

Development of screening tool for child abuse in the Korean emergency department

Using modified Delphi study

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Abstract

Mandatory reporting rate of suspected child abuse by health care provider is relatively low in South Korea. The purpose of the study was to develop a screening tool for child abuse and evaluate the feasibility of using this screening tool in emergency department (ED) of South Korea. Injured children younger than 14 years old in the ED were enrolled as subjects to use this screening tool. Candidate items for screening tool were decided after reviewing relevant previous studies by researchers. Using the modified Delphi method, it was judged that the consensus for items of screening tool was achieved in 2 rounds, and the final item of the screening tool was decided through the discussion in the final round. The registry including the developed screening tool was applied to 6 EDs over 10 weeks. Variables of the registry were retrospectively analyzed. A child abuse screening tool called Finding Instrument for Non-accidental Deeds (FIND) was developed. It included 8 questions. One item (suspected signs in physical examination) had 100% agreement; 3 items (inconsistency with development, inconsistent history by caregivers, and incompatible injury mechanism) had 86.7% agreement; and 4 items (delayed visit, inappropriate relationship, poor hygiene, and head or long bone injury in young infants) had 80% agreement. During the period of registry enrollment, the rate of screening with FIND was 72.9% (n=2815). 36 (1.3%) cases had 1 or more "positive" responses among 8 items. Two (0.07%) cases were reported to the Child Protection Agency. An ED based screening tool for child abuse consisting of 8 questions for injured children younger than 14 years old was developed. The use of screening tools in Korean ED is expected to increase the reporting rate of child abuse. However, further study is necessary to investigate the accuracy of this screening tool using a national child abuse registry.

Abbreviations: ED = emergency department, EMT = emergency medical technician, FIND = finding instrument for non-accidental deeds, NCPA = national child protection agency.

Keywords: child abuse, Delphi technique, emergency department, feasibility studies, screening

1. Introduction

Child abuse is a serious social problem worldwide. Childhood experiences of abuse can lead to internal and external behavioral

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problems that might have long-term negative consequences.^[1] In 2001, there were 2606 cases of child abuse in South Korea. In 2014, this number was dramatically increased to 15,025, with a more than 5-fold increase over a 13-year period.^[1-3] The reported incidence of child abuse in South Korea was 1.32 per 1000 children in 2015.^[2] When compared to incidences of child abuse in other countries, this reporting rate in South Korea is relatively low.^[2,4,5] One study has shown that a low reporting rate can be associated with insufficient mandatory reporting.^[3] Among mandatory reporters such as healthcare providers who report suspected child abuse, the rate of reporting in South Korea was only about 1% until 2015 and the reporting rate has shown little changes in the last decade.^[2] The rate of child abuse among children visiting ED varies widely from country to country; the detection rate of child abuse in the ED has been reported to range from 0.2% to 10% according to previous studies.^[6-8]

To improve early detection and reporting, screening tools have been developed.^[9-11] Studies have shown that utilizing screening tools in the ED can increase the rate of reporting child abuse.^[12] The aim of this study was to develop and evaluate the feasibility of a screening tool for the detection of suspected child abuse and neglect among injured children in South Korean EDs.

2. Methods

2.1. Study design and setting

This study consisted of 2 parts. The first part was to develop a screening tool through literature review with a modified Delphi

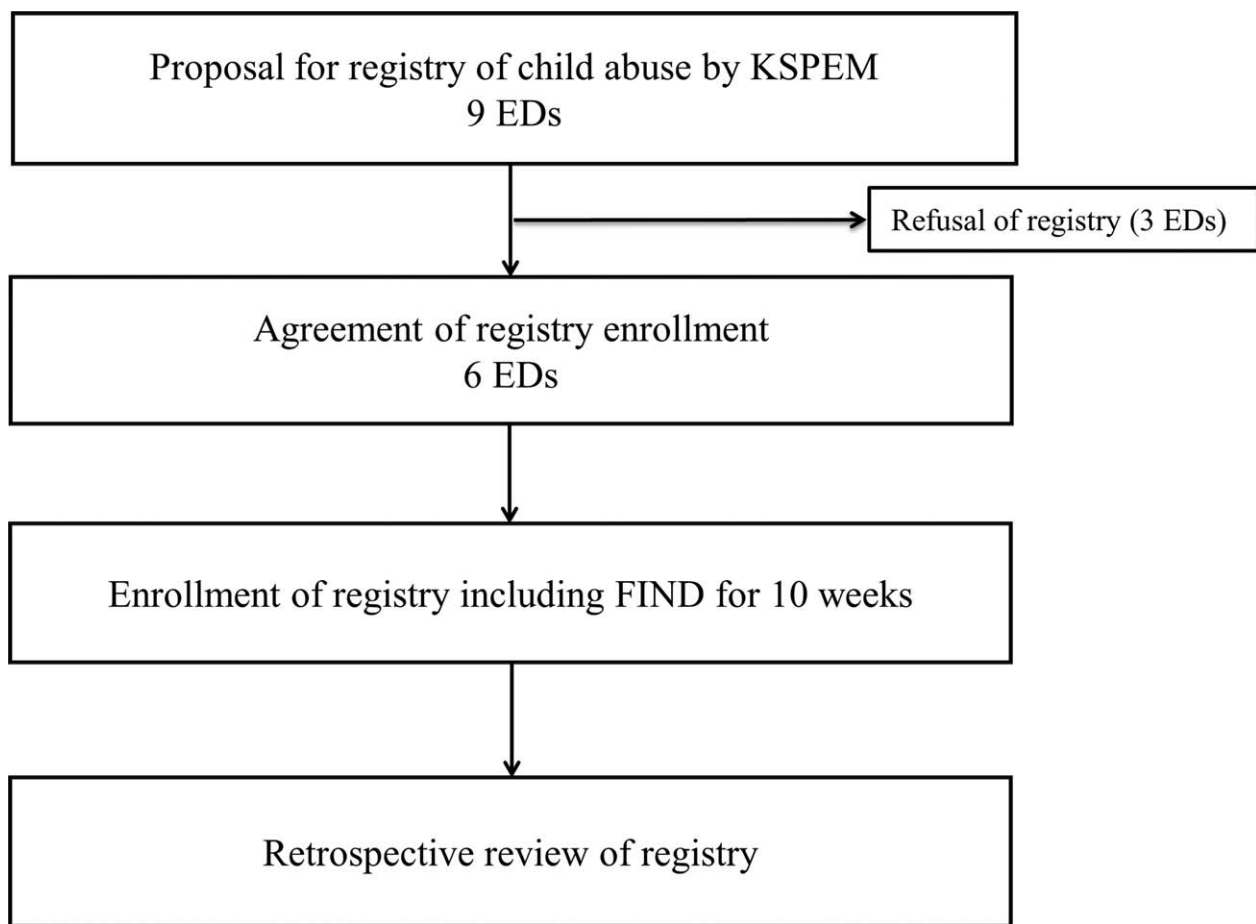


Figure 1. Study process of child abuse registry. A total of 6 emergency departments were enrolled for 10 weeks. ED=emergency department; FIND=Finding instrument for non-accidental deeds; KSPEM=Korean Society of Pediatric Emergency Medicine.

method.^[17] For the second part, a preliminary feasibility test of the screening tool was conducted using pediatric trauma patients 13 years old or younger in EDs of 6 tertiary hospitals. The researcher proposed the project of child abuse screening using registries of 9 hospital EDs that were members of the Korean Society of Pediatric Emergency Medicine. Of 9 EDs, 3 EDs chose not to participate in this project. Thus, a total of 6 hospitals were enrolled from September 2nd to November 10th in 2014 (Fig. 1). These 6 participating EDs included 3 pediatric EDs and 3 general EDs. Four of these EDs were located in Seoul, South Korea. One ED was located in Gyeonggi Province while the last ED was located in Jeju Province, South Korea. This study was approved by the Institutional Review Board (IRB) of Seoul National University Medical Center (IRB-1612-123-817). The requirement of informed consent was waived due to its retrospective nature.

2.2. Literature review

Although various screening tools have been developed, we believed that it was more appropriate for experts to determine the items considering the domestic hospital situation showing low awareness of child abuse and low educational experience than using screening tools developed in other countries. Candidate questions for the screening tool were derived from literature review of screening tools, including 4 screening tools systematically reviewed by Lower et al in 2010, guidelines for the

evaluation of child abuse proposed by the American Academy of Pediatrics, and 2 screening tools recently released in the Netherlands.^[9-11,13-17]

2.3. Modified Delphi method

A 3-step modified Delphi method was used to establish consensus between January and March of 2014. The Delphi method is recommended for use in the healthcare setting as a reliable means to determine consensus for a defined clinical problem. The modified Delphi method consisted of 2 rounds of email questionnaires and a final face-to-face meeting. It was chosen because it allowed expert interaction in the final round so that members of the panel could provide further clarification on some matters and present arguments in order to justify their viewpoints. Previous studies have demonstrated that the modified Delphi method is superior to the original Delphi method as it is highly cooperative and effective.^[18-20] 15 experts agreed to participate. A panel discussion was held to finalize check-list items. These experts were composed of specialists in pediatrics and pediatric emergency medicine in South Korea. These 15 experts included 2 directors of a hospital child-protection team, 7 pediatric emergency medicine experts with experience in child abuse cases, 5 pediatric ED directors, and an injury prevention expert. Most hospitals in Korea have few child protection teams. They do not have medical child abuse specialists as in developed countries up to date.

In round 1, the draft document containing the list of statements was circulated by email to all-15 panel members accompanied by a clear explanation of the objective of the study and specific instructions for member participation. Each expert was asked to vote by marking "agree" or "disagree" besides each statement. Experts were also given opportunity to provide comments and suggest additional items that might not have been included when developing the initial list of statements. Statements required 80% agreement from the panel (ie, agreement among 12 of 15 experts) in order to accept or omit a statement during construction of the final guideline. In other words, if 12 experts agreed on a statement, the statement was accepted for the final guideline document. However, if 12 disagreed, the item was omitted from the list of statements. The criterion of 80% chosen as an appropriate cut off was based on the work of Lynn.^[19,20] We also used the definition of agreement proposed by RAND/UCLA appropriateness criteria work group. These experts ranked their agreement with each candidate question using a 9-point Likert scale (1=strongly disagree, 5=neither agree nor disagree, and 9=strongly agree). A score of 7 to 9 was defined as "agreement." These experts were also prompted to provide qualitative written feedback of each item's structure and clarity, to add items that were relevant but missing, and to suggest other pertinent questions.^[20] In round 2, these experts used the same voting method as described for round 1. However, in this round, they had knowledge of the group's scores and comments. Thus, participants could reflect upon group results and change their mind, while preserving the anonymity of their responses. Final responses were analyzed as described for round 1. Statements not meeting expert agreement were retained for discussion in round 3.^[20] Round 3 was comprised of a face-to-face meeting. Again, 80% agreement was used to determine acceptance or rejection of a statement. Round 3 voting occurred using a show of hands. Thus, anonymity was not retained. Panel members were encouraged to discuss the remaining check-list until agreement was reached to retain, modify, or eliminate the statement from the final child abuse screening check-list.^[19]

2.4. Feasibility test

After reviewing references related to screening tool, the screening tool was named 'Finding Instrument for Non-accidental Deeds (FIND)'. Each hospital staff taught healthcare providers (physicians, nurses, and emergency medical technicians) how to use FIND. Physicians, nurses, and emergency medical technicians (EMTs) were voluntarily recommended to use this tool at any time from initial triage to discharge or hospitalization in EDs. The registry was required to be completed during the patient's stay in the ED. Users of the screening tool were instructed to notify ED faculty when 1 or more item (question) was 'yes' (positive). The ED faculty then interviewed patients and/or caregiver (s) for additional information such as a detailed history and physical examination. After the interview, another item could be found positive based on results (Fig. 2). The ED faculty made the decision to place the case into 1 of 3 categories: 'unlikely' (no evidence of abuse), 'moderately likely' (need more evaluation), and 'highly likely' (necessary to report to the Child Protection Agency). One or 2 ED faculty members voluntarily assisted in the FIND process in each of the 6 hospitals. All data were collected from the registry. Screening rate with FIND, positive and missing rate of each question, and the reporting rate to the Child Protection Agency were retrospectively analyzed to evaluate the feasibility of FIND.

2.5. Statistical analysis

Descriptive statistics of modified Delphi responses and demographics of participants were performed to obtain proportions, medians, and the interquartile range. Numbers of injured children, screened children, and reported children were calculated proportions. Data were entered into an Excel spreadsheet. Descriptive statistical analysis was performed using IBM SPSS ver. 20 (IBM Corp., Armonk, NY, USA).

3. Results

3.1. Development of a screening tool for child abuse

Table 1 shows modified Delphi method and their agreement. After 2 rounds of e-mails and a final discussion, 8 questions were selected for the screening tool. In the first round, 6 of 12 items showed agreement (agreement rate >80%) among the panel members. Two additional items were selected through the second round and the final discussion. After 3 rounds of discussions, 8 of 12 items were finally selected for the screening tool. Table 2 shows FIND and 8 questions.

3.2. Feasibility of the screening tool

A total of 3855 pediatric trauma patients visited 6 EDs for 10 weeks. Of them, 72.9% were enrolled for FIND. Characteristics of these screened children are shown in Table 3. The average age of these screened children was 4.0 years old (SD 3.4) and the proportion of males was 62.1% (n=1067). The largest (65.7%) age group was the 0 to 4-year-old group. Among all enrolled children, 6 children were suspected of child abuse before screening with FIND. These 6 cases were detected during pre-screening and reported to child protection services. Therefore, they were excluded from FIND screening. Of 2815 screened children, 36 (1.3%) cases had 1 or more positive answer to FIND. Of these 36 cases, 30 were reviewed by each ED faculty. Six cases were not reviewed because healthcare providers failed to contact their hospital ED faculty. After reviewing the 30 cases by ED faculty, they were categorized into 19 cases of 'unlikely' or no evidence of abuse; 9 cases of 'need follow up check-up or evaluation for abuse' or the need for more evaluation; and 2 cases of 'need to report to the Child Protection Agency' (Fig. 2).

Of 8 questions, the item pertaining to 'clothes and hygiene of the child' showed the highest positive rate (0.39%), followed by 'clinically significant injury for infant' item (0.29%) and 'changing/inconsistency trauma history among caregivers' item (0.25%). The rate of unknown was the highest for item 'suspicious of physical abuse' (0.43%) while the rate of missing values was the highest for item 'clinically significant injury for infant' item (0.32%).

4. Discussion

This was the first study to develop a child abuse screening tool for healthcare providers in South Korea. A child abuse screening tool, 'FIND' consisting of 8 questions was developed using a modified Delphi study and can be used for injured children under the age of 14 in EDs of South Korea that is known to have a low reporting rate of child abuse. When 6 EDs were encouraged to voluntarily use a screening tool after a brief education, the screening rate of child abuse was about 73% and the reporting rate was 0.07%.

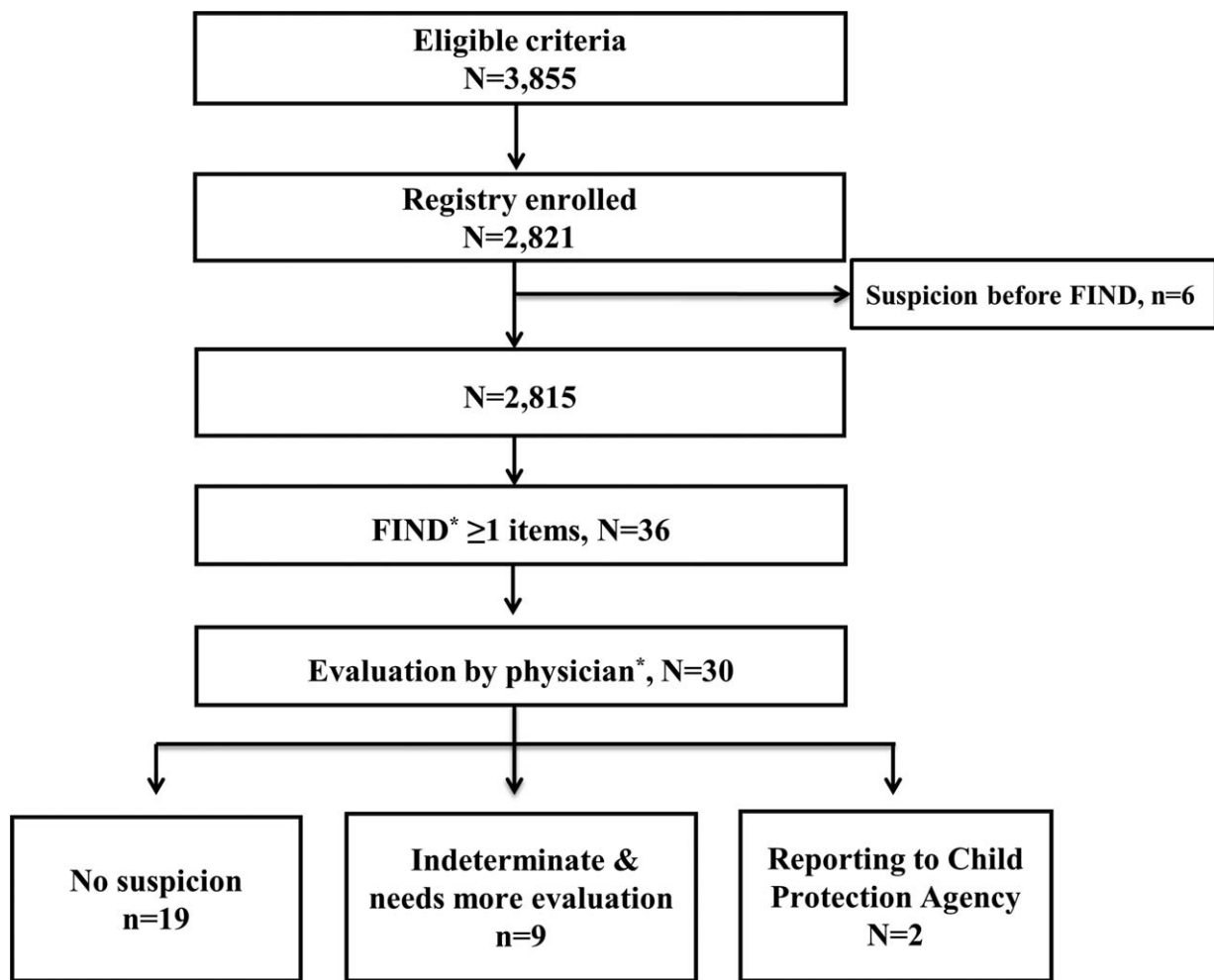


Figure 2. Flow diagram of registered children. The screening rate was 72.9% and the positive rate of screening tool was 0.1%. A total of 2 children were reported to Child Protection Agency. FIND=finding instrument for non-accidental deeds, * Emergency medicine board certified physician.

Although items of our instrument FIND are similar to previous screening tools, the main advantage of using FIND is that it reflects opinions of pediatric emergency experts who know the domestic situation well. The 6 items in our tool were derived from recent studies. They are mainly focused on detecting physical

abuse and neglect such as an injury that fits with developmental level, an injury that is in accordance with wound (s) and history, suspected signs of physical abuse and interaction/relationship between the child and caregiver. In addition, we added 2 more questions, including hygiene and inappropriateness of clothing,

Table 1

The selected 12 candidate questions by specialists using the Delphi method and their agreement.

Items	Agreement		Disagreement		Consensus	
	1st round	2nd round	1st round	2nd round	1st round	2nd round
1. Is the mechanism of injury incompatible with the development of the child?	86.7%	86.7%	13.3%	13.3%	Y	Y
2. Does the trauma history change or is it inconsistent among caregivers?	86.7%	86.7%	13.3%	13.3%	Y	Y
3. Is there an inappropriate delay in seeking medical help?	80.0%	80.0%	20.0%	20.0%	Y	Y
4. Are there any witnesses when a child is injured?	73.3%	66.7%	26.7%	33.3%	N	N
5. Does the relationship between the child and caregiver (s) seem to be inappropriate?	73.3%	80.0%	27.0%	20.0%	N	Y
6. Does the child have suspicious sign (s) of physical abuse? ex: bruises (fresh and faded), perineal/hip burns, etc.	100%	100%	0%	0%	Y	Y
7. Is the mechanism and type of injury incompatible/conflicting with the wound (s)?	86.7%	86.7%	13.3%	12.3%	Y	Y
8. Are the clothes and/or hygiene of the child inappropriate?	66.7%	80.0%	33.3%	20.0%	N	Y
9. Has he/she achieved appropriate growth and development for his/her age?	53.3%	46.7%	46.7%	53.3%	N	N
10. Is there a history of multiple ED visits due to injury within one year?	66.7%	66.7%	33.3%	34.3%	N	N
11. Is the injury clinically significant for an infant (<2 years old)? ex: intracranial haemorrhage, long bone fracture	80.0%	80.0%	20.0%	20.0%	Y	Y
12. Although there are no signs from the above, is there any suspicion of abuse?	60.0%	66.7%	40.0%	33.3%	N	N

N=No; Y=Yes.

Table 2**FIND and related questions of each items.**

FIND	Find the signs of abuse -Does the child have suspicious sign (s) of physical abuse?
F	Family/Fracture -Does the relationship between the child and caregiver (s) seem to be inappropriate? -Is the injury clinically significant for an infant (<2 years old)? For example, intracranial haemorrhage or long bone fracture
I	Inconsistency -Is the trauma history changing or inconsistent among caregivers? -Is the mechanism and type of injury incompatible/conflicting with the wound (s)?
N	Neglect -Are the clothes and/or hygiene of the child inappropriate?
D	Delay visit / Development -Is there an inappropriate delay in seeking medical help? -Is the mechanism of injury incompatible with the development (age) of the child?

FIND=finding instrument for non-accidental deeds.

and clinically significant injuries in children younger than 2 years old. In Netherlands, 2 instruments, the SPUTOVAMO-R and ESCAPE, were developed for screening child abuse.^[16,17] The SPUTOVAMO-R had 6 questions with binary answers. A child with 1 or more positive answer (s) was referred to a pediatrician or child-abuse team.^[17] Questions for the SPUTOVAMO-R instrument were as follows:

- (1) injury compatibility with history and age;
- (2) history consistency when repeated;
- (3) delayed visit;
- (4) head-to-toe examination;
- (5) unexplained injury; and
- (6) parent and child interaction.^[17]

Of these 6 items, 5 items except for unexplained injury were similar to the screening tool 'FIND' developed in the present study. Louwers et al also have developed a 6 item check-list (the ESCAPE instrument) that was similar to SPUTOVAMO-R for child abuse and tested it in all children younger than 18 years of age in 4 EDs.^[16] The ESCAPE form is a check-list with 6 questions. Compared to SPUTOVAMO-R, item 2 is missing in ESCAPE and a danger signal for the safety of the child or family is

included in ESCAPE. Head injuries and long bone fractures in preverbal children could be the result of physical abuse. They have been recommended as indicators to consider child abuse.^[21] Woodman et al have reviewed previous studies, and found that markers such as visiting age, repeated attendance and injury type (ie, head injury, bruises, fractures, burns, or other) for physical abuse or neglect were not sufficiently accurate to screen injured children in the ED.^[22]

In 2015, 137 victims were reported by healthcare providers in South Korea and accounted for 0.007% of the total pediatric patients (about 2 million visits).^[2,23] The reporting rate of child abuse in ED of South Korea is relatively low compared to reporting rate of 0.2% to 10% in other countries.^[7-9] In this study, the reporting rate of 6 hospitals was 0.07% (2 cases). The number of reported cases is estimated to be approximately 500 cases (ED visits by injured children estimated at 700,000) of child abuse by emergency medical personnel, which is 3.6 times higher than the actual number of reported cases of all medical personnel.^[23,24] Previous studies have shown that, to improve screening and detection rates of child abuse, development and application of a screening method could be helpful.^[15,16,25] Considering the low perception of child abuse reporting by medical practitioners in South Korea, the introduction of screening tools could be a way to increase child abuse detection and reporting rates.

Before the introduction of this project, the screening of child abuse was not routinely performed in Korean EDs, including EDs that participated in the present study. The rate of screening was approximately 73% for all injured children and the detection rate of positive screening (1 or more items) in this study was 1.3%. In 2012, Louwers et al used ESCAPE screening instrument in 3 hospitals for the first time. The screening rate was increased from 20% to 67%. The detection rate of suspected child abuse was significantly higher in children who were screened for child abuse than in those who were not screened for child abuse (0.5% vs 0.1%).^[25] Their detection rate of positive screening was 1.1%. The use rate of screening tool in this study was higher than that in the Netherlands. However, our reporting rate was lower. The use rate of screening tool was higher than 70% because the use of screening tool included not only doctors, interns, residents, and specialists, but also nurses and emergency medical technicians. In the case of the Netherlands ESCAPE tool, triage nurses were used.^[16] The use of a screening tool may vary depending on mandatory reporting and subjects who use it. In order to increase its utilization rate, the tool should be easy to use even in a

Table 3**Characteristics of the children who were screening with FIND.**

	Screened children, N (%) N=2805
Sex (male)	1741 (62.1%)
Age (y), median (IQR)	3 (1-6)
0-4	1842 (65.7%)
5-9	671 (23.9%)
10-13	292 (10.4%)
ED visit time (h)	
0-5:59	95 (3.4%)
6:00-11:59	423 (15.1%)
12:00-17:59	973 (34.7%)
18:00-23:59	1314 (46.8%)
Persons who wrote a registry	
Intern	1598 (57.0%)
Resident	92 (3.3%)
Professor	405 (14.4%)
Nurse	474 (16.9%)
Emergency medical technician	236 (8.4%)

ED=emergency department; FIND=finding instrument for non-accidental deeds.

congested ED. Thus, its items should be simple while the accuracy of the screening tool should be assured.

This study has some limitations. First, the research period was short and the number of participating hospitals was small due to limited research funding. Since the detection rate of child abuse in ED was low, longer periods of study and more funding are warranted for the accuracy of the screening tool. Second, it was impossible to evaluate the accuracy of screening tool because confirmatory decision data of each case from the National Child Protection Agency (NCPA) were unavailable. The Decree of the Personal Information Protection Act makes it difficult to confirm if children suspected of abuse are really abused or not. Because the authors could not access data from the NCPA, we could only find results of screening rate and reporting rate without confirmation rate. A method of matching reports by healthcare providers to confirmation data from the NCPA is needed to analyze the accuracy of the screening tool in further studies. In addition, previous studies have shown that diagnostic check-lists lack comprehensive evidence of their accuracy.^[9,14,16,17] SPU-TOVAMO-R2, an easy to use child abuse detection check-list, has shown a low detection rate with a high false positive rate.^[17,26] Since the use of a screening tool without being assessed for accuracy may be perceived as unnecessary work for healthcare providers in congested EDs, it may be necessary to determine the recommendation for use after a large screening tool validity assessment initiated by the government. Third, this screening tool is for emergency pediatric trauma patients, not for children who visit the emergency room, ill children, or outpatient clinics or pediatric wards. Therefore, it is difficult to find emotional abuse or sexual abuse because it is more focused on physical abuse among various types of child abuse. Fourth, children who are elementary school children or younger were considered as the main target population of this tool. For middle school age adolescents or older, they could explain the abuse situation themselves and have different characteristics with younger children. Thus, we enrolled trauma patients aged 13 years or younger.

5. Conclusions

We developed an ED based screening tool for child abuse consisting of 8 questions for injured children younger than 14 years old. The use of such screening tool in the ED with low reporting rate of child abuse is expected to increase the reporting rate. However, further study is needed to investigate the accuracy of the screening tool using national child abuse registry.

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Author contributions

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