

Measuring competence in healthcare learners and healthcare professionals by comparing self-assessment with objective structured clinical examinations (OSCEs): a systematic review protocol

Kim Sears, RN, PhD^{1,3}

Christina M Godfrey, RN, PhD^{1,3}

Marian Luctkar Flude, RN, MScN (PhD candidate)¹

Liane Ginsburg, RN, PhD²

Deborah Tregunno, RN, PhD¹

Amanda Ross-White, MLIS, AHIP^{1,3}

1. Queens University, Kingston, Ontario, Canada

2. York University, Toronto, Ontario, Canada

3. The Queen's Joanna Briggs Collaboration for Patient Safety: a collaborating centre of the Joanna Briggs Institute, Queen's University, Kingston, Ontario, Canada (QJBC)

Corresponding author

Kim Sears

kim.sears@queensu.ca

Review question/objective

The objective of this systematic review is to compare the use of self-assessment instruments versus an objective structured clinical examination (OSCE) to measure the competence of healthcare learners and healthcare professionals. The specific question that will guide this review is: When measuring the competence of healthcare learners and healthcare professionals is the evaluation obtained by self-assessment instruments comparable to performance on an OSCE?

Background

Establishing the effectiveness of the health professional education process is complex and requires a multifaceted approach to assess the outcomes.¹ Typically, outcomes are assessed in terms of the competence of the professional, level of confidence, performance and/or skills. Throughout the literature on this topic, these terms are used interchangeably, but there is overlap and some terms may encompass others. It is important to begin by providing descriptions/definitions of these terms.

Competence

In their paper that discusses the definition and assessment of professional competence, Epstein and Hundert define professional competence as: “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values and reflection in daily practice for the benefit of the individual and community being served.”^{2(p226)}

Confidence

Holland’s concept analysis of professional confidence describes four components, namely affect (feelings associated with action), reflection (thoughtfully examine one’s actions and intentions), higher cognitive functioning (which includes aspects such as learning and integration of concepts, decision making, attention, motivation and memory) and action.^{3(p219)}

Performance

The on-line Merriam-Webster dictionary defines performance as “the execution of an action or something accomplished – a deed or feat”.⁴

Skill

Skill is defined as “proficiency, facility, or dexterity that is acquired or developed through training or experience.”⁵

Self-efficacy

Self-efficacy is defined as “people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives.”⁶

Knowledge

Knowledge is defined as “(1) the fact or condition of knowing something with familiarity gained through experience or association; (2) acquaintance with or understanding of a science, art, or technique.”⁷

Empathy

Empathy is defined as the “ability to understand and share the feelings of another.”⁸

Looking at the above definitions of competence, confidence and performance it is clear that there is considerable overlap. The term competence was found to be the most inclusive. However, because there are nuances involved in each term, in this review the following concepts will be referred to: that of competence (including knowledge and performance) and confidence (including self-efficacy).

There are a variety of ways to measure health professionals’ competence and self-assessment is a cost effective source of information. Self-assessment has been defined as: the evaluation or judgment of ‘the worth’ of one’s performance and the identification of one’s strengths and weaknesses with a view to improving one’s learning outcomes.^{9(p146)} For example, self-reported patient safety competence may provide data about learners’ insights into and likely safety of, their own practice,¹⁰ and about their perceived strengths or limitations.^{11,12} The value of using more objective methods to assess competence is unclear. Recent studies examining self versus expert assessment of technical and non-technical skills have produced mixed results. Surgeons seem to be able to accurately assess their own technical skills but not their non-technical skills,¹³ however, an earlier study of junior medical

officers found no correlation between their self-assessments of confidence and their measured competencies on routine procedural skills.¹⁴

In a systematic review published in 2006, Davis and colleagues describe how accurately health professionals, primarily physicians, subjectively evaluate their own competence compared with external observations of their competence.¹⁵ They concluded that physicians have a limited ability to accurately self-assess and this may be particularly true among those rated as the least skilled and those who were also the most confident. These results were found to be consistent with other professions.¹⁶

The objective structured clinical examination (OSCE) is another method that has shown to be a useful means to assess the competence of a learner. Typically an OSCE consists of a specific scenario established by the examiners that requires the learner to demonstrate their proficiency in that area. The evaluator can control the environment and standardize the patient and in this manner use the OSCE to objectively assess competencies (i.e. knowledge, attitudes and behaviors). There is growing recognition that OSCEs are appropriate for evaluating the interpersonal skills associated with breaking bad news or cross-cultural interviewing.¹⁷ The use of the OSCE to assess physician communication skills is also becoming more common (e.g. Huntley, Salmon, Fisher, Fletcher, & Young;¹⁸ Iramaneerat, Myford, Yudkowsky, & Lowenstein;¹⁹ Ponton-Carss, Hutchison, & Violato;²⁰ Van Nuland, Van den Noortgate, van der Vleuten, & Jo.²¹)

In the realm of patient safety there is a small but emerging body of literature encouraging the use of OSCEs to assess aspects of patient safety competence among medical trainees.²²⁻²⁸ In this area most OSCEs assess the technical aspects of patient safety or quality improvement competence,^{25,27-29} or clinical aspects of patient safety such as hand hygiene compliance and medication labeling.²⁵ Few studies describe the use of OSCEs to assess socio-cultural aspects of patient safety,^{24,26} and those that do tend to focus on communicating or disclosing an error and are discipline-specific in nature.^{30,31}

In nursing, a recent integrative review by Walsh and colleagues located 41 papers and identified major gaps regarding the psychometrics of nursing OSCEs.³² In concluding their review, the researchers highlighted the need for additional research on using the OSCE as an evaluative tool in nursing.

The OSCE is thought to be a more objective measure than self-assessment. However, while limited, examinations of the extent to which OSCE performance predicts outcomes on other performance metrics are somewhat equivocal. Some studies have failed to detect a significant positive relationship between OSCE performance and other forms of summative evaluations of health professionals and learners.²³ A study by Tamblyn found that scores achieved in a patient-physician communication and clinical decision-making OSCE, that was part of a national licensing examination, predicted complaints to medical regulatory authorities up to 10 years later.³³

In an environment where providing optimal student learning and quality patient care is a goal, there is a need to explore whether a link exists between self-assessment scores and OSCEs in light of providing the best learning for the most affordable means. It has been noted that some studies comparing self and external assessments of competence (such as the OSCE) have had several methodological problems. Davis and colleagues report that fewer than half of the studies they included in their systematic review (1) used pretested or validated OSCEs or standardized patients or

assessment instruments, or (2) described objective criteria for performance assessment.¹⁵ Others have noted there is insufficient methodological detail in most published research involving standardized patients (SP), in particular details pertaining to SP characteristics and their training.

An examination of the Cochrane Library of Systematic Reviews, the Joanna Briggs Institute Database of Systematic Reviews and Implementation Reports and the PROSPERO database indicates that no systematic reviews have been completed (or proposed) on this topic since the Davis review in 2006. Building on the Davis review, this systematic review will explore research that examines the relationship between self-assessed competence and objective assessments of competence using the OSCE. The proposed synthesis is part of a broader program of research which builds on recommendations from numerous international bodies regarding the need to restructure health professional education to ensure it equips learners with the knowledge, skills and attitudes they need to function safely.^{1,34-37} Notably, there is also recognition that what is evaluated drives what is taught and learnt.^{38,39} Accordingly, development of an OSCE for adoption by various health professional education programs may be crucial for truly integrating patient safety into health professional education. Just as written examinations and OSCEs assess different things,^{40,41} so do subjective and objective assessments; however, both are understood to yield important data.¹⁰

Keywords

OSCE; objectiv\$ structur\$ clinic\$ exam\$; self-assessment; self-report; competence; confidence; self-efficacy

Inclusion criteria

Types of participants

In this review all healthcare learners and healthcare professionals will be considered, including but not limited to physicians, nurses, dentists, occupational therapists, physiotherapists, social workers and respiratory therapists.

Types of intervention(s)/phenomena of interest

In this review studies in which participants are first administered a self-assessment (related to performance), followed by an OSCE will be considered; the results of which will then be compared. The review will consider studies that explore the evaluation of competence by self-assessment, which is then compared with the evaluation of competence using an OSCE exam.

Types of outcomes

In this review studies that include the following outcome measures will be considered: competence, confidence, performance, self-efficacy, knowledge and empathy as defined in the background section.

Types of studies

In this review both experimental and epidemiological study designs will be considered, including randomized controlled trials, non-randomized controlled trials, quasi-experimental, before and after studies, prospective and retrospective cohort studies, case control studies and analytical cross-sectional studies for inclusion.

Descriptive epidemiological study designs will also be considered, including case series, individual case reports and descriptive cross-sectional studies for inclusion.

Search strategy

The search strategy aims to find both published and unpublished studies. A three-step search strategy will be utilized in this review. An initial limited search of MEDLINE and CINAHL will be undertaken, followed by an analysis of the text words contained in the title and abstract and of the index terms used to describe the article. A second search using all identified keywords and index terms will then be undertaken across all included databases. Thirdly, the reference lists of all identified reports and articles will be searched for additional studies. In this review only studies published in English will be included. In order to provide the broader picture of all available literature on this topic the non-English literature will be tallied, but not translated. Although this review is building on a review done in 2006, in order to be thorough, no date limit will be placed on the search strategy.

The databases to be searched include:

Medline, CINAHL, Embase, ERIC, Education Research Complete, Education Full Text, CBCA Education, GlobalHealth, Sociological Abstracts, Cochrane, Mosby's Nursing Consult and PsycInfo.

The search for unpublished studies will include: Dissertation Abstracts and Google Scholar.

Initial keywords to be used will be: OSCE; objectiv\$ structur\$ clinic\$ exam\$; self-assessment; self-report; competence; confidence; self-efficacy.

Assessment of methodological quality

Papers selected for retrieval will be assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Meta Analysis of Statistics Assessment and Review Instrument (JBI-MASARI) (Appendix V). Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer.

Data collection

Data will be extracted from papers included in the review using the standardized data extraction tool from JBI-MASARI (Appendix VI). The data extracted will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives.

Data synthesis

Quantitative data will, where possible, be pooled in statistical meta-analysis using JBI-MASARI. All results will be subject to double data entry. Effect sizes expressed as odds ratios (for categorical data) and weighted mean differences (for continuous data) and their 95% confidence intervals will be calculated for analysis. Heterogeneity will be assessed statistically using the standard Chi-square and also explored using subgroup analyses based on the different study designs included in this review. Where statistical pooling is not possible, the findings will be presented in narrative form including tables and figures to aid in data presentation where appropriate.

The data will be analyzed using the “Four Stages of Learning” theory developed by Noel Burch (Glendon Training International) in the early 1970s.⁴² The model is comprised of four stages including: Stage 1 Unconscious Incompetence; Stage 2 Conscious Incompetence; Stage 3 Conscious Competence and Stage 4 Unconscious Competence. According to Burch, everyone progresses through the same four stages regardless of the skill that needs to be acquired. From the beginning stage of acquiring a new skill, the learner progresses from Stage 1 towards Stage 4 as they gain experience and their level of competence increases. In this systematic review the focus will be on the assessment of competence; thus this model provides a useful framework to interpret the levels of competence demonstrated by the participants in the included studies.

Conflicts of interest

The reviewers declare no conflict of interest.

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Appendix I: Appraisal instruments

MAStARI appraisal instrument

JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not Applicable
1. Was the assignment to treatment groups truly random?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were participants blinded to treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was allocation to treatment groups concealed from the allocator?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were those assessing outcomes blind to the treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were the control and treatment groups comparable at entry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were groups treated identically other than for the named interventions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in the same way for all groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include ☐ Exclude ☐ Seek further info. ☐

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Descriptive / Case Series

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Was study based on a random or pseudo-random sample?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If comparisons are being made, was there sufficient descriptions of the groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not Applicable
1. Is sample representative of patients in the population as a whole?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are the patients at a similar point in the course of their condition/illness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Has bias been minimised in relation to selection of cases and of controls?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include ☐ Exclude ☐ Seek further info. ☐

Comments (Including reason for exclusion)

Appendix II: Data extraction instruments

MAStARI data extraction instrument

JBI Data Extraction Form for Experimental / Observational Studies

Reviewer Date

Author Year

Journal Record Number

Study Method

RCT ☐ Quasi-RCT ☐ Longitudinal ☐

Retrospective ☐ Observational ☐ Other ☐

Participants

Setting

Population

Sample size

Group A Group B

Interventions

Intervention A

Intervention B

Authors Conclusions:

Reviewers Conclusions:

Study results**Dichotomous data**

Outcome	Intervention () number / total number	Intervention () number / total number

Continuous data

Outcome	Intervention () number / total number	Intervention () number / total number