USING THE MODIFIED DELPHI METHOD TO PROPOSE AND VALIDATE COMPONENTS OF A CHILD INJURY SURVEILLANCE SYSTEM FOR IRAN

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Using the Modified Delphi Method to Propose and Validate Components of a Child Injury Surveillance System for Iran

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Abstract

Background: Child injuries are a worldwide public health concern. An injury surveillance system (ISS) has a beneficial impact on child injury prevention, but an evidence-based consensus on frameworks is necessary to establish a child ISS.

Objectives: To investigate key components of a child ISS and to propose a framework for implementation.

Methods: Data were gathered through interview with experts using unstructured questions to identify child ISS functional components. Qualitative data was analyzed using content analysis method. Then, the Modified Delphi method was used to validate functional components. Based on the outcomes of the content analysis, a questionnaire with closed questions was developed to be presented to a group of experts. Consensus was achieved in two rounds.

Discussion: In round I, 117 items reached consensus. In round II, five items reached consensus and were incorporated into the final framework. Consensus was reached for 122 items comprising the final framework and representing seven key components: goals of the system, data sources, data set, coalition of stakeholders, data collection, data analysis, and data distribution. Each component consisted of several sub-components and respective elements.

Conclusion: This agreed framework will assist to standardize data collection, analysis, and distribution to detect child injury problem and provide evidence for preventive measures.

Keywords: Wounds and injuries, surveillance system, child, framework, consensus, Modified Delphi method

Introduction

Child injuries are an increasing global public health problem. Unintentional injuries of children aged one to 18 years-old are the major cause of death and hospitalization worldwide, with the likelihood of lifetime disabilities. Intentional and unintentional injuries account for mortality of hundreds of thousands of children and disability of millions more children globally. More than 95 percent of all fatal injuries in children occur in low and middle income countries (LMICs) where the magnitude of the problem is greater and injury data is more likely to be missing, as well as of lower quality or availability.

In Iran, with recent advances in providing timely, quality healthcare services to citizens, disease
patterns have transitioned from communicable disease to non-communicable disease and injuries. Globally, Iran ranks fifth in road traffic mortality rates and also has the highest mortality rate in the Eastern Mediterranean region. Iran has a population of more than 80 million people, among which 32 percent are younger than 19 years of age. On average in Iran, 20.2 percent of deaths in children under five years-old occurs because of unintentional injuries. According to the results of a national injury registry, burn injuries account for 58.8 percent of injuries among children under seven-years-old. Also, injuries are the highest cause of mortality in children 1 to 14 years-old.

Injuries are preventable and the first step to preventing injuries is understanding the extent and magnitude of the problem. Injury Surveillance Systems (ISSs), through ongoing systematic data collection, analysis, interpretation, and dissemination, help identify injury patterns, trends, and the magnitude of the problem, and provide necessary data for health policy makers to decide on preventive measures.

Despite the fact that various studies have evaluated the usefulness of ISSs to provide data about injury trends and identify high risk groups, as well as prevention programs, few countries have established formal injury surveillance systems because of various obstacles. Obstacles identified in Iran include lack of political commitment, limited resources, poor management, and poor data collection procedures. ISSs are are implemented mainly in high-income countries, while in LMICs where the magnitude of the problem is larger, often no formal data collection mechanism exists for child injury surveillance.

Although research has been conducted in the field of child injuries and prevention in Iran, the majority of this research is limited to epidemiologic studies and less research has addressed the problem from a surveillance based point of view. There is lack of evidence in the body of knowledge in terms of ISS framework with respect to its key functional components. Examining the functional components of a child ISS is useful as it could contribute to a standard data collection system and more quality injury data. Thus, the aim of this study was to first identify and second to validate key functional components of a framework for child ISS in Iran, using interviews and the modified Delphi method respectively.

**Materials and Methods**

This research was carried out from January 2017 to June 2018 and involved two tandem steps, including 1) identifying and collecting child ISS components through interviews with experts and 2) validating the components using the modified Delphi method.

**Identification of child ISS functional components**
Identification of key components needed to build a child ISS for Iran was performed by means of interviews using an interview guide with unstructured questions. Participants were asked to express their opinion about key components of an ISS used to collect injury data on children in Iran. A snowball sampling technique was applied to identify experts, and interviews continued until data saturation was achieved. Thus, 14 experts in different fields of epidemiology, pediatrics, social medicine, safety promotion and injury prevention, and health information management were interviewed. Written informed consents to participate in this research as well as to record the interviews were obtained in the beginning of each interview session after instructions were given to the participants.

Recorded interviews were transcribed verbatim. Data were analyzed using content analysis methods. Transcriptions were reviewed by the main researcher and open coding for the smallest possible meaning unit took place. Codes were revised and classified in some selected groups and subgroups based on their similarities and differences. All codes were revised by a team member with experience and expertise in qualitative research.

**Validation of child ISS functional components**

This paper reports on a research study that employed the modified Delphi technique with a set of pre-selected items drawn from the interviews. In the second step, based on the outcomes of the content analysis, a questionnaire with closed questions was developed to be presented to a group of experts. The questionnaire was subjected to scrutiny by a panel of experts and was pilot tested by a sample of injury prevention and control experts. Items were rated on a scale of 1=Very Important, 2=Important, 3=Moderately important, 4=Of Little Importance and 5=Unimportant. The questionnaire included 151 elements, which were divided into the following seven major components (some components included subcomponents as well). (Table 1)

- 11 items in goals of the system (e.g., to support injury prevention acts, to provide epidemiologic patterns of fatal injuries, to provide epidemiologic patterns of nonfatal injuries, to determine injury severity, etc.);
- 12 items in data sources (e.g., prehospital emergency, emergency department of general hospitals, emergency department of specialized hospitals with the priority of children hospitals, population-based surveys, etc.);
- 36 items in data set organized in eight subcomponents of identifiers, demographics, time related data, place related data, injury characteristics, injury context, parents’ supervision and safety equipment’s (e.g., national ID number, date of creation of the record, hospital name, etc.);
- 21 items in coalition of stakeholders organized in two subcomponents of members and leader (e.g., Ministry of Health and Medical Education, healthcare organizations/hospitals, forensic medicine, police, Ministry of Roads & Urban Development, etc.);
- 11 items in data collection organized in four subcomponents of ISS type, data collection
methods, data entry methods, and case definition (e.g., active data collection including data collection by child ISS officers; inactive data collection, including data collection by healthcare providers and facilities, a combination of both methods, etc.);

- 24 items in data analysis and interpretation organized in two subcomponents of indicators and analysis level (e.g., injury frequencies, injury percentages, injury rates, injury rates in special groups, adjusted injury rates, Years Lived with Disability (YLD), etc.); and
- 36 items in data distribution organized in three subcomponents of data distribution methods, audience, time intervals of reports (e.g., organizational newsletter, newspaper, mass media (TV and radio), social media (face book, twitter, Instagram, etc.), scientific papers published in journals and conferences, etc.).

Although five to 10 experts are adequate for content validation, 16 experts representing epidemiology, pediatrics, social medicine, safety promotion and injury prevention, health information management, and medical informatics were invited to participate on the expert panel. In round one, 151 items organized in seven key functional components were distributed to the panel. Panel members were asked to rate the relative importance of individual items and make changes to the phrasing or substance of the items. The same voting method was used for round two. The research goal was to obtain consensus regarding what functional components and their respective elements (items) are important for establishing a child ISS in Iran. Round one presented a questionnaire to panel members, who completed and returned it to the researcher. The responses were analyzed and compiled to build the round two questionnaire. For each item, interquartile ranges were calculated as measures of dispersion and median scores were calculated as measures of central tendency. The combination of these indices was used to determine the degree of importance and consensus for each item. Items were accepted if they acquired more than 75 percent of collective consensus of (1=Very Important) and (2=Important). Collective consensus of items less than 50 percent and between 50 percent to 75 percent were removed and sent for the next round respectively.

Panelists were faculty members or researchers holding a PhD degree and medical specialists with established careers in the field of child injury prevention, injury surveillance, health information management, or medical informatics, with at least 10 years of experience working in the field. Panelist also had expertise in using injury surveillance systems.

Ethics approval for this study was provided by the Ethics Committee of Iran University of Medical Sciences.

Results

ISS component development

The outcome of the content analysis was 151 elements (items), which were categorized in seven
major categories, including goal of the system, data sources, data set, coalition of stakeholders, data collection, data analysis and interpretation, and data use. Four of these major categories, including data set, coalition of stakeholders, data collection, data analysis and interpretation, and data distribution, comprised various subcomponents themselves. Table 1 illustrates the seven major categories (components) of child ISS and a sample of its respective elements.

Insert Table 1 here.

**Modified Delphi Round 1**

After round one voting was completed and comments were summarized, redundant statements and statements sharing similar constructs were grouped and reduced. Specifically, 18 of 151 initial statements were combined and reduced to create nine statements that reached consensus and were accepted for the final framework. For example, the following two items were originally included in the list of statements for round one (goals of the system): 1.) to provide epidemiologic patterns of fatal injuries; and 2.) to provide epidemiologic patterns of nonfatal injuries. Both items received consensus (≥ 75 percent of respondents rated important/very important response (one or two) on the Likert scale for the element), were combined into a single statement to reduce redundancy, and accepted for the final framework. The revised element now reads “to provide epidemiologic patterns of fatal and nonfatal injuries.” Of the 151 initial elements, 108 were deemed not redundant, reached consensus, and were accepted into the final child ISS framework without modification. In total, 117 elements from round one were accepted into the final framework.

Round one was also used to generate 18 new elements by the panelists. New elements were categorized in the following components: data sources, data set, coalition of stakeholders, and data distribution. Also, 25 out of 151 initial statements did not reach consensus after round 1. In total, 43 elements were sent to round two. Figure 1 illustrates the results of the modified Delphi process.

**Modified Delphi Round 2**

In round two, five of 43 elements reached consensus and were accepted without modification (≥ 75 percent of respondents rated important/very important response (one or two) on the Likert scale for the element), and were accepted into the final child ISS framework. Thirty-eight of 43 elements did not reach consensus (≤ 50 percent of respondents rated important/very important response (one or two) on the Likert scale for the element) and were omitted from the final framework. The final child ISS framework consists of 7 major components and 122 elements: four related to goals, 8 related to data sources, 32 related to data set, 15 related to coalition of stakeholders, nine related to data collection, 19 related to data analysis and interpretation, and 36 related to data (Table 2).

**Discussion**

Child injuries are a worldwide public health concern requiring urgent attention. There seems to be a potential beneficial impact of the application of an injury surveillance system on special populations,
such as children, in injury prevention. In LMICs, in some cases, data pertinent to child injuries and violence are weakly gathered; in other cases collected injury related data is of less quality and/or is scattered between different organizations with reduced opportunities for access and linkage. Thus, there is a need for evidence-based consensus on frameworks to establish child ISS for improving injury surveillance systems where there is agreement.

The current data collections for child injury in Iran is plagued with management barriers, weakness in data capture and usage, resource limitation, lack of coordination between different stakeholders, and lack of commitment to prevent injuries.

Development of frameworks to establishing child ISS provide a step-by-step sequence that improves quality of data, data collection procedure, data dissemination, and coordination of injury prevention intervention across the entire continuum of injury chain prevention. This contributes to injury prevention and planning by identifying injury; detecting injury risk factors; monitoring the results of interventions; and identifying the best way to use available resources. Although there is plenty of research in the field of child injuries in Iran, no research about establishing an injury surveillance system for children was found. Only WHO guidelines to establish injury surveillance systems was identified through a literature search. Therefore, this study implores the use of a modified Delphi method to develop a framework for establishing a child ISS in an Iranian setting. The modified Delphi method was also used to build consensus around the components, elements, and description of such a system. A detailed description of the Delphi method was included in this study to improve the quality of the final consensus framework and to add a level of credibility to component development and selection process.

To the best of our knowledge, this is the first use and reporting of a modified Delphi method to develop a framework for child ISS in an Iranian healthcare setting. Consensus was also reached for 122 elements representing seven major components (e.g., goals, data sources, data set, coalition of stakeholders, data collection, data analysis and interpretation, and data distribution) that could be used as a framework to establish a child ISS.

In agreement with the literature, this framework recommends that the goal of such a system not only should be providing the epidemiology pattern of child injuries but also, more importantly, providing adequate supporting data to help in designing injury interventions and surveillance purposes a component that is lacking in most current data collections in Iran. Considering the variables in injury data sets in order to help gather the necessary information about child injury risk factors will make reaching this goal possible. Variables proposed in the data sets of this framework, such as describing the injury event, activity of the patient child at the time of injury, parents’ supervision, use of protective devices, and region of residence can provide the opportunity to
analyze this data and identify possible child injury risk factors. Variables such as injury nature and injury mechanism based on ICD-10 also provide more structured data to analyze injury cause and the affected areas in more detail.31

Previous studies indicated that in the current injury data collection systems in Iran, deaths occurring at the injury scene, deaths occurring after leaving the emergency department (ED) for an operating ward, and deaths following hospital discharge are not registered at in hospitals’ ED.32-34 The same is true about injury patients who receive care at the scene of injury and do not go to an ED for further medical treatment.32 It is estimated that this latter group makes up 30 percent of unintentional injuries in Iran.17 Thus, current data collections fail to cover a considerable amount of fatal and non-fatal injury cases. Data sources proposed in this framework address this challenge by considering data from various existing injury mortality and morbidity data collections. For instance, prehospital emergency data is a valuable data source for injuries/death occurring at the scene and injuries/death that are not referred to a medical facility.35

The Forensic Medicine, National Death Registry, and 1-59 Month Child Death Surveillance are also important sources for death data because they gather considerable mortality data not registered at hospitals. Among these, the Forensic Medicine acts as the gold standard because death data is highly supported with death certificates and evidence. Police Department, Fire Department, and Red Crescent also have a substantial role in registering road traffic injuries, fire-related injuries, and injuries due to natural disasters, respectively. They can provide more details about what went wrong during the injury as well as injury risk factors, which are highly valuable when designing interventions.

Using different data sources leads not only to expanded data coverage but also to a 360-degree perspective on injury incidents, as various data sources gather a variety of information based on their organizational mission. The importance of considering a variety of data sources for data collection has been recognized in different literature.14,30,36 WHO emphasizes postmortem or pathology reports, police reports, ED injury records, hospital inpatient records, trauma registries, ambulance records, community-based or household surveys, transportation department reports, records of car insurance companies, occupational safety or industrial, compensation records, rehabilitation centers, and national insurance schemes as potential sources of data30 that each country can take into consideration based on its available resources.

Previous studies also indicate that current injury data collection in Iran is partially electronic.9 Data from all over the country are submitted to the Iran Ministry of Health and Medical Education (MOHME) for national data integration, quality control check, analysis, and dissemination for annual national reports.4,32,37-39 Data collected in this way lacks timeliness, as it takes a complete year for
MOHME staff to complete this process.

The data collection method put forth in this framework solves this problem by considering a time interval of one month for the data collection process from identified data sources in order to ensure the data acquired from hospitals accurately record patients’ outcome. It is important to note that the one-month time interval is considered for data collection, as it may take some time to investigate patients’ real outcome after their discharge from hospital.

Prior studies in Iran have demonstrated that injury data are analyzed using descriptive statistics such as frequencies and percentages; more advanced analysis is not available. This guideline highlights the importance of considering analytical statistics and geographic-based analysis to demonstrate black spots or spot maps for child injuries. Application of global positioning systems (GPS) could provide the needed geographical data for improved analysis.

Research also specifies that child injury reports are not well communicated through the healthcare system and stakeholders in the country. Evaluation studies have revealed that data usage is the weakest part of this system in Iran. The ultimate goal of every injury surveillance system is to provide data for action. Designing, implementing, monitoring, and evaluating interventions aimed at preventing childhood injuries is only possible when the required data for identifying causes of the problem as well as factors are well communicated between different stakeholders.

Thus, identifying the major child injury stakeholders as well as the means to distribute child injury reports are major keys in injury prevention programs. The proposed framework has identified a group of stakeholders from different involved organizations such as related offices of MOHME, forensic medicine, police, Ministry of Roads and Urban Development, insurance companies, representative from provincial governments, municipality, fire department, Red Crescent organization, standard organization, media, and NGOs to act as a focal point for establishing child injury interventions and further inter-organizational cooperation.

Different distribution means have been also identified in this framework to be employed for extended data dissemination to make data available. All of the following may contribute to the dissemination of injury information to stakeholders and to society at large: Organizational newsletters, newspapers, mass media (TV and radio), social media (Facebook, Twitter, Instagram, etc.), scientific papers published in journals and delivered at conferences, educational leaflets and pamphlets for patients in healthcare centers and hospitals, and discussion of child injury data in meetings and on websites of related offices affiliated to the Ministry of Health. Child injury strategies can be employed using these different methods.

Although Iran took significant steps to develop and promote the ED surveillance system, based on an evaluation in 2009, it was revealed that the system requires major modifications in data collection and dissemination processes to make it more operative and useful for injury prevention.
activities. Many researchers even believe that the system may not be a candidate for an injury surveillance system, as it does not comply with the formal standard definition of an injury surveillance system in terms of ongoing systematic and regular injury data collection process and data usage.\textsuperscript{15,41}

Limitations

This study has some limitations. Firstly, the opinions of experts in this study are based on the available resources and capacity of each data source, which is responsible for injury data collection. This could affect the amount of data which is to be collected. In this respect, although further variables with more focus on parents’ supervision at the time of injury as well as variables for parents’ and the child’s activity at the time of injury with a proper classification were suggested, they were not approved by the experts to be included in the final data set. The main concern was that the recognized data sources are not of the required capacity to gather information on a large data set due to different reasons, such as human resource limitations, time limitation, and physical and financial limitations.\textsuperscript{17} In addition, environments such as EDs are of a highly-stressed nature with a great focus of delivering emergency services to patients requiring immediate care, making the data registration process less of a priority. Instead, experts agreed on collecting such data through routine and systematic population-based surveys. Secondly, injury is a multi-factorial health problem requiring cooperation and coordination between different stakeholders and organizations. Although, based on the results of this study, a coalition of stakeholders was agreed upon, this does not guarantee collaboration of the identified organizations in the coalition in practice. Hence, legislation should provide this commitment.

Conclusion

The purpose of this study was to provide a framework on the major components, elements, and their description of a child ISS in an Iranian setting in order to standardize child injury data collection procedures and assist in designing evidence-based injury prevention interventions for health policymakers. The framework is also meant to accomplish the following: 1.) improve the coordination and cooperation between the stakeholders; 2.) increase the efficiency of data sharing and access; and 3.) increase the early adoption of appropriate prevention intervention. This framework serves as the first step to informing public health policy-makers about the ideal structure of a child ISS in Iran. The next step is to compare the current state of child injury surveillance to the ideal state, represented by this framework. This will identify gaps in data collection, data analysis and data dissemination with the ultimate goal of proposing a solution that can help narrow the gap between the ideal state and the current state. This framework should also be recurrently reviewed to ensure consensus remains consistent with current injury surveillance literature and national guidelines.

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**Declaration of Interest Statement**

The authors report no conflict of interest.

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Table 1. Content analysis results demonstrating seven major components of child ISS with their respective subcomponents/elements

| Row | Components | Subcomponents/elements |
|-----|------------|------------------------|

Page: 14
1 Goals
(1) to support injury prevention acts
(2) to provide epidemiologic patterns of fatal injuries
(3) to provide epidemiologic patterns of nonfatal injuries
(4) to determine injury severity
(5) to determine injury burden (fatal injuries)
(6) to determine injury burden (nonfatal injuries)
(7) to analyze fatal injury mechanism
(8) to analyze nonfatal injury mechanism
(9) to analyze fatal injury nature
(10) to analyze nonfatal injury nature
(11) to evaluate the effectiveness of injury interventions

2 Data sources
(1) emergency department (general hospitals)
(2) emergency department (specialized hospitals with the priority of children hospitals)
(3) population-based surveys
(4) trauma registry
(5) national death registry
(6) 1-59 month children death surveillance
(7) National Organization for Civil
(8) Statistical Center of Iran
(9) insurance companies
(10) Ministry of Roads & Urban Development
(11) police
(12) forensic medicine
| 3 | Data set | identifiers | (1) national ID number, (2) date of creation of the record, (3) hospital name |
|   |         | demographics | (4) name, (5) date of birth, (6) gender, (7) address of residence place, (8) postal code, (9) race/ethnicity, (10) education level, (11) occupation, (12) BAC |
|   |         | time of injury related data | (13) date of injury/death, (14) time of injury/death, (15) date of visit, (16) time of visit, (17) date of examination by a doctor, (18) time of examination by a doctor |
|   |         | place of injury related data | (19) injury place (home, outside of home, RTI, work, other, unknown), (20) if home, the exact place in home, (21) if outside of home, the exact place, (22) if RTI, the exact place, (23) if work, the exact place, (24) postal address of injury place |
|   |         | injury characteristics | (25) body part, (26) external cause based on ICD-10, (27) injury nature based on ICD-10, (28) injury severity, (29) patient’s outcome, (30) injury description (a free text field to describe what went wrong) |
|   |         | injury context | (31) any involved products, (32) patient’s activity at the time of injury (a free text field to describe patient’s activity) |
|   |         | safety equipment | (33) use of safety tools, (34) color of the clothes |

| 4 | Coalition of stakeholders | Members of the coalition | (1) Ministry of Health and Medical Education, (2) healthcare organizations/hospitals, (3) forensic medicine, (4) police, (5) Ministry of Roads & Urban Development, (6) Plan and Budget Organization, (7) Ministry of Education, (8) Ministry of Science, Research and Technology, (9) State Welfare Organization of Iran, (10) Iranian Social Security Organization, (11) insurance companies, (12) NGOs, (13) Legislature of Iran, (14) the Executive (government), (15) Judicial System of Iran, (16) Iran Broadcasting Organization, (17) state governors, (18) mayors, (19) fire departments, (20) standard organization |
|   |         | leadership of the coalition | (21) Ministry of Health and Medical Education |
| 5 | Data collection | ISS type          |
|---|----------------|-------------------|
|    | data collection method | (1) comprehensive child ISS |
|    |                  | (2) active including data collection by child ISS officers, (3) inactive including data collection by healthcare providers and facilities, (4) a combination of both methods |
|    |                  | (5) paper- based, (6) electronic (off-line), (7) online |
|    | data entry method | (8) the first visit of one person |
|    |                  | (9) International Classification of Disease- 10\(^{th}\) revision codes including (S00-S99), (T00-T78), (V01-X59), (X60-X84), (X85-Y09), (Y10-Y34), (Y35-Y36) and other injury related codes |
|    | case definition | (10) Monthly data registration, as it needs at least a complete month to determine patients' final outcome |
|    | data entry criteria | (11) International Classification of Disease- 10\(^{th}\) revision |
|    | data entry time interval classification | |

| 6 | Data analysis and interpretation | indicators |
|---|---------------------------------|------------|
|    |                                 | (1) injury frequencies, (2) injury percentages, (3) injury rates, (4) injury rates in special groups, (5) adjusted injury rates, (6) Years Lived with Disability (YLD), (7) death frequencies, (8) death percentages, (9) death rates, (10) death rates in special groups, (11) adjusted death rates, (12) Years of potential life lost (YPLL), (13) Disability-Adjusted Life Year (DALY), (14) admission rates, (15) disability rates, (16) trends over time, (17) direct costs, (18) indirect costs, (19) costs payable to relatives, (20) geographical analysis using GPS data to create spot map, (21) area or choropleth map, (22) black spots |
|    |                                 | (23) national and (24) provincial |
Data distribution methods (1) organizational newsletter, (2) newspaper, (3) mass media (TV and radio), (4) social media (face book, twitter, Instagram, etc.), (5) scientific papers published in journals and conferences, (6) educational leaflet and pamphlet in healthcare centers and hospitals for patients, (7) reports and governmental documents, (8) discussion of child injury data/ reports in meetings, (9) websites of related offices affiliated to Ministry of Health as well as coalition of stakeholders

audience (10) Ministry of Health and Medical Education, (11) healthcare organizations/ hospitals, (12) forensic medicine, (13) police, (14) Ministry of Roads & Urban Development, (15) Plan and Budget Organization, (16) Ministry of Education, (17) Ministry of Science, Research and Technology, (18) State Welfare Organization of Iran, (19) Iranian Social Security Organization, (20) insurance companies, (21) NGOs, (22) Legislature of Iran, (23) the Executive (government), (24) Judicial System of Iran, (25) Iran Broadcasting Organization, (26) the public, (27) journalists, (28) researchers, (29) fire department, (30) Standard Organization, (31) municipalities

time intervals of reports (32) weekly, (33) monthly, (34) quarterly, (35) every six months, and (36) annual reports based on the type of the audience

Figure 1 Modified Delphi process and the results of each round

Table 2 child ISS framework comprising 7 major components and 122 elements

Goals
(1) to support injury prevention acts
(2) to provide epidemiologic patterns of fatal and nonfatal injuries
(3) to analyze fatal and nonfatal injury mechanism
(4) to analyze fatal and nonfatal injury nature

Data sources
(1) prehospital emergency
(2) emergency department of general and specialized hospitals with the priority of children hospitals
(3) national death registry
(4) 1-59 month children death surveillance
(5) police
(6) forensic medicine
(7) fire department
Data set
identifiers: (1) national ID number, (2) date of creation of the record, (3) hospital name
demographics: (4) name, (5) date of birth, (6) gender, (7) address of residence place, (8) postal code
time of injury related data: (9) date of injury/death, (10) time of injury/death, (11) date of visit, (12) time of visit, (13) date of examination by a doctor, (14) time of examination by a doctor
place of injury related data: (15) injury place (home, outside of home, RTI, work, other, unknown), (16) if home the exact place in home, (17) if outside of home the exact place, (18) if RTI the exact place, (19) if work the exact place, (20) postal address of injury place
injury characteristics: (21) body part, (22) external cause based on ICD-10, (23) injury nature based on ICD-10, (24) injury severity, (25) patients’ outcome, (26) injury description (a free text field to describe what went wrong)
injury context: (27) any involved products, (28) patient’s activity at the time of injury (a free text field to describe patient’s activity)
safety equipment: (29) use of safety tools, (30) color of the clothes
(31) injury intention, (32) parent’s supervision

Coalition of stakeholders
Members of the coalition: (1) Ministry of Health and Medical Education, (2) healthcare organizations/hospitals, (3) forensic medicine, (4) police, (5) Ministry of Roads & Urban Development, (6) insurance companies, (7) NGOs, (8) Legislature of Iran, (9) Iran Broadcasting Organization, (10) state governors, (11) mayors, (12) fire departments, (13) standard organization, (14) red crescent

leadership of the coalition: (15) Ministry of Health and Medical Education

Data collection
ISS type: (1) comprehensive child ISS
data collection method: (2) active including data collection by child ISS officers, (3) inactive including data collection by healthcare providers and facilities, (4) a combination of both methods
data entry method: (5) online

case definition: (6) the first visit of one person
data entry criteria: (7) International Classification of Disease-10th revision codes including (S00-S99), (T00-T78), (V01-X59), (X60-X84), (X85-Y09), (Y10-Y34), (Y35-Y36) and other injury related codes
data entry time interval  (8) Monthly data registration as it needs at least a complete month to determine patients’ final outcome

classification  (9) International Classification of Disease- 10th revision

**Data analysis and interpretation**
indicators  (1) injury/ death frequencies, (2) injury/ death percentages, (3) injury/ death rates, (4) injury/ death rates in special groups, (5) adjusted injury/ death rates, (6) Years Lived with Disability (YLD), (7) Years of potential life lost (YPLL), (8) Disability-Adjusted Life Year (DALY), (9) admission rates, (10) disability rates, (11) trends over time, (12) direct costs, (13) indirect costs, (14) costs payable to relatives, (15) geographical analysis using GPS data to create spot map, (16) area or choropleth map, (17) black spots

analysis level  (18) national and (19) provincial

**Data distribution**
data distribution methods  (1) organizational newsletter, (2) newspaper, (3) mass media (TV and radio), (4) social media (face book, twitter, Instagram, etc.), (5) scientific papers published in journals and conferences, (6) educational leaflet and pamphlet in healthcare centers and hospitals for patients, (7) reports and governmental documents, (8) discussion of child injury data/ reports in meetings, (9) websites of related offices affiliated to Ministry of Health as well as coalition of stakeholders

audience  (10) Ministry of Health and Medical Education, (11) healthcare organizations/hospitals, (12) forensic medicine, (13) police, (14) Ministry of Roads & Urban Development, (15) Plan and Budget Organization, (16) Ministry of Education, (17) Ministry of Science, Research and Technology, (18) State Welfare Organization of Iran, (19) Iranian Social Security Organization, (20) insurance companies, (21) NGOs, (22) Legislature of Iran, (23) the Executive (government), (24) Judicial System of Iran, (25) Iran Broadcasting Organization, (26) the public, (27) journalists, (28) researchers, (29) fire department, (30) Standard Organization, (31) municipalities

time intervals of reports  (32) monthly, (33) quarterly, (34) every six months, and (35) annual reports based on the type of the audience, (36) ad hoc reports such as injuries on special occasions, national festivals, etc.
There are no comments yet.