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Training on brain injury for juvenile justice professionals: Findings from pre- and post-training surveys and focus groups

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ABSTRACT

Despite the need for improved knowledge and skill, little peer-reviewed research evidence exists to support the design, implementation, and effectiveness of brain injury training specifically in the justice system. The present study sought to build upon the findings from Riccardi et al. (2022) to design, conduct, and evaluate a pilot training on brain injury for juvenile justice professionals. Juvenile court professionals completed pre- and post-training focus group interviews (n = 5) and surveys (N = 28). Focus group participants' responses were grouped into various themes related to perspectives on brain injury and training preferences, including current challenges, content needs, methods desired, most helpful content and methods, professional changes since training, and suggested modifications to the training. Average knowledge and confidence scores improved significantly from pre- to post- training with large effect sizes. The preliminary findings of this research study may be used to support change in training practices and administrative procedures, as well as support the need for continued research in brain injury in JIYs.

KEYWORDS: training, brain injury, justice, probation, youth

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INTRODUCTION

Justice-involved youth (JIYs) are significantly more likely to have experienced multiple brain injuries compared to youth not involved in the justice system (Farrer et al., 2013). Although estimates vary, it is likely that upwards of 70% of JIY have a history of at least one brain injury (Durand et al., 2017; Farrer & Hedges, 2011; Hughes et al., 2015; Shiroma et al., 2010; Williams et al., 2010). The cognitive and behavioral symptoms associated with childhood brain injury, including difficulties with attention, problem solving, and self-regulation, are known to increase the risk for involvement with the justice system (Vaughn et al., 2014), as well as pose challenges for successful engagement with that system (e.g., probation, detention; Nagele et al., 2021). Despite the high prevalence of brain injury in and known negative consequences for JIYs, brain

injury is often under-diagnosed and misunderstood within the justice system (Dams-O'Connor et al., 2014; Nagele et al., 2021).

Previous studies have highlighted the high rates of misconceptions about brain injuries in professionals serving children (Linden et al., 2013; Yuhasz, 2013), JIYs (Riccardi et al., 2022), and adult offender groups (McMillan, 2022; O'Rourke et al., 2018; Yuhasz, 2013). Professionals working with JIYs demonstrate relatively strong foundational knowledge about brain injury (e.g., negative impacts of mild brain injuries), but have higher rates of misunderstanding of concepts particularly important for JIYs (e.g., compounding effects of repeated brain injuries; memory and behavior challenges associated with brain injury; McMillan, 2022; Riccardi et al., 2022). Knowledge appears to vary independent of most professionals' characteristics (e.g., years of experience, job category; McMillan, 2022; Riccardi et al., 2022). Consistent misconceptions about brain injury with low rates of brain injury-related training provide a starting point for education of juvenile justice professionals to increase their understanding of brain injury specific to JIYs (Riccardi et al., 2022).

In identifying areas of focus to better address brain injuries in the juvenile justice system, the National Conference of State Legislatures recommended "education and training of the workforce within the juvenile justice system to better understand the effects of traumatic brain injury" (Teigen & Goodwin, 2019, p. 8). Education and training on brain injury has been shown to increase both knowledge and knowledge application for non-brain injury specialists (e.g., paraprofessionals working with individuals with brain injury) in real-world settings (e.g., schools and community rehabilitation; McCart et al., 2020; Powell et al., 2021).

Despite the need for improved knowledge and skill, little peer-reviewed research evidence exists to support the design, implementation, and effectiveness of brain injury training specifically in the justice system. Although training and education is expected to improve the identification of, treatment of, and outcomes related to brain injury in JIYs (McMillan, 2022; Nkoana et al., 2020; Riccardi et al., 2022; Teigen & Goodwin, 2019), empirical evidence is needed to identify training components that are acceptable and feasible to improve long-term practices, policies, and outcomes. Further, given that professional competence is related to both knowledge and confidence (Kim et al., 2020), evaluations of trainings need to include analysis of both provider knowledge and confidence to understand how trainings may impact professional practice.

The present study sought to build upon the findings from Riccardi et al. (2022) to design, conduct, and evaluate a pilot training on brain injury for juvenile justice professionals. The primary aim of this pilot study was to understand court professionals' knowledge, confidence, and interest in brain injury before and after training. The secondary aim of this pilot study was to use pre- and post-training focus group participation to investigate court professionals' 1) perspectives on brain injury and 2) training preferences.

ABREVIATIONS

JIY: justice-involved youth
M: mean
SD: standard deviation
TBI: traumatic brain injury

METHODS

Procedure

The training analyzed in this study was developed as a result of a knowledge survey completed by

juvenile court professionals in 2020 (Riccardi et al., 2022). Participants in this study were from the same juvenile court system in the urban Midwest described in Riccardi et al. (2020). Additional demographic characteristics are listed in Table 1. Prior to the knowledge survey, the researchers met with court administrators to discuss, educate, and understand the current needs and capacities of the juvenile court related to brain injury. After reviewing results of the knowledge survey, researchers met with court administration in March 2021 to discuss the results and identify areas of need that could be addressed in an online training. It was agreed that a pre- and post-training focus group, as well as pre- and post-training surveys, would be helpful in designing the present training and subsequent training opportunities. A court administrator emailed employees in the probation department and related administrative units twice: 1) in June 2021 to inform them about the opportunity to participate in the focus groups, and 2) in September 2021 to invite them to the 1.5-hour online training. No participants received reimbursement for their participation, but they did receive continuing education credit for attending the training and completing the pre- and post-training surveys. The university's Institutional Review Board approved the study.

Focus Groups

To gain a deeper understanding of juvenile court professionals' 1) perspectives on brain injury-related content and 2) training preferences, the researchers conducted a pre- and post-training focus group. The focus groups served to gather a collective view on the content and methods to be used in the training, as well as collective feedback after the training (Nyumba et al., 2017). Focus groups also presented structured opportunities for the researchers to clarify information directly with training participants, particularly valuable given the different professional fields of the researchers and participants (Nyumba et al., 2017).

The first five employees who contacted the researchers, by responding to the email from the court administrator, were included in the focus group as a convenience sample. These participants worked in departments that would be invited to participate in the training. Additionally, all participants attend the live training. Both focus groups were conducted online where participants had the option to turn their cameras off. The pre-training focus group was conducted in June 2021 and lasted about 45 minutes. A post-training focus group was conducted one week after the training and lasted about 30 minutes. Focus group questions are available in Appendix 1.

Training

Researchers then designed the present training based on information collected during the focus group along with their own expertise in childhood brain injury. The training was made available to all employees in the probation department and related administrative units, including but not limited to the focus group participants. The training included content on: 1) general background on brain injury; 2) brain injury specific to JIYs; 3) opportunities for JIY professionals to better identify and support youth with brain injury; 3) a case study; and 4) an overview of local and national brain injury resources. A combination of lecture, video examples, discussions, independent learning activities, and open time for questions were used by both authors during the training. Training materials are available upon reasonable request to the first author.

Pre- and post-training surveys were completed during the online training time (i.e., immediately before and after the training). These surveys were created specifically for this training and included questions on: 1) knowledge of brain injury using a modified version of the Common Misconceptions-TBI questionnaire (Gouvier et al., 1988), also used in Riccardi et al. (2022); 2) confidence in working with JIYs with a credible history of brain injury; and 3) the training. The pre-training survey also included demographic questions that were not asked on the

post-training survey given that responses were linked. The knowledge and confidence ratings and questions are listed in Table 2.

An average knowledge score and an average confidence rating were calculated by averaging the items within the respective categories, also listed in Table 2. Training questions included participants rating their: 1) interest in learning (more) about JIY who have a credible history of a brain injury, and 2) how relevant they think the training will be to their work, as well as identifying (check all that apply) formats they would like or liked most during the training (i.e., lecture, video examples, discussion, role play/experiential, independent learning activities).

Analysis

Focus Groups

Audio recordings of the focus group were transcribed by an undergraduate research assistant and checked for accuracy by the first author. Focus group prompts were organized by topic and sub-topics and participants' responses were grouped based on the sub-topic they were addressing. Participant responses were then condensed into overall themes by the first author and checked by an undergraduate research assistant. Table 3 provides representative quotes for more detailed or abstract themes.

Pre- and Post-Training Surveys

Survey data was collected and exported from RedCAP (Harris et al., 2009, 2019) and analyzed using JASP (JASP Team, 2023). Thirty-four participants completed the pre-training survey. Six participants were excluded from analysis due to missing data. Ultimately, data on 28 participants, matched from pre- to post-training were analyzed. Paired sample t-tests were conducted to compare pre- and post-training responses from participants. Cohen's d effect sizes were interpreted as: small > 0.2; medium > 0.5, and large > 0.8 (Cohen, 1988). A power analysis was conducted using G*Power version 3.1.9.7 (Faul et al., 2007) to determine the minimum sample size required to test the study hypothesis. Results indicated the required sample size to achieve 95% power for detecting a large effect, at a significance criterion of $\alpha = .05$, was N = 23 for a paired sample t-test. Thus, the obtained sample size of N = 28 is adequate to test the study hypothesis. When there was no variance in participants' post training responses (i.e., all participants answered correctly), a Chi-square test was conducted. Effect sizes were unable to be reported for Chi-square tests as there were no two-by-two comparisons. Bonferroni's correction was applied to account for multiple comparisons in the knowledge and confidence analyses. For knowledge questions (eight analyses), results were considered significant when $p < .006$. For confidence questions (seven analyses), results were considered significant when $p < .007$. For all other analyses, results were considered significant when $p < .05$.

Table 1.
Trainee Characteristics (*N* = 28)

Characteristic	% (*n*)
Gender	
Male	35.71% (10)
Female	64.29% (18)
Job	
Court Administration	3.57% (1)
Probation Staff	78.57% (22)
Probation Management	14.29% (4)
Other	3.57% (1)
Highest Degree	
High School Diploma	3.57% (1)
Associates Degree	3.57% (1)
Bachelor's degree	64.28% (18)
Graduate Degrees	28.57% (8)

Probation Service Experience	17.85% (5)
Less than 2 years	10.71% (3)
2 to 5 years	25.00% (7)
6 to 10 years	17.85% (5)
11 to 15 years	3.57% (1)
16 to 20 years	25.00% (7)
More than 20 years	
Contact with Offenders	
Daily	50.00% (14)
Once a week	14.28% (4)
Once a month	10.71% (3)
Rarely	21.42% (6)
None	3.57% (1)

RESULTS

Trainee Characteristics

Of the 28 professionals who participated in the brain injury training, most were female (64.29%) and working as probation staff (78.57%). Participants reported a range of years of experience in juvenile justice services (Med. = 6-10 years) and a range of contact with JIYs (Med.= daily). Complete trainee characteristics are listed in Table 1. When asked to rate their confidence in working with JIYs (on a 5-point Likert Scale with 5 being "very confident"), participants reported high levels of confidence (M = 4.36 (0.95)). Half of training participants reported receiving previous training on brain injury in youth, while 10.71% of trainees reported receiving previous training on brain injury specifically in JIYs. Almost half (46.43%) of participants reported having experience working with a JIY with a brain injury.

Of the five trainees that also participated in the pre- and post-training focus groups, most were female (80.00%), all worked as probation staff and reported daily (80.00%) or weekly (20.00%) contact with JIYs.

Focus Groups Findings

Table 3 presents the topics, themes and quotes of the focus group participants related to their perspectives on brain injury and training preferences.

Pre- and Post- Training Knowledge & Confidence

Pre- and post-training knowledge and confidence results are reported in Table 2.

Pre-training, participants rated themselves as having significantly less knowledge on brain injury in JIYs (M = 2.07 (0.86)) compared to their knowledge on brain injury in the general population (M = 2.50 (0.96); $t(27) = 3.58$, $p = .001$, $d = 0.68$; large effect size). Self-rated knowledge significantly improved from pre- to post-training with large effect sizes (M = 3.64 (0.78) for the general population; M = 3.63 (0.91) for JIYs), with no significant difference in self-rated knowledge on brain injury in the general population compared to in JIYs ($t(27) = 0.08$, $p = .940$).

Average knowledge and confidence scores improved significantly from pre- to post- training with large effect sizes. Knowledge questions related to the following topics improved significantly from pre- to post-training: cause of childhood brain injury; irritability and anger as symptoms after brain injury; and application of brain injury-related strategies to all JIYs.

Training Interest/Feedback

Pre-training, participants reported high rates of interest in learning about JIYs who have a credible history of brain injury (M = 4.21 (0.79)) and maintained high levels of interest for more learning post-training (M = 4.25 (0.80)). Pre- and post-training, participants thought the training was relevant to their work (pre-training M = 4.18 (0.98); post-training M = 4.46 (0.69)). Pre-training, when asked about training delivery formats, participants reported preferring the following formats: video examples (85.71%), lecture (75.00%), discussion (42.86%), independent learning activities (14.27%), and role play/experiential learning (10.71%). Post-training, participants reported preferring the following formats: discussion (60.71%), video examples (57.14%), lecture (57.14%), role play/experiential learning (17.86%), and independent learning activities (14.27%).

Table 2.
Changes from Pre-Training to Post-Training

	Pre-Training	Post-Training	Change
Knowledge			
Rating (1= none/barely any knowledge, 5= highly knowledgeable)	Mean (SD)	Mean (SD)	
Rate your personal knowledge on brain injury in the general population	2.50 (0.96)	3.64 (0.78)	5.61, $p < .001$, $d = 1.06$
Rate your personal knowledge on brain injury in justice-involved youth	2.07 (0.86)	3.63 (0.91)	8.39, $p < .001$, $d = 1.59$
Question	Percent Correct	Percent Correct	
What is the most common cause of brain injury in 14-19 year old children?	17.86%	53.57%	3.40, $p = .002$, $d = 0.66$
TRUE or FALSE Items: For a brain injury to occur, there must be a direct blow to the head.	85.71%	89.29%	0.44, $p = .663$, $d = 0.08$
Children who have had one brain injury are more likely to have a second one and are less able to withstand a second one.*	75.00%	100.00%	7.00, $p = .008$
Problems with irritability and difficulties controlling anger are common in children who had a brain injury.*	96.43%	100.00%	24.14, $p < .001$
A child with a brain injury may have trouble remembering events that happened before the injury, but usually does not have trouble learning new things.	32.14%	60.71%	2.83, $p = .009$, $d = 0.54$
Experiencing a brain injury during childhood increases violent and/or aggressive behaviors later in life.	78.57%	89.29%	1.36, $p = .184$, $d = 0.26$
A brain injury in justice-involved youth often causes difficulties in comprehending directions or maintaining attention.	100%	100.00%	n/a
Strategies used to support justice-involved youth with brain injuries can be helpful for all justice-involved youth, whether or not they have a brain injury.*	96.43%	100.00%	24.14, $p < .001$
Average Knowledge Score	72.77% (13.63)	86.61% (11.75)	1.36, $p < .001$, $d = 0.81$
Confidence			
Rating (1 = not at all confident, 5 = very confident)	Mean (SD)	Mean (SD)	Change
Recognizing when a justice-involved youth had a likely brain injury.	2.61 (0.83)	4.04 (0.69)	8.22, $p < .001$, $d = 1.55$
Recognizing and understanding the challenges experienced by justice-involved youth with brain injury (e.g., memory, poor attention, impulsivity, anger).	3.07 (0.77)	4.18 (0.67)	7.04, $p < .001$, $d = 1.33$
Working with justice-involved youth with a brain injury.	3.14 (0.97)	4.07 (0.72)	5.02, $p < .001$, $d = 0.95$
Communicating effectively with a justice-involved youth with a brain injury (e.g., rephrasing, slowing down).	3.29 (0.90)	4.07 (0.66)	4.99, $p < .001$, $d = 0.94$
Using strategies to manage behaviors of justice-involved youth with a brain injury.	3.04 (0.88)	4.14 (0.59)	6.69, $p < .001$, $d = 1.27$
Using resources that could further personal knowledge on brain injury and secure access to accommodations and services for JIYs with brain injury.	2.89 (1.10)	4.29 (0.60)	6.16, $p < .001$, $d = 1.16$
Average Confidence Score	3.01 (0.70)	4.10 (0.60)	8.28, $p < .001$, $d = 1.56$

Table 3.
Pre- and Post-Training Themes and Quotes

Pre-Training				Post-Training		
Topic	Sub-Topics	Themes	Quotes	Sub-Topics	Themes	Quotes
Perspectives on brain injury	Current challenges	Workload Resources and services Collaborating with families	"I feel like we do lack the appropriate services. Like really, where would we even send someone who has a traumatic brain injury. Who's trained to work with them? It's like we have to constantly like research ourselves to like figure out who is appropriate." [resources] "Sometimes the parents are clueless too and it's pretty much hand holding the kid and the parents" [collaborating]	Most helpful content	Resources Background	"I liked the the resources for.., this is where you can go, these are ..the hospitals, this is the contact and then also the check off for the symptoms" [resources]
	Content need	Basic background Effective strategies/ treatment	"just an overall general information training. You know what [brain injury] is, what it looks like, you know, how you can tease it out…what resources we need." [background] "Give a training on like what is effective. What have you guys seen that actually works because that's, I mean at the end of the day, that's what we really want is like what's effective and what's not effective." [strategies]	More content needed	Co-occurring needs Practice guidelines/ procedures	"Just how to like kind of more identify the difference between like… ADHD… compared to.. he might have had like a traumatic brain injury and that's why his behavior is a certain way" [co-occurring needs] "More hands on procedural stuff" [practice]

				Changes since training	Viewing youth differently Reviewing case history more thoroughly	"It's making me reflect on these other kids I had and kids that I've had in past and looking at their behavior what they've been doing and I'm like maybe there's something there that's not a mental health thing - it might be something you know a little more on the lines of this. So it's making me look at my caseload a little bit differently." [viewing]
Training preferences	Methods desired	Breakout rooms Resources for staff and families Contact person for questions	"Brochures, flyers, hands out handouts, whatever you got, send our way." [resources] "If we do get a resource, if there could be a contact person within that organization that you guys have access to. that makes it easier for us if we do go back and reference it, you know that we can go to them directly and ask questions if we need to." [resources/contact person]	Most helpful method	PowerPoint Video	"The PowerPoint. We can always go back and reference it with all the information that was inside" [PowerPoint] "Watching that [video] instead of just reading was nice" [video]
				Suggested modifications	Using actual clients for case study, more case studies, longer time on case studies Practice guidelines/ procedures In-person	"I would ask for a little more time, especially when it comes to the case study, so that we have a little more time to process it, and especially… doing multiple case studies" [case study]

DISCUSSION

This study provides preliminary evidence for training on brain injury for juvenile justice professionals. Overall, participants in this pilot training demonstrated significant improvement in their self-rated knowledge, knowledge scores, and confidence on brain injury in JIYs from pre- to post-training, with high levels of interest for more training. Additionally, focus group participants provided initial, actionable suggestions to refine this training that might better address juvenile justice professionals' preferences and needs in brain injury knowledge and training methods for this juvenile court system.

Participants in this study, a sub-sample of those in Riccardi et al. (2022), demonstrated consistent levels of knowledge pre-training as described in Riccardi et al. (2022). Participants' pre-training knowledge, including accuracy and patterns of error (e.g., questions related to behavior), and brain injury training experiences and interest were similar to those found by McMillan (2022) with Scottish police. Changes from pre- to post-training in participants' knowledge, confidence, and interest highlight the positive impact of this relatively short, pilot training session for professionals in this juvenile court and were consistent with findings from McCart et al. (2020) with school professionals, although Powell et al. (2021) did not find significant changes in self-efficacy (confidence) in paraprofessionals. Without confidence, professionals are less likely to implement their knowledge and skills within their work (Kim et al., 2020). With greater knowledge (self-reported and knowledge scores) and greater confidence, as reported in the surveys and in the focus groups, these professionals working with JIYs might be more prepared and willing to facilitate the identification, assessment, and management of brain injury than before the training (Kim et al., 2020).

While participants in this pilot training rated the training as relevant to their work, suggestions from the surveys and focus groups provide opportunities to modify the training to further increase engagement and potentially application to their work and practice. These suggestions should be considered by other groups aiming to conduct trainings in their juvenile court systems. First, focus group participants from this juvenile court were interested in understanding more about the co-occurring needs of JIYs with credible history of brain injury, including strategies to differentially diagnose and treat the presenting deficits. Although it has been established that JIYs often have multiple educational (e.g., learning disabilities), communication (e.g., speech, language), social-emotional (e.g., oppositional defiant disorder), and cognitive (e.g., attention-deficit/ hyperactivity disorder) needs (Holland et al., 2022; Kvarfordt et al., 2005; Nkoana et al., 2020), best practices for how to identify and address these needs are lacking (Teigen & Goodwin, 2019) and likely outside of the scope of the professionals that have most frequent contact with JIYs (e.g., probation officers). Training should first provide foundational information to support the professionals working with JIYs in understanding the complex needs of JIYs and the general assessment process, and then provide referral resources to local professionals who could assess and differentially diagnose.

Additionally, focus group participants from this juvenile court recommended offering more information on practice guidelines or procedures, as well as more in-depth case studies, to the training. The authors of this study, also the trainers for this project, were concurrently drafting practice guidelines in collaboration with juvenile justice administrators and supervisors regarding brain injury screening, referrals, and supports. These practice guidelines were planned to be presented at a second training, within two months of the initial training. Instead, the

practice guidelines could be embedded into the first training. With a single training combin-ing the foundational content and practice-related changes, case studies that require foundational and applied knowledge will be more easily incorporated and could increase the carry-over of training-related content and skills into practice. This might increase trainee buy-in by having trainers more directly and immediately apply the foundational material to practice. Additionally, immediate implementation of improved practices related to brain injury could decrease frustration amongst staff, given their increased awareness and motivation to improve their work with JIYs.

The findings of this research study support the need for continued research in brain injury in JIYs and as preliminary evidence for change in practice and policy. Some of the information requested in the survey and focus groups (e.g., effective treatment approaches for JIYs with a brain injury) could not be addressed given limited research and policies related to brain injury in JIYs. To better inform future trainings, research is needed to understand the incidence and impact of brain injury on JIYs, as well as the relationship between brain injury and other challenges (e.g., oppositional defiant disorder). With the future implementation of other trainings, brain injury screenings, referrals, and related treatments, data collected across different juvenile courts in the United States could be used to advance both foundational and applied understanding of brain injury in JIYs. Utilizing various research methods, including basic and pre-clinical, clinical, and implementation research, will be essential for improved trainings that could result in better identification, treatment, and long-term outcomes of JIYs with brain injury (Jackman & Hamilton, 2020; Theobald et al., 2018).

In addition to the positive outcomes and high levels of interest, the present training was acceptable to participants and addressed a need perceived by various stakeholders (e.g., juvenile justice professionals, administrators, JIYs, adult offenders, clinicians; Conrick et al., 2022; McMillan, 2022; Nkoana et al., 2020; Riccardi et al., 2022). The methods and materials used in this training can serve as a starting point for other professionals, in different juvenile courts and states, hoping to conduct similar trainings with professionals working with JIYs. Expanding on the present training and implementing trainings on procedures related to brain injury screening, referral, and treatment plans would also likely be well-received and feasible. Motivated, confident, and well-prepared professionals would be critical to the successful implementation of the procedures (Kim et al., 2020).

Limitations

Given the pilot nature of this training and study, a number of limitations might impact the generalizability of the results. The training and focus group participants were a convenience sample from one juvenile justice system without a control group. Selection bias might influence the findings of this study, particularly for the qualitative focus groups. The small number of participants in the focus group limit the generalizability of results to other employees within the court and to other juvenile courts. Additionally, given that the focus group participants were the first to volunteer to participate, they likely represent employees more interested in and more willing to expand their skills in the area of brain injury. While these focus groups were informative for the present training, the needs and perspectives of other juvenile courts might not be represented in the present findings.

Further, this sample is not representative of the larger population of professionals working with JIYs in the United States or internationally. The pre-training findings of this sample might be reflective of the individual state's academic, employment, or professional requirements for these

positions and not represent other states with greater requirements for juvenile court employees. Implementing this training with multiple juvenile justice systems in different states and with larger, more diverse samples, including diversion, probation, and detention, could provide results that are more easily applied to different systems and types of JIYs.

This study used a non-validated and non-standardized survey. To the best of the authors' knowledge, no validated or standardized measures existed at the time of this study related to pediatric brain injury knowledge, brain injury training outcomes, or brain injury in JIYs. The questionnaire was based off of a widely accepted knowledge survey (Gouvier, 1988) with questions added related to the specific content and format of the training. Future research might include validating this measure to ensure reliability when analyzing results of future trainings. Additionally, the survey only measured the change in knowledge and confidence from immediately before the training to immediately after the training for professionals working directly with JIYs. Including program and facility administrators in a formal training before training other professionals might increase buy-in of administrators to make positive changes to the resources and practices related to brain injury in their juvenile court system. Then, professionals trained in subsequent trainings might have greater buy-in or at least be enabled to implement changes more effectively. Tracking long-term knowledge and behavior changes of all professionals (e.g., court administrators, probation staff) would provide more robust insight onto the generalizability of this training, as well as areas of need for follow-up training.

Lastly, the training curriculum and pre- and post-training measures were designed by the authors of this study and not standardized. Given the paucity of formal trainings on brain injury specific to JIYs, future work could expand on or refine the training materials from this study to begin creating a standardized curriculum that could be utilized in various JIY-related settings nationally. Despite these limitations, this study highlights the early steps of implementing and evaluating a brain injury training for professionals working with JIYs.

CONCULSIONS

The preliminary findings of this research study may be used to support change in practice and policy, as well as support the need for continued research in brain injury in JIYs. Given the positive outcomes and high levels of interest in training, based on survey data and focus group interviews, the methods and materials used in this training can serve as a starting point for other professionals hoping to conduct similar trainings with professionals working with JIYs. Expanding on the present training and implementing trainings on procedures related to brain injury screening, referral, and treatment plans might also be well-received and feasible. While more research and training are needed, this study is an early, preliminary step to addressing a major need in "education and training of the workforce within the juvenile justice system to better understand the effects of TBI" (Teigen & Goodwin, 2019, p. 8), as identified by the National Conference of State Legislatures.

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Appendix 1. Focus Group Questions

Pre-Training Focus Group Questions

1) Tell us what you know about childhood brain injury broadly.

    How did you learn about childhood brain injury?

2) What are your experiences working with justice-involved youth with a brain injury?

    Do you know if any youth that you interact with have experienced a brain injury? Do you suspect any have experienced a brain injury? How would you find out if they have a brain injury?

3) How do you think experiencing a brain injury might have impacted, or continue to impact, the youth you interact with?

    (Their interactions with adults or other youth; their ability to participate in programming/school)

It is estimated that between 25 and 80% of justice-involved youth have experienced a brain injury. Often, youth have experienced multiple brain injuries due to repeated violence and increased risk-taking behaviors. Brain injuries in children are known to cause challenges in academic, social, and community settings. Youth with a history of brain injury are likely to be more impulsive, reactive, and experience difficulties in learning new skills, compared to their peers without brain injury. These youth might have a hard time paying attention, not think about consequences to their actions, or act out more aggressively. Brain injuries in children increase the likelihood of police involvement and the rate of recidivism throughout childhood and adulthood.

4) With this information, do you think any other youth that you interact with have experienced a brain injury?

    How might knowing this information change your perspective on interacting with youth with possible brain injuries?

5) What challenges do you anticipate or have you experienced in interacting with youth with a brain injury or

youth who have behaviors similar to those seen after a brain injury?

6) How could a training on childhood brain injury help you in your everyday work?

What information would be helpful? What scenarios would be helpful to discuss?

What expectations do you have for a training on brain injury in justice-involved youth?

7) Tell us about what format is most helpful for trainings. We want this training to be useful to your everyday work. Tell us about ways to deliver information, activities, or overall features of trainings that have been helpful in the past.

Post-Training Focus Group Questions

1) Tell us what information you thought was helpful from the training. (e.g., statistics about justice-involved youth, information on outcomes for justice-involved youth with TBI, ways to approach working with justice-involved youth with TBI)

2) Tell us what you wanted to learn more about. What topics should have been included or expanded on?

3) Tell us what format or activities you thought was most effective in delivering information.

(e.g., PowerPoint, videos, scenarios, examples, role play)

4) Tell us how we could improve the format or activities of the training.

5) Tell us how the training has impacted your everyday work, if it has at all.

(e.g., perceiving youth differently, acting differently)

6) If we conducted more trainings in the future, would you be interested in attending? What is most important to cover? In what format?

7) What other feedback do you have on the training?