

The Use of Global Rating Scales and Checklists in Clinical Simulation-Based Assessments: A Protocol for a Scoping Review

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Protocol

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Abstract

Background

Assessment in health sciences education remains a hotly debated topic, with measures of competency and how to determine them in simulation-based assessments enjoying much of the focus. Global rating scales (GRS) and checklists enjoy widespread use within simulation-based education but there is a question regarding how the two strategies are used within clinical simulation assessment. The aim of this proposed scoping review is therefore to explore, map and summarise the nature, range and extent of published literature available relating to the use of GRS and checklists in clinical simulation-based assessment.

Methods

We will follow the methodological frameworks and updates described by Arksey and O'Malley, Levac, Colquhoun and O'Brien, and Peters, Marnie and Tricco *et al* and will report using the PRISMA extension for Scoping Reviews. We will search PubMed, CINAHL, ERIC, Cochrane Library, Scopus, EBSCO, ScienceDirect, Web of Science, the DOAJ, and several sources of grey literature. We developed a search strategy in collaboration with an experienced research librarian and include an example of a full electronic search in this article. We will screen all titles and abstracts and relevant full-text articles and extract the relevant data using the data extraction form. Quantitative data will be presented as will a narrative account of all included studies. We will import the narrative into Atlas.ti and use thematic analysis to identify themes and map the data. We will be including all identified sources published in English after 1 January 2010 that relate to the use of GRS and/or checklists in clinical simulation-based assessments.

Discussion

The overview of literature produced will help to identify knowledge gaps and inform future research in the use of GRS and checklists in clinical simulation-based assessments. This information will be valuable and useful for all stakeholders that are interested in clinical simulation-based assessments.

Scoping review protocol registration:

Open Science Framework (OSF) submitted on 26 November 2021 and available at <https://osf.io/7yfbq>.

Background

Simulation-based education (SBE) and training has rapidly evolved as a teaching methodology over the past few years and has gained acceptance in various clinical domains [1]. SBE is defined as “a technique

that creates a situation or environment that allow a person to experience a representation of a real event for the purpose of practice, learning, evaluation, testing or to gain understanding of systems or human actions” [2]. In addition, SBE is often employed in clinical settings within various educational domains. These domains include teaching, learning and assessment within which SBE affords a health sciences student the opportunity to practise, learn and demonstrate clinical competencies [3]. Clinical SBE has proven to be an effective educational methodology within a health science curriculum [1] and has been linked with increased patient safety outcomes [4].

SBE is increasingly being used within health sciences education and its value as an assessment tool links closely with its perceived advantages [5]. Assessment in health sciences education remains a hotly debated topic, with measures of competency and how to determine them in simulation-based assessments enjoying much of the focus. One of the current debates in literature is measuring learner competence in a manner that avoids bias and personal judgements [6]. Clinical simulation-based assessments are often open to bias from both the marker and moderators alike [7]. When assessing clinical performance in simulated environments it is critical to ensure that any assessment strategies employed are rigorous and have measures in place to minimise rater (facilitator, marker and moderator) bias [7]. The INACSL Standards of Best Practice also highlight the importance of using a valid and reliable tool in clinical simulation-based assessments [8]. Two common assessment strategies in clinical simulation are global rating scales (GRS) and checklists [6].

GRS and checklists are used in a variety of assessment domains, but their advantages and disadvantages remain the subject of much debate [6]. GRS are used in various health sciences curricula and have been developed as a reasonable generic tool that assesses the competency levels of a learner across several skill domains [9]. GRS require the marker or moderator to provide a final judgement on the competency levels of the learner, usually by way of a percentage based on some form of a competency scale [10]. Checklists on the other hand use binary options to indicate how the student performed against a list of predetermined criteria [6, 10]. Both of these clinical assessment methodologies are attractive and feasible for Higher Education implementation as they do not require additional equipment and allow for the freedom on assessment timing [9]. In a study on GRS and checklist instruments, Seo and colleagues concluded that both GRS and checklists are better suited to formative than summative assessments [11]. Although evidence suggests that both GRS and checklists enjoy widespread use within simulation assessment. There remains a question related to how the two strategies are used within clinical simulation assessment.

There seems to be a paucity of evidence related to the use of GRS and checklists within clinical simulation-based assessment. Determining how GRS and checklists are used within clinical simulation assessment will permit more comprehensive comparison of the environments that each may be best suited to.

A scoping review is the most appropriate strategy to identify the various types of available evidence in the field of GRS and checklists and the use thereof within clinical simulation-based assessments literature

[12]. A systematic review would not be suitable as we are still unclear what specific questions can be posed in the identified study area. The aim of this proposed scoping review is therefore to explore, map and summarise the nature, range and extent of published literature available that relates to the use of GRS and checklists in clinical simulation-based assessment. To achieve the aim of this proposed scoping review, we will:

1. Determine and explore the range and extent of research relating to the use of GRS and checklists in simulation assessment within clinical simulation education. This will include plotting the publication timelines, themes and publication sources.
2. Explore and group research methods and designs related to the use GRS and checklists in clinical simulation assessment.
3. Explore the use of GRS and checklists as tools within clinical simulation-based education for assessment purposes.

By doing this scoping review, educators would be able to scrutinise the charted data and develop a better understanding of the context of GRS and checklists within their own domain.

Methods

This scoping review protocol was developed using the methodological framework for scoping studies developed by Arksey and O'Malley [13] and incorporates the updated frameworks suggested by Levac, Colquhoun and O'Brien [14] and Peters, Marnie and Tricco *et al* [15]. In addition, reporting will follow the PRISMA extension for Scoping Reviews [16] (see the checklist in Additional file 1). The framework consists of six phases namely: (1) Identification of the research question; (2) Identification of the relevant studies; (3) Careful selection of the studies to be included using a consultative approach; (4) Charting of the data in both tabular and narrative format; (5) Collation, summarising and reporting of the results for identification of the implications related to the findings linked to practice and research; (6) Consultation with various stakeholders, to validate the findings.

This protocol is registered as a priori in the Open Science Framework on <https://osf.io/7yfbq>.

Stage one: Identify the research question(s) and objectives

The aim of this scoping review will be to systematically map the available literature on the use of GRS and checklists within clinical simulation-based assessments and to potentially identify any existing gaps. We used the Population-Concept-Context (PCC) framework [15] to formulate our research question and this scoping review therefore asks: "What is known from the existing literature about the use of GRS and checklists (concept) within clinical simulation-based (context) assessment practices (population)?" The sub-questions for this scoping review is:

- What definitions for GRS and checklists exist within clinical simulation-based assessment assessments/practises?.

- What are the perceived advantages of GRS and checklists within clinical simulation-based assessments?
- What are the perceived disadvantages of GRS and checklists within clinical simulation-based assessments?
- What different types of GRS and/or checklists are used within clinical simulation-based assessments?
- How are GRS and checklists used in formative and/or summative assessment?
- What are the characteristics of the raters used to assess clinical simulation using GRS and/or checklists?

Within the context of the above questions we will be exploring the range and extent of research conducted in clinical simulation assessment where GRS and/or checklists are used.

Stage two: Identification of relevant studies

To ensure this study is as comprehensive as possible, grey literature and indexed databases related to GRS and simulation-based assessments will be searched for possible studies that will allow us to answer the research question. We will adopt the approach of Arksey and O'Mally as well as that of Sucharew and Macaluso [13,17] by searching for evidence via different sources that include, but are not necessarily limited to electronic searching for primary studies on electronic databases, hand-searching key journals, scrutinising reference lists of articles that form part of the review and searching networks, organisations and conferences.

Information sources

Both researchers and a qualified research librarian will develop a search strategy for this scoping review to discover relevant sources of evidence. The primary sources of literature will be a structured search of major electronic databased that includes PubMed, CINAHL, Education Resources Information Center (ERIC), Cochrane Library, Scopus, EBSCO, ScienceDirect, Web of Science and the Directory of open Access Journals (DOAJ). We will also use the Rayyan screening tool as an adjunct to assist in identification and selection of eligible studies [18].

The secondary sources will include Google (Google books and Google scholar), ProQuest, OpenGrey (www.opengray.eu), worldwidescience.org and various university dissertation and thesis repositories [19]. Additionally, hand-searching of key journals and relevant references of included studies will be done to identify any potential sources that might have been missed in the initial searches of journals and reviews. Lastly, pertinent organisations and individuals involved in the relevant projects will be contacted to obtain information on unpublished and/or ongoing studies that were identified.

A draft search strategy developed by the research librarian for MEDLINE is presented in Table 1. This will be pilot tested and refined as needed for subsequent database searches.

Table 1 Pilot search in MEDLINE electronic database

Date	Keywords	Search results
2021/11/26	(((Global Rating Scale) OR (Checklist)) AND (clinical simulation assessment)) AND (((2010/01/01[Date - Publication] : 2021/12/31[Date - Publication])) , , (((global[All Fields] OR globalism[All Fields] OR globalize[All Fields] OR globalized[All Fields] OR globalizes[All Fields] OR globalizing[All Fields] OR globally[All Fields] OR globals[All Fields] OR internationality[MeSH Terms] OR internationality[All Fields] OR globalization[All Fields]) AND (rated[All Fields] OR ratee[All Fields] OR ratees[All Fields] OR rating[All Fields] OR ratings[All Fields]) AND (scale s[All Fields] OR scaled[All Fields] OR scaling[All Fields] OR scalings[All Fields] OR weights and measures[MeSH Terms] OR weights[All Fields] AND measures[All Fields]) OR weights and measures[All Fields] OR scale[All Fields] OR scales[All Fields])) OR (checklist[MeSH Terms] OR checklist[All Fields] OR checklists[All Fields] OR checklist s[All Fields])) AND ((ambulatory care facilities[MeSH Terms] OR ambulatory[All Fields] AND care[All Fields] AND facilities[All Fields]) OR ambulatory care facilities[All Fields] OR clinic[All Fields] OR clinic s[All Fields] OR clinical[All Fields] OR clinically[All Fields] OR clinicals[All Fields] OR clinics[All Fields]) AND (computer simulation[MeSH Terms] OR computer[All Fields] AND simulation[All Fields]) OR computer simulation[All Fields] OR simulation[All Fields] OR simul[All Fields] OR simulate[All Fields] OR simulated[All Fields] OR simulates[All Fields] OR simulating[All Fields] OR simulation s[All Fields] OR simulational[All Fields] OR simulations[All Fields] OR simulative[All Fields] OR simulator[All Fields] OR simulator s[All Fields] OR simulators[All Fields]) AND (assess[All Fields] OR assessed[All Fields] OR assesment[All Fields] OR assesses[All Fields] OR assessing[All Fields] OR assessment[All Fields] OR assessment s[All Fields] OR assessments[All Fields])) AND 2010/01/01:2021/12/31[Date - Publication]"	1013

Eligibility Criteria

Our review will include publications that relate to the use of global rating scales and/or checklists in simulation-based clinical assessments. We will consider all peer-reviewed publications and grey literature for inclusion, including theoretical, conceptual or empirical designs, that focus on use of global rating scales and/or checklists in simulation-based clinical assessments. Non-research study designs will be excluded, including editorials, discussion papers, opinion papers, letters, guidelines and non-systematic reviews. All publications considered for inclusion must have an abstract and an aim or aims that are clearly stated. We will only consider sources published after 1 January 2010. All potential sources will be scrutinised for ethical approval and where any ethical risks are identified within a study, these sources will be excluded. Sources not available in English will be excluded. The detailed eligibility and inclusion criteria have been specified in Figure 1 and depict the relationship between the research objectives, questions and eligibility criteria. The population, concept and context inclusion criteria recommended by the updated JBI Reviewer's Manual have been included within the PCC Framework of Figure 1 [15].

Stage three: Study selection

The selection of sources of evidence will be based on the eligibility criteria, mentioned above, and will be conducted by 2 academics (AM and KH) in the research team. The results of the Rayyan and librarian-developed search strategy will form the base of the selection process. The initial selection of sources will be a screening exercise based on the title of the artifact. The abstracts of sources that passed the screening phase will be read and compared with the inclusion and exclusion criteria of this scoping review. Sources that will be included in the study will be downloaded in full and again measured against the primary inclusion and exclusion criteria. This process will be carried out independently by the two review authors. This process will be tested using a pilot sample of twenty titles and abstracts from the literature search to ensure consistency and reliability prior to starting the formal screening process.

Stage four: Charting and appraising the data

For the development of our data extraction forms we adopted the strategy of the Joanna Briggs Institute [15]. The data extraction phase of this scoping review will be completed for each eligible source and data will be recorded as depicted in Appendix 1. The data extraction form will be piloted with 10 articles to determine its appropriateness and the research team will use an iterative process to make any changes deemed necessary. The charting procedure will be conducted independently by the same 2 academics that selected the sources. This process will involve reading and extracting the data from each study that is included and then comparing the data extraction forms for congruency. Data in both extraction forms will periodically be compared by AM and KH. Disagreement will be resolved by rereading the papers that they disagree upon, followed by a consensus discussion. To add further rigour to the review, we will perform a critical appraisal of the methodological quality of the evidence sources using the mixed methods appraisal tool (MMAT) [20]. To reduce bias, AM and KH will independently conduct the MMAT appraisal and then compare and discuss the results.

Stage five: Collating, summarising and reporting of the results

This scoping will present a tabular and narrative account of the available literature on the use of GRS and checklists for clinical simulation-based assessments. We will use two methods to present the data; a quantitative data presentation and a content analysis data presentation. The quantitative data presentation will summarise the data as it relates to the extent, nature and distribution of the studies identified. This numerical data will provide an overview of the identified information relating to the aim and objectives and will provide an overview of potential knowledge gaps in the literature. The second data presentation strategy will utilise thematic analysis to map the use of GRS and checklists within clinical simulation assessment. This strategy will include information related to the use of GRS and checklists within the context of clinical simulation-based assessment strategies, learning outcomes and any identified learning theories. Data from the narrative will be imported into Atlas.ti (version 8, ATLAS.ti Scientific Software Development GmbH, Berlin, Germany) and thematic analysis used to identify themes that will then be summarised and discussed in relation to the study aims and objectives [21].

Step Six: Consultation exercise

Although optional, to add validity to this scoping review, the authors will review the identified literature and will be afforded the opportunity to provide their own insights where relevant to inform and validate the findings. During this phase the following questions will be asked [22]; have all the elements of the review questions and objectives been addressed accurately and has this scoping review been adequately situated within the context of the relevant field of literature, practice or policy?

Discussion

Currently GRS and checklists are used extensively in health professions education. There is also an abundance of literature that tries to address the validity and reliability GRS and checklists as assessment tools in medical education and clinical simulation-based assessment alike. However, our initial searches identified that the appropriate use of these assessment tools are often blurred. Therefore, this scoping review is needed to provide an overview of and to systematically map the available literature on the use of GRS and checklists within clinical simulation-based assessments. We purposefully created a relatively broad search strategy, as we are not interested in the depth of the topic but rather the scope thereof. We anticipate that the systematic and rigorous nature of scoping reviews will encapsulate the relevant information on the appropriate use of GRS and checklists in clinical simulation-based assessments and allow us to potentially identify any existing gaps. We expect that this scoping review will be valuable and useful for all stakeholders that are interested in clinical simulation-based assessments.

Strengths and limitations

As with all research studies, scoping reviews are not without limitations. Firstly, we are not focussing on the depth of information pertaining to the use of GRS and checklist in clinical simulation-based assessments, but only on the breath of the information to determine the current use of these assessment tools. This broad search strategy may produce a high number of redundant texts or publications. Secondly, we are only including full-text articles written in English. The strength of this study includes the fact that we will use a procedure that is both transparent and reproducible for a population, concept and context that are clearly described. Both authors have experience in conducting both scoping and systematic reviews and we will be following the systematic approach of the PRISMA-ScR to guide the review.

Importance and beneficiaries

We anticipate that educators and various stakeholders who are interested in clinical simulation-based assessment will benefit by being able to scrutinise the charted and collated data. This has the potential to improve the use of GRS and checklists in clinical simulation assessment. Understanding the use of GRS and checklists within clinical simulation-based assessments is a vital first step in ensuring valid, reliable and fair assessments within the pedagogy of clinical simulation-based education.

Abbreviations

JBI: Joanna Briggs Institute; PRISMA-ScR: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews;

Declarations

Authors contributions

Both authors contributed equally to the development of this protocol, including the design, review questions and data extraction framework. Both authors have read and approved the final manuscript.

Funding

The proposed scoping review is currently not allocated any funding- should funding be allocated, this will be declared in the final write-up. Where relevant, funding for studies used in the scoping review will be included.

Availability of data and materials

Given that this is a scoping review protocol, there are currently no applicable data.

Ethics approval and consent to participate

The nature of the proposed scoping review is such that only sources already published will be included and no participants, human or animal will be required. Ethical approval will not be required but the study will follow all relevant guidelines contained within the Declaration of Helsinki [23].

Consent for publication

This study does not contain any individual person's data.

Competing interests

There are no financial or non-financial competing interests to declare.

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Figures

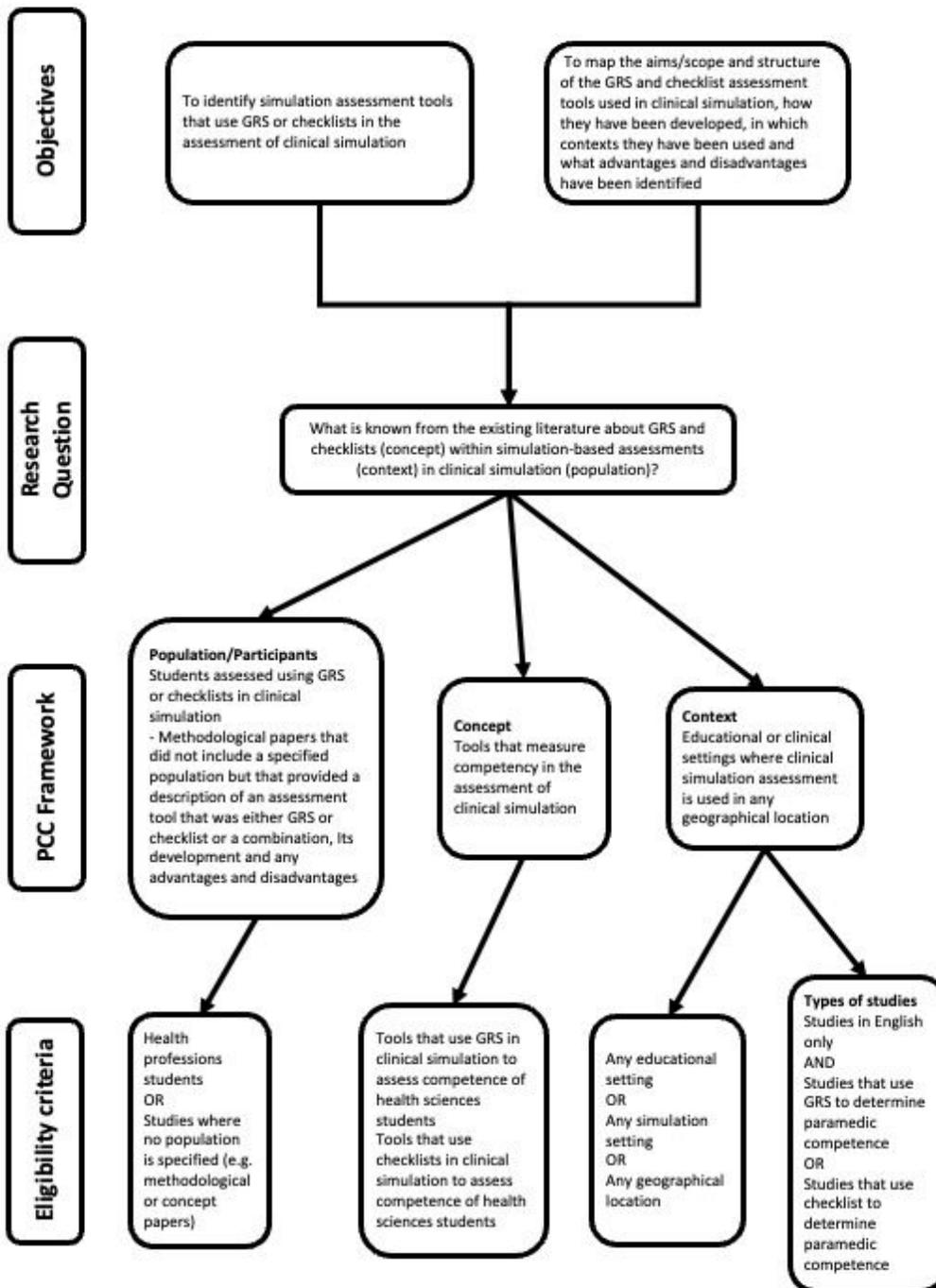


Figure 1

The relationship between research objectives, questions and eligibility criteria.

Supplementary Files

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