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Templates for reporting pre-hospital major incident medical management: systematic literature review

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ABSTRACT

Introduction: In 2010, a total of 385 natural disasters killed more than 297 000 people worldwide and affected over 217 million others. More standardised reporting of major incident management have been advocated in the previous years. Prevention, mitigation, preparedness and major incident response may be improved through collection and analysis of high-quality standardised data on medical management of major incidents. Standardised data may elevate the level of scientific evidence within disaster medicine research.

Methods and analysis: A systematic literature review will be conducted to identify templates for reporting pre-hospital major incident medical management. The first set of entry terms aims to describe major incidents published during the last 20 years. The second set aims to focus the number of search results from the first set to those publications that describe templates based on data collections from these major incidents. Predefined free search phases will be combined with the first two sets.

Ethics and dissemination: The results will be submitted for publication in an open access, peer-reviewed scientific journal. The PRISMA checklist will be applied. No ethics approval is considered indicated, as this is a literature review only.

Registration details: This review is registered in PROSPERO (registration number: CRD42012002051).

ARTICLE SUMMARY

Article focus

- Aim to identify, describe and appraise the quality of templates for reporting from major incidents published since 1990.

Key messages

- Medical management of major incidents may be improved through collection and analysis of high-quality standardised data.
- Standardised data may elevate the level of scientific evidence within disaster medicine research.

Strengths and limitations of this study

- The strength of the study is that it is a systematic review.
- A main limitation is that only literature in English, Norwegian, Danish and Swedish will be included.

INTRODUCTION

Tsunamis, earthquakes, terror attacks and other major incidents alike have throughout history claimed lives and destroyed infrastructure. In 2010, a total of 385 natural disasters killed more than 297 000 people worldwide and affected over 217 million others.[1] As much as 89% of natural disaster victims in 2010 were from Asia. Due to the earthquakes in Chile and Haiti and storms in Mexico and the USA, the Americas had 46% of damages. Africa counted fewer victims from natural disasters in 2010 (9.9 million) compared with the 2000–2009 annual average (15.1 million). Europe saw the biggest increase in natural disaster occurrence, although <1% of victims came from this continent.[1] A report published by the Norwegian research institute Sintef[2] showed that there have been 103 major incidents in Norway with a total of 1174 deceased in the period 1970–2001.

The 1990s were by the United Nations declared the International Decade for Natural Disaster Reduction.[3] As part of this work, the Yokohama Strategy[4] was developed stating that disaster prevention, mitigation and preparedness are better than disaster response alone in achieving disaster reduction goals. Tools for better reporting from major incidents have been asked for in the previous years.[5 6] Although several case reports have been published after major incidents, scientific evidence is considered weak.[5] We believe that prevention, mitigation, preparedness and major incident response could be improved through gathering and analysis of high-quality standardised data on medical management of major incidents. This could be a significant step in elevating the level of scientific evidence within the field of major incident medical management. Previously, a template

for major incident evaluation and research was published according to the Utstein style[7]; however, the feasibility of this template and the extent of its implementation remain uncertain.[8]

We aim to identify, describe and appraise the quality of templates for reporting from major incidents published since 1990. We further aim to discuss if there is a need to develop an updated template for reporting after major incidents, by analysing the data found. The overall goal is to enable those responsible to improve major incident management through analyses of standardised data from previous major incidents.

METHODS AND ANALYSIS

Search strategy

The controlled vocabulary of Medical Subject Headings (MeSH) from PubMed,[9] including Subheadings, Publication Types and Supplementary Concepts, will be used, when applicable, in searches throughout all databases. Building searches with MeSH terms ensures a controlled vocabulary, also in databases that do not use MeSH to index articles. The MeSH descriptors are arranged in a hierarchical structure and descriptors further down in the hierarchical structure may be used to limit results from individual searches.

Two sets of entry terms will be applied and combined (cf. figure 1 for search strategy).

The first set aims to describe major incidents published since 1 January 1990 (inclusive). The second set of entry terms aims to identify and describes templates based on data collections from major incidents identified by the first set of entry terms. The first and second set of entry terms will be combined with the boolean operator AND. In addition to MeSH terms, free search phrases will be included. The predefined free search phrases will be combined with the boolean operator OR to ensure that all terms are included. The free search phrases will then be combined with the results from the combination of the first and second set of entry terms with the boolean operator AND.

Depending on the relevance and the number of articles found for each search combination, a further limitation might be considered by stepping down the MeSH hierarchical ladder for the first and second set of entry terms. All deviations from the protocol will be listed in the final review.[10]

Definitions

- Major incidents: any incident where the location, number, severity or type of live casualties requires extraordinary resources.[11]
- Uncompensated major incident: a 'disaster' or 'catastrophe' is synonymous with an uncompensated major incident. Uncompensated means: 'load exceeds the capacity'.[11]
- Pre-hospital: relating to procedures administered or care provided prior to a patient's arrival at a hospital.[12]
- Template: something that serves as a model for others to copy.[12]
- Contingency planning: a management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations.[13]
- Emergency management: the organisation and management of resources and responsibilities for addressing all aspects of emergencies, in particular preparedness, response and initial recovery steps.[13]

Databases and inclusion and exclusion criteria

The full search will include the following databases:

- PubMed/Medline
- EMBASE
- Cinahl
- Scopus
- Web of Knowledge (WoK)
- ProQuest Research Library

For grey literature:

Figure 1 Search strategy for systematic review on templates for reporting pre-hospital major incident medical management. Mesh: NoExp refers to an entry term that does not include MeSH terms found below this term in the MeSH hierarchy.

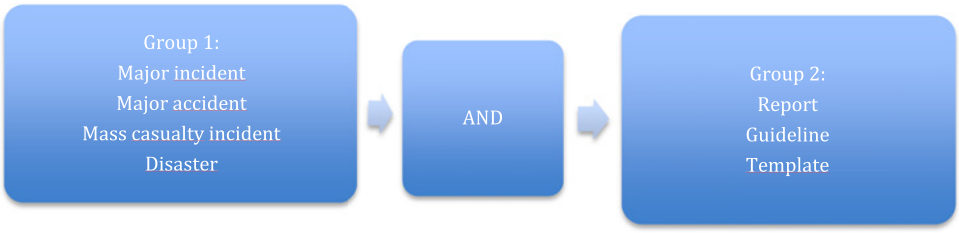

Figure 2 Simplified search strategy for grey literature.

- System for Information on Grey Literature in Europe (OpenSIGLE).[14]
- The Global Health Library.[15]
- Global Health and Global Health Archive.[16]
- Essential Health Links.[17]
- Eurasia Health.[18]
- MedCarib.[19]
- African Journals Online.[20]
- PreventionWeb.[21]
- The Major Accident Hazards Bureau.[22]
- United Nations International Strategy for Disaster Reduction (UNISDR).[23]

Due to limitations in the grey literature databases, the search strategy will be simplified (cf. figure 2 for simplified search strategy for grey literature).

- Inclusion criteria:
  - Templates reporting the medical management of the pre-hospital phase of major incidents.
  - Templates published after 1 January 1990 (inclusive) and until the date of the literature search.
- Exclusion criteria shall be:
  - All non-English literature except Norwegian, Danish and Swedish language literature.
  - Literature without an available abstract.
  - Literature reporting only psychological aspects.

Study organisation

One author will scan titles and abstracts of identified literature; papers that clearly do not meet the inclusion criteria will be excluded. Uncertain literature shall be subject to consensus between two or three authors. All papers excluded by consensus will be depicted in a document explaining reason for exclusion. This process shall be conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[24 25] and

Box 1 Quality appraisal list for included literature

Internal validity

1. Was the methodology for developing the template clearly explained?
   A template based on the best available consensus methodology is preferable to a list of variables created without formal methodology.
2. Are the data variables listed in the template clearly defined?
3. Is the rationale for the data variables described?
   The variables included should be important variables reported in previous studies or a rationale for the variables should be provided.
4. Is handling of missing information described?
5. Has the template been approved by an ethics committee?
   A template should ideally have a pre-approval from an ethics committee so that data collection can commence in the immediate post-incident phase.

External validity

1. Who developed the template (profession and position of those involved) and how was the process funded?
2. Which continent/country/organisation/s was the template developed in and where is it intended to be used?
   Ideally, experts from the region/s the template is intended to be used in should be involved in its development.
3. Are the data variables transferable to other countries or major incident management systems?
4. Is it possible to report the incident timeline?
5. Were the medical outcomes predicted valid?
   Ideally, validity for outcomes other than mortality should be reported.
6. Is a valid discussion included about possible sources of bias?
7. Do the authors discuss the possibility of using the template as a tool for evaluation?
   The ultimate goal of reporting from an incident is to be able to contribute to the evaluation process and improve major incident preparedness and management.
8. Was the clinical credibility of the template evaluated?
   For a template to have clinical credibility it should be accepted by physicians. Ideally the acceptability of a template should be evaluated.
9. Was the feasibility of the template evaluated?
10. If possible to identify that the template has been used: in which occasions was it used? What have the outcomes been?

Box 2 Data extraction from included literature

Does the template allow for the following to be reported?

Demography
- Basic information on the affected area.
- Characteristics and number of the affected population prior to the major incident.
- Other relevant pre-event information reported?

Incident characteristic descriptors:
- Time and date of major incident occurrence.
- Description of damage caused by incident.
- Consequences of the damage caused:
  - Number of deceased.
  - Number of severely injured, moderately injured, slight injured, uninjured.
- Other incident characteristic descriptors reported?

System characteristic descriptors:
- Description of the response phase.
  - Information received by ambulance dispatch centre.
  - Information provided by ambulance dispatch centre to responders.
  - Accessibility of the incident site.
  - Time from alarm to arrival at scene.
  - Safety situation at and around the site of the incident.
  - Which pre-hospital resources were available?
  - Which pre-hospital resources were lacking.
  - Pre-hospital triage systems used.
- Situation of the pre-hospital telecommunications system.
- Communication between rescue workers/aid organisations.
- Coordination of rescue/relief work.
- Time required for moving casualties from the site to the immediate next level of care.
- Scaling up and scaling down of the response.
- Other system characteristic descriptors reported?

Patient characteristic descriptors
- Children, adults, senior citizens (age >65 years) or all age groups involved.
- How injury severity was classified:
  - What triage classifications the patients received (both at the dispatch centre, first evaluation on scene, evaluation on scene before transport to immediate next level of care).
  - Injury model/s used.
  - Median/mean injury score reported.
- The most frequent types of medical injuries/illnesses.
  - How medical illness was classified.
- Other patient characteristic descriptors reported?

literature selection shall be presented in a PRISMA flow chart.[25] When a template is identified, the main author will be contacted and/or we shall search the internet to identify if the template has been used. Included literature will be reviewed using a quality appraisal list (box 1).

Data extraction will be performed in excel using predefined variables (box 2). Under each subheading in box 2, we have added an open question beginning with 'other' under which information that is reported in the template but not covered by the questions above can be categorised.

To further reduce the risk of overlooking relevant literature, a hand search of reference lists in the included literature will be conducted. A quantitative synthesis (meta-analysis) will not be performed.

Ethics and dissemination

The protocol has been registered in the international prospective register of systematic reviews, PROSPERO (registration number: CRD42012002051).[26] The systematic review results will be published in an open access, peer-reviewed scientific journal. The PRISMA checklist[25] will be used when writing the final review. No ethics approvals were considered indicated, as this is a literature study only.

Contributors SF, MR and TW conceived the idea and designed the study. ER designed the search strategy for the literature search. SF, MR, ER and TW approved the final version of the manuscript.

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