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**Comorbid Traumatic Brain Injury and Visual Impairment:
Vocational Rehabilitation Service Provision and Agency-Level Outcomes**

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Abstract

Introduction: The purpose of this study was to investigate how services are provided to state-federal vocational rehabilitation (VR) consumers with comorbid traumatic brain injury (TBI) and visual impairment and the prevalence and competitive employment rates of this population.

Methods: We utilized a mixed-methods approach by incorporating interview data from 51 VR agency administrators (to identify strategies used to serve these consumers) and VR case service data (to identify prevalence and competitive employment rates at the agency level). We combined the data to examine the relationship between strategies used and the prevalence of and employment outcomes for this population. A modified grounded theory approach was used for qualitative data analysis and descriptive statistics and ANOVAs were used for quantitative data analyses.

Results: Strategies used to serve these consumers included collaboration between counselors, involvement of external organizations, specialized TBI units/caseloads, staff training in TBI, and personnel with dual expertise in TBI and visual impairment. Over a third of agency administrators reported that they did not do anything special or different to serve this population. The average agency percentage of consumers with visual impairment who also had a TBI was 2.1%. Their average competitive employment rate by agency was 43.2%. Employing staff with dual expertise in TBI and visual impairment was associated with serving a greater percentage of consumers and having a higher competitive employment rate.

Discussion: No agencies had a unique service delivery program or method to serve this population, perhaps due to its low prevalence. Agencies had substantial variability in the proportion of consumers with TBI and visual impairment served and their competitive employment rates.

Implications for practice: Training VR professionals to develop expertise in both TBI and visual impairment may help agencies better serve these consumers.

Comorbid Traumatic Brain Injury and Visual Impairment: Vocational Rehabilitation Service Provision and Agency-Level Outcomes

Traumatic brain injury (TBI) refers to an injury to the head (open or closed) that results from an external physical force. Examples of events that commonly cause TBI include falls, assaults that involve blows to the head, car accidents, and combat-related injuries in active-duty military personnel (Centers for Disease Control and Prevention [CDC], 2015). The definition of TBI excludes brain injuries that are secondary to non-traumatic events, such as stroke, although both types of brain injury may result in similar symptom profiles (CDC, 2015; Iskow, 2010). The CDC (2015) estimates that between 3.2 and 5.3 million Americans are living with TBI-related disability.

Because they are characterized by significant damage to the brain, TBIs can result in a wide range of physical and cognitive symptoms, such as impaired fine and gross motor abilities; emotional regulation deficits; difficulties with speech, memory and learning; and sensory impairments (CDC, 2015). People who sustain a TBI may have a pre-existing visual impairment (i.e., blindness or low vision) or may acquire one related to the injury. Rehabilitation can be especially complex for those who experience a visual impairment associated with a TBI; learning blindness skills may be particularly challenging due to short term memory loss, spatial and perceptual difficulties, and physical limitations (Iskow, 2010; Kingston, Katsaros, Vu, & Goodrich, 2010). Unfortunately, visual impairment is not always be addressed in rehabilitation treatment for TBI (LeJeune, 2010).

Research on the prevalence of comorbid TBI and visual impairment has largely focused on visual impairment that occurs following TBI in veteran populations; this focus may be due to concerns about blast injuries being a particularly likely cause of comorbid TBI and sensory impairment (Iskow, 2010). In a sample of inpatient veterans with moderate to severe TBI,

Brahm and colleagues (2009) found that visual acuity loss of 20/100 to no light perception was present in 13% and visual field deficits were present in 32.3% of the veterans. Both acuity loss (1.2%) and visual field loss (3.6%) were much less common among outpatient veterans with mild TBI (Brahm et al., 2009). Vision problems associated with TBI may resolve over time, but some may be long-lasting or permanent (Iskow, 2010; Kingston et al., 2010). Although many of these vision problems may not be severe enough to result in a visual impairment that reaches the level of disability, individuals with TBI may experience a number of different visual dysfunctions and/or ocular impairments that intersect to create functional impairment (Goodrich et al., 2013; Iskow, 2010).

Employment for People with TBI and People with Visual Impairments

Both people with visual impairments and those with TBI are consistently employed at much lower rates than the general population. Arango-Lasprilla and colleagues (2008) found that 55% of whites and 76% of minorities with moderate or severe TBI who were employed at the time of injury were not employed one-year post-injury and that approximately 90% who were not employed at the time of injury remained so at one-year follow-up. Gary and colleagues (2010) found that almost 40% of white patients and 63% of non-white patients were not employed 10 years following a moderate or severe TBI, indicating that unemployment following TBI is a long-term issue. Approximately 65% of people with visual impairments are not employed, more than twice the rate of the general population (U.S. Bureau of Labor Statistics, 2018). The presence of additional disabilities has been linked to lower employment rates in people with visual impairment (Giesen & Cavanaugh, 2012, 2013; McDonnall, 2016), although other researchers have found no significant contribution of secondary disability status to unemployment for this population (Capella-McDonnall, 2005; Darensbourg, 2013). Given the

potential severity and variety of impairments associated with TBI (CDC, 2015), many individuals with combined TBI and visual impairment could face additional challenges in finding and retaining employment. Indeed, overall greater functional impairment has been consistently linked to lower employment rates in people with moderate to severe TBI (Arango-Lasprilla et al., 2008; Gary et al., 2010).

Present Study and Research Questions

Despite the relatively high rates of visual problems associated with TBI, the increased potential risk of TBI among people with visual impairment, and the low employment rates among both populations, we are not aware of any research specifically examining state-federal vocational rehabilitation (VR) practices or outcomes for consumers with comorbid TBI and visual impairment. Researchers have found that another subpopulation of consumers with visual impairments, those who are deaf-blind, may benefit from specialized VR practices that include a deaf-blindness specialist assisting with services or collaboration between a counselor for the blind and a counselor for the deaf (Authors, in press). We do not know how VR agencies serve consumers with comorbid TBI and visual impairment or what approaches are most effective. Thus, we conducted a study to examine how agencies serve these consumers, the prevalence of TBI among the VR visually impaired population and competitive employment rates for these consumers. Our research questions were as follows:

1. How do VR agencies provide services to consumers with comorbid TBI and visual impairment?
2. What proportion of consumers with visual impairments who receive VR services have a TBI by agency?
3. What proportion of VR consumers with comorbid TBI and visual impairment obtain

competitive employment by agency?

4. Are agency service provision factors associated with proportion of consumers with comorbid TBI and visual impairment that are served by agency?
5. Are agency service provision factors associated with agency-level competitive employment rates for consumers with comorbid TBI and visual impairment?

Method

We utilized a mixed-methods approach to investigate service provision and employment outcomes for VR consumers with comorbid TBI and visual impairment. We obtained qualitative data from interviews with VR agency administrators and quantitative data from the Rehabilitation Services Administration's Case Service Record Report Data, referred to as RSA-911 data (RSA, 2013). These two data sources were analyzed and reported separately to answer our first three research questions, and combined to answer our final two research questions.

Interview Data

The data on service strategies for consumers with comorbid TBI and visual impairment were taken from interviews conducted in 2016 and 2017 with VR agency administrators from all 50 states and the District of Columbia. Twenty-seven states have one VR agency that serves all consumers with disabilities in the state (combined agencies), and 24 states have two VR agencies – one that serves only people with blindness/visual impairments (separate agencies) and one that serves consumers with all other types of disabilities (general agencies). In states with a separate and a general agency, an administrator from the separate agency was interviewed. In states with one VR agency, an administrator from that combined agency was interviewed. The director of each agency was invited to participate in the interview; this person or a designee completed the interview. Administrators from all 51 agencies participated in the study; their positions included

agency director, director of blind services, assistant or deputy director, and director of field services. The main question regarding serving consumers with comorbid TBI and visual impairment was “Does your agency have a unique program or method of providing services to consumers with combined TBI and visual impairment?” Based on administrators’ response to that question, interviewers asked follow-up questions to gain additional information about service provision in that agency. Common follow-up topics included a) whether the agency has staff with expertise in both TBI and visual impairment and b) if and how staff collaborated with other counselors to serve consumers with comorbid TBI and visual impairment.

Coding and themes. Most administrators elaborated on how their agency serves consumers with comorbid TBI and visual impairment, therefore, we developed themes based on interviewee responses using a modified grounded theory approach for short-form qualitative data (Glaser, 1998; Strauss & Corbin, 1990). An initial list of themes (i.e., strategies used to serve these consumers) was generated through independent reading and discussion of the transcripts by all three researchers. Using this list, the researchers re-read the transcripts and coded whether or not each agency used the identified strategies. The researchers then discussed and refined the list of strategies, which resulted in seven themes: a) collaboration within and between VR agencies; b) use of external organizations; c) substantial involvement of external organizations; d) staff with expertise in both TBI and visual impairment; e) provide staff training on TBI; f) specialized TBI units or counselors; and g) do nothing special or different to serve consumers with comorbid TBI and visual impairment. Each researcher then re-coded the transcripts using this list of strategies. Following this second round of coding, inter-rater agreement was assessed by comparing codes across all raters. Inter-rater agreement was 84.6%, with fifty-five discrepancies identified. All discrepancies were resolved through discussion and review of interview

transcripts until a consensus was reached.

RSA-911 Data

Sample. RSA-911 data contains information about consumers whose cases were closed during each fiscal year (FY), including demographics, primary and secondary disability, cause of primary and secondary disability, services received, agency that provided services, and outcomes. We utilized data from FYs 2013, 2014, and 2015 to identify a sample of consumers who had a primary or secondary disability of blindness (code 01) or visual impairment (code 02) and a cause of TBI (code 37) for either their primary or secondary disability. VR counselors assign these codes for each consumer, but additional information about how to assign codes (i.e., a definition for each disability and cause) is not provided in the RSA-911 manual (RSA, 2013). Each VR agencies is able to establish specific criteria, with the general requirement that the disability identified results in an impediment to employment. We limited our sample to those consumers who were accepted for and received services (closure codes 3 and 4) as the focus of our study was service provision. We only included consumers who were served by combined and separate agencies, to match our qualitative data sample. Three years of data were utilized to increase sample size; 914 consumers with combined TBI and visual impairment were served and closed by combined and separate agencies during the timeframe. To determine proportion of VR consumers with visual impairments who have a TBI (research question 2), we identified a sample of consumers who met the abovementioned criteria, without the requirement that TBI be a cause for either their primary or secondary disability. This sample consisted of 55,140 consumers. We utilized these consumer samples to create agency-level averages of percent of consumers served with a TBI and percent of consumers with a TBI who were competitively employed at case closure, resulting in a sample size of 51 for statistical analyses.

Variables and data analyses. RSA-911 variables utilized for the study were agency that provided services, case closure status, and employment category at case closure. Employment category was used to identify consumers who were competitively employed at closure. Individuals who were employed with or without supports in an integrated setting (employer job), self-employment, or Business Enterprise Program (BEP), and compensated at or above the federal minimum wage were classified as competitively employed. Those closed in other employment categories and those closed without employment were classified as not competitively employed. Independent variables utilized for research questions 4 and 5 were six of the seven service factors identified in the interview data (use of external organizations was not included in analyses). The dependent variables were agency-level proportion of consumers with TBI served and competitive employment rates for this population. Descriptive statistics (means, standard deviations, and ranges) were used to address research questions 2 and 3. ANOVA was utilized to address research questions 4 and 5. Eta-squared was utilized as an effect size measure. SAS 9.4 was employed for all statistical analyses.

Results

None of the VR agency administrators described a particularly unique program or method of providing services to consumers with combined TBI and visual impairment. Some agencies have a specific method or procedure for providing services to consumers with TBI, but nothing unique for those with TBI and visual impairment. Despite not having a unique program or method, administrators shared information about how they use collaboration, external organizations, staff with expertise, and specialized units or counselors to meet the rehabilitation needs of this population.

Collaboration

Overall, 45.1% ($n = 23$) of the 51 administrators reported using between-agency or within-agency collaboration to serve consumers with combined TBI and visual impairment. The type of collaboration differed by agency type; separate agencies used between-agency collaboration and combined agencies used within-agency collaboration.

Between-agency. Twelve of the 24 separate agency administrators (50.0%) indicated that their agency uses between-agency collaboration (i.e., collaborating with their state's general VR agency) to provide services to consumers with combined TBI and visual impairment. Seven of those administrators used phrasing such as *dual case* ($n = 4$), *joint case* ($n = 1$), *shared case* ($n = 1$), and *joint planning* ($n = 1$) when describing how they collaborate with the general agency, indicating that a counselor from each agency opens a case and they work together on service provision for the consumer. The other five administrators used more general phrasing to describe collaboration with the general agency. Examples include "the supervisors and then the counselors would get together and discuss which is the best way for each agency to provide services to the individual, who is going to cover what services" and "for individuals who have a traumatic brain injury, one of the things that we will do is we will really consult."

The other 12 separate agency administrators (50.0%) did not report collaboration with the general agency as a primary method of serving consumers with combined TBI and visual impairment, but several described limited or infrequent interactions between their staff and the general agency staff. For example, one administrator stated that collaboration with the general agency may occur in situations that are beyond the separate agency counselors' knowledge or competency. Other administrators indicated that their counselors may consult with counselors at the general agency or use them as a resource.

Within-agency. Eleven of the 27 combined agency administrators (40.7%) reported

using within-agency collaboration to serve consumers with combined TBI and visual impairment. In most of these cases, a counselor who serves consumers with visual impairments consults or works with a counselor who serves consumers with TBI. One administrator said:

We have one counselor, for instance, that has expertise in TBI and she has the credentials; so, when a consumer has TBI, we have her as part of the team to help this individual. So, although the primary counselor might be in the blind unit, we also have this other counselor who is assisting the other [blind unit] counselor to help this individual.

Another administrator described service coordination among multiple agency staff for a consumer with blindness and a TBI: “We all met and staffed the case so that client could get all services from each division.”

External Organizations

Some administrators reported use of and substantial involvement with external organizations as a component of service provision for consumers with combined TBI and visual impairment. Service provision for 23 agencies (45.1%) involved use of external organizations, including medical centers, hospitals, rehabilitation centers, brain injury programs, developmental disability agencies, and other state and private agencies. Twelve administrators (23.5%) reported using these organizations purely as vendors or contractors (e.g., to conduct assessments) or only for specific situations (e.g., to provide supported employment services). The other 11 administrators (21.6%) described a deeper level of involvement with external organizations; they used phrasing such as *work closely with*, *partner with*, *do a lot of partnering with*, *have a liaison with*, *developed some working relationships with*, and *they are a great partner of ours* when referring to the external organizations. For example, one agency administrator stated:

In addition to that, we also work very closely with the Rehabilitation Hospital of [state name]. And we purchased from them a service called Resource Facilitation, which is really specifically geared to helping people with traumatic brain injury be successful in employment, and other things, and setting them up with the appropriate supports that they need. But it isn't only for people who have traumatic brain injury and visual impairment.

Staff Expertise and Training

Only three administrators (5.9%) reported having a person on staff within their agency with expertise in both TBI and visual impairment. One separate agency administrator reported having “an employee who is certified on traumatic brain injury” who is an expert on TBI and vision loss. One combined agency has “vision specialists” with TBI expertise, and another has personnel with TBI and visual impairment expertise in central and local offices. An additional six administrators (11.8%) indicated that their staff members who serve consumers with visual impairments receive training about TBI. For instance, one administrator said that agency staff “almost religiously attend the TBI and stroke conference each year.” Another administrator described how the state brain injury association provides training for the agency’s counselors:

We have a practice at the agency that every quarter, the VR counselors throughout the state, they develop a professional level training meeting, and, invariably once a year, we have folks coming out from the Brain Injury Association to talk to our counselors about some of the latest techniques of working with folks with traumatic brain injury.

Specialized TBI Units or Counselors

Nine administrators (17.6%), all from combined agencies, indicated that their agency has a specialized TBI unit, program, or service providers. Specifically, administrators reported having a TBI unit, program, or team ($n = 4$; 7.8%); counselors with expertise in TBI ($n = 4$;

7.8%); and specialized TBI caseloads ($n = 1$; 2.0%). Some agencies used these personnel to provide direct services to consumers with TBI and visual impairment and some used them as a resource to help serve these consumers. One agency has a TBI program plus TBI counselors and TBI care coordinator positions. The TBI care coordinators work with consumers after they leave the hospital but before they are ready for VR services: “they kind of are at the bridge between being injured in the hospital and being ready to come to VR for services.”

No Special Services

Eighteen administrators (35.3%) did not report any special services or differences in service provision for consumers with combined TBI and visual impairment compared to other consumers with visual impairments served by their agency. This category included eight of the agencies that used external organizations as vendors or contractors without substantial involvement with them. For example, one administrator stated that consumers with combined TBI and visual impairment are “served on a regular blind counselor’s caseload” and another stated that “any of the VR counselors that work here would provide those services and would seek out additional resources wherever they could.” One administrator specified that agency staff in the past have primarily focused on visual impairment and “any kind of secondary conditions, any kind of secondary impairments have been either ignored or not addressed.” This administrator indicated that agency culture was changing and that training on how to deal with additional disabilities was being provided to staff.

RSA-911 Data

The overall agency-level average percentage of consumers with visual impairments who had a TBI was 2.1% ($SD=1.20\%$). This percentage ranged considerably by agency, from 0 to 5.9%. The number of consumers served ranged from 0 to 92 ($M=17.92$, $SD=18.93$). The overall

agency-level average percentage of consumers with comorbid TBI and visual impairment who obtained competitive employment was 43.2% ($SD=20.49\%$). This percentage also ranged considerably by agency, from 0 to 100%. Two agencies did not close any consumers with competitive employment, one closed 80% and another closed all consumers with competitive employment. However, each of these agencies served five or fewer consumers.

Having staff with dual expertise in TBI and visual impairment was the only agency service provision factor associated with both proportion of consumers with visual impairments that have a TBI and agency-level competitive employment rates (see Table 1 for ANOVA results and percentages). Agencies that had staff with dual expertise served a significantly higher percentage of consumers with TBI and also closed a much higher percentage of these consumers as competitively employed. The size of these effects were medium (for competitive employment) and large (for proportion of consumers with TBI).

Discussion

We investigated VR service provision to a special population of consumers with visual impairments: those with comorbid TBI. A primary focus of the study was increasing our knowledge about how VR agencies provide services to this population, and identifying any unique service delivery programs or methods being utilized. Unfortunately, no agencies currently have a unique program for providing services to consumers with comorbid TBI and visual impairments. Common service delivery methods were collaboration between counselors (one with expertise in visual impairments and one with expertise in TBI), and utilizing external organizations that have TBI expertise. Several administrators acknowledged that internal staff do not have TBI expertise, and therefore agencies rely on external organizations (including the state's general agency for some separate agencies and external organizations for both separate

and combined agencies). Only three agencies had personnel with dual expertise in TBI and visual impairments.

Although most agencies use strategies to attempt to address the specific needs of this population, more than a third indicated that service provision for consumers with comorbid TBI is essentially the same as service provision for all consumers with visual impairments. Given that TBI can involve a large number of impairments that often require specialized intervention, this may be a concern. However, the low percentage of consumers with visual impairments who also have a TBI may explain the lack of specialized services, and the lack of unique programs created for this population.

The proportion of visually impaired consumers with TBI varied by agency, yet all agencies had a percentage below 6%. Only one service factor was related to this proportion: having a staff member with dual expertise. This factor had a strong relationship with proportion of consumers with TBI served; agencies with staff member(s) with dual expertise served a percentage approximately twice as large. Having a person or persons with this expertise on staff may make VR personnel more aware of the presence of TBI among consumers with visual impairments. In addition, some agencies may do a better job of documenting a history of TBI than others. One agency reported that they do a screening with all visually impaired consumers to determine a history of TBI. No other agencies reported a similar screening process, but this question was not specifically asked.

Competitive employment rates for consumers varied dramatically by agency. Although outcomes for visually impaired consumers also vary considerably by agency, their range is much smaller and the variability exhibited for consumers with both TBI and visual impairment was much greater than that seen in all consumers with visual impairment (Author, 2018). One

potential contributing factor is the extremely small number of consumers with TBI served by agency. During this study's three-year period, 21 agencies served and closed fewer than 10 consumers with comorbid TBI and visual impairment.

Having personnel with dual expertise in TBI and visual impairments was the only service factor that was significantly associated with competitive employment outcomes. This finding potentially indicates the importance of having one person who understands both conditions involved in service provision for these consumers. As mentioned previously, having dual expertise staff was also associated with a higher proportion of consumers with TBI served. Perhaps having staff with dual expertise increases the likelihood of identifying a TBI, and consequently providing appropriate services to help consumers obtain competitive employment. Many agencies rely on collaboration between counselors or with external organizations to meet the needs of these consumers. Neither of these service provision options are likely to result in consumers interacting with professionals who understand both conditions well, as it is unlikely that external organizations have personnel with expertise in both TBI and *permanent* visual impairment, although they may be well-versed in the other vision problems that often accompany TBI.

Limitations

Limitations to the qualitative and quantitative components of this study should be considered when interpreting our findings. First, the interviews with VR agency administrators only included one consistent question. Some agencies may be doing more to serve consumers with combined TBI and visual impairment, but unless administrators volunteered that extra information, it was not reflected in our data. Second, we only had interview data for combined and separate agencies, but general agencies also serve consumers with combined TBI and visual

impairment. Consequently, the qualitative data did not include perspectives of general agency administrators, and consumers served by general agencies were excluded from this study.

General agency personnel and consumers would be important to include in future investigations of VR service provision for consumers with combined TBI and visual impairment.

Some consumers with combined TBI and visual impairment may not be identified in the RSA-911 data. For example, consumers could have a TBI that was not documented as a cause of their primary or secondary disability. Another possibility is that consumers may have a TBI documented as the cause of their primary or secondary disability, but their visual impairment may not be documented. As a result, our quantitative analyses may inadvertently exclude some consumers with combined TBI and visual impairment because they were not identified as such in the dataset. Finally, this study only involved univariate analyses, which may not tell the whole story. Additional research involving multivariate analysis at the consumer level is needed to document associations between service provision factors and outcomes while controlling for consumer characteristics.

Implications for Practice

Our results support the importance of professionals who serve individuals with comorbid TBI and visual impairment having expertise in both conditions, and we recommend that agencies have at least one staff member with this dual expertise. Because few VR agencies have personnel with dual expertise, counselors and other professionals who work with individuals with visual impairments could pursue TBI-related training and certification. One option for professionals who frequently work with individuals with TBI would be to pursue Certified Brain Injury Specialist certification and related training offered through the Brain Injury Association of America (BIAA) and the Academy of Certified Brain Injury Specialists (BIAA, 2018).

Additionally, professionals could seek specific training on TBI and combined TBI and visual impairment as part of their on-going professional development. For example, the National Technical Assistance Center on Blindness and Visual Impairment offers a free online continuing education course covering basic information about brain injury and vision loss. Other organizations, such as the Council on Rehabilitation Counselor Certification and Envision University, offer continuing education courses related to brain injury and TBI. Free online courses about TBI are available from the Defense and Veterans Brain Injury Center and the Working with People with Traumatic Brain Injury website. Furthermore, national, state, and local conferences may offer presentations and workshops on TBI or combined TBI and visual impairment. Although a single course will not provide expertise on TBI or combined TBI and visual impairment, comprehensive and continuing professional development in these areas may be helpful in improving counselor competency in working with this population.

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Table 1

Differences in Agency-Level Proportions of Consumers with TBI Served and Competitive Employment Rates Based on Service Factors

| Service Factor | Consumers with TBI ^a | | | | | Competitive Employment ^b | | | | |
|-------------------------------------|---------------------------------|-----------|----------|----------|----------|-------------------------------------|-----------|----------|----------|----------|
| | % | <i>SD</i> | <i>F</i> | <i>p</i> | η^2 | % | <i>SD</i> | <i>F</i> | <i>p</i> | η^2 |
| Collaboration | | | 2.42 | .10 | .09 | | | 0.18 | .84 | .007 |
| Between-agency | 1.6 | 0.77 | | | | 46.3 | 19.48 | | | |
| Within-agency | 2.7 | 1.29 | | | | 42.4 | 17.02 | | | |
| None | 2.1 | 1.25 | | | | 42.2 | 22.65 | | | |
| External organizations ^c | | | 0.11 | .75 | .002 | | | 0.17 | .68 | .004 |
| Yes | 2.2 | 1.44 | | | | 40.8 | 19.05 | | | |
| No | 2.1 | 1.15 | | | | 43.8 | 21.01 | | | |
| Dual expertise | | | 8.35 | < .01 | .15 | | | 4.28 | .04 | .08 |
| Yes | 3.9 | 1.75 | | | | 66.2 | 7.68 | | | |
| No | 2.0 | 1.08 | | | | 41.7 | 20.20 | | | |
| Staff training | | | 0.01 | .91 | < .001 | | | 0.01 | .94 | < .001 |
| Yes | 2.0 | 0.87 | | | | 43.8 | 14.21 | | | |
| No | 2.1 | 1.24 | | | | 43.1 | 21.32 | | | |
| Specialized TBI unit/counselors | | | 1.10 | .30 | .02 | | | 0.00 | .96 | < .001 |
| Yes | 2.5 | 1.11 | | | | 42.9 | 14.59 | | | |
| No | 2.0 | 1.21 | | | | 43.3 | 21.71 | | | |
| No special services | | | 0.16 | .69 | .003 | | | 0.13 | .72 | .003 |
| Yes | 2.0 | 1.05 | | | | 44.7 | 23.45 | | | |
| No | 2.1 | 1.29 | | | | 42.4 | 19.13 | | | |

Note. TBI = traumatic brain injury.

^a*N* = 51

^b*N* = 50, due to one agency not closing anyone with TBI and visual impairment

^cVariable was *substantial* involvement with external organizations rather than use of external organizations.