ORIGINAL ARTICLE

Emergency department screening for risk for post-traumatic stress disorder among injured children

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Objective: To discuss the successes and challenges associated with the implementation of a post-traumatic stress disorder (PTSD) screening tool in two pediatric emergency departments (ED).

Methods: The STEPP screening tool has been developed previously on an inpatient population of motor vehicle trauma patients. It was applied here to the general ED population at two different pediatric trauma centers. Nurse screeners were trained and a convenience sample of patients with unintentional injuries who met study criteria were screened in the ED. Feedback from nurse screeners was obtained.

Results: The process of implementing a screening tool to identify patients and their families significantly at risk for PTSD symptomatology presented some barriers, but overall acceptability of the process was high for both the emergency department staff and the patient. Recommendations for others considering implementation of screening programs in the ED are offered.

Conclusions: Future research using screening protocols in the ED should, in their design, attempt to capitalize on the successes identified in the current protocol and circumvent barriers also encountered.

Each year, 20–25% of America's children sustain an injury sufficiently severe to require medical attention, missed school, or bed rest.¹ Long after the physical injuries resolve, post-traumatic stress and other emotional outcomes linger for about one in six injured children and their caregivers.^{2–8} Unfortunately, these conditions often go unrecognized and untreated.² This is due in part to the challenges in identifying at-risk children and their parents in the emergency care setting. An easily administered, reliable screening tool could identify at-risk patients and their families.

STEPP (Screening Tool for Early Predictors of PTSD (post-traumatic stress disorder)) was developed in a study of pediatric inpatients with injuries from road traffic crashes. The STEPP was found to have excellent screening properties for identifying children and parents at risk for PTSD symptomatology, which persists for several months after injury and impairs functioning.⁹ The STEPP was designed for use in the acute trauma care setting, with brevity and simple scoring rules. It is applied here to patients in the emergency department (ED) who experienced a variety of unintentional injuries. Parallel studies were undertaken in two large but somewhat different pediatric EDs. This collaboration has allowed for better assessment of feasibility, acceptability to clinicians, practical utility, and generalizability of the screening protocol with a diverse patient population. Research questions include the extent to which nurses were able to implement the screener within the course of normal care of injured patients, and nurses' perceptions of the screening process, of the STEPP items, and of the acceptability of the screening protocol to children and parents.

METHODS

Sample

A convenience sample of injured patients was assessed over approximately a six month period in each institution. Sites 1 and 2 are both large EDs. However, site 1 is larger and has more of an urban population. Site 2 has a rural/urban mix. The two sites are also from different regions of the country. Testing the STEPP screen in two somewhat different ED

environments was thought to strengthen the argument of generalizability.

Patients with a diverse range of injuries, including but not limited to road traffic crashes, were included in the studies. Each study was approved by the respective institutional review board (IRB). All children ages 8 to 17 who presented to the ED for treatment of an unintentional injury, and their parents, were eligible for inclusion in the study, except:

- Children with suspected non-accidental injuries related to abuse, neglect, or assault;
- Children and parents who do not speak English well;
- Children or parents who were intoxicated;
- Children whose injury resulted in intubation, sedating medication, or other physically limiting state that hampered participation.

STEPP implementation procedures

Potential participants were identified by nursing or clerical staff, and a color coded cue prompted nurses to approach families about the project, including obtaining consent from parents and assent from patients. Participating nurses then completed the STEPP (asking parent and child four items each, recording four items from medical record information). Nurses were encouraged to speak separately, if possible, with the parent and the child. After the STEPP was completed, parents and children were given educational information regarding emotional recovery post-injury and various treatment options. Parents were advised to contact their primary care physician given insurance requirements of a PCP referral to receive services. The research team was available for consultation regarding any acute psychological distress or needs.

Staff training

Brief presentations were made to clinical and administrative staff in the EDs, to ensure awareness of the project and enrollment inclusion/exclusion criteria. Physicians working in the EDs at both centers were involved in this project to ensure optimal acceptance of the project in the ED.

Given their role as screeners, the most intensive training was directed toward nurses. Nurse training sessions at both sites included description of the purpose and procedures for the study, and training in how to complete the STEPP. Interview directions on the instrument itself served as reminders of STEPP administration.

Nurses eligible for participation differed between sites because of different IRB requirements. At site 1, all ED nurses were able to participate. At the time of the study, there were 91 nurses working in the ED. All ED nurses received written reminders and instructions for STEPP implementation. All nurses were invited to participate in a 30 minute training session before the implementation period. Multiple training sessions were held (with refreshments provided), during all ED shifts, and supervisors encouraged attendance at these sessions within work hours. Thirty three nurses attended a training session. No data are available on why some did not attend. At site 2, the IRB required specific research training. Nine nurses volunteered. All undertook one hour of STEPP training before the study began, with ongoing informational sessions held throughout the implementation period (with refreshments provided).

Protocol integrity

Informational sheets were posted in the ED to serve as reminders to screen. Nurses were given verbal prompts by research or ED staff to identify and screen all injured children who met study criteria. Reliable administration of study protocol was also promoted with monitoring by the site principal investigators and other research staff.

MEASURES

STEPP

The Screening Tool for Early Predictors of PTSD (STEPP; see the appendix)⁹ contains four child-report items, four parent-report items, and four items answered from the medical record. In the STEPP development sample, this set of items showed strong sensitivity (0.88, with 95 percent confidence interval (CI) = 0.69 to 0.96) and reasonable specificity (0.48, with 95 centile CI = 0.39 to 0.57) in predicting persistent PTSD symptoms in parents (six items) and in children (eight items).⁹ The STEPP takes under two minutes to complete.

Nurse feedback questionnaire

A 19 item questionnaire, created for the current study, was used to gather nurses' impressions of the STEPP implementation process. Nurses rated the STEPP's length, wording, and

ease of use; their comfort in asking the STEPP questions and willingness to implement such screening on a larger scale, and their impressions of parents' and child's comfort with the process. Care was taken to assure anonymity in this feedback process, to encourage full disclosure.

RESULTS

STEPP implementation

At site 1, all ED nurses were asked to identify injured children under their direct care. Over a six month period, approximately 4413 eligible patients were seen in the ED (based on a review of all ED data); 263 (6% of all eligible) agreed to participate in the study. There were 10 refusals documented and 116 patients consented but the screener was not completed, though data are not available to show why.

Seventy nurses administered the STEPP screener at least one time during the study period. Fifty eight percent of the children screened were male; 70% were African-American, 26% were white, and 4% of other ethnicity; 73% of participating parents were mothers, 19% fathers, and 5% other female guardians. Injury circumstances included falls (25.3%), sports injuries (24.3%), injuries sustained in traffic crashes (21.5%), and other injury causes (27.2%). Primary injury diagnoses included extremity fracture (28.3%), sprain/strain (26.4%), laceration (19.6%), contusion (10.2%), and others.

At site 2, also over a six month period, approximately 1712 eligible patients came through the ED, of whom 1405 presented when a study nurse was present. The nine participating ED nurses screened 348 subjects (24.8% of all eligible). All nine nurses screened at least 10 children. Sixty one percent of the subjects were male; 45% were African-American, 52% were white, and 2% of other ethnicity; 82% of participating parents were mothers, 12% fathers, and 5% other female guardians. Injury circumstances included falls (33.3%), sports injuries (17.2%), motor vehicle traffic crashes (17.5%), and other injury causes (32%). Primary injury diagnoses included extremity fracture (28.2%), sprain/strain (19.8%), laceration (22.4%), contusion (8.3%), and others (21.3%).

The samples at sites 1 and 2 were similar to the types of patients seen in the ED at both sites, with a similar age range, the majority being male (60% or more in both), and the ethnicity breakdown being similar (50–70% African-American).

Nurses' feedback

Across both sites, 45 (57%) of the nursing staff who administered a screener completed feedback surveys. Among nurses responding to the survey, 13 (29%) had administered one to four screeners, 15 (33%) had administered five to 10, and 17 (38%) had administered more than 10.

Anonymous nurse feedback data presented here are aggregated for the two sites. Forty-five nurses who completed the questionnaire. Most nurses indicated that the STEPP's length is appropriate for the ED setting. None found it to be too long, 38 (84%) thought the length was about right, and five (11%) felt that more questions could be added.

Nurses' ratings of specific aspects of the STEPP screener are summarized in table 1. Results were similar at site 1 and site 2, but the sample size at site 2 limited the power so statistical analyses were not possible. The vast majority of participating nurses reported that the STEPP is easy to use. The majority of respondents in both EDs found parents and children felt comfortable about being asked such questions in the ED setting. About two thirds of nurses in both EDs felt comfortable asking the questions, although several expressed concern about asking children about subjective life threat

Table 1 Nurses' ratings of aspects of STEPP screener in the emergency department (n = 45)

	Number (%) who agreed or strongly agreed
STEPP easy to use with patients in the ED	41 (91%)
STEPP format and layout are clear	44 (98%)
Wording of questions straightforward and easy to use	38 (84%)
I feel comfortable asking parents and children about these things	32 (71%)
Parents understand the four parent questions	40 (89%)
Parents comfortable being asked these questions in the ED	36 (80%)
Children understand the four child questions.	34 (76%)
Children comfortable being asked these questions in the ED	29 (64%)
Parents comfortable with child being asked these questions in the ED	30 (67%)

ED, emergency department; STEPP, Screening Tool for Early Predictors of PTSD (post-traumatic stress disorder).

when injured (“did you think you might die”). One nurse who was initially reluctant later indicated that not only did the patients not mind this question but that a surprising number of patients responded affirmatively, even if they had relatively minor injuries.

When asked if they would be willing to use a screener like the STEPP as part of a regular nursing protocol for injured children, 30 (67%) of the nurses indicated willingness, six (13%) reported that they would not be willing to do so, and eight (20%) were uncertain. Not surprisingly, nurses who were comfortable asking the STEPP questions more often reported that they would be willing to administer the STEPP as a standard clinical protocol.

DISCUSSION

The screening protocol implemented in this project was designed to identify children and their parents who would later have significant PTSD symptoms. Implementing this protocol in the ED resulted in some successes but also presented challenges. These lessons may be useful in identifying optimal ways to engage clinical staff in the ED in implementing such a screening protocol for traumatic stress risk after pediatric injury.

Feasibility in the ED environment

We are cautiously optimistic about the feasibility of screening for risk of ongoing psychological distress in the ED environment, based on this experience. Many aspects of this screening protocol were seen quite positively by participating clinical staff. Formal and informal feedback from ED staff suggests that even with limited time and busy schedules, administering the screening instrument was quick and easy and had a minimal impact on patient flow. Staff training procedures were completed easily and evaluation of protocol administration showed consistency in delivery.

The screening protocol was implemented in diverse settings, suggesting that generalizability of this program to other EDs is possible. Internationally, emergent care settings can be structured quite differently from those in this study. Caution in applying these results to those settings is suggested.

The population assessed was heterogeneous regarding age range, type of injury, and severity of injury, reflecting the diverse nature of the ED environment. Although it was not specifically assessed, anecdotal evidence would suggest that it was not always the most severe injuries or the youngest patients who were most at risk. Further research to address the issue of what factors predispose victims of unintentional injury to PTSD is needed (including whether they were the unintentional cause of the injury). A screening of all ED patients is recommended at the present time, given that this information is not yet available.

The relatively low overall screening rate at both institutions is a concern. This lowered screening rate may be partly explained by the protocol's implementation as a research study rather than being part of standard clinical procedures.

In addition, informal feedback from nurses indicated that they would be more willing to screen if they could use the results to make a difference in patient care. In actual clinical practice, nurses and other ED clinicians would be able to see how the results of screening affected the care of individual patients in need by enacting a protocol of inpatient psychological consultation and monitoring. Given this screening is for patients “at risk” for PTSD, they should have a positive impact from such immediate receipt of preventative/treatment services.

Not all nurses were willing or able to participate in the study, which had an impact on the percentage of potential subjects screened. IRB requirements at site 2 severely limited

the number that volunteered and consequently the number of patients screened. At site 1 nurses were asked to screen only those patients with whom they had clinical contact, also limiting the number of patients screened.

Acceptability of the screening protocol

A striking finding from the nurse feedback surveys was that, though nearly all found the screening protocol quick and easy to use, only two thirds felt comfortable asking these questions of parents and children in the ED. It is unclear what the percentage of discomfort was before using the screener (whether familiarity and regular use made it easier to ask the questions or whether asking the questions uncovered sensitive material that it became more uncomfortable to ask the questions). A pre-post evaluation would be helpful in future research, as would engaging nurses and other clinicians in addressing both the ways in which screening protocols are designed and the skill sets and comfort of the clinicians implementing these protocols.

One concern about implementing screening might be that the screening process itself could be distressing for patients or parents. Experience in this project provides some evidence that this was not the case. Though procedures were in place to respond to any child or parental distress, no nurse screener reported specific distress that required additional intervention, though this does not rule out the possibility that the patient or caregiver felt distressed. However, research evidence indicates very low risk of distress from answering questions or completing a written questionnaire about one's traumatic injury experience.¹⁰ There was some degree of variability in the nurses' reports about the acceptability of this screening protocol for children and parents. Three quarters of nurses in the current project were sure that parents were comfortable with the screening process for themselves, and just over half reported that children and parents were comfortable with the child being asked these questions. While future studies should address this directly with parents and children, these nurse impressions are important to take account of when designing implementation initiatives. It will be crucial to ensure that parents, patients, and clinicians can feel comfortable with this type of screening.

Implications of screening for patient follow up or referral

The question of the practical utility of screening for risk of ongoing psychological distress cannot be fully addressed without considering the referral process and the treatment of individuals who are found to be in need of more immediate assistance. This issue is beyond the focus of the present study, but a few comments seem warranted. There is strong evidence for the effectiveness of cognitive behavioral therapy for PTSD symptoms in both adults and children. The availability of this treatment varies depending on the setting and the geographical location. However, in ED settings the most appropriate outcome of a positive screen for risk of later

Key points

- Screening for risk of post-traumatic stress is critical for early intervention/prevention. The STEPP (Screening Tool for Early Predictors of PTSD) was applied in two trauma centers to investigate its feasibility in children.
- Nurses were trained to apply the screener, which is brief and can be used in a busy ED environment.
- The overall acceptability of the process was demonstrated at both trauma centers.

PTSD would not usually be an immediate referral for formal mental health treatment, but rather referral to services that can provide further monitoring, follow up assessment, and assistance. Stepped preventive intervention models that link screening results to systematic follow up and appropriate intervention are recommended as best practice for prevention of persistent post-traumatic stress after a potentially traumatic event.^{11,12} Future research could track access to these services as well as outcomes.

Design limitations

This study has several limitations. First, we used a convenience sample of patients presenting to two emergency departments and this may not represent the population of injured children presenting to emergency care settings nationally. Because both sites were tertiary pediatric hospitals, the results might not be generalizable to other hospital settings. Ongoing refinement of the protocol should include further analysis to determine whether the screening is effective in identifying patients at risk for mental health consequences and in promoting successful and appropriate monitoring, follow up, and referral. As part of an assessment of utility to families long term, a study involving a control group and screening/referral group with a six month or one year follow up survey, or both, would be helpful.

Implications for prevention

Early detection of those at risk of post-traumatic stress symptoms is a first step toward prevention. This project provides useful lessons for future implementation of this or similar PTS screening protocols integrated into the emergency care pediatric setting. Feedback from ED staff shows the acceptability of screening, but also indicates challenges in achieving universal screening in busy clinical environments. Additional studies to assess the impact of preventive screening and treatment are warranted.

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APPENDIX

SCREENING TOOL FOR EARLY PREDICTORS OF PTSD (STEPP) ITEMS

Ask parent

- 1 Did you see the incident (accident) in which your child got hurt?
- 2 Were you with your child in an ambulance or helicopter on the way to the hospital?
- 3 When your child was hurt (or when you first heard it had happened), did you feel *really helpless*, like you wanted to make it stop happening, but you couldn't?
- 4 Does your child have any behavior problems or problems paying attention?

Ask child

- 5 Was anyone else hurt or killed (when you got hurt)?
- 6 Was there a time when you didn't know where your parents were?
- 7 When you got hurt, or right afterwards, did you feel *really afraid*?
- 8 When you got hurt, or right afterwards, did you think you might die?

Record from medical record

- 9 Suspected extremity fracture?
- 10 Was pulse rate at ED triage: >104 if child is under 12? or >97 if child is 12 or older?
- 11 Is this child 12 or older?
- 12 Is this a girl?