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Utility of tabletop exercises in healthcare education: a scoping review protocol

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ABSTRACT

Introduction: The later increase in the occurrence of worldwide disasters such as wars, natural disasters, or even biological disasters have potentiated the risk of emergency departments (EDs) to face a mass-casualty incident (MCI) where the EDs would be overcrowded. This raise concerns worldwide as safe and timely access to definitive care is dependent on an optimized patient flow. Hence, this international context urged the need to develop educational initiatives in healthcare to optimize disaster management and patient flow through health facilities. Tabletop exercises (TTX) were proposed as an educational educative fulfilling the aforementioned objectives. The aim of this scoping review is to synthesize evidence from the published literature on the utility of tabletop exercises in healthcare settings. The findings of this review will inform future efforts to incorporate tabletop exercises into the training of healthcare professionals.

Methods and analysis: A broad search of the literature will be conducted using a combination of MeSH terms and keywords in PubMed, MEDLINE, EBM Reviews, CINAHL, EMBASE, and ERIC, along with a search of the grey literature using various online platforms. Studies reporting on the use of tabletop exercises in healthcare will be included. Two reviewers will independently perform article screening and data extraction. To review disparate data systematically, the quality of included articles will be assessed by two reviewers using the validated checklist developed by Hawker and colleagues, as well as the JBI Critical Appraisal Checklist for Text and Opinion Papers. Data will be synthesized quantitatively using descriptive statistics and qualitatively through a narrative summary.

Ethics and dissemination: As this scoping review will examine previously collected data, no Institutional Review Board approval is required. Study results will be submitted to an appropriate peer-reviewed journal.

Keywords: medical education, tabletop exercises, TTX, healthcare, disaster medicine, training, simulation

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The results of this scoping review will provide a quantitative and narrative synthesis of evidence for the application of tabletop exercises as a teaching tool in healthcare – a timely and important topic for training in the fields of disaster medicine and non-disaster medicine.
- This study has a rigorous methodology that is reported according to the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist and the scoping methodological framework developed by Arksey and O'Malley.
- A formal quality assessment of included studies will be conducted using a checklist developed by Hawker and colleagues, as well as the JBI Critical Appraisal Checklist for Text and Opinion Papers.
- A limitation of this study is the potential to miss relevant articles as the search will be limited to publications in English or French; however, a preliminary search suggests a negligible number of relevant articles have been published in another language.

INTRODUCTION

In the past decade, the occurrence of worldwide disasters such as wars, natural disasters, or even biological disasters have increased.[1] As disaster incidents are generally associated with the surge of multiple injured victims, the healthcare system can be quickly overwhelmed by a lack of human and material resources. This is commonly called a mass-casualty incident (MCI). As the initial point of access to the healthcare system for the majority of injured patient, the emergency department (ED) becomes rapidly overcrowded in the event of an MCI. Overcrowding in the ED can be defined as "a situation where the demand for emergency services exceeds the ability of an ED to provide quality care within appropriate time frames".[2] Delays to definitive care are a serious threat to patient safety, and have been associated with increased mortality and poor outcomes.[3] One strategy for improving patient outcomes is to educate emergency physicians and staff on how to optimally manage patient flow in their ED.[4-10]

As such, there is actually a growing interest in developing educational interventions to teach and reinforce disaster management and planning in healthcare to improve patient flow.[11-14] One of the proposed training methods is tabletop exercises (TTX), which have gained popularity because of their lower cost compared to disaster drills. A tabletop exercise is essentially a meeting to discuss a simulated emergency or disaster; these exercises are used to evaluate the preparedness of an organization and to educate participants on their roles during the response. The exercise can take the form of a discussion-based activity that is guided by a facilitator and involves a dialogue on the steps to take in response to a hypothetical emergency scenario. Tabletop exercises can also take the form of a board game where the board depicts a disaster scene or a healthcare setting and the participants play as their own role in real life and move around symbol units (also called "movable markers") which represent healthcare professionals, patients and available resources.[15] Symbol units that represent patients usually show visible injuries on the front and physical exam results and clinical evaluations on the back. Under the guidance of an instructor, participants move their markers around the board to accomplish their duties as they would in real life. Using tabletop exercises as a simulation tool, hospital administrators can assess whether professional roles and responsibilities throughout the

response system are well understood and accomplished promptly to optimize patient flow.[16]

Although two previous reviews of emergency preparedness activities have included tabletop exercises among other types of training exercises,[17,18] there has not been a review to date that systematically and specifically evaluates the utility of tabletop exercises in the healthcare setting. As tabletop exercises are gaining popularity worldwide, performing an overview of the current state of literature on these activities will help better understand their benefits and limitations in the various healthcare contexts where they are being used. The purpose of this scoping review is to map the nature and extent of studies that have investigated the utility of tabletop exercises in healthcare education. The findings of this review will guide future research in this area and inform clinician educators and administrators who are considering or developing tabletop exercises to improve work flows at their local institutions.

METHODS

The protocol for this scoping review is based on Arksey & O'Malley's five-stage methodological framework statement and reported according to the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.[19-21]

Stage 1: Identifying the research question

As this scoping review aims to assess the utility of tabletop exercises in healthcare settings, we will address the following research questions:

- To date, what educational interventions in a healthcare setting have involved tabletop exercises?
    - What were the contexts, settings, theoretical frameworks, program types (stand-alone intervention or part of multi-component intervention), duration and frequency of these interventions?
    - What were the study designs?
    - Who were the participants?
    - Who were the instructors?

- What were the interventions (details of the tabletop exercise) and what were the comparators (if applicable)?
- What were the outcomes evaluated and the study findings?

As previously mentioned, the primary objective of this study is to synthesize evidence on the utility of tabletop exercises in healthcare settings. In addition, we will report the outcomes of each included study according to the Kirkpatrick Model of outcomes of educational programs.[22] This model determines aptitude from training and educational programs based on four levels of criteria: reaction, learning, behaviour, and organizational results. Thus, as a secondary objective, the following research question will be addressed:

- What were the outcomes of studies that investigated the use of tabletop exercises in healthcare settings according to the Kirkpatrick Model of outcomes of educational programs?

The four levels of the Kirkpatrick Model are described below:

- The first level is "Reaction". This level aims to measure the immediate perception and attitude of the learner to the intervention. This does not predict what has been learned, nor which information will be transferred into the future practice of the learner.
- The second level is "Learning". This level aims to measure what has been learned during the pedagogical intervention (e.g., by comparing results of a pre-test and post-test).
- The third level is "Behaviour". This level aims to measure if the learner applies the new knowledge in their daily life (e.g., by direct observation of the learner or by a test in their work environment).
- The fourth level is "Results". This level aims to measure the organizational impact of daily use of the new knowledge by the learner (e.g., by analyzing changes in morbidity and mortality statistics, or in the patient flow statistics of a unit following training).

Generally, building an educational intervention that addresses higher levels of the Kirkpatrick Model and measures higher-level outcomes is more complete than building one that only addresses the lower levels.[22]

Stage 2: Identifying relevant studies

Eligible studies, abstracts and conference summaries will be identified through a comprehensive search of CINAHL, Embase, EBM Reviews, ERIC, MEDLINE, and PubMed, while the grey literature will be searched using various online platforms (see Supplementary Material I). For practical reasons, searches will be limited to articles in English and French. There will be no limit on publication date in order to generate as broad a picture as possible of educational interventions in healthcare using tabletop exercises.

The search strategy was collaboratively and iteratively developed with the assistance of a librarian. We were unable to identify a medical subject heading (MeSH) that was specific for tabletop exercises. Hence, we developed a search strategy for PubMed using keywords related to the following concepts: tabletop exercises, whiteboards with magnetic symbols, simulation, training and serious games. Open and closed vocabulary were used to determine the best possible strategy. The search strategy was adapted to search the other online databases, and similar keywords were used to search the grey literature.

Stage 3: Study selection

Inclusion and exclusion criteria

The eligibility of articles will be assessed based on the following inclusion criteria:

- The population of interest is healthcare professionals, including students in a healthcare program.
- Academic and clinical settings where healthcare is provided or taught (e.g., university, hospital, clinics) will be considered.
- Studies assessing a tabletop exercise as a stand-alone intervention or as part of a multi-component intervention (e.g., combined with a workshop or a classroom-based learning activity) will be considered.
- To be included, articles must report on at least one learning outcome from the Kirkpatrick Model (as previously described).
- All types of study designs (e.g., qualitative designs, quantitative designs and mixed methods designs) and methodologies including commentaries, case studies, descriptions of pedagogical innovations, conference summaries and

viewpoint articles will be considered for inclusion. Scoping review and systematic review articles will not be considered for inclusion.

- Publication languages will be limited to English and French.

Selection process

EndNote software (Version X9, Clarivate Analytics) will be used to import, manage, categorize and upload all collected references during the screening and selection process. If we are unable to obtain the full text of an article, we will contact the corresponding author for the article in question; failure to respond will result in study exclusion. The reference lists of all included studies will be screened to search for any additional relevant studies.

Two reviewers (AF, AC) will meet to discuss the criteria for inclusion, and will then independently screen the titles and abstracts.

Following the initial selection process, the full text of articles that are potentially relevant will be screened for eligibility by two reviewers (AF, MAMC). Any disagreements regarding study inclusion will be resolved through consensus. If consensus cannot be reached, a third reviewer (AC) will be consulted to resolve the disagreement. Reasons for excluding references at the full-text assessment stage of the screening process will be documented and reported in a PRISMA flow diagram.[20] The reviewers will meet again following full-text assessment to discuss any challenges and uncertainties related to study selection.

Stage 4: Charting the data

Two reviewers (AF, MAMC) will independently perform data extraction from studies included in the review. The research team has adapted a standardized charting form that was inspired by a protocol published by Shen et al.,[23] which was based on a similar research question that was applied to a different subject. This form was judged by members of our research team to be easy to use and relevant to our aims. The data charting domains and subdomains are described in Table 1. Reviewers will pilot the charting form on five to ten studies to determine whether this approach to data extraction is consistent with the research question and study purpose. Any relevant data that is not captured during the

initial data extraction phase will be added iteratively by adapting the chart. If there is unclear or missing data in an article, we will contact the corresponding author to obtain clarification or additional data.

Although an assessment of study quality is not mandatory for a scoping review, it is strongly recommended by Arksey & O'Malley's five-stage methodological framework statement.[21] We will assess the quality of included studies to describe

Table 1: Data charting domains and description of subdomains

Domain/subdomains	Description
Article details	
Author	Last name and initials of the first author
Year	Publication year of the article
Country	Country where the study was performed
Initiative details	
Context	What was the need to organize a tabletop exercise?
Setting	Where did the educational intervention take place (e.g., community, hospital, university)?
Theoretical framework	What was the theoretical framework? (if available)
Program delivery	How was the program delivered (e.g., seminar, lecture, course, in-service training)?
Instructors	Who were the facilitators/instructors?
Program length	How long did the program/intervention last?
Study details	
Study design	What was the study design?
Participants	Who were the study participants? What was the sample size?
Intervention	What was the intervention? Will report as described by the study authors
Comparator	What was the comparator? (if applicable)
Study outcomes	What did the authors identify as the study outcomes?
Outcomes	What were the main results of the study?
Kirkpatrick's level	
Reaction	Did the intervention measure the immediate perception and attitude of the learner regarding the intervention?
Learning	Did the intervention measure what was learned during the pedagogical intervention?
Behaviour	Did the intervention measure if the learner applied the new knowledge in their daily life?
Results	Did the intervention measure the organizational impact of daily use of the new knowledge at work by the learner?
Risk of bias	
Hawker checklist	What is the score of the study? (if original study)
JBI checklist	What is the score of the study? (if editorial, opinion, or comment)

more precisely the current evidence on tabletop exercises in healthcare and to formulate future-oriented recommendations that address methodological gaps identified in the

literature. For original studies, study quality will be independently assessed by two reviewers (AF, MAMC) according to the checklist developed Hawker et al. (see Supplementary Material II).[24] This tool was chosen because it has been validated to systematically review disparate data, whether qualitative or quantitative. For editorials, opinion texts and comments, we will assess quality using the validated JBI Critical Appraisal Checklist for Text and Opinion Papers (see Supplementary Material III).[25]

Stage 5: Collating, summarizing and reporting the results

We will synthesize and report data on study characteristics and outcomes including the lead author, publication year, country, study context, setting, design, theoretical framework, program delivery, program duration, participants, instructors, intervention, comparator (if applicable), and the outcomes. Moreover, for each study we will classify the outcomes using the Kirkpatrick Model of outcomes of educational programs (possible levels include reaction, learning, behaviour, and results).[22] We will report on all levels of Kirkpatrick's Model, with special inquiry into the level that is most frequently measured among the studies included in the review. Finally, results of the quality assessment will be reported using the checklist developed by Hawker et al. for each original study, and using the JBI Critical Appraisal Checklist for Text and Opinion Papers for any editorials, opinion texts or comments included in the review.[24,25]

In addition, studies measuring the same outcome through the same type of population (e.g. nurses in training, emergency medicine residents, etc.) will be grouped. A narrative review to extract contextual information from each study or group of studies will be performed. Where applicable, a qualitative deductive thematic analysis of common outcomes following Kirkpatrick's framework will be performed.

ETHICS AND DISSEMINATION

As this will be a scoping review of previously published studies, no ethics approval is required. The study findings will be submitted to an appropriate peer-reviewed journal.

DISCUSSION

This scoping review will fill an important gap in the literature, as there are no existing reviews that exclusively focused on the use of tabletop exercises in healthcare settings. The protocol of this scoping review was developed in accordance with the PRISMA-ScR Checklist and Arksey & O'Malley's five-stage methodological framework.[19-21] An extensive quality assessment of included studies will be performed in an effort to substantiate and strengthen any conclusions that are drawn.

Our search strategy was developed collaboratively with the assistance of a trained librarian, and will be used to search several relevant databases as well as the grey literature. Since we have limited this review to articles published in English or French, there is the possibility that our search will miss relevant articles that were published in another language. However, the results of a preliminary search by our group to identify articles examining the use of tabletop exercises in healthcare suggest that few (if any) studies on this topic have been published in another language. Furthermore, we will carefully search the reference lists of included articles in order to identify any relevant articles that may have been missed by the search strategy.

The results of this study will inform researchers, educators, clinicians, and administrators on the utility of tabletop exercises in a healthcare environment. Moreover, it will identify gaps in the literature regarding the application of tabletop exercises in healthcare. These findings will be used to help develop and implement future educational programs involving tabletop exercises, with the hope that enhanced training of healthcare professionals will ultimately lead to improvements in patient satisfaction, security and outcomes.

AUTHOR CONTRIBUTIONS

All authors contributed to the conception of the protocol. AF wrote the initial draft of the protocol. AC, MAMC, SC, VC, NS, JSCB and RF critically revised the initial draft for important intellectual content. All authors have approved the final version of this submitted manuscript and agree to be accountable for all aspects related to this work.

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DATA SHARING

No additional data available.

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COMPETING INTERESTS

All authors declare no support from any organization for the submitted work, no financial relationships with any organizations that might have an interest in the submitted work in the previous three years, and no other relationships or activities that could appear to have influenced the submitted work.

TRANSPARENCY DECLARATION

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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SUPPLEMENTARY MATERIAL I – SEARCH STRATEGY

PubMed

Database	
Database	MEDLINE
Interface	PubMed
Search date	24th July, 2018
Filters	-

Syntax	
[MeSH Terms]	Medical Subject Heading
OR, AND	Boolean operators
*	Truncation
[tw]	Text word

Search strategy

emergo[tw] **OR** "train simulation"[tw] **OR** "table simulation"[tw] **OR** macsim[tw] **OR** "ETS simulation"[tw] **OR** ETS instructor*[tw] **OR** "train simulations"[tw] **OR** "table simulations"[tw] **OR** "ETS simulations"[tw] **OR** "Distributed Cognition for Teamwork"[tw] **OR** Train System[tw] **OR** DigEmergo[tw] OR ISEE Hospital[tw] **OR** DigEmergo[tw] **OR** simulation game*[tw] OR tabletop exercise*[tw]

OR
((Whiteboard[tiab] OR adhesive label*[tiab] OR movable marker*[tiab] OR "magnetic symbol"[tiab] OR "magnetic symbols"[tiab] OR scenario-based[tiab])

AND
(train*[tiab] OR simulation*[tiab] OR prepare*[tiab] OR educational[tiab] OR serious games[tiab]))

AND
emergency
Total references: 524

MEDLINE

Database	
Database	Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily, and Versions(R) 1946 to July 24, 2018
Interface	OvidSP
Research date	25th July, 2018
Filters	None

Syntax	
/	Exact Subject Heading
*/	Focus on Exact Subject Heading
tw	Text word field in MEDLINE includes Title (TI) and Abstract (AB)
kw	Keywords
or, and	Boolean operators
adj2	The Adjacent operator
*	Truncation

Search strategy

1 (emergo or macsim or ETS instructor* or "ETS simulation" or "Distributed Cognition for Teamwork" or DigEmergo).tw,kw. (14)
2 (train simulation* or table simulation* or Train System or ISEE Hospital or simulation game* or tabletop exercise*).tw,kw. (222)
3 1 or 2 (233)
4 (Whiteboard or adhesive label* or movable marker* or magnetic symbol* or scenario-based).tw,kw. (1009)
5 (train* or simulation* or prepare* or educational or serious game*).tw,kw. (1221383)
6 4 and 5 (309)
7 3 or 6 (540)

EBM Reviews

Database	
Databases	EBM Reviews - Cochrane Database of Systematic Reviews 2005 to July 18, 2018, EBM Reviews - ACP Journal Club 1991 to June 2018, EBM Reviews - Database of Abstracts of Reviews of Effects 1st Quarter 2016, EBM Reviews - Cochrane Clinical Answers June 2018, EBM Reviews - Cochrane Central Register of Controlled Trials June 2018, EBM Reviews - Cochrane Methodology Register 3rd Quarter 2012, EBM Reviews - Health Technology Assessment 4th Quarter 2016, EBM Reviews - NHS Economic Evaluation Database 1st Quarter 2016
Interface	OvidSP
Research date	25th July, 2018
Filters	None

Syntax	
/	Exact Subject Heading
kw	Keywords
af	All fields
or, and	Boolean operators
*	Truncation
adj2	The Adjacent operator

Search strategy

1 (emergo or macsim or ETS instructor* or "ETS simulation" or "Distributed Cognition for Teamwork" or DigEmergo).tw,kw. (0)
2 (train simulation* or table simulation* or Train System or ISEE Hospital or simulation game* or tabletop exercise*).tw,kw. (22)
3 1 or 2 (22)
4 (Whiteboard or adhesive label* or movable marker* or magnetic symbol* or scenario-based).tw,kw. (82)
5 (train* or simulation* or prepare* or educational or serious game*).tw,kw. (97711)
6 4 and 5 (43)
7 3 or 6 (65)

CINAHL

Database	
Databases	CINAHL Complete
Interface	EBSCO
Search date	25th July, 2018
Filters	None

Syntax	
MH	Exact Subject Headings
MM	Exact Major Subject Headings
TI	Title
AB	Abstract
S (1, 2, 3…)	Search
OR, AND	Boolean operators

Search strategy

#	Question	Results
S1	(emergo or macsim or ETS instructor* or "ETS simulation" or "Distributed Cognition for Teamwork" or DigEmergo)	8
S2	(train simulation* or table simulation* or Train System or ISEE Hospital or simulation game* or tabletop exercise*)	119
S3	((Whiteboard or adhesive label* or movable marker* or magnetic symbol* or scenario-based)) AND ((train* or simulation* or prepare* or serious game*))	204
S4	S1 OR S2 OR S3	328

Embase

Database	
Database	Database Field Guide Embase 1974 to 2018 July 23
Interface	OvidSP
Research date	25th July, 2018
Filters	-

Syntax	
/	Exact Subject Heading
*/	Focus on Exact Subject Heading
tw	Text word field in EMBASE includes Title (TI), Abstract (AB) and Drug Trade Name (TN).
kw	Keywords
or, and	Boolean operators
adj2	The Adjacent operator
*	Truncation

Search strategy

1 (emergo or macsim or ETS instructor* or "ETS simulation" or "Distributed Cognition for Teamwork" or DigEmergo).tw,kw. (16)
2 (train simulation* or table simulation* or Train System or ISEE Hospital or simulation game* or tabletop exercise*).tw,kw. (274)
3 1 or 2 (283)
4 (Whiteboard or adhesive label* or movable marker* or magnetic symbol* or scenario-based).tw,kw. (1327)
5 (train* or simulation* or prepare* or educational or serious game*).tw,kw. (1475558)
6 4 and 5 (470)
7 3 or 6 (753)

ERIC

emergo OR "train simulation" OR "table simulation" OR macsim OR "ETS simulation" OR "ETS instructor" OR "Distributed Cognition for Teamwork" OR "Train System" OR DigEmergo OR "ISEE Hospital"

OR

"Train Systems" OR "train simulations" OR "table simulations" OR "ETS instructors" OR "ETS simulations" OR "tabletop exercises" OR "tabletop exercise"

OR

Whiteboard OR "adhesive label" OR "adhesive labels" OR "movable marker" OR "movable markers" OR "magnetic symbol" OR "magnetic symbols" OR scenario-based

AND

train* OR simulation* OR prepare* OR educational OR "serious game" OR "serious games"

Grey literature

http://ansm.sante.fr/
http://iucpq.qc.ca/fr/institut/qualite-et-performance/evaluation-des-technologies-et-modes-d-intervention-en-sante-etmis/accueil
https://www.adelaide.edu.au/ahta/
https://www.ahrq.gov/
https://aqoa.qc.ca/aqoa/
https://www.base-search.net/
https://www.cadth.ca/fr
http://www.chus.qc.ca/academique-ruis/
http://www.crd.york.ac.uk/PanHTA/
https://cse.google.com/cse/home?cx=006602048900252416398:sju5c9cfyea&hl=en
https://scholar.google.ca/
https://www.cadth.ca/resources/finding-evidence/grey-matters
https://www.cebm.net/
https://www.guideline.gov/
https://www.kce.fgov.be/fr
https://nrepp.samhsa.gov/landing.aspx
http://www.horizonscanning.gov.au/
https://www.cma.ca/Fr/Pages/clinical-practice-guidelines.aspx
http://www.msac.gov.au/
https://www.nice.org.uk/
https://www.nihr.ac.uk/
https://www.crd.york.ac.uk/CRDWeb/
http://www.opengrey.eu/
https://papyrus.bib.umontreal.ca/xmlui/
http://www.crd.york.ac.uk/PROSPERO/searchadvanced.php
https://www.york.ac.uk/crd/research/
https://www.tripdatabase.com/
http://vortal.htai.org/
http://oaister.worldcat.org

SUPPLEMENTARY MATERIAL II – CHECKLIST DEVELOPED BY HAWKER AND COLLEAGUES

1. Abstract and title: Did they provide a clear description of the study?

Good	Structured abstract with full information and clear title.
Fair	Abstract with most of the information.
Poor	Inadequate abstract.
Very Poor	No abstract.

2. Introduction and aims: Was there a good background and clear statement of the aims of the research?

Good	Full but concise background to discussion/study containing up-to-date literature review and highlighting gaps in knowledge. Clear statement of aim AND objectives including research questions.
Fair	Some background and literature review. Research questions outlined.
Poor	Some background but no aim/objectives/questions, OR Aims/objectives but inadequate background.
Very Poor	No mention of aims/objectives. No background or literature review.

3. Method and data: Is the method appropriate and clearly explained?

Good	Method is appropriate and described clearly (e.g., questionnaires included). Clear details of the data collection and recording.
Fair	Method appropriate, description could be better. Data described.
Poor	Questionable whether method is appropriate. Method described inadequately. Little description of data.
Very Poor	No mention of method, AND/OR Method inappropriate, AND/OR No details of data.

4. Sampling: Was the sampling strategy appropriate to address the aims?

Good	Details (age/gender/race/contact) of who was studied and how they were recruited. Why this group was targeted. The sample size was justified for the study. Response rates shown and explained.
Fair	Sample size justified. Most information given, but some missing.
Poor	Sampling mentioned but few descriptive details.
Very Poor	No details of sample.

5. Data analysis: Was the description of the data analysis sufficiently rigorous?

Good	Clear description of how analysis was done. Qualitative studies: Description of how themes derived/respondent validation or triangulations.

	Quantitative studies: Reasons for tests selected hypothesis driven/numbers add up/statistical significance discussed.
Fair	Qualitative: Descriptive discussion of analysis Quantitative
Poor	Minimal details about analysis.
Very Poor	No discussion of analysis.

6. Ethics and bias: Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

Good	Ethics: Where necessary issues of confidentiality, sensitivity, and consent were addressed. Bias: Researcher was reflexive and/or aware of own bias.
Fair	Lip service was paid to above (i.e., these issues were acknowledged).
Poor	Brief mention of issues.
Very Poor	No mention of issues.

7. Results: Is there a clear statement of the findings?

Good	Findings explicit, easy to understand, and in logical progression. Tables, if present, are explained in text. Results relate directly to aims. Sufficient data are presented to support findings.
Fair	Findings mentioned but more explanation could be given. Data presented relate directly to results.
Poor	Findings presented haphazardly, not explained, and do not progress logically from results.
Very Poor	Findings not mentioned or do not relate to aims.

8. Transferability or generalizability: Are the findings of this study transferable (generalizable) to a wider population?

Good	Context and setting of the study is described sufficiently to allow comparison with other contexts and settings, plus high score in Question 4 (sampling)
Fair	Some context and setting described, but more needed to replicate or compare the study with others, PLUS fair score or higher in Question 4.
Poor	Minimal description of context/setting.
Very Poor	No description of context/setting.

9. Implications and usefulness: How important are these findings to policy and practice?

Good	Contributes something new and/or different in terms of understanding/insight or perspective. Suggests ideas for further research. Suggests implications for policy and/or practice.
Fair	Two of the above (state what is missing in comments).
Poor	Only one of the above.
Very Poor	None of the above.

SUPPLEMENTARY MATERIAL III – JBI CRITICAL APPRAISAL CHECKLIST FOR TEXT AND OPINION PAPERS

JBI Critical Appraisal Checklist for Text and Opinion Papers

Reviewer_____ Date_____

Author _____ Year_____Record Number _____

	Yes	No	Unclear	Not applicable
1. Is the source of the opinion clearly identified?	☐	☐	☐	☐
2. Does the source of opinion have standing in the field of expertise?	☐	☐	☐	☐
3. Are the interests of the relevant population the central focus of the opinion?	☐	☐	☐	☐
4. Is the stated position the result of an analytical process, and is there logic in the opinion expressed?	☐	☐	☐	☐
5. Is there reference to the extant literature?	☐	☐	☐	☐
6. Is any incongruence with the literature/sources logically defended?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

_____

_____

_____

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	Click here to enter text.
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Click here to enter text.
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Click here to enter text.
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Click here to enter text.
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Click here to enter text.
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Click here to enter text.
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Click here to enter text.
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Click here to enter text.
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Click here to enter text.
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms	Click here to

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	enter text.
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Click here to enter text.
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Click here to enter text.
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Click here to enter text.
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Click here to enter text.
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Click here to enter text.
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Click here to enter text.
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Click here to enter text.
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Click here to enter text.
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Click here to enter text.
Limitations	20	Discuss the limitations of the scoping review process.	Click here to enter text.
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as	Click here to

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		well as potential implications and/or next steps.	enter text.
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Click here to enter text.

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. ;169:467–473. doi: 10.7326/M18-0850

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item
ADMINISTRATIVE INFORMATION		
Title:		
Identification	1a	Identify the report as a protocol of a systematic review
Update	1b	If the protocol is for an update of a previous systematic review, identify as such
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number
Authors:		
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments
Support:		
Sources	5a	Indicate sources of financial or other support for the review
Sponsor	5b	Provide name for the review funder and/or sponsor
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol
INTRODUCTION		
Rationale	6	Describe the rationale for the review in the context of what is already known
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)
METHODS		
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated
Study records:		
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review

Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

BMJ Open

Use of tabletop exercises for healthcare education in disaster medicine and non-disaster medicine: a scoping review protocol

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Primary Subject Heading:	Medical education and training
Secondary Subject Heading:	Communication, Emergency medicine, Intensive care, Public health, Qualitative research
Keywords:	MEDICAL EDUCATION & TRAINING, ACCIDENT & EMERGENCY MEDICINE, HEALTH SERVICES ADMINISTRATION & MANAGEMENT, INTENSIVE & CRITICAL CARE, PRIMARY CARE, QUALITATIVE RESEARCH

Use of tabletop exercises for healthcare education in disaster medicine and non-disaster medicine: a scoping review protocol

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ABSTRACT

Introduction: There is a growing interest in developing interprofessional education (IPE) as a means to cultivate collaborative practice. Various pedagogical designs of IPE activities, such as tabletop exercises (TTX), have been proposed by clinician educators to promote collaborative practice. A TTX is a meeting where various professionals need to take charge of a situation. TTX are an educational initiative that has been as of now in disaster medicine for disaster preparedness. TTX have also been used, to a lesser extent, in non-disaster medicine. As TTX are gaining popularity, performing a review about the scope of their use as well as their outcomes is indicated. Hence, the aim of this scoping review is to map the uses of TTX in various contexts of healthcare and to classify their reported outcomes according to the Kirkpatrick Model of outcomes in educational programs. The findings of this review will inform future efforts to TTX into the training of healthcare professionals.

Methods and analysis: A search of the literature will be conducted using a combination of MeSH terms and keywords in PubMed, MEDLINE, EBM Reviews, CINAHL, EMBASE, and ERIC, along with a search of the grey literature using various online platforms. The search will be performed after the publication of this protocol and will be repeated one month prior to the submission for publication of the final review. Studies reporting on the use of TTX in healthcare in English or French will be included. Two reviewers will independently perform article screening and data extraction.

Results: Various uses of TTX will be classified in disaster medicine versus non-disaster medicine and in IPE versus non-IPE in an effort to map their use. Moreover, following the same mapping objective, outcomes of TTX will be reported according to the Kirkpatrick Model of outcomes of educational programs. Even though quality assessment of a study is not mandatory for a scoping review, the quality of the included articles will be assessed by two reviewers using a validated checklist developed by Hawker and colleagues, as well as the JBI Critical Appraisal Checklist for Text and Opinion Papers in order to provide more information about current literature to clinician educators.

Ethics and dissemination: No Institutional Review Board approval is required for this review. Results will be submitted for publication in a peer-reviewed journal.

Keywords: medical education, tabletop exercises, healthcare, disaster medicine, training, simulation, interprofessional education

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The search strategy proposed here is broad and therefore unlikely to miss any significant articles.
- The results of this study will be reported using a strategy based on the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist and the scoping methodological framework developed by Arksey and O'Malley.
- In addition to the standard requirements for scoping reviews, a formal quality assessment of included studies will be conducted using a checklist developed by Hawker and colleagues, as well as the JBI Critical Appraisal Checklist for Text and Opinion Papers.
- The study selection, the evaluation of the quality of the retained articles and data extraction will be performed by two independent reviewers to minimize the risk of bias or errors.
- The outcomes of each included study will also be reported according to the Kirkpatrick Model of outcomes of educational programs.

INTRODUCTION

Most serious errors in critical care occur because of poor communication or collaboration rather than individual mistakes.[1] Therefore, interest in interprofessional education (IPE) as a means to cultivate collaborative practice continues to grow among clinician educators worldwide.[2-3] According to the Centre for the Advancement in Interprofessional Education (CAIPE), IPE occurs when "two or more professions learn with, from and about each other to improve collaboration and the quality of care".[4] IPE aims to develop competencies of collaborative practice in health workers including role clarification, patient-centered care, teamwork, collaborative leadership, interprofessional communication and interpersonal conflict resolution.[5] Various pedagogical designs of IPE activities have been used by clinician educators to develop collaborative practice in health workers. [6] More specifically, tabletop exercises (TTX) have been proposed as an IPE activity.[7]

TTX are an educational initiative that has been thus far mostly used in disaster preparedness.[8-12] A TTX is a meeting where various professionals are required to respond to simulated critical situations, such as in disaster medicine. These exercises are used to evaluate the preparedness of an organization and to educate participants on their roles during the response. Using TTX as a simulation tool, hospital administrators can assess whether professional roles and responsibilities throughout the response system are well understood and accomplished promptly.[13]

Moreover, TTX have also been used, to a lesser extent, in non-disaster medicine.[14-15] However, no review have described the different uses of TTX whether in disaster or non-disaster medicine. As TTX are gaining in popularity, performing a review about the various context of its use is indicated. Given the broad scope of this study, a scoping review methodology seems the best option as it aims "to examine the extent, range and nature of research activity. This type of rapid review might not describe research findings in any detail but is a useful way of mapping fields of study where it is difficult to visualize the range of material that might be available"[16] In this scoping review, the various contexts in which TTX were used will be classified as disaster medicine or non-disaster medicine and as IPE or not IPE. An effort will be made to classify the outcomes of their use. Hence, the purpose of this scoping review is to map the various contexts in

which TTX are used as well as to examine their outcomes in healthcare setting. The findings of this review will guide future research in this area and inform clinician educators and administrators who are considering or developing tabletop exercises in their institution.

METHODS

The protocol for this scoping review is based on Arksey & O'Malley's five-stage methodological framework statement and reported according to the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.[16-18] The development of this protocol started in June 2018 and publication of the review is estimated for June 2020.

Stage 1: Identifying the research question

This scoping review aims to report the uses of tabletop exercises in healthcare.

Definitions:

Tabletop exercises are usually defined as a form discussion-based activity that is guided by a facilitator. They usually involve a dialogue on the steps to take in response to a hypothetical scenario. Since there are various TTX designs, the definition that will be used in this scoping review is the following:

"A TTX is a type of real or virtual board game. The board depicts a disaster scene or a healthcare setting and the participants play as their own professional role in real life. The participants move around symbol units (also called "movable markers") which represent healthcare workers, patients and available resources. Participants accomplish their duties as they would in real life."[12]

The definition that will be used for IPE is the following:

"When two or more professions learn with, from and about each other to improve collaboration and the quality of care".[4]

The definition that will be used for disaster medicine is the following:

"Disaster medicine is defined as the study and collaborative application of various health disciplines to the prevention, preparedness, response and recovery from the health problems arising from disaster."[19]

Contexts not attributive to the definition of disaster medicine will be classified in "non-disaster medicine".

Research question:

In addition to classifying contexts of TTX's uses in disaster medicine versus non-disaster medicine and in IPE versus non-IPE, we plan to report the outcomes of each included study according to the Kirkpatrick Model of outcomes of educational programs.[20] This model determines aptitude from training and educational programs based on four levels of criteria: reaction, learning, behaviour, and organizational results. Generally, building an educational intervention that addresses higher levels of the Kirkpatrick Model and measures higher-level outcomes is more complete than building one that only addresses the lower levels.[20] Therefore, the following research questions will be addressed:

- What uses of TTX have been made, and in which contexts: disaster medicine versus non disaster medicine and IPE versus non-IPE? What were the outcomes of studies that investigated the use of tabletop exercises in healthcare settings according to the Kirkpatrick Model of outcomes of educational programs?

While the primary focus of this review is to sum up in which contexts tabletop exercises have been used in healthcare and their outcomes, we will also provide a narrative review of the included studies regarding their design, setting, participants, interventions and outcomes.

Stage 2: Identifying relevant studies

Eligible studies, abstracts and conference summaries will be identified through a comprehensive search of CINAHL, Embase, EBM Reviews, ERIC, MEDLINE, and PubMed, while the grey literature will be searched using various online platforms. For practical reasons, searches will be limited to articles in English and French. There will be no limit on publication date in order to generate as broad a picture as possible of educational interventions in healthcare using tabletop exercises.

The search strategy was collaboratively and iteratively developed with the assistance of a librarian. We were unable to identify a medical subject heading (MeSH)

that was specific for tabletop exercises. Hence, we developed a search strategy for PubMed using keywords related to the following concepts: tabletop exercises, whiteboards with magnetic symbols, simulation, training, serious games, desktop and board game. Open and closed vocabulary were used to determine the best possible strategy. The search strategy was adapted to search the other online databases, and similar keywords were used to search the grey literature.

This search strategy was developed the July 24th 2018. We plan to perform the search after the publication of this protocol and will repeat it one month prior to the submission for publication to ensure it is still up to date.

Stage 3: Study selection

Inclusion and exclusion criteria

The eligibility of articles will be assessed based on the following inclusion criteria:

- The population of interest, i.e. healthcare professionals, including students in a healthcare program.
- Academic and clinical settings where healthcare is provided or taught (e.g., university, hospital, clinics) will be considered.
- Studies assessing a tabletop exercise as a stand-alone intervention or as part of a multi-component intervention (e.g., combined with a workshop or a classroom-based learning activity) will be considered.
- To be included, articles must report on at least one learning outcome from the Kirkpatrick Model (as previously described).
- All types of study designs (e.g., qualitative designs, quantitative designs and mixed methods designs) and methodologies including commentaries, case studies, descriptions of pedagogical innovations, conference summaries and viewpoint articles will be considered for inclusion. Scoping review and systematic review articles will not be considered for inclusion.

Given the nature of this review and to keep it as broad as possible, studies published in a language other than English or French will be excluded.

EndNote software (Version X9, Clarivate Analytics) will be used to import, manage, categorize and upload all collected references during the screening and selection process. If we are unable to obtain the full text of an article, we will contact the corresponding author for the article in question; failure to respond will result in study exclusion. The reference lists of all included studies will be screened to search for any additional relevant studies.

Two reviewers (AF, AC) will meet to discuss the criteria for inclusion and will then independently screen the titles and abstracts.

Following the initial selection process, the full text articles that are potentially relevant will be screened for eligibility by two reviewers (AF, MAMC). Any disagreements regarding study inclusion will be resolved through consensus. If consensus cannot be reached, a third reviewer (AC) will be consulted to resolve the disagreement. Reasons for excluding references at the full-text assessment stage of the screening process will be documented and reported in a PRISMA flow diagram.[18] The reviewers will meet again following full-text assessment to discuss any challenges and uncertainties related to study selection.

Stage 4: Charting the data

Two reviewers (AF, MAMC) will independently perform data extraction from studies included in the review. The research team has adapted a standardized charting form that was inspired by a protocol published by Shen et al.,[21] which was based on a similar research question that was applied to a different subject. This form was judged by members of our research team to be easy to use and relevant to our aims. The data charting domains and subdomains are described in Table 1. Reviewers will pilot the charting form on five to ten studies to determine whether this approach to data extraction is consistent with the research question and study purpose. Any relevant data that is not captured during the initial data extraction phase will be added iteratively by adapting the chart. If there is unclear or missing data in an article, we will contact the corresponding author to obtain clarification or additional data.

Although an assessment of study quality is not mandatory for a scoping review, it is strongly recommended by Arksey & O'Malley's five-stage methodological framework statement.[16] We will assess the quality of included studies to more precisely describe the

Table 1: Data charting domains and description of subdomains

Domain/subdomains	Description
Article details	
Author	Last name and initials of the first author
Year	Publication year of the article
Country	Country where the study was performed
Initiative details	
Context	What was the need to organize a tabletop exercise? Does it take part of disaster medicine or of non-disaster medicine?
Setting	Where did the educational intervention take place (e.g., community, hospital, university)?
Theoretical framework	What was the theoretical framework? (if available)
Program delivery	How was the program delivered (e.g., seminar, lecture, course, in-service training)?
Instructors	Who were the facilitators/instructors?
Program length	How long did the program/intervention last?
Study details	
Study design	What was the study design?
Participants	Who were the study participants? What was the sample size? Is it fulfilling the definition of interprofessional education or not?
Intervention	What was the intervention? Will report as described by the study authors
Comparator	What was the comparator? (if applicable)
Study outcomes	What did the authors identify as the study outcomes?
Outcomes	What were the main results of the study?
Kirkpatrick's level	
Reaction	Did the intervention measure the immediate perception and attitude of the learner regarding the intervention?
Learning	Did the intervention measure what was learned during the pedagogical intervention?
Behaviour	Did the intervention measure if the learner applied the new knowledge in their daily life?
Results	Did the intervention measure the organizational impact of daily use of the new knowledge at work by the learner?
Risk of bias	
Hawker checklist	What is the score of the study? (if original study)
JBI checklist	What is the score of the study? (if editorial, opinion, or comment)

current evidence on TTX in healthcare and to formulate future-oriented advice that address methodological gaps identified in the literature. For original studies, study quality will be independently assessed by two reviewers (AF, MAMC) according to a checklist developed Hawker et al..[22] This tool was chosen because it has been validated to systematically review disparate data, whether qualitative or quantitative. For editorials, opinion texts and

comments, we will assess quality using the validated JBI Critical Appraisal Checklist for Text and Opinion Papers.[23]

Stage 5: Collating, summarizing and reporting the results

We will report data on study characteristics and outcomes including the lead author, publication year, country, study context, setting, design, theoretical framework, program delivery, program duration, participants, instructors, intervention, comparator (if applicable), and the outcomes. An effort will be made to classify uses of TTX in two different fields: disaster medicine versus non-disaster medicine and IPE versus non-IPE. This classification will facilitate the mapping of current uses of TTX.

Moreover, for each study we will classify the outcomes using the Kirkpatrick Model of outcomes of educational programs (possible levels include reaction, learning, behaviour, and results).[20] We will report on all levels of Kirkpatrick's Model, with special inquiry into the level that is most frequently measured among the studies included in the review.

Finally, results of the quality assessment will be reported using a checklist developed by Hawker et al. for each original study, and using the JBI Critical Appraisal Checklist for Text and Opinion Papers for any editorials, opinion texts or comments included in the review.[22-23]

Patient and Public Involvement

No patients involved.

ETHICS AND DISSEMINATION

As this will be a scoping review of previously published studies, no ethics approval is required. The study findings will be submitted to an appropriate peer-reviewed journal.

DISCUSSION

This scoping review will fill an important gap in the literature, as there are no existing reviews that exclusively focusses on mapping the use of TTX in healthcare settings. The results of this study will inform researchers, educators, clinicians, and

administrators on the various uses of TTX in healthcare and more specifically in which domain (disaster medicine versus non-disaster medicine and IPE versus non-IPE) they are being used. Moreover, it will potentially identify gaps in Kirkpatrick's level of outcome. These findings will be used to help develop and implement future educational programs involving TTX, with the hope that enhanced training of healthcare professionals will ultimately lead to improvements in patient, care, safety and satisfaction.

AUTHOR CONTRIBUTIONS

All authors contributed to the conception of the protocol. AF wrote the protocol. AC, MAMC, MI, NS, JSCB, SC, VC and RF critically revised the draft for important intellectual content. All authors have approved the final version of this submitted manuscript and agree to be accountable for all aspects related to this work.

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DATA SHARING

No additional data available.

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COMPETING INTERESTS

All authors declare no support from any organization for the submitted work, no financial relationships with any organizations that might have an interest in the submitted work in the previous three years, and no other relationships or activities that could appear to have influenced the submitted work.

TRANSPARENCY DECLARATION

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	6
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	6
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	n/a
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	9
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8-9
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	n/a
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	8-9
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done	10

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	11
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	11-12
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	12
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	n/a
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	n/a
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	n/a
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	n/a
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	n/a
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	12-13
Limitations	20	Discuss the limitations of the scoping review process.	n/a
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	n/a
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	14

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. ;169:467–473. doi: 10.7326/M18-0850

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Use of tabletop exercises for healthcare education: a scoping review protocol

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Use of tabletop exercises for healthcare education: a scoping review protocol

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ABSTRACT

Introduction: There is a growing interest in developing interprofessional education (IPE) in the community of healthcare educators. Tabletop exercises (TTX) have been proposed as a mean to cultivate collaborative practice. A TTX simulates an emergent situation in an informal environment. Healthcare professionals need to take charge of this situation as a team through a discussion-based approach. As TTX are gaining in popularity, performing a review about their uses could guide educators and researchers. The aim of this scoping review is to map the uses of TTX in healthcare.

Methods and analysis: A search of the literature will be conducted using MeSH terms and keywords in PubMed, MEDLINE, EBM Reviews, CINAHL, EMBASE, and ERIC, along with a search of the grey literature. The search will be performed after the publication of this protocol (estimated to be December 1st 2019) and will be repeated one month prior to the submission for publication of the final review (estimated to be April 1st 2020). Studies reporting on TTX in healthcare and published in English or French will be included. Two reviewers will screen the articles and extract the data. The quality of the included articles will be assessed by two reviewers. To better map their uses, the varying TTX activities will be classified as performed in the context of disaster health or not, for IPE or not and using a board game or not. Moreover, following the same mapping objective, outcomes of TTX will be reported according to the Kirkpatrick Model of outcomes of educational programs.

Ethics and dissemination: No Institutional Review Board approval is required for this review. Results will be submitted for publication in a peer-reviewed journal. The findings of this review will inform future efforts to TTX into the training of healthcare professionals.

Keywords: medical education, tabletop exercises, healthcare, disaster health, training, simulation, interprofessional education

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The results of this study will be reported using a strategy based on the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist and the scoping methodological framework developed by Arksey and O'Malley.
- In addition to the standard requirements for scoping reviews, a formal quality assessment of included studies will be conducted using a checklist developed by Hawker and colleagues, as well as the JBI Critical Appraisal Checklist for Text and Opinion Papers.
- The study selection, the evaluation of the quality of the retained articles and data extraction will be performed by two independent reviewers to minimize the risk of bias or errors.
- The outcomes of each included study will also be reported according to the Kirkpatrick Model of outcomes of educational programs.
- The search strategy proposed here is broad, but one of its limitation is the exclusion of articles published in languages other than English or French.

INTRODUCTION

Most serious errors in critical care occur because of poor communication or collaboration rather than individual mistakes.[1] Therefore, interest in interprofessional education (IPE) as a means to cultivate collaborative practice continues to grow among healthcare educators worldwide.[2-3] According to the Centre for the Advancement in Interprofessional Education (CAIPE), IPE occurs when "two or more professions learn with, from and about each other to improve collaboration and the quality of care".[4] IPE aims to develop competencies of collaborative practice in healthcare professionals including role clarification, patient-centered care, teamwork, collaborative leadership, interprofessional communication and interpersonal conflict resolution.[5] Various pedagogical designs of IPE activities, such as tabletop exercises (TTX), have been used by healthcare educators to develop collaborative practice in healthcare professionals. [6-7]

A TTX is a facilitated group discussion that simulates an emergency situation in an informal, stress-free environment, sometimes using a board game format, and aims to strengthen readiness to manage a health emergency. TTX have been mostly used in disaster health to evaluate an organization's preparedness to face a disaster and to educate healthcare professionals on their roles during the response.[8-13] By using TTX as a simulation tool, hospital administrators can assess whether professional roles and responsibilities throughout the response system are well understood and accomplished promptly.[14] TTX have also been used, to a lesser extent, in non-disaster health.[15-16]

No review has yet described the different uses of TTX. Hence, as TTX are gaining in popularity, performing a review about their uses is indicated. The aim of this scoping review is to map the uses of TTX in healthcare. Given the broad scope of this study, a scoping review methodology seems the best option as it aims "to examine the extent, range and nature of research activity. This type of rapid review might not describe research findings in any detail but is a useful way of mapping fields of study where it is difficult to visualize the range of material that might be available."[17] In this scoping review, the various contexts in which TTX were used will be classified as in the field of disaster or non-disaster health, as an IPE or non-IPE exercise and whether or not they use a board game format. Moreover, an effort will be made to classify the reported outcomes of each selected study. The findings of this review will guide future research in this area and inform

healthcare educators and administrators who are considering or developing TTX in their institution.

METHODS

The protocol for this scoping review is based on Arksey & O'Malley's five-stage methodological framework statement and reported according to the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.[17-19] The development of this protocol started in June 2018 and publication of the review is estimated for April 2020.

Stage 1: Identifying the research question

This scoping review aims to report the uses of TTX in healthcare and their outcomes.

Definitions:

Tabletop exercises are usually defined as a form of discussion-based activity that is guided by a facilitator. They usually involve a dialogue on the steps to take in response to a hypothetical scenario. Since there are various TTX designs, the definition that will be used in this scoping review is the following:

"A tabletop exercise is an exercise that uses a progressive simulated scenario to make participants consider the impact of a potential health emergency on existing plans, procedures and capacities. A TTX simulates an emergency situation in an informal, stress-free environment. The purpose of a TTX is to strengthen readiness to manage a health emergency, through facilitated group discussions."[20]

The definition that will be used for disaster health is the following:

"Disaster medicine is defined as the study [of] prevention, preparedness, response and recovery from the health problems arising from disaster."[21]

Contexts not attributed to the definition of disaster health will be classified as "non-disaster health".

The definition that will be used for IPE is the following:

"When two or more professions learn with, from and about each other to improve collaboration and the quality of care".[4]
Contexts not attributed to the definition of IPE will be classified as "non-IPE".

The definition that will be used for board game TTX is the following:
"A board game TTX can be real or virtual. The board depicts a disaster scene or a healthcare setting. The participants move around symbol units (also called "movable markers") which represent healthcare workers, patients and available resources to accomplish their duties."[12]
Contexts not attributed to the definition of board game TTX will be classified as "non-board game TTX".

Research question:

In addition to classifying contexts of TTX's uses as pertaining to the field of disaster or non-disaster health, as an IPE or non-IPE exercise and whether or not they use a board game format, we plan to report the outcomes of each included study according to the Kirkpatrick Model of outcomes of educational programs.[22] This model determines aptitude from training and educational programs based on four levels of criteria: reaction, learning, behaviour, and organizational results. Generally, building an educational intervention that addresses higher levels of the Kirkpatrick Model and measures higher-level outcomes is more complex than building one that only addresses the lower levels.[22] Therefore, the following research questions will be addressed:

- How have TTX been used in healthcare? More specifically, have they been used in the field of disaster or non-disaster health, as an IPE or non-IPE exercise and did they use a board game format?
- What were the outcomes of the studies on tabletop exercises in healthcare according to the Kirkpatrick Model of outcomes of educational programs? Was a level of outcome more represented than another?

While the primary focus of this review is to sum up in which contexts tabletop exercises have been used in healthcare and their outcomes, we will also provide a narrative

review of the included studies regarding their design, setting, participants and interventions.

Stage 2: Identifying relevant studies

Eligible studies, abstracts and conference summaries will be identified through a comprehensive search of CINAHL, Embase, EBM Reviews, ERIC, MEDLINE, and PubMed, while the grey literature will be searched using various online platforms (e.g., Google Scholar). For practical reasons, searches will be limited to articles in English and French. There will be no limit on publication date in order to generate as broad a picture as possible of educational interventions in healthcare using TTX.

The search strategy was collaboratively and iteratively developed with the assistance of a librarian. We were unable to identify a medical subject heading (MeSH) that was specific for tabletop exercises. Hence, we developed a search strategy for PubMed using keywords related to the following concepts: tabletop exercises, whiteboards with magnetic symbols, simulation, training, serious games, desktop and board game. Open and closed vocabulary were used to determine the best possible strategy. The search strategy was adapted to search the other online databases, and similar keywords were used to search the grey literature.

This search strategy was initially developed on July 24th 2018 and improved during the revision of this manuscript. We plan to perform the search as soon as the present manuscript is accepted for publication (estimated to be December 1st 2019) and we will repeat it one month prior to the submission for publication of the final review (estimated to be April 1st 2020) to ensure it is still up to date.

Stage 3: Study selection

Inclusion criteria

The eligibility of articles will be assessed based on the following inclusion criteria:

- The population of interest: healthcare professionals, including students in a healthcare program;
- The settings: academic and clinical settings where healthcare is provided or taught (e.g., university, hospital, clinics);

- The intervention: a tabletop exercise as a stand-alone intervention or as part of a multi-component intervention (e.g., combined with a workshop or a classroom-based learning activity);
- The outcome: at least one learning outcome from the Kirkpatrick Model (as previously described) is reported;
- Study design: all types of study designs (e.g., qualitative designs, quantitative designs and mixed methods designs) and methodologies including commentaries, case studies, descriptions of pedagogical innovations, conference summaries and viewpoint articles.

Exclusion criteria

- Scoping review and systematic review articles will be excluded.
- Studies published in a language other than English or French will be excluded.

EndNote (Version X9, Clarivate Analytics) will be used to import, manage, categorize, and upload all collected references during the screening and selection process. If we are unable to obtain the full text of an article, we will contact the corresponding author for the article in question; failure to respond will result in the exclusion of the study. The reference lists of all included studies will be screened to search for any additional relevant studies.

Two reviewers (AF, AC) will meet to discuss the criteria for inclusion and will then independently screen the titles and abstracts.

Following the initial selection process, the full text articles that are potentially relevant will be screened for eligibility by two reviewers (AF, MAMC). Any disagreements regarding study inclusion will be resolved through consensus. If consensus cannot be reached, a third reviewer (AC) will be consulted to resolve the disagreement. Reasons for excluding references at the full-text assessment stage of the screening process will be documented and reported in a PRISMA flow diagram.[19] The reviewers will meet again following full-text assessment to discuss any challenges and uncertainties related to study selection.

Stage 4: Charting the data

Two reviewers (AF, MAMC) will independently perform data extraction from studies included in the review. The research team has adapted a standardized charting form that was inspired by a protocol published by Shen et al.,[23] which was based on a similar research question that was applied to a different subject. This form was judged by members of our research team to be easy to use and relevant to our aims. The data charting domains and subdomains are described in Table 1.

Table 1: Data charting domains and description of subdomains

Domain/subdomains	Description
Article details	
Author	Last name and initials of the first author
Year	Publication year of the article
Country	Country where the study was performed
Initiative details	
Context	What was the need to organize a TTX? Is it in the context of disaster health or of non-disaster health? Is it in the context of IPE or non-IPE? Were they using a board game format or not?
Setting	Where did the educational intervention take place (e.g., community, hospital, university)?
Program delivery	How was the program delivered (e.g., seminar, lecture, course, in-service training)?
Instructors	Who were the facilitators/instructors?
Program length	How long did the program/intervention last?
Study details	
Study design	What was the study design?
Participants	Who were the study participants? What was the sample size?
Intervention	What was the intervention?
Comparator	What was the comparator? (if applicable)
Study outcomes	What did the authors identify as the study outcomes?
Kirkpatrick's level	
Reaction	Did the intervention measure the immediate perception and attitude of the learner regarding the intervention?
Learning	Did the intervention measure what was learned during the pedagogical intervention?
Behaviour	Did the intervention measure if the learner applied the new knowledge in their daily life?
Results	Did the intervention measure the organizational impact of daily use of the new knowledge at work by the learner?
Risk of bias	
Hawker checklist	What is the score of the study? (if original study)
JBI checklist	What is the score of the study? (if editorial, opinion, or comment)

Reviewers will pilot the charting form on five studies to determine whether this approach to data extraction is consistent with the research question and study purpose. Any relevant data that is not captured during the initial data extraction phase will be added

iteratively by adapting the chart. If there is unclear or missing data in an article, we will contact the corresponding author to obtain clarification or additional data.

Although an assessment of study quality is not mandatory for a scoping review, it is strongly recommended by Arksey & O'Malley's five-stage methodological framework statement.[17] We will assess the quality of included studies to more precisely describe the current evidence on TTX in healthcare and to formulate future-oriented advice that addresses methodological gaps identified in the literature. For original studies, study quality will be independently assessed by two reviewers (AF, MAMC) according to a checklist developed Hawker et al..[24] This tool was chosen because it has been validated to systematically review disparate data, whether qualitative or quantitative. For editorials, opinion texts and comments, we will assess quality using the validated JBI Critical Appraisal Checklist for Text and Opinion Papers.[25]

Stage 5: Collating, summarizing and reporting the results

We will report data for each selected study including lead author, publication year, country, study context, setting, design, program delivery, program duration, participants, instructors, intervention, comparator (if applicable), and the outcomes. An effort will be made to report contexts of TTX according to three different characteristics:

I. Disaster health or non-disaster health
II. IPE or non-IPE
III. Board game or non-board game format

This classification will facilitate the mapping of the current uses of TTX.

Moreover, we will classify the outcomes using the Kirkpatrick Model of outcomes of educational programs for each study.[22] We will report on all levels of Kirkpatrick's Model, with special inquiry into the level that is most frequently represented among the studies included in the review.

Finally, results of the quality assessment will be reported using a checklist developed by Hawker et al. for each original study, and using the JBI Critical Appraisal Checklist for Text and Opinion Papers for any editorials, opinion texts or comments included in the review.[24-25]

Patient and Public Involvement

No patients involved.

ETHICS AND DISSEMINATION

As this will be a scoping review of previously published studies, no ethics approval is required. The study findings will be submitted to an appropriate peer-reviewed journal.

DISCUSSION

This scoping review will fill an important gap in the literature, as there are no existing reviews that exclusively focusses on mapping the use of TTX in healthcare settings. The results of this study will inform researchers, healthcare educators, clinicians, and administrators on the various uses of TTX in healthcare and more specifically in which contexts they are being used. Moreover, it will be possible to observe if the available literature focuses primarily on a single level of Kirkpatrick's model of outcome or ignores a particular level of outcome. These findings will be used to help develop and implement future educational programs involving TTX, with the hope that enhanced training of healthcare professionals will ultimately lead to improvements in patient, care, safety and satisfaction.

A limitation of this review is the exclusion of articles published in languages other than English of French.

AUTHOR CONTRIBUTIONS

All authors contributed to the conception of the protocol. AF wrote the protocol. AC, MAMC, MI, NS, JSCB, SC, VC and RF critically revised the draft for important intellectual content. All authors have approved the final version of this submitted manuscript and agree to be accountable for all aspects related to this work.

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DATA SHARING

No additional data available.

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COMPETING INTERESTS

All authors declare no support from any organization for the submitted work, no financial relationships with any organizations that might have an interest in the submitted work in the previous three years, and no other relationships or activities that could appear to have influenced the submitted work.

TRANSPARENCY DECLARATION

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	n/a
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	8-9
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	n/a Reviewer 3 asked for removal of Supplementary Material I
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	9

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	10
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	10
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	11
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	11
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	n/a
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	n/a
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	n/a
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	n/a
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	n/a
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	12
Limitations	20	Discuss the limitations of the scoping review process.	n/a
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	n/a

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	14

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. ;169:467–473. doi: 10.7326/M18-0850

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

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METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	n/a
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Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8-9
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	n/a
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	8-9
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done	10

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
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Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	n/a
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	n/a
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	12-13
Limitations	20	Discuss the limitations of the scoping review process.	n/a
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	n/a
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	14

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BMJ Open

Use of tabletop exercises for healthcare education: a scoping review protocol

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Primary Subject Heading:	Medical education and training
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Keywords:	MEDICAL EDUCATION & TRAINING, ACCIDENT & EMERGENCY MEDICINE, HEALTH SERVICES ADMINISTRATION & MANAGEMENT, INTENSIVE & CRITICAL CARE, PRIMARY CARE, QUALITATIVE RESEARCH

Use of tabletop exercises for healthcare education: a scoping review protocol

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ABSTRACT

Introduction: There is a growing interest in developing interprofessional education (IPE) in the community of healthcare educators. Tabletop exercises (TTX) have been proposed as a mean to cultivate collaborative practice. A TTX simulates an emergent situation in an informal environment. Healthcare professionals need to take charge of this situation as a team through a discussion-based approach. As TTX are gaining in popularity, performing a review about their uses could guide educators and researchers. The aim of this scoping review is to map the uses of TTX in healthcare.

Methods and analysis: A search of the literature will be conducted using MeSH terms and keywords in PubMed, MEDLINE, EBM Reviews, CINAHL, EMBASE, and ERIC, along with a search of the grey literature. The search will be performed after the publication of this protocol (estimated to be January 1st 2020) and will be repeated one month prior to the submission for publication of the final review (estimated to be June 1st 2020). Studies reporting on TTX in healthcare and published in English or French will be included. Two reviewers will screen the articles and extract the data. The quality of the included articles will be assessed by two reviewers. To better map their uses, the varying TTX activities will be classified as performed in the context of disaster health or not, for IPE or not and using a board game or not. Moreover, following the same mapping objective, outcomes of TTX will be reported according to the Kirkpatrick Model of outcomes of educational programs.

Ethics and dissemination: No Institutional Review Board approval is required for this review. Results will be submitted for publication in a peer-reviewed journal. The findings of this review will inform future efforts to TTX into the training of healthcare professionals.

Keywords: medical education, tabletop exercises, healthcare, disaster health, training, simulation, interprofessional education

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The results of this study will be reported using a strategy based on the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist and the scoping methodological framework developed by Arksey and O'Malley.
- In addition to the standard requirements for scoping reviews, a formal quality assessment of included studies will be conducted using a checklist developed by Hawker and colleagues, as well as the JBI Critical Appraisal Checklist for Text and Opinion Papers.
- The study selection, the evaluation of the quality of the retained articles and data extraction will be performed by two independent reviewers to minimize the risk of bias or errors.
- The outcomes of each included study will also be reported according to the Kirkpatrick Model of outcomes of educational programs.
- The search strategy proposed here is broad, but one of its limitation is the exclusion of articles published in languages other than English or French.

INTRODUCTION

Most serious errors in critical care occur because of poor communication or collaboration rather than individual mistakes.[1] Therefore, interest in interprofessional education (IPE) as a means to cultivate collaborative practice continues to grow among healthcare educators worldwide.[2-3] According to the Centre for the Advancement in Interprofessional Education (CAIPE), IPE occurs when "two or more professions learn with, from and about each other to improve collaboration and the quality of care".[4] IPE aims to develop competencies of collaborative practice in healthcare professionals including role clarification, patient-centered care, teamwork, collaborative leadership, interprofessional communication and interpersonal conflict resolution.[5] Various pedagogical designs of IPE activities, such as tabletop exercises (TTX), have been used by healthcare educators to develop collaborative practice in healthcare professionals. [6-7]

A TTX is a facilitated group discussion that simulates an emergency situation in an informal, stress-free environment, sometimes using a board game format, and aims to strengthen readiness to manage a health emergency. TTX have been mostly used in disaster health to evaluate an organization's preparedness to face a disaster and to educate healthcare professionals on their roles during the response.[8-13] By using TTX as a simulation tool, hospital administrators can assess whether professional roles and responsibilities throughout the response system are well understood and accomplished promptly.[14] TTX have also been used, to a lesser extent, in non-disaster health.[15-16]

No review has yet described the different uses of TTX. Hence, as TTX are gaining in popularity, performing a review about their uses is indicated. The aim of this scoping review is to map the uses of TTX in healthcare. Given the broad scope of this study, a scoping review methodology seems the best option as it aims "to examine the extent, range and nature of research activity. This type of rapid review might not describe research findings in any detail but is a useful way of mapping fields of study where it is difficult to visualize the range of material that might be available."[17] In this scoping review, the various contexts in which TTX were used will be classified as in the field of disaster or non-disaster health, as an IPE or non-IPE exercise and whether or not they use a board game format. Moreover, an effort will be made to classify the reported outcomes of each selected study. The findings of this review will guide future research in this area and inform

healthcare educators and administrators who are considering or developing TTX in their institution.

METHODS

The protocol for this scoping review is based on Arksey & O'Malley's five-stage methodological framework statement and reported according to the Preferred Reporting Items for Systematic Review and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.[17-19] The development of this protocol started in June 2018 and publication of the review is estimated for June 1st 2020.

Stage 1: Identifying the research question

This scoping review aims to report the uses of TTX in healthcare and their outcomes.

Definitions:

Tabletop exercises are usually defined as a form of discussion-based activity that is guided by a facilitator. They usually involve a dialogue on the steps to take in response to a hypothetical scenario. Since there are various TTX designs, the definition that will be used in this scoping review is the following:

"A tabletop exercise is an exercise that uses a progressive simulated scenario to make participants consider the impact of a potential health emergency on existing plans, procedures and capacities. A TTX simulates an emergency situation in an informal, stress-free environment. The purpose of a TTX is to strengthen readiness to manage a health emergency, through facilitated group discussions."[20]

The definition that will be used for disaster health is the following:

"Disaster medicine is defined as the study [of] prevention, preparedness, response and recovery from the health problems arising from disaster."[21]

Contexts not attributed to the definition of disaster health will be classified as "non-disaster health".

The definition that will be used for IPE is the following:

"When two or more professions learn with, from and about each other to improve collaboration and the quality of care".[4]
Contexts not attributed to the definition of IPE will be classified as "non-IPE".

The definition that will be used for board game TTX is the following:
"A board game TTX can be real or virtual. The board depicts a disaster scene or a healthcare setting. The participants move around symbol units (also called "movable markers") which represent healthcare workers, patients and available resources to accomplish their duties."[12]
Contexts not attributed to the definition of board game TTX will be classified as "non-board game TTX".

Research question:

In addition to classifying contexts of TTX's uses as pertaining to the field of disaster or non-disaster health, as an IPE or non-IPE exercise and whether or not they use a board game format, we plan to report the outcomes of each included study according to the Kirkpatrick Model of outcomes of educational programs.[22] This model determines aptitude from training and educational programs based on four levels of criteria: reaction, learning, behaviour, and organizational results. Generally, building an educational intervention that addresses higher levels of the Kirkpatrick Model and measures higher-level outcomes is more complex than building one that only addresses the lower levels.[22] Therefore, the following research questions will be addressed:

- How have TTX been used in healthcare? More specifically, have they been used in the field of disaster or non-disaster health, as an IPE or non-IPE exercise and did they use a board game format?
- What were the outcomes of the studies on tabletop exercises in healthcare according to the Kirkpatrick Model of outcomes of educational programs? Was a level of outcome more represented than another?

While the primary focus of this review is to sum up in which contexts tabletop exercises have been used in healthcare and their outcomes, we will also provide a narrative review of the included studies regarding their design, setting, participants and

interventions. If ever some contexts of use of TTX not identified beforehand emerge during the review process, they will be added iteratively.

Stage 2: Identifying relevant studies

Eligible studies, abstracts and conference summaries will be identified through a comprehensive search of CINAHL, Embase, EBM Reviews, ERIC, MEDLINE, and PubMed, while the grey literature will be searched using various online platforms (e.g., Google Scholar). For practical reasons, searches will be limited to articles in English and French. There will be no limit on publication date in order to generate as broad a picture as possible of educational interventions in healthcare using TTX.

The search strategy was collaboratively and iteratively developed with the assistance of a librarian. We were unable to identify a medical subject heading (MeSH) that was specific for tabletop exercises. Hence, we developed a search strategy for PubMed using keywords related to the following concepts: tabletop exercises, whiteboards with magnetic symbols, simulation, training, serious games, desktop and board game. Open and closed vocabulary were used to determine the best possible strategy. The search strategy was adapted to search the other online databases, and similar keywords were used to search the grey literature.

This search strategy was initially developed on July 24th 2018 and improved during the revision of this manuscript. We plan to perform the search as soon as the present manuscript is accepted for publication (estimated to be January 1st 2020) and we will repeat it one month prior to the submission for publication of the final review (estimated to be June 1st 2020) to ensure it is still up to date.

Stage 3: Study selection

Inclusion criteria

The eligibility of articles will be assessed based on the following inclusion criteria:

- The population of interest: healthcare professionals, including students in a healthcare program;
- The settings: academic and clinical settings where healthcare is provided or taught (e.g., university, hospital, clinics);

- The intervention: a tabletop exercise as a stand-alone intervention or as part of a multi-component intervention (e.g., combined with a workshop or a classroom-based learning activity);
- The outcome: at least one learning outcome from the Kirkpatrick Model (as previously described) is reported;
- Study design: all types of study designs (e.g., qualitative designs, quantitative designs and mixed methods designs) and methodologies including commentaries, case studies, descriptions of pedagogical innovations, conference summaries and viewpoint articles.

Exclusion criteria

- Scoping review and systematic review articles will be excluded.
- Studies published in a language other than English or French will be excluded.

EndNote (Version X9, Clarivate Analytics) will be used to import, manage, categorize, and upload all collected references during the screening and selection process. If we are unable to obtain the full text of an article, we will contact the corresponding author for the article in question; failure to respond will result in the exclusion of the study. The reference lists of all included studies will be screened to search for any additional relevant studies.

Two reviewers (AF, AC) will meet to discuss the criteria for inclusion and will then independently screen the titles and abstracts.

Following the initial selection process, the full text articles that are potentially relevant will be screened for eligibility by two reviewers (AF, MAMC). Any disagreements regarding study inclusion will be resolved through consensus. If consensus cannot be reached, a third reviewer (AC) will be consulted to resolve the disagreement. Reasons for excluding references at the full-text assessment stage of the screening process will be documented and reported in a PRISMA flow diagram.[19] The reviewers will meet again following full-text assessment to discuss any challenges and uncertainties related to study selection.

Stage 4: Charting the data

Two reviewers (AF, MAMC) will independently perform data extraction from studies included in the review. The research team has adapted a standardized charting form that was inspired by a protocol published by Shen et al.,[23] which was based on a similar research question that was applied to a different subject. This form was judged by members of our research team to be easy to use and relevant to our aims. The data charting domains and subdomains are described in Table 1.

Table 1: Data charting domains and description of subdomains

Domain/subdomains	Description
Article details	
Author	Last name and initials of the first author
Year	Publication year of the article
Country	Country where the study was performed
Initiative details	
Context	What was the need to organize a TTX? Is it in the context of disaster health or of non-disaster health? Is it in the context of IPE or non-IPE? Were they using a board game format or not?
Setting	Where did the educational intervention take place (e.g., community, hospital, university)?
Program delivery	How was the program delivered (e.g., seminar, lecture, course, in-service training)?
Instructors	Who were the facilitators/instructors?
Program length	How long did the program/intervention last?
Study details	
Study design	What was the study design?
Participants	Who were the study participants? What was the sample size?
Intervention	What was the intervention?
Comparator	What was the comparator? (if applicable)
Study outcomes	What did the authors identify as the study outcomes?
Kirkpatrick's level	
Reaction	Did the intervention measure the immediate perception and attitude of the learner regarding the intervention?
Learning	Did the intervention measure what was learned during the pedagogical intervention?
Behaviour	Did the intervention measure if the learner applied the new knowledge in their daily life?
Results	Did the intervention measure the organizational impact of daily use of the new knowledge at work by the learner?
Risk of bias	
Hawker checklist	What is the score of the study? (if original study)
JBI checklist	What is the score of the study? (if editorial, opinion, or comment)

Reviewers will pilot the charting form on five studies to determine whether this approach to data extraction is consistent with the research question and study purpose. Any relevant data that is not captured during the initial data extraction phase will be added

iteratively by adapting the chart. If there is unclear or missing data in an article, we will contact the corresponding author to obtain clarification or additional data.

Although an assessment of study quality is not mandatory for a scoping review, it is strongly recommended by Arksey & O'Malley's five-stage methodological framework statement.[17] We will assess the quality of included studies to more precisely describe the current evidence on TTX in healthcare and to formulate future-oriented advice that addresses methodological gaps identified in the literature. For original studies, study quality will be independently assessed by two reviewers (AF, MAMC) according to a checklist developed Hawker et al..[24] This tool was chosen because it has been validated to systematically review disparate data, whether qualitative or quantitative. For editorials, opinion texts and comments, we will assess quality using the validated JBI Critical Appraisal Checklist for Text and Opinion Papers.[25]

Stage 5: Collating, summarizing and reporting the results

We will report data for each selected study including lead author, publication year, country, study context, setting, design, program delivery, program duration, participants, instructors, intervention, comparator (if applicable), and the outcomes. An effort will be made to report contexts of TTX according to three different characteristics:

I. Disaster health or non-disaster health
II. IPE or non-IPE
III. Board game or non-board game format

This classification will facilitate the mapping of the current uses of TTX.

Moreover, we will classify the outcomes using the Kirkpatrick Model of outcomes of educational programs for each study.[22] We will report on all levels of Kirkpatrick's Model, with special inquiry into the level that is most frequently represented among the studies included in the review.

Finally, results of the quality assessment will be reported using a checklist developed by Hawker et al. for each original study, and using the JBI Critical Appraisal Checklist for Text and Opinion Papers for any editorials, opinion texts or comments included in the review.[24-25]

Patient and Public Involvement

No patients involved.

ETHICS AND DISSEMINATION

As this will be a scoping review of previously published studies, no ethics approval is required. The study findings will be submitted to an appropriate peer-reviewed journal.

DISCUSSION

This scoping review will fill an important gap in the literature, as there are no existing reviews that exclusively focusses on mapping the use of TTX in healthcare settings. The results of this study will inform researchers, healthcare educators, clinicians, and administrators on the various uses of TTX in healthcare and more specifically in which contexts they are being used. Moreover, it will be possible to observe if the available literature focuses primarily on a single level of Kirkpatrick's model of outcome or ignores a particular level of outcome. These findings will be used to help develop and implement future educational programs involving TTX, with the hope that enhanced training of healthcare professionals will ultimately lead to improvements in patient, care, safety and satisfaction.

A limitation of this review is the exclusion of articles published in languages other than English of French.

AUTHOR CONTRIBUTIONS

All authors contributed to the conception of the protocol. AF wrote the protocol. AC, MAMC, MI, NS, JSCB, SC, VC and RF critically revised the draft for important intellectual content. All authors have approved the final version of this submitted manuscript and agree to be accountable for all aspects related to this work.

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DATA SHARING

No additional data available.

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COMPETING INTERESTS

All authors declare no support from any organization for the submitted work, no financial relationships with any organizations that might have an interest in the submitted work in the previous three years, and no other relationships or activities that could appear to have influenced the submitted work.

TRANSPARENCY DECLARATION

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	5
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	n/a
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	8-9
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	n/a Reviewer 3 asked for removal of Supplementary Material I
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	9

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	10
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	10
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	11
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	11
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	n/a
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	n/a
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	n/a
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	n/a
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	n/a
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	12
Limitations	20	Discuss the limitations of the scoping review process.	n/a
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	n/a

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	14

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. ;169:467–473. doi: 10.7326/M18-0850