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Trauma Center Youth Violence Screening and Brief Interventions: A Multisite Pilot Feasibility Study

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Every day, 16 American youths between the ages of 10 and 24 years are murdered; 84% of these fatalities involve a firearm. Nearly half of traumatic youth deaths result from violence-related injuries. In 2013, 580,250 youth suffered nonfatal, assault-related injuries, necessitating emergency department treatment. The aim of this multisite pilot study was to examine the process, feasibility, and challenges of violence brief interventions (VBIs). The participants were youth between 15 and 25 years of age, at 2 major Level 1 trauma centers (TCs; TC1, TC2) in the Southeastern United States. Eligible participants ($N = 38$; TC1: $n = 20$, TC2: $n = 18$) received at least 1 VBI during their hospital stay, which provided information about individual screening results and elicited patients' perspectives on violent and risky behaviors. More participants at TC2 than at TC1 completed 2 VBI sessions. Barriers to and support of implementation were identified at both sites, and factors for improving implementation were identified, including the need for staff support through clinical guidelines and coordinated prevention and outreach programs. Further research is needed to identify factors for successful implementation of VBIs in TCs.

Keywords: violence; trauma centers; violence brief interventions; risk factors; youth

In 2013, 580,250 American youth aged 10–24 years suffered nonfatal, assault-related injuries necessitating emergency department treatment (Centers for Disease Control and Prevention [CDC], 2013a). Homicide is a leading cause of death for youth aged 10–24 years (CDC, 2013b). The 2013 Youth Risk Behavior Surveillance

System (YRBSS) revealed that more than 17.9% of high school youth had carried a weapon (e.g., a gun, a knife, or a club), more than 5.5% had a gun, and more than 3.1% had been in a physical fight at least once in the previous 12 months (CDC, 2013a).

In the United States, each year, guns are responsible for more than 70,000 nonfatal injuries with more than 28,000 of them in youth (CDC, 2013d). Easy access to handguns is directly related to youths seeking care for violence-related injuries in inner-city emergency rooms. Furthermore, exposure to firearm violence increases the chances that youth will commit retaliatory violence within 2 years (Cunningham et al., 2009). Copeland-Linder, Johnson, Haynie, Chung, and Cheng (2012) reported similar retaliatory behaviors among adolescents aged 10–15 years. In interviews with violence-injured African American males, Rich and Grey (2005) found that victim retaliation was often the result of a perceived loss of peer respect.

Risk factors for violence include personal, family, peer, social, and community factors (CDC, 2013c). Youth violence peaks during mid-to-late adolescence and declines as youth age; however, early violence can be a predictor of later alcohol abuse, and use of alcohol by adolescents aged 13–18 years is related to increased violence later in life (Xue, Zimmerman, & Cunningham, 2009). This is particularly important because research has shown that people involved in violence are more likely to abuse alcohol and drugs (Chermack et al., 2014; Mercado-Crespo & Mbah, 2013; Walton et al., 2009). Alcohol and drug use are also risk factors for gang involvement, which frequently leads to violence (Marcus & Jamison, 2013; Noffsinger et al., 2012; Swahn, Bossarte, West, & Topalli, 2010).

In 2005, the American College of Surgeons (ACS) issued a mandate requiring Level 1 trauma centers (TCs) to have instruments in place to recognize and intervene with risky drinkers. Soon after, guidelines were established by the American College of Surgeons Committee on Trauma (ACSCOT) to develop alcohol screenings and brief interventions (BIs; ACS, 2006). Because the guidelines were implemented, there has been a reduction in trauma recidivism (Neville, Goodall, Williams, & Donnelly, 2014; Zatzick et al., 2014). Indeed, numerous randomized trials have demonstrated the efficacy of the guidelines in various medical settings, including primary care (Ballesteros, Duffy, Querejeta, Ariño, & González-Pinto, 2004). Also, studies have found positive results using BIs designed to protect violence-injured youth from retaliation and recidivism (Cooper, Eslinger, & Stolley, 2006; Cunningham et al., 2012; Walton et al., 2010). Cunningham et al. (2012), for example, found that 1 year after a brief motivational interviewing intervention in an urban emergency department, youth were less likely to report peer-related violence; however, alcohol use remained unchanged. In a study by Walton et al. (2010), 3 months following a single emergency department–implemented violence and alcohol BI, youth reported a reduction in violence, along with continued reduction in alcohol consumption at 6 months postintervention.

Violence brief interventions (VBIs) performed during the life-altering days following a near-fatal violent injury are a promising strategy for reducing subsequent violent behaviors, reinjury, and retaliation. TCs are key locations for interventions designed to reduce future violent incidents and retaliation and recidivism, using specialized screening and brief counseling interventions during a patient's hospitalization (Cunningham et al., 2009; Walton et al., 2015). Despite these promising results, many TCs are slow to implement VBI services, and thus, knowledge of the process, feasibility, and challenges of implementing VBI in TCs remains very limited. Further research is needed to identify the optimal process for implementation of VBIs in hospitals (Cunningham et al., 2009; Milner, Barry, Blow, & Welsh, 2010; Neville et al., 2014; Walton et al., 2015; Walton et al., 2008).

Therefore, to identify barriers and evaluate the feasibility of implementing VBI, we conducted a pilot study comparing implementation at two major TCs in the Southeastern

United States where youths were admitted for violence-related injuries, such as gunshot or stab wounds. We evaluated the feasibility of delivering a VBI intervention at each site by examining the data collected and outcomes. We also looked at the timing of interventions during a hospital stay, the type of staff responsible for recruitment and screening, and the personnel responsible for evaluation. Supports for and barriers to conducting violence screenings and VBIs with young adult patients were explored. Based on the findings, we provide recommendations for development and implementation of VBI in TCs for youths.

METHOD

Study Design and Setting

Researchers recruited participants during a 2-year period at two TCs in the Southeastern United States, with a target enrollment of 20 participants at each site. This study was approved by the institutional review boards of both TCs and the researchers' academic institution. VBIs were implemented simultaneously at the two centers. The participating institutions (TC1, TC2) were ranked at the highest possible designation, Level 1, with verification by the ACS. Both TCs located within major hospitals are private nonprofit centers, averaging 3,000 trauma admissions per year. They admit large numbers of severely injured patients daily, from a wide geographic area, and have an interdisciplinary team that includes trauma surgeons and nurse specialists. Specialists, including orthopedists, neurosurgeons, plastic surgeons, anesthesiologists, radiologists, and internal medicine, are available at each site to care for various forms of trauma, and the centers have highly sophisticated medical diagnostic equipment available 24 hours a day. One TC serves a more rural population and a wider geographic area from Appalachia to a mid-sized urban area (TC1), whereas the other center primarily serves a large metropolitan urban area (TC2).

Participants

Thirty-eight participants (TC1, $n = 20$; TC2, $n = 18$), ages 15–24 years, were enrolled in the study. All were admitted to the hospitals with violence-related injuries such as gunshot or stab wounds. Nursing and medical staff recruited participants using talking points developed by the research team. If a patient expressed interest in the study, a research team member prescreened the patient for eligibility using a single question from the brief FiGHTS measure: *During the past 12 months, have you been in a physical fight?* (Hayes & Sege, 2003). Exclusion criteria included unwillingness or inability to provide informed consent or assent, inability to complete at least one VBI, admission for a sexual assault-related injury, involvement in a child abuse investigation, or involvement in a fatality leading to the hospitalization. Researchers approached all eligible participants who screened positive using the FiGHTS measure explaining that the study was designed to assess the feasibility of violence screenings and brief counseling interventions. In addition to obtaining participant assent, researchers obtained parental consent for patients younger than the age of 18 years. Patients who declined to participate in the study were offered a BI and a referral to providers for counseling services in the community. After obtaining the required signatures on the informed consent forms, the study counselors proceeded with violence screenings using the five-item FiGHTS screening tool. Screenings also included the Alcohol Use Disorders Identification Test (AUDIT-C; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998).

Violence Brief Intervention

The Violence Brief Intervention based on Motivational Interviewing (MI) is considered one of the most effective intervention strategies for preventing alcohol misuse and violence (Crane & Eckhardt, 2013; Schumacher et al., 2011). MI described by Miller and Rollnick (2002) uses personalized feedback and discussion of participants' alcohol use related to their risky behaviors. The goal of MI is to assist participants to establish a change plan. MI constructs are person-centered, nonconfrontational, empathetic, and nonjudgmental; they encourage change talk and build self-efficacy (Miller, 1983; Miller & Rollnick, 2002). MI techniques used by counselors include rolling with resistance, avoiding argumentation, expressing empathy, and supporting self-efficacy (Miller & Rollnick, 2002). In this study before being assigned participants, counselors were trained in MI techniques and the use of harm reduction techniques, drinking with an emphasis on reflective listening. Counselors developed skills to reflect with empathy, expressing concern for health during the intervention session, and affirming healthy change goals and intervention plans that included attention to risky drinking or drug use.

During their hospital stay, participants at both sites were offered two VBI sessions. During the sessions, participants were given information about their individual screening results, and their perspectives were elicited regarding violent and risky behaviors. Counselors discussed positive findings on the alcohol screening with an exploration of patient goals involving a reduction in either the number of drinks or the number of days on which they consumed alcohol, especially if the patient identified risky substance use as related to risk of violent behaviors. The counselors provided feedback on the patients drinking and his or her health concerns, education regarding drinking limits and health risks when exceeding drinking limits, explicit advice to decrease drinking or quit, follow-up, and when indicated, referral to addictions treatment. Counselors also explored with patients nonviolent alternatives and change goals pertaining to potential violence (as either as the victim or initiator of the violence). Also, counselors reviewed injury risk associated with retaliation violence and risky behaviors contributing to violence.

The average length of the VBI sessions at both sites (TC1, TC2) was approximately 35 min, with a range from 24 to 60 min. The VBI sessions were conducted by licensed professionals and addiction counselors at the doctoral level. At the end of the VBI sessions, all participants were offered information about nonviolent behavior, healthy coping patterns, and recommendations for change. Participants were also provided information about local counseling services for follow-up. A note indicating that a VBI was entered on the patients' charts following all pertinent Health Insurance Portability and Accountability Act (HIPAA), state, and federal confidentiality guidelines. After conducting the VBI sessions, the counselors attended meetings with the principal investigator (PI) for individual supervision of participant sessions. The PI reviewed the therapeutic tasks that should be performed during the sessions. In addition, VBI sessions were randomly taped and reviewed by the PI for fidelity who provided counselors with feedback and strategies to improve their MI techniques.

Data Collection

In addition to being offered two VBI sessions during their hospitalization, participants at TC1 were provided a follow-up session by phone 1 month after discharge from the hospital.

During the call the FiGHTS measure was administered to assess participants' current status. For participating in the phone session participants received a \$40 gift card.

At the end of the study, an evaluation survey was administered to the medical staff and research team members to collect data on barriers to implementation of the VBI in the TCs. Sample survey questions included the following: (a) What barriers or challenges did you experience during the study? and (b) What did you feel was effective about the project implementation? Also, suggestions for improvement were elicited.

Measures

Participants at both sites (TC1, TC2) completed the brief FiGHTS (Hayes & Sege, 2003); the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), and, when risky drinking was indicated, the AUDIT-C (Bush et al., 1998). These instruments have demonstrated reliability and validity and have been used with young adults (Becker, Rothenberger, Sohn, Ravens-Sieberer, & Klassen, 2015; Ortuño-Sierra et al., 2015; Walton et al., 2015; Williamson, McElduff, Daniels, & Eades, 2014).

The brief FiGHTS measure is a screening tool composed of five items (Fi = fighting, G = gender, H = hurt while fighting, T = threatened, S = smoker) derived from the YRBSS. Responses are dichotomized (yes/no). FiGHTS scores thus range from 1 to 5. One point is given for each "yes" response with a total possible score of 5 with a positive screen. The brief FiGHTS has a sensitivity of 82% and specificity of 71%. Because the brief FiGHTS scores have high sensitivity and specificity for predicting firearms-carrying, the measure may be used for testing in the clinical area (Hayes & Sege, 2003).

The SDQ (Goodman, 1997), a 25-item questionnaire, has five scales with five items each. The five scales are Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems, and Prosocial (Strengths) Behaviors. The scores range from 0 to 10 on each of the five scales. Scores are classified as "normal," "borderline," or "abnormal." The conduct, hyperactivity, emotional, and peer problems scale scores are summed to calculate a total difficulty score. The SDQ measures mental health problems, and can be administered to youth aged 11 years or older. Internal consistency of the total difficulty score is .84, with a range between .69 and .78 for the SDQ subscales (Becker et al., 2015; Goodman, Meltzer, & Bailey, 1998).

The AUDIT-C (Bush et al., 1998) is a brief screening consisting of three questions to identify alcohol misuse. The AUDIT-C scale scores range from 0 to 12 points. In general, the higher the AUDIT-C score, the more likely drinking is affecting health and safety. A score of four or more in men is considered positive for alcohol misuse; 3 or more points in women is considered positive. The AUDIT-C has performed adequately in identifying heavy drinkers who might benefit from BIs. Also, the scale has been validated for young adults as a screening tool (Kelly, Donovan, Chung, Bukstein, & Cornelius, 2009). An AUDIT-C cutoff score of 4 or greater demonstrated a sensitivity of 92.6% and a specificity of 86.3% in detecting risky drinkers (Levola & Aalto, 2015; Rubinsky et al., 2012).

Statistical Analysis

Descriptive statistics were used to summarize study variables. Fisher's exact test was used to identify possible associations between the categorical variables (such as age group, gender, race, etc.) and implementation of VBI at the TCs. A paired *t* test was used to determine the differences between FiGHTS scores before and after the intervention at TC1. All analyses were conducted with SAS Version 9.4; $p \leq .05$ was considered significant.

RESULTS

Upon admission to a TC, potential participants were identified by the medical and nursing staff. Several factors eliminated potential participants from further screening. For example, injuries that resulted in death, being discharged or in police custody and minors without a parent present eliminated participants. At TC1, more than half (52.9%, $n = 27$) of the 51 potential participants met eligibility criteria for the study. Of these eligible participants, 20 (74%) were enrolled in the study, 6 (3%) declined, and 1 did not have parental consent to participate. At TC2, of the 62 potential participants, 40 patients (64.5%) were eligible; of these, 18 (45%) were enrolled. TC1 reached the enrollment target ($n = 20$) and did so in a briefer time (12 months) than did TC2, which achieved 90% of the enrollment target ($n = 18$) in 18 months.

At both sites, the majority of the participants were male, single, and African American. The mean age of participants was 21.55 years ($SD = 2.94$ years) at TC1 and 20.1 years ($SD = 1.3$ years) at TC2. There were only three female participants, two at TC1 and one at TC2. Three ethnicities were represented in the study (European Americans, African Americans, and Hispanic Americans). All of the TC2 site participants were African American, whereas the TC1 site had a mix of European Americans (40%), and African Americans (55%) and one Hispanic participant (5%). The participants from TC1 and TC2 thus differed significantly in race ($p = .0019$). At both TC1 and TC2, the majority of the participants were single (95% and 67%, respectively). Most presented with gunshot wounds (63%), followed by injuries sustained from stabbings (21%), and injuries from assaults (16%).

The sites were similar in the number of participants positive for alcohol. TC2 had 33% positive blood alcohol levels (BAL), TC1 had 30% of participants with positive BAL. The two sites showed no significant differences in risky drinking behavior among participants. At TC1, 11 participants (55%) had mean AUDIT scores of 4 or above, whereas only 4 participants (22%) at TC2 had mean AUDIT scores at least 4. However, the overall differences in AUDIT scores between TC1 and TC2 were not significant. Both sites had positive screens for drug use: 40% at TC1 and 50% at TC1. The characteristics of TC1 and TC2 participants are shown in Table 1.

Participants at both sites were offered two VBI sessions during their hospitalization. More participants at TC2 (39%) completed both sessions than at TC1, where only two participants completed both sessions. Several factors affected completion of the second session, including patient discharge from the TC and pain medication causing heavy sedation. The majority of TC1 participants ($n = 18$, 90%) were discharged after the first session and, therefore, unavailable for a second session. Other issues included unavailability of counselors' and patients for a second session. Counselors at TC1 conducted follow-up sessions by phone 1 month after discharge from the hospital with 13 participants (65%), using an adapted FiGHTS screen to assess participants' status. At both TC1 and TC2, readmission rates were low over the 12-month period (5% and 22%, respectively), and readmissions were for nonviolent occurrences (see Table 2).

All of the participants ($n = 38$) completed FiGHTS screening and, at least, one VBI. In the initial FiGHTS screening conducted before the first VBI session, most participants (more than 80%) at TC1 scored at the riskiest range, with an average score greater than 4 out of a possible 5. Also, 94% of TC2 participants scored 4 or more. At TC1, 13 (65%) participants completed the postintervention phone call; participant completed a follow-up for TC2. Among the participants who completed FiGHTS follow-up, there was a significant reduction ($p < .0001$) in violence and violent behaviors, with an average score of 1.38 (Tables 3 and 4).

TABLE 1. Mean Comparison of Characteristics Between Level 1 Trauma Center and Level 2 Trauma Center

Variable	Category	TC1 (n = 20)	TC2 (n = 18)	p Value	Total (N = 38)
Age group	15–18	0 (0%)	1 (5%)	.3201	1 (3%)
	18–20	6 (30%)	8 (45%)		14 (37%)
	21–25	14 (70%)	9 (50%)		23 (60%)
Gender	Female	2 (10%)	1 (5%)	1.0000	3 (8%)
	Male	18 (90%)	17 (95%)		35 (92%)
Race	European	8 (40%)	0 (0%)	.0019	8 (21%)
	American	11 (55%)	18 (100%)		29 (76%)
	African	1 (5%)	0 (0%)		1 (2%)
	American Hispanic				
Marital status	Single	19 (95%)	12 (67%)	.0067	31 (82%)
	Married	1 (5%)	0 (0%)		1 (2%)
	Missing	0 (0%)	6 (33%)		6 (16%)
Violent act	Gunshot	10 (50%)	14 (77%)	.1698	24 (63%)
	Knife wound	5 (25%)	3 (17%)		8 (21%)
	Assault	5 (25%)	1 (5%)		6 (16%)
Alcohol	Positive	6 (30%)	6 (33%)	.8204	16 (42%)
	Negative	10 (50%)	10 (56%)		16 (42%)
	Unknown	4 (20%)	2 (11%)		6 (16%)
AUDIT	At least four	11 (55%)	4 (22%)	.0958	15 (39%)
	Less than four	6 (20%)	7 (39%)		13 (34%)
	Unknown	3 (15%)	7 (39%)		10 (26%)
Drug use	Positive	8 (40%)	9 (50%)	.0885	17 (45%)
	Negative	0 (0%)	3 (17%)		3 (7%)
	Unknown	12 (60%)	6 (33%)		18 (47%)

Note. TC1 = Level 1 trauma center; TC2 = Level 2 trauma center; AUDIT = Alcohol Use Disorders Identification Test.

TABLE 2. Level 1 Trauma Center (TC1) and Level 2 Trauma Center (TC2) Sessions, Follow-Up by Site

Site	TC1 (<i>n</i> = 20)	TC2 (<i>n</i> = 18)
One session	20 (100%)	18 (100%)
Two sessions	2 (10%)	7 (39%)
One-month phone call	13 (65%)	N/A
Hospital readmission	1 (5%)	4 (22%)

TABLE 3. Comparison of FiGHTS Scores Between Level 1 Trauma Center and Level 2 Trauma Center (*M*)

FiGHTS Score	TC1 (<i>n</i> = 20)		TC2 (<i>n</i> = 18)
	Pre	Post	
0	0	1	0
1	0	7	0
2	0	4	0
3	4	1	1
4	10	0	10
5	6	0	7
Mean scores	4.10	1.38	4.33

Note. TC1 = Level 1 trauma center; TC2 = Level 2 trauma center.

TABLE 4. Comparison of Level 1 Trauma Center Participants Pre- and Post-FiGHTS Scores, *p* Value < .0001

Group	Individual's Score													<i>M</i> (<i>SD</i>)
Preintervention	3	3	4	4	4	3	4	4	5	4	5	4	5	4 (0.68)
Postintervention	1	2	1	1	0	2	1	1	3	2	2	1	1	1.38 (0.74)

The 25-item SDQ was administered during the first or second VBI session. The majority of participants at both sites, 75% of the TC1 participants ($n = 4$) and 86% of the TC2 participants ($n = 16$) scored in the normal range on the total score. All of the TC1 participants scored in the normal range on the problem conduct and prosocial subscales. On all subscales, for example, emotional, conduct, hyperactivity, peer problems, and prosocial behavior, only a few of the participants in either group scored in the abnormal range. However at TC2, six participants scored in the borderline range on the prosocial behavioral subscale (Table 5).

Violence Brief Intervention Implementation Successes

At both centers, medical staff supported the study. At TC2, because counselors were unable to provide onsite coverage, the medical personnel were the primary source of referrals. Because TC1 had better staffing by counselors, this made it possible to identify more eligible participants. During the VBI sessions, counselors applied the principles of MI and explored with participants change plans to increase healthy alternatives to violence. During the sessions, no patient directed threatening behavior to any member of the research team and participants often voiced their appreciation for having the opportunity to participate in the VBI session. Also, participants noted the benefits of VBI follow-up phone calls at TC1; for example, family relations had improved, they had begun counseling, or they had restarted educational pursuits. Clearly participants benefited from the VBI session, as evidenced by the violently injured youth's receptivity to confidential screening and brief counseling interventions while hospitalized and reports positive changes at follow-up.

Violence Brief Intervention Implementation Barriers

Significant barriers to implementation of VBI were identified during the study. Staffing varied at the sites, and there were no full-time counselors at either. Overall, TC1 had better staffing with several part-time counselors who conducted eligibility determinations and enrolled 20 participants in a much shorter time than at TC2. Also, participants at TC1 were also provided incentives, that is, gift cards, upon completion of the follow-up phone contact and that may have improved their willingness to participate. Counselors at TC2 volunteered their professional time and responded when paged to the TC if their schedule permitted. At both sites, however, counselors were unavailable on weekends, resulting in many missed opportunities to recruit participants. In addition, many Spanish-speaking patients were not enrolled because there were no bilingual counselors. Also, several individuals were in police custody, and because confidentiality could not be guaranteed, they were not recruited for the study. Finally, many potential participants at both sites were not seen because they were not younger than the age of 25 years.

Trauma physicians and medical staff at TC2 actively recruited patients for the study; however, there was a lack of "buy-in" by some medical staff in the TC and as a result, there was a lack of consistency in identifying and referring patients. Also, trauma staff expressed concern about approaching patients about the study because patients were reluctant to be seen by counselors and family members were often unwilling to have counselors see the patient. At TC2 where the trauma staff handled recruitment, they often had difficulty reaching a counselor to schedule a participant visit. Further limited availability of counselors made it difficult to coordinate patients' sessions. As noted earlier, 29 of the participants

TABLE 5. Level 1 Trauma Center Strengths and Difficulties

SDQ Score TC1 (n = 4)	Abnormal (%)		Borderline (%)		Normal (%)		Median Score (SD)	
	TC1	TC2	TC1	TC2	TC1	TC2	TC1	TC2
Total difficulties score	1 (25%)	0 (0%)	0 (0%)	2 (14%)	3 (75%)	12 (86%)	14.25 (7.37)	8.79 (4.82)
Emotional symptom score	1 (25%)	0 (0%)	0 (0%)	0 (0%)	3 (75%)	14 (100%)	4.00 (4.08)	1.64 (1.34)
Conduct problem score	0 (0%)	1 (7%)	0 (0%)	1 (7%)	4 (100%)	12 (86%)	1.25 (0.96)	1.64 (1.50)
Hyperactivity score	2 (50%)	0 (0%)	1 (25%)	1 (7%)	1 (25%)	13 (93%)	6.00 (1.41)	3.00 (1.52)
Peer problem score	1 (25%)	0 (0%)	1 (25%)	0 (0%)	2 (50%)	14 (100%)	3.00 (2.45)	2.43 (1.20)
Prosocial score	0 (0%)	0 (0%)	0 (0%)	6 (43%)	4 (100%)	8 (57%)	9.00 (1.15)	0.00 (1.04)

Note. TC1 Missing 16 (80%) were not conducted and TC2 Missing 4 (22%) were not conducted. SDQ = Strengths and Difficulties Questionnaire; TC1 = Level 1 trauma center; TC2 = Level 2 trauma center.

did not receive a second VBI session because of early discharge, altered mentation or the patient's unavailability because of other procedures or therapies.

Because six participants from both sites were identified with abnormal prosocial behavioral attributes on the SDQ, it is important for all participants to be screened with the SDQ. At TC1, only 20% of the participants completed the SDQ. Although 78% at TC2 completed the SDQ, counselors at both sites found the SDQ screening tool difficult to administer because of its length. Participant's early discharge and altered mentation also contributed significantly to the limited SDQ administration. Finally, lack of funding at both TCs affected the ability to provide support staff and resources for the study.

DISCUSSION

Although we found it feasible to conduct VBI with violently injured youth in the TCs, there were many missed opportunities to provide services. Although there was interest and support among physicians and medical staff in both TCs, steps to improve communication and patient willingness to participate in VBI are needed.

There is clearly a need for better coverage with onsite counselors to see more patients, given hospital lengths of stay less than 36 hr and a need for weekend coverage and clinical guidelines are needed to guide medical staff, and clinicians, along with training of medical staff, counselors, recruitment protocols, and coverage schedules. At both sites, participant alcohol use was more than 30% and drug screens were positive, 40% at TC1 and 50% at TC2. These findings are consistent with prior research demonstrating a strong correlation between substance use and violence (Cunningham et al., 2012; Kelly et al., 2009; Marcus & Jamison, 2013; Walton et al., 2015). All participants who received screening for risky alcohol use were open to exploring the connection between substance use and violence. These findings suggest that VBI could be enhanced by adding alcohol and other drug screening as a component of VBI, discussed participants' substance use and related risky behaviors, and establishing a change plan. Furthermore, there needs to be coordinated support at TCs to provide a referral for substance use and youth outreach programs. Finally, we found a lack of bilingual medical staff and counselors to provide services to non-English-speaking patients. To address this issue, we suggest more standardized procedures in TCs, such as translation services and personnel trained in other languages. Many participants did not have a second VBI session because of discharge, medical procedures or altered mentation. At one site, only 20% of participants remained hospitalized long enough to be able to be seen for a second VBI and additional screening of overall functioning. At both sites, cost and lack of resources were major barriers to wider implementation of VBI yet violence interventions have been effective in multiple settings (Neville et al., 2014). Research has also demonstrated that the cost of a BI to prevent violence is far less than the cost of providing medical care to victims (Neville et al., 2014; Sharp et al., 2014). Referrals to community agencies for continued counseling would be advantageous for all participants. Future research should develop and test hybrid models of VBI for other vulnerable populations including incarcerated women and men, homeless violent offenders, and rape victims, among others.

Limitations of this pilot feasibility study included the small sample size, and variances in procedures between sites, including coverage by counselors and resources, for example, to provide a participant incentive. TC1 employed counselors who routinely provided VBI to trauma patients while hospitalized, which contributed to the faster recruitment of participants. Because TC2 did not employ counselors in the TC, all VBI services

were provided by research team counselors. Some potential participants at TC2 were not recruited into the study because of lack of counselor availability. Finally, since TC2 served an urban population, whereas TC1 was in rural Appalachian, and thus generalizability of the findings may be limited. The study will need to be replicated in other TCs with larger sample sizes, more streamlined protocols, and better long-term tracking to identify factors essential for successful VBI implementation in TCs for at-risk youths. Despite its limitations, the study shows the feasibility of brief violence interventions and suggests that BIs can have a significant impact on the lives of youth at risk of violent injury and death. The findings may increase understanding of challenges to widespread implementation of VBI in TCs to prevent violent injury and death among youths. Based on the findings of this study, VBI delivered by counselors in TC may be a promising strategy to reduce youth violence and victimization.

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