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Traumatic Brain Injury:
The Efficacy of a Half-Day Training for School Psychologists

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Abstract

The incidence rates of traumatic brain injuries (TBI) are increasing, yet educators continue to be inadequately trained in assessing and serving students with TBIs. This study examined the efficacy of a half-day TBI training program for school psychologists designed to improve their knowledge and skills. Results of quantitative and qualitative survey analysis indicated there was little increase in knowledge and skills from pre-training to one-year follow-up, although participants did increase in confidence related to their decision-making abilities in working with students with TBI. The data indicate a need for future study of more effective training models.

Introduction

Traumatic Brain Injury (TBI) is an acquired injury to the brain that is a result of an external force that causes disability and/or impairment (U.S. Department of Education, 2004). TBIs can result in a range of cognitive, behavioral, and/or academic deficits; thus students with TBI may require specialized assessment, instruction, modifications, and interventions in the educational environment (Deidrick & Farmer, 2005). Due to relatively high rates of TBI incidence, it is important that all school personnel, including school psychologists, have knowledge about and skills for how to best identify and serve students with TBI.

Educators tend to believe TBI is a low incidence disability; however, statistical data indicates it is a major health concern (Fowler & McCabe, 2011). While much recent media attention has focused on brain injuries in war veterans and professional athletes, school-aged children are at the highest risk to sustain a TBI (Arroyos-Jurado & Savage, 2008). TBI is the primary cause of injury, death, and long-term disability in children and adolescents (National Institutes of Health, 2002; Yeates, 2000). Research indicates that more than 130,000 students nationwide have sustained a TBI that would be considerable enough to qualify for special education services (Glang, Todis, Thomas, Hood, Bedell, & Cockrell, 2008). However, according to the U.S. Department of Education, National Center for Education Statistics (2011), only about 25,000 students nationwide are served under the IDEA disability category of TBI. If a school district has 10,000 students, the district can expect 20 or more students to sustain a TBI and need educational supports and services (Arroyos-Jurado & Savage, 2008).

Because TBI is a disability with varied outcomes, it is important for educators to be aware of the possible impairments students with TBI may exhibit so that the children can receive the most appropriate education services (Arroyos-Jurado & Savage, 2008). School psychologists thus need to understand pre-injury function, post-injury function, and the different factors that can be linked to both the recovery and outcomes of TBI (Arroyos-Jurado, Paulsen, Ehly, & Max,

2006). Also, many of these problems may not manifest themselves until months or even years after the injury has occurred (Glang, Tyler, Pearson, Todis, & Morivant, 2004). Because there are clear educational needs for individuals with TBI, educators and support staff have a responsibility to gain fuller awareness and knowledge (Hux, Walker, & Sanger, 1996).

School Psychologists and Traumatic Brain Injury

A student with TBI can create challenges for schools and require unique services, assessments, behavioral plans, and continuous examination of services for and progress made by the student (Bullock, Gable, & Mohr, 2005; Deidrick & Farmer, 2005; Stavinoha, 2005, Shaughnessy et al., 2006). School psychologists play an important role in several aspects, including assessment, treatment, and progress-monitoring (Hooper, 2006).

Knowledge of school psychologists. A survey conducted by Hooper (2006) found that school psychologists lacked the knowledge required to recognize the typical myths and misconceptions about individuals with TBI. Over 83% of the respondents indicated they did not believe the training they had received was adequate enough to work with the TBI population. Even the subgroup of respondents who felt they *had* sufficient knowledge and training to work with the TBI population tended to support the myths and misconceptions as frequently as those who felt they did not have sufficient knowledge to work with students with TBI. These results indicate it is likely that school psychologists do not have adequate knowledge to work effectively with TBI students

Training of school psychologists. Many graduate training programs for school psychologists require course work in a variety of areas related to issues school psychologists will encounter, but there is often a shortage of course work relating to TBI. There is generally a course required in the area of biological bases of behavior; however, these courses typically do not have a specific focus on TBI, instead giving only an overview of the disability (Hooper, 2006).

A survey of 86 school psychology programs in the U.S. revealed these programs do not appear to be training students to work with children who have acquired brain injuries (Walker, Boling, & Cobb, 1999). In addition, of the 86 programs surveyed, only 19 of them offered a course in neuropsychology. Hooper (2006) found that if school psychology graduate programs offered a course involving neuropsychology, it was generally in a school that offered a doctoral degree in school psychology. If school psychologists have training in TBI, it is generally not from their graduate program, but rather from additional trainings, workshops, or another area of related studies (Hooper, 2006). Results from a more recent study indicated that most school psychology programs provide little instruction on TBI and that at the end of internship students do not feel adequately prepared to serve this population (Davies, in press).

Additional training in graduate programs in the area of neuropsychology and TBI can have positive effects. The increase in knowledge regarding the brain can help increase the understanding of other disabilities, such as autism, attention-deficit/hyperactivity disorder, and specific learning disabilities (Decker, 2008).

Professional Development

Importance of professional development programs. As Hooper (2006) has indicated, there is a need for additional training for educators—school psychologists in particular—in the area of TBI. Professional development can be any type of activity that increases knowledge, changes attitudes, and adds to the skill set of educators. In turn, the level of learning students receive is improved (Guskey, 2000). It is essential for all individuals, especially those in education, to update skills and knowledge related to their career (Somers & Sikorova, 2002). A professional development program can help increase an individual's skill base, which can lead to change in practice (Steinert, Meterissian, Liben, & McLeod, 2008; Steyn, 2006).

Characteristics of quality professional development programs. According to Steyn (2006), a quality professional development program requires several essential elements. First, the leader or leaders of the program are critical in the program's success. Leaders must have

knowledge in the professional development area, must be inspirational, must know how to encourage and display teamwork, and must provide individualized support. The leaders are responsible for assisting individuals in learning new skills and making changes to the way they practice. Second, the effective program must provide a model appropriate for the participants' use, one that gives specific examples for the participants to learn from. Finally, the individuals must be taught exactly how to put the knowledge they obtained during the professional development program into practice.

Specifically for education, a quality professional development program should also include direct skill training along with modeling, practice, and feedback. Such a program for TBI might include training in the area of evidence-based interventions, assisted practice with newly obtained skills, ongoing feedback through mentoring, and consultation in the school environment (Glang, Todis, Sublette, Brown, & Vaccaro, 2010). Professional development programs provide an opportunity for effective supports and instruction to be implemented by trained educators.

Despite the adverse effects of TBI, students with TBI continue to be under-served and under-identified within the school system (Glang, Todis, Thomas, Hood, Bedell, & Cockrell, 2008). Better methods of providing professional development in TBI to school-based practitioners are clearly needed. Thus, the purpose of this study was to assess the efficacy of a half-day TBI training for school psychologists. Participants' level of knowledge prior to the training and after the training was evaluated.

Methods

Research Question

This study evaluated the efficacy of a half-day TBI training in school psychologists' knowledge and skills. It was expected that upon completion of the training participants would have a better knowledge and skill base, which would lead to more effective practice in working

with students with TBI. It was also expected that participants would feel more confident in their ability to work successfully with students who sustained a TBI.

Research Design

This longitudinal mixed-methods study utilized a survey designed to evaluate the impact of the TBI training on participant knowledge and skills. Items included both questions on a five-point rating scale and open-ended questions that were analyzed qualitatively. The survey was administered to participants three times: immediately before the training, two months after the training, and one year after the training.

Participants

Participants included 82 individuals who attended the TBI in the Schools training at a statewide school psychology association conference. Participants selected for the two-month and one-year follow-up studies were those who attended the presentation, filled out the original survey, and provided contact information for the follow-up. Completion of all surveys was voluntary and the participants' identities were known only by the researcher. Email addresses and completed surveys were collected separately. The surveys were accessed only by the researchers.

Demographic information collected on the surveys included a participant's status in the school psychology profession, the highest degree attained, when the degree was awarded, current work setting, the age of students the participant served, and the participant's level of TBI training and experience. Because the focus of the study was on impact of the training on practitioner knowledge and skills, data from the graduate students and intern survey was not included. The majority of participants (92% at pre-training, 90% at two-month follow-up, 89% at one-year follow-up) were trained at the masters or educational specialist level. The remainder held doctoral degrees. The majority worked in public school settings (94% at pre-training, 100% at both two-month and one-year follow-ups). Participants worked with a variety of age groups, preschool through high school, as shown in Table 1.

Table 1

Distribution of School Setting by age

School Setting:	Percentage at Pre-Training	Percentage at 2 Month Follow-Up	Percentage at 1 Year Follow-Up
Preschool:	7%	0%	0%
Elementary:	17%	20%	28%
High School:	6%	10%	0%
Elementary and Middle School:	13%	15%	28%
Preschool, Elementary, and High School:	4%	10%	11%
Preschool, Elementary, Middle, and High School:	23%	15%	11%
Elementary, Middle, and High School:	16%	20%	11%
Middle and High School:	1%	5%	0%
Preschool, Elementary, and Middle School:	4%	5%	6%
Preschool and Elementary:	4%	0%	6%
Preschool and Middle School:	1%	0%	0%

Instrument

The survey used in this study was modified from a questionnaire developed by Hux, Walker, and Sanger (1996) to determine speech and language pathologists’ knowledge of TBI. The revised instrument was pilot tested at the primary researchers’ university, and minor changes,

such as improvements to clarify questions, were made based on pilot participants' feedback. The final survey included five demographic questions, three open-ended questions related to training and experience, 11 knowledge questions answered on a 5-point rating scale (strongly disagree to agree), nine skills question answered on a 5-point rating scale (not qualified to highly qualified), and a final open-ended question related to primary concerns about providing services to students with TBI. It took participants approximately ten minutes to complete.

Procedures

The half-day TBI in the Schools training was presented at a statewide school psychology conference. The training was designed and conducted by a university researcher and a school psychology practitioner, both with expertise in TBI. The session was designed to give participants information about TBI and to describe a TBI initiative currently in a local school district directed at increasing awareness of TBI, better identification of students with TBI, and improving the education for students with TBI.

Baseline data on participant knowledge and skills were collected immediately prior to the TBI in the Schools training via paper-and-pencil survey. To determine changes made in the knowledge, skills, and practice by the school psychologists who attended the training, two-month and one-year follow-up studies were conducted through an online survey tool using the contact information provided by training participants. A content analysis was conducted on one of the surveys' open-ended narrative question that asked participants to describe their concerns regarding providing services to students with TBIs.

Results

This study was designed to determine the level of change, if any, in knowledge and skills of school psychologists from pre-training to their two-months and one-year post-training. The response rate for the follow-up studies was calculated from the original number of participants who completed the pre-training survey, participants who completed the two-month follow-up survey, and those who completed the one-year follow-up survey. Response rate for the two-

month follow-up was 23% of the original sample; response rate for the one-year follow-up was 22% of the original sample.

The questions used to determine participants’ knowledge and skills related to TBI were on a 5-point Likert Scale format (Strongly Agree to Strongly Disagree). The ordinal/interval data that were obtained from the responses was converted into scaled data. Scores were converted by giving correct answers (answering either Strongly Agree or Strongly Disagree correctly) 2 points. Partially correct answers (answering Somewhat Agree or Somewhat Disagree) were given 1 point. Incorrect answers (included all incorrect responses for the question and responses of Uncertain) were given 0 points. For example, when looking at the question *Most public schools have at least one student who has sustained a TBI*, the answer is True, or Strongly Agree. The answer of Strongly Agree would earn the participant 2 points, Somewhat Agree would earn 1 point, and Uncertain, Somewhat Disagree, or Strongly Disagree would earn 0 points. An independent samples *t* test was used to analyze the knowledge- and skill-based questions. The p-value was set at .05 to determine significance. Data were also collected on how comfortable and qualified the participants felt in regards to specific skills in relation to TBI by using a 5-point Likert Scale (Not at all Qualified to Highly Qualified). Descriptive statistics were used to analyze the Likert Scale questions.

Training of Participants

Training in TBI was determined by self-report on the pre-training survey. Participants reported whether or not they had received TBI training, and if so, what type of training they had received. Type of training may have been a training session, training, or coursework during a graduate program. Of the participants, 46% had not received any type of training prior to the training, and 54% had received some type of training (see Table 2).

Table 2
Distribution of TBI Training Prior to Pre-training Survey

Type of Training:	Percentage:
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No Training	47%
Coursework only	35%
Coursework and Training Session/Workshop	12%
Training Session or Workshop only	6%

Participants who attended a TBI training session or workshop prior to the TBI in the Schools training indicated these included workshops conducted by personnel from Children’s Hospital, completion of a school neuropsychology year-long training program, neuropsychology certification, and National Association of School Psychologists (NASP) convention workshops.

Number of Years since Degree and Identification

The relationship between the number of years since participants had obtained their last degree and the number of TBI students whom they had identified or worked with was examined. Participants varied regarding the average number of students with TBI they had served when compared to the number of years since they earned their last degree (see Table 3).

Table 3
Number of Years Since Previous Degree and Number of Students Identified with TBI at Pre-training

Number of years since last degree:	Average number of students identified:
0-8 years since last degree obtained:	1.1
9-18 years last degree obtained:	2.9
19-28 years last degree obtained:	2.8
29-38	2.3

At the follow-up studies, participants were given the opportunity to state the number of TBI students they had identified in the past year. At the two-month follow-up, 8 of the 19 participants reported they had identified at least one student with a TBI in the past year, and on average, 1.4 students with TBI. At the one-year follow-up, 4 of the 18 participants reported they had identified at least one student with a TBI in the past year, and on average, 1.3 students with TBI. At the pre-training, participants had identified or worked with approximately 2.3 students with a TBI, on average.

Knowledge and Skills

The hypothesis was that, upon completion of the training, participants would have an increase in knowledge and skills. Overall, there was an increase in knowledge and skills from pre-test to two-month follow-up; however, that knowledge was not maintained at the one-year follow-up. An independent-samples *t* test was conducted, with the time of the training taking place as the independent variable (pre-training, two month follow-up, one year follow-up) and knowledge of a specific TBI skill or practice as the dependent variable. An independent samples *t* test was used as opposed to a paired samples *t* test due to an inconsistent sample size.

When examining the pre-training knowledge and skills with the two-month follow-up knowledge and skills, the test yielded significant results, $t(378.53)=-4.70, p=.00$. Participants reported significantly more knowledge and skills according to the survey at the two-months post-training ($M=1.78, SD=.56$) when compared with pre-training ($M=1.56, SD=.70$).

When examining the pre-training knowledge and skills with the one-year follow-up knowledge and skills, the test did not yield significant results: $t(284.72)=-1.56, p=.12$. Participants did not report significantly more knowledge and skills according to the survey at the one-year post-training ($M=1.65, SD=.72$) when compared with pre-training ($M=1.56, SD=.70$).

Participants from the TBI in Schools training demonstrated knowledge in several areas at the *two-month follow-up* as measured by the percentage of correct answers (see Table 4). A greater percentage of participants with training knew, for example, that a multifaceted evaluation

should not be delayed for a student who has sustained a moderate to severe TBI, that students with TBI have difficulty forming and maintaining relationships, that behavior problems are common among students with TBI, that goals for students with TBI need to be altered frequently, and that less structured measures are more beneficial than standardized tests when assessing deficits secondary to TBI.

Participants from the TBI in Schools training demonstrated strength in several areas at the *one-year follow-up* as measured by the percentage of correct answers (see Table 4). A greater percentage of participants with training knew, for instance, that a multifaceted evaluation should not be delayed for a student who has sustained a moderate to severe TBI; that there are many similarities between students with ADHD and students with TBI; that students with TBI have difficulty forming and maintaining relationships; that goals for students with TBI need to be altered more frequently; and that less structured measures are more beneficial than standardized tests when assessing deficits secondary to TBI.

Table 4
Percentage of Participants Answering Knowledge Questions Correctly

Question:	Pre-Training N=82	2 Month Follow-Up N=19	1 Year Follow-Up N=18
Neuropsychological evaluation must be conducted prior to planning an educational program for a student with TBI. (F)	74%	79%	83%
A multifaceted evaluation should be delayed for a student who has sustained a mod. to severe TBI until brain has had time to recover. (F)	39%	79%*	78%*
Most public schools have at least one student who has sustained a TBI. (T)	94%	95%	94%
Many students with TBI display characteristics similar to those with ADHD. (T)	85%	95%	100%*

Student with TBI often have difficulty forming and maintaining relationships. (T)	60%	89%*	73%*
Students who have sustained mild TBIs rarely display behavior problems. (F)	74%	95%*	72%
TBI is equally common in males and females. (F)	35%	53%	50%
Recovery following TBI may continue for several years. (T)	96%	100%	100%
A student’s cognitive and behavioral problems resulting from a TBI may not be evident until years post-injury. (T)	73%	89%	89%
Goals for students with TBI may need to be revised more frequently than goals for students with other types of disabilities. (T)	89%	100%*	100%*
Standardized tests are more beneficial than less structured measures in assessing deficits secondary to TBI. (F)	61%	90%*	72%*

*Indicates significance at the .05 level.

Confidence at One-Year Follow-Up

The confidence of school psychologists in working with students with TBI was assessed by asking questions relating to how qualified they felt to conduct specific activities and tasks related to TBI. Participants used a five-point Likert Scale to assess their confidence and level of qualification, with a 1 being “Not At All Qualified” and a 5 being “Highly Qualified.” From pre-training to one-year post-training, participant confidence increased (see Table 5).

Table 5
Participants Rating of Qualification and Confidence

Time of Rating:	Rating of Confidence:	Qualification:
Pre-Training	2.77	Not Qualified

Two-Month Follow-Up	3.00	Somewhat Qualified
One-Year Follow-Up	3.41	Somewhat Qualified

The relationship between the increase in knowledge and how participants rated their level of comfort with specific skills related to TBI was examined. Results of self-reported skills of participants are summarized in Table 6. Relatively few participants felt competent in any area of TBI skills at the pre-training session. Responses ranged from as few as 20% of participants feeling comfortable being part of a multidisciplinary team serving a student with TBI to 41% of participants feeling comfortable monitoring classroom behavior and academic progress for students with TBI. These numbers increased to 33% and 67%, respectively, by the one-year follow-up. The most significant increases were in providing educators with information about TBI (increased from 30% at pre-training to 72% at one-year follow-up) and designing appropriate accommodations and modifications for students with TBI (increased from 27% at pre-training to 67% at one-year follow-up).

Table 6
Percentage of Self-Reported Skills of Participants

Skill Area Qualification	Pre-Training N=82	2-Month Follow-Up N=19	1-Year Follow-Up N=18
Be a part of a multidisciplinary team serving a student with TBI.	20%	21%	33%
Serve as a case manager for a student with TBI.	24%	26%	38%
Provide educators with information about TBI.	30%	32%	72%

Provide students in my school with information about TBI.	27%	32%	44%
Provide assessment services for students who display signs of TBI.	22%	21%	38%
Provide appropriate school-based interventions for students with TBI.	30%	32%	39%
Design appropriate accommodations and modifications for students with TBI.	27%	48%	67%
Differentiate between students with TBI and students with cognitive impairments.	25%	42%	56%
Monitor classroom behavior and academic progress for students with TBI.	41%	42%	67%

Concerns

As part of the pre-training assessment and both follow-up assessments, participants responded to an open-ended question that asked *what their primary concerns were related to providing services for student with TBIs*. A content analysis was conducted on the open-ended questions to describe the comfort, qualification, and concerns of school psychologists. The researchers evaluated patterns and themes that emerged from participants’ responses at each evaluation period, establishing the following categories of concerns: perception of TBI as a low-incidence disability, coordination with outside agencies, resources and funding, academic programming, lack of training and professional development, determination of whether or not an injury had occurred, requirements for special education qualification, and locating resources (see Table 7).

Table 7
Self-Reported Concerns of Participants

Self-Reported Concerns of Participants:	Number of Participants Reporting Concern	Number of Participants Reporting Concern at 2-	Number of Participants’ Reporting Concern
------------------------------------------------	-------------------------------------------------	-------------------------------------------------------	--------------------------------------------------

	at Pre-Training (N=82)	Month Follow-Up (N=19)	at 1-Year Follow-Up (N=18)
Low incidence disability	5	0	2
Communication with medical professionals	4	3	3
Resources and funding	1	0	4
Academic programming	7	3	0
Lack of training and professional development	10	0	0
Other concerns: Determining whether or not a TBI had occurred	0	0	1
Other concerns: What is needed for qualification	0	0	1
Other concerns: How to locate resources for additional training	5	0	1
Other concerns: Resources for gaining more information	0	0	1

One of the concerns expressed by participants was the false idea that TBI is a low-incidence disability. At the pre-training and one-year follow-up, a notable number of participants reported that TBI “is such a low-incidence disability that it may be missed by some personnel.” Coordinating with and “communicating with medical professionals” and outside agencies was another area of concern. For example, one participant at the pre-training stated concern over “transitioning from medical to schools, making sure care is appropriate.” Another area of concern reported was the lack of funding for providing adequate services for students with TBI—as one participant put it, “funding and doing more with fewer financial resources.” Then at the one-year follow-up, 4 of the 18 participants reported concern over “having the resources to provide

services needed and training for educators about TBI.” Or as another participant from the one-year follow-up expressed it, there were no “resources to provide services needed,” including the ability to monitor progress as frequently as needed, the correct screening tools, and enough personnel to assist with the intense treatment needed.

Participants reported concerns with dealing with the educational impact, including appropriate academic programming, progress monitoring, and establishing goals for students with TBIs. At the pre-training, 7 of the 82 participants reported this as an area of concern. One of the participants at the pre-training stated that a major area of concern was “identification and interventions that really assist the students—academic programming specifically is a huge area.” At the two-month follow-up, 3 of the 18 participants reported that academic programming is a concern. One participant noted this concern: “academic programming for students—I think students with TBI are frequently mis-identified and may not get the services they need.”

Lack of training was another concern. At the pre-training, 10 of the 82 participants reported their lack of training or professional development in the area of TBI. One pre-training participant admitted not having had “enough training on the issue.” A general lack of training was noted only at the pre-training.

Additional concerns were expressed by participants at the one-year follow-up. One participant expressed concern about how to determine whether or not a TBI had occurred: “My primary concern is how to increase finding out when and if there was a brain or head injury in the first place.” One participant expressed concerns about what to do when a school receives documentation that a TBI occurred as well as determining what exactly is needed for qualification purposes: “We recently received hospital stay discharge papers with ‘TBI’ listed as diagnosis but no follow-up, transition, or neurological assessment. Is that discharge statement enough to warrant an educational diagnosis of TBI coupled with teacher observations, works samples, MFE, etc.” In addition, participants indicated they would like more information regarding how to locate

resources to provide services and additional training, and more information on continuing education availability.

Discussion

The TBI in Schools training was designed to increase school psychologists' knowledge and skills related to serving students with TBI. While there was a significant gain in knowledge and skills from the pre-training to the two-month follow-up, gains diminished by the one-year follow-up. While there was not an overall significant increase in participant knowledge and skills from pre-training to one-year follow-up, some questions did yield significant improvements in the following areas: *conducting a prompt evaluation for a student who has sustained a TBI*; realizing the *difficulty students with TBI have in forming and maintaining relationship*; attaining a better *awareness of how common behavior problems are among students with TBI*; developing a better *awareness of how frequently goals need to be altered for students with*; recognizing the *types of assessments that will yield the best results when working with students with TBI*; recognizing the *similarity of characteristics between students with ADHD and student with TBI*.

The hypothesis that participants would feel more confident in their knowledge of TBI and in their decision making abilities in working with students with TBI was supported, with a slight increase over time in confidence related to decision-making skills related to working with students with TBI.

Professional development for educators often relies upon an expert from the outside who delivers new information. Educators are then expected to transfer that knowledge over into practice. Unfortunately, this type of professional development is not always effective in helping educators actually put into practice any new skills or knowledge learned (Glang, Todis, Sublette, Brown, and Vaccar, 2010). Glang et al. (2010) suggested that a strong professional development program that would cultivate long-term change in knowledge and practice should have not only direct training for skills, but also practice with skills, ongoing mentoring and feedback, and consultation in the school environment. This half-day workshop relied upon an expert from

outside of the practitioners' districts, and there was no mechanism in place for ongoing practice of skills, mentoring, feedback, or consultation. Therefore, the results of this study support the findings of Glang et al. (2010) that a delivery of information from an expert outside of the district is not sufficient for ensuring transfer of new knowledge into practice.

Furthermore, previous research has indicated that a "one-shot" professional development program often does not lead to long-lasting change in practice or retention of knowledge (Glang, Tyler, Pearson, Todis, & Morvant, 2004). Results of this study support that conclusion, as there was not a sufficient and consistent increase in participants' knowledge and skills as a result of the training. These conclusions provide support for more broad-based training in the area of TBI, including increased coverage in school psychology training programs (pre-service), follow-up training and support for professional development participants, such as from school psychologists in their own districts, and the expansion of ongoing professional development opportunities, such as consultation with outside agencies, educating students with TBI, and so forth.

Limitations

Participants in this study represented a convenience sample and may not be representative of all school psychologists. Further, there was a longitudinal component to this study, which is reflected in the relatively low response rate at the two-month and one-year follow-ups. Previous research has also indicated that longitudinal studies have a tendency to have a loss of participants over time, which may have an impact on the validity (Kazdin, Esveltd-Dawson, French, & Unis, 1987).

Participants may have obtained information from sources other than this study's training (between this study's training and the one-year follow-up), which might affect responses on follow-up surveys. This study also relied on self-report, so participants may not have responded accurately. Additionally, participants with a particular interest in TBI may have been more likely to respond than participants who were less interested in the topic.

Directions for Future Research

Future research might examine the training that school psychologists receive in graduate school. This might include specific courses graduate students take, what is covered in those courses, and how much time is spent on TBI. Research is being conducted regarding the knowledge, skills, and training of teachers, special education teachers, and teacher training programs. This is important because previous research has indicated educators lack of understanding regarding the multifaceted and distinct issues that students with TBI (Glang et al., 2004).

Research is also needed in the area of retention and transfer of knowledge and skills to long-term practice. For example, additional research can examine the qualities of a training that lead to long-term retention of skills. This might include embedding ongoing follow-up and consultation by a school psychologist related to specific TBI cases.

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