to provide person-centered services to individuals who are known to have complex histories of trauma beyond experiencing a TBI. Identifying and utilizing external support systems, such as family members and friends, would enhance the carry-over and long-term success of reentry services. While holistic service approaches need further development and evaluation, some existing models begin to incorporate interdisciplinary perspectives that target the varied needs of women and youth with TBI at transition, such as link-worker models.<sup>73–76,89</sup>

As noted in the commentary, there is a lack of research on interventions for women and youth, with TBI transitioning from prison to community. Researchers should aim to identify and refine approaches that are feasible to implement on a large scale, address the unique needs of women and youth compared to men, and that ultimately improve outcomes after transition for women and youth with TBI. Future research studies should be sufficiently powered to detect significant changes in outcome and use strong study designs with comprehensive and well-validated measures to assess life history and outcomes of the intervention including disability and gender.<sup>90</sup>

There is increasing recognition of the utility of implementing scientific approaches for promoting the uptake of evidence-based interventions in criminal justice and community settings and improving health outcomes among justice-involved populations.<sup>91,92</sup> Implementation science is “the scientific study of methods to promote the systematic uptake of evidence-based ... interventions into routine practice”.<sup>93</sup> An applied and interdisciplinary area of research, implementation science comprises a range of theories, methods, and frameworks that seek to bridge the gap between research and practice. Implementation science approaches engage with the context into which an intervention is introduced into practice. They do this by examining the conditions, practices, resources, and strategies that contribute to the successful uptake of evidence-based interventions, often focusing on barriers and facilitators to intervention feasibility, acceptability, adoption, fidelity, and sustainability. Given the complexity of the transition process for women and youth, using implementation science approaches early in the research process provides a grounded methodological pathway to proactively identify barriers to implementation, guide solution testing and gauge success in relation to outcomes, and importantly, the feasibility of scaling promising solutions.

Implementation science approaches are particularly relevant in the context of TBI since they can promote the understanding of factors that influence the uptake of evidence-based accommodations and interventions to support people with TBI disabilities, thereby reducing social and health disparities for women and youth. It is anticipated that given the unique needs of these individuals and the unique settings in which they live, work, and interact that implementation science methods – which focus analytical attention on how particular contexts influence the uptake of evidence-based interventions – could improve the efficiency, quality, and reach of services to generate a timely, positive impact. Critically, research should be conducted at the individual/group, organizational, and system levels to consider personal factors, practices, and policies that could support or detract from successful implementation of promising services and supports. By utilizing implementation science methods early in the research process, promising approaches to serving these populations can be designed with consideration of these barriers to uptake, increasing the efficiency of evaluation and ultimately successful implementation.

## Ethics Statement

This is a commentary and thus did not require ethical review.



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