2018

Key considerations for selecting instruments when evaluating healthcare professionals' EBP competencies: A discussion paper

Saunders, Hannele

Wiley

Tieteelliset aikakauslehtiartikkelit
© John Wiley & Sons Ltd
All rights reserved
http://dx.doi.org/10.1111/jan.13802

https://erepo.uef.fi/handle/123456789/7029
Downloaded from University of Eastern Finland's eRepository
Investigation. A discussion of key considerations related to selecting instruments and tools for evaluating healthcare professionals’ evidence-based practice competencies.

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/jan.13802

This article is protected by copyright. All rights reserved.
Design A discussion paper.

Data Sources Articles published in international peer-reviewed journals from January 2000 to November 2017 on validated instruments for assessing healthcare professionals’ performance-based evidence-based practice competencies.

Implications for Nursing Validated evidence-based practice competency instruments based on actual performance to evaluate the evidence-based practice competencies of healthcare professionals are currently available in the field of medicine. Although some of these instruments have already been adapted for use in physical and occupational therapy, their modification for use in nursing has begun only in the last few months.

Conclusion A concerted effort on modifying and validating objective measures of actual performance for use in nursing should be commenced to evaluate directly measurable evidence-based practice competencies, instead of continuing to rely on nurses’ self-assessments. Future studies focusing on development and validation of objective instruments to evaluate evidence-based practice competencies based on actual performance and exploring the modification of currently available objective instruments from medicine are urgently needed in nursing.

Impact Instead of measuring actual evidence-based practice competencies, the majority of competency evaluations in nursing are still being conducted via self-assessments, despite growing evidence of their poor accuracy in evaluating directly measurable constructs such as evidence-based practice knowledge and skills. Accurate measurement of nurses’ evidence-
based practice competencies is essential to increasing systematic implementation of evidence-based practice in healthcare organizations, thus promoting the attainment of improved care quality and patient outcomes in healthcare delivery.

**Keywords**: evidence-based practice, healthcare professional, instrument, competency, performance

**Summary Statement**

**Why is this research or review needed?**

- Adoption and measurement of evidence-based practice competencies help organizations clarify performance expectations and guide professional practice for integration of best evidence into clinical decision-making, thus promoting the attainment of improved care quality and patient outcomes via consistent implementation of evidence-based practice in daily care delivery.

- Some healthcare disciplines including nursing have a long tradition of measuring perceived evidence-based practice competencies via self-assessments, although directly measurable constructs, such as evidence-based practice knowledge and skills, should be evaluated through more objective measures of actual performance, to ensure measurement as accurately as possible.

- There is an urgent need to evaluate validated instruments of actual evidence-based practice competencies from other healthcare disciplines for possible modification,
validation and use in nursing, to move towards more objectively and accurately measuring evidence-based practice competencies of nurses.

What are the key findings?

- Validated, objective evidence-based practice competency instruments based on measurement of actual performance are currently available in medicine and have already been modified for use in physical and occupational therapy. However, work for their modification and use in nursing has only recently began, despite a growing evidence base showing poor accuracy of self-rated instruments in assessing directly measurable constructs, such as evidence-based practice knowledge and skills.

- Most of evidence-based practice competency sets and instruments used in nursing measure perceived evidence-based practice competencies via self-assessments in a single evidence-based practice competency domain, such as evidence-based knowledge, instead of simultaneously measuring several domains of actual evidence-based practice competencies required for completing the steps of the evidence-based practice implementation process.

How should the findings be used to influence policy/practice/research/education?

- As evidence-based practice is a shared competency and the steps of implementing evidence-based practice are universal, validated instruments for evaluating actual evidence-based practice competencies of clinicians across healthcare disciplines should urgently be developed.
In addition, validated instruments that simultaneously assess several actual, i.e., performance-based evidence-based practice competency domains required of clinicians for successfully completing the steps of the EBP implementation process should be developed and validated for use across healthcare disciplines.

INTRODUCTION

Evidence-based practice (EBP) has become a global megatrend for healthcare organizations due to the consistent evidence showing that EBP improves the quality, effectiveness and cost-efficiency of care and patient outcomes (Grol & Grimshaw, 2003; Hart et al. 2008; Melnyk et al. 2014; Wallen et al. 2010) as well as reduces patient morbidities and mortalities, medical errors and unwanted variations of healthcare services (McGinty & Anderson, 2008; Melnyk et al. 2010; Melnyk et al. 2012, Melnyk et al. 2018b). However, integration of EBP into the daily practice of healthcare professionals has been challenging (Gifford et al. 2007; Melnyk et al. 2018a, Wilkinson et al. 2011) due to multifaceted reasons, including insufficient EBP competencies as well as confusion and uncertainty about the type of EBP competencies healthcare professionals should meet and exactly how they should be measured. These challenges impede healthcare organizations from delivering highest-quality, evidence-based healthcare and attaining best patient outcomes. As a result, despite organizational leaders’ and patients’ expectations that EBP should be standard practice in daily healthcare delivery, the majority of clinicians do not engage in EBP on a consistent basis (McGinty & Anderson, 2008; Melnyk et al. 2012; Melnyk et al. 2016; Melnyk et al. 2018a, Saunders et al. 2016a; Wallen et al. 2010). Far too many healthcare professionals still continue to deliver healthcare services to patients based on tradition, outdated routines and practices and expired information learned years before in their educational programs. Furthermore, healthcare organizations and educational institutions often have little idea of the EBP competency level.
of their healthcare employees and students, as they are unclear about the type of EBP competencies their employees and students should meet and how those EBP competencies should be measured.

The findings from several recent systematic and integrative reviews on EBP competencies of healthcare professionals from different health disciplines indicate that the EBP competencies of healthcare professionals internationally are at a low to moderate level (Condon et al. 2016; Mota da Silva et al. 2015; Saunders & Vehviläinen-Julkunen, 2015; Scurlock-Evans et al. 2014; Upton et al. 2014). Therefore, it is essential that efforts to improve and accurately measure the EBP competencies of healthcare professionals are increased, before healthcare professionals can realistically be expected to consistently implement EBP in their daily practice. This substantial chasm between the low level of EBP competencies among large groups of healthcare professionals impeding their engagement in EBP and the priority goals of healthcare organizations to improve care quality and clinical outcomes via systematic EBP implementation, is precisely the gap that requires urgent action from healthcare organization leaders worldwide.

Background

The outlining and measurement of nurses’ knowledge, skills and attitudes, i.e., competencies needed for successfully performing key clinical patient care tasks has been a standard practice for years in many healthcare organizations (Melnyk et al. 2014; Stevens, 2009). These clinical competencies have been essential in establishing a mechanism to measure clinical performance, to guide and support clinicians in their daily practice, as well
as to counteract the uncertainty, confusion and lack of clarity about the clinical performance expectations related to key clinical work functions that practicing healthcare professionals in real-world healthcare settings should meet (Dunn, 2000; Melnyk et al. 2014). However, measurement of nurses’ EBP competencies at clinical settings, i.e., evaluation of the critically important issue of whether nurses’ decision-making related to patient care is evidence-based or opinion- and tradition-based, is still limited and currently impedes healthcare organizations from delivering highest-quality, evidence-based healthcare via consistent, broad-based EBP implementation.

**Frameworks and approaches for assessing healthcare professionals’ EBP competencies**

The idea that it is important for healthcare professionals to develop a sufficient level of EBP competency is not new, similarly to the concept of EBP itself (DiCenso et al. 1998; Sackett et al. 1996). Over a dozen years ago, the first Sicily statement (Dawes et al. 2005) on recommendations for EBP education outlined that it is a minimum requirement for all healthcare professionals to understand and implement the principles and process of EBP. To develop competency in EBP, healthcare professionals and students should advance their abilities in all domains of EBP competence, i.e., knowledge, skills, attitudes/beliefs and EBP implementation/behaviors, required to implement the steps of the EBP process (i.e., asking, searching for, critically appraising, integrating and evaluating best evidence). In addition, the second Sicily statement (Tilson et al. 2011) introduced a classification rubric for EBP competency assessment tools in education (CREATE) which outlined the categories for EBP competency assessment as well as guidance and recommendations on the types of assessments to use for evaluating the EBP competencies (Ilic et al. 2014). The EBP competency assessment categories included reaction to educational experience, attitudes, self-efficacy, knowledge, skills, behaviors and benefit to patients, while the types of
assessments consisted of self-reports, cognitive tests, performance assessments, activity monitoring and patient outcomes. The second Sicily statement also outlined that all healthcare students should learn the steps of the EBP implementation process, whereas practicing healthcare professionals, depending on their primary role and the clinical context, should also master additional EBP skills, such as how to integrate evidence summaries into clinical practice.

While achieving consistent, broad-based EBP implementation among healthcare professionals in daily practice is important for healthcare organizations in the attainment of their priority organizational goals, it is essential to also consider the individual needs and preferences of the healthcare professionals regarding advancing their EBP competencies (Ilic, 2009; Tilson et al. 2011). Instead of developing expertise in all the steps of the EBP implementation process, many individual clinicians may prefer attaining a high level of EBP competence related only to some of the steps of EBP implementation process. For example, busy clinicians whose focus is on applying translated, i.e., pre-appraised best evidence to their daily practice, might not be interested in spending time on completing critical appraisals of best evidence, i.e., performing step 3 of the EBP implementation process (Ilic, 2009). The chasm of divergent priorities related to EBP competence between individual clinicians and healthcare organizations has led to the development of several frameworks to help guide the measurement and evaluation of healthcare professionals’ EBP competence. These frameworks include a conceptual framework for evaluating the teaching of evidence-based medicine (Straus et al. 2004), the CREATE framework for EBP competency assessment tools in education (Tilson et al. 2011) and the general competency frameworks focusing on the foundational principles (e.g., safety, quality and EBP) of professional nursing practice by the American Association of Colleges of Nursing (AACN, 2008) and Quality and Safety
Education for Nurses (QSEN, 2007). More recently, Leung and colleagues (2016) have developed a competency framework specifically for evaluating nurses’ EBP knowledge and skills, which has helped outline some EBP competency criteria for nurses. However, much uncertainty remains about the specific levels of EBP competence required for nurses and exactly how they should be measured.

Interestingly, the approaches taken by the various healthcare disciplines to address the recommendations outlined in both Sicily statements (Dawes et al. 2005; Tilson et al. 2011) on developing the EBP competencies of healthcare professionals and students have been divergent. In nursing, there has been an emphasis on developing instruments to measure perceived, i.e., self-rated EBP competencies and self-assessed EBP competency sets for nurses in various primary roles and educational levels. By contrast, in other healthcare disciplines, there has been a focus on developing new instruments to more objectively measure healthcare professionals’ actual, i.e., performance-based EBP competencies. This work was first undertaken in the field of medicine, with modifications of the newly developed tools to assess actual EBP competencies made primarily for the fields of physical and occupational therapy. Only very recently have the first efforts for making similar modifications to these tools been published for use in the field of nursing (X et al. 2018). Previous studies have shown a discrepancy between the results of healthcare professionals’ EBP competency evaluations via self-assessments and more objective measures of actual performance, especially regarding performing highly complex tasks such as implementing the steps of the EBP process (Scurlock-Evans et al. 2014; Wonder et al. 2017). Using self-assessments to measure EBP competencies may result in more socially acceptable responses and in overestimation of some directly measurable EBP competencies such as EBP knowledge and skills, for which more objective measures are available. In addition, recall...
bias may also affect healthcare professionals by placing them at risk to believing that their baseline EBP knowledge or skills were much poorer than what they actually were, resulting in overestimation of the perceived improvement after an intervention promoting their EBP competencies (Ilic, 2009). While it is appropriate to measure some EBP competency domains involving healthcare professionals’ perceptions, such as self-efficacy or attitudes toward EBP with self-assessments, other directly measurable EBP competencies such as EBP knowledge and skills, should be evaluated through more objective measures of actual performance (Ilic et al. 2014; Saunders et al. 2016b; Tilson et al. 2011; Wonder et al. 2017). Therefore, in healthcare disciplines which traditionally have measured perceived EBP competencies through use of self-assessment instruments, such as nursing, physical therapy and occupational therapy (Condon et al. 2016; Saunders & Vehviläinen-Julkunen, 2015; Scurlock-Evans et al. 2014; Upton et al. 2014), it is crucially important to measure healthcare professionals’ EBP competencies as accurately as possible. This means moving towards using more objective measures of actual performance when evaluating healthcare professionals’ EBP competencies, as well as modifying and validating existing measures of EBP competency based on actual performance for use in other healthcare disciplines.

As part of the tradition of developing self-assessment instruments to measure nurses’ EBP competencies, Melnyk and colleagues (2014) and Stevens (2009) have developed EBP competency sets in two separate national consensus processes across the USA, aiming at evaluating practicing nurses’ abilities to employ EBP and guiding EBP professional development and education programs in nursing. Melnyk and colleagues (2014) developed EBP competency sets for practicing professional Registered Nurses (13 EBP competencies) and Advanced Practice Nurses (11 additional EBP competencies) through a panel of seven national EBP nurse experts creating the EBP competency statements, which were then

This article is protected by copyright. All rights reserved.
evaluated by a large Delphi panel of EBP mentors from across the USA to establish national consensus. Similarly, the EBP competency development process led by Stevens (2009) established consensus among a large national expert panel on EBP competency sets consisting of 10 to 32 competencies, depending on the level of nursing education (i.e., Associate, Baccalaureate, Master’s and Doctoral level). Although both of these EBP competency sets are based on nurses’ self-assessments, using the expertly developed and validated sets of EBP competencies in daily practice is important because they provide a pragmatic quality standard for nurse clinicians to aspire to and attain related to EBP. Such EBP competency sets are central to professional practice because they enable nurses to develop expertise for making clinical decisions grounded on best available evidence and integrating it into their daily practice. The standardized EBP competencies thus promote the achievement of improved care quality and patient outcomes via broad-based, consistent implementation of EBP in the delivery of healthcare services.

**The EBP implementation process**

The EBP implementation process involves from five (Straus et al. 2011) to seven (Melnyk et al. 2014) steps, depending on the authors and how the steps have been construed. However, all descriptions of the steps of the EBP implementation process emphasize the importance of integrating clinical expertise and patient values with best available evidence as the basis of healthcare professionals’ clinical decision-making to attain improved care quality and patient outcomes. Furthermore, it is important to recognize that each step of the EBP implementation process involve different domains of EBP competence, i.e., EBP knowledge, skills, attitudes/beliefs, or implementation/behaviors, which should be assessed with different types of EBP competency assessments. These are illustrated in Table 1.
AIM

The primary aim of this paper was to discuss some key considerations for selecting instruments or tools for measuring the actual, i.e., performance-based EBP competencies of healthcare professionals.

DESIGN

This is a discussion paper which focuses on describing the currently available instruments for measuring the actual EBP competencies of healthcare professionals, highlighting the strengths, limitations and key considerations for selecting an EBP competency assessment tool for use in practice.

METHOD

The topic of selecting instruments for measuring the actual EBP competencies of healthcare professionals was approached from the perspective of practicing healthcare professionals from any healthcare discipline, including (but not limited to) the field of nursing. A discussion paper format was selected because the authors wanted to highlight an important methodological issue affecting nursing research practice and the quality of research findings: the long tradition in nursing research of evaluating directly measurable, complex constructs via self-assessments. A growing body of research evidence shows that directly measurable, complex constructs such as the EBP competency domains of EBP knowledge and skills should be evaluated through more objective measures of actual performance, instead of assessing perceived, i.e., self-rated competencies, to ensure a measurement that is as accurate as possible.
DATA SOURCES

As a discussion paper is not intended to be a systematic review, a systematic search strategy is not required. This discussion paper is based on our own experiences and supported by theory and literature. With regard to literature, research articles published in international, peer-reviewed, English-language journals from January 2000 to November 2017 on instruments and tools for assessing the EBP competencies of healthcare professionals were retrieved through reference chasing and searching the tables of contents for the following international peer-reviewed journals where articles on this topic have most commonly been published: BMC Medical Education, BMJ, Evidence Based Medicine, Medical Education, Worldviews on Evidence-Based Nursing and Journal of Advanced Nursing.

DISCUSSION

Several systematic reviews have been conducted over the last 12 years on the instruments for assessing the competencies of healthcare professionals, including their EBP competencies. Davis and colleagues (2006) asserted in their systematic review on physician self-assessment compared with observed measures of competence that physicians have a limited ability to self-assess their competencies. They concluded that competence evaluations may need to focus more on external assessments, i.e., measures based on actual performance. In a systematic review on instruments for evaluating medical students’ and trainees’ education on EBP, Shaneyfelt and colleagues (2006) identified 104 instruments for evaluating EBP competencies, the majority of which primarily focused on only one step of the EBP implementation process. The single step that EBP competency evaluations most often concentrated on was step 3, i.e., critically appraising evidence. Shaneyfelt and colleagues (2006) concluded that only two validated instruments, the Fresno (Ramos et al. 2003) and...
Berlin (Fritsche et al. 2002) assessment tools, focused on four steps of the EBP implementation process, had sound psychometric properties and objectively measured EBP competencies. In another systematic review on tools for assessing EBP behaviour among healthcare professionals, Oude Rengerink and colleagues (2013) identified 42 validity and/or reliability tested EBP instruments, of which 16 assessed only one step of the EBP implementation process and 26 evaluated multiple EBP steps (mostly a combination of steps 2 and 4, i.e., Accessing and Applying evidence). They concluded that only one instrument, an Italian translation of the Evidence-Based Practice Questionnaire (EBPQ, Upton & Upton, 2006), assessed all five steps of the EBP implementation process. Similarly to Oude Rengerink and colleagues’ (2013) results, in another systematic review on instruments for measuring nurses’ EBP knowledge, skills and attitudes, Leung and colleagues (2014) contended that of the 24 instruments included in the review, the EBPQ (Upton & Upton, 2006) had the highest validity and was the most practical instrument to use for evaluating nurses’ EBP competencies. However, as the EBPQ is a self-report instrument, Leung and colleagues (2014) concluded that there is an urgent need for developing performance-based instruments for measuring the actual EBP competencies of nurses.

Validated tools for assessing actual EBP competencies of healthcare professionals

Few researchers to date have developed instruments to more objectively measure the actual, i.e., performance-based EBP competencies of medical practitioners and trainees, or to modify them for use in occupational and physical therapy (Fritsche et al. 2002; Ilic et al. 2014; McCluskey & Bishop, 2009; Ramos et al. 2003; Tilson, 2010). Although some of these more objective instruments for assessing EBP competencies simultaneously measure EBP competencies across several steps of the EBP implementation process, only one, the Fresno assessment tool ((Ramos et al. 2003), has very recently been evaluated and modified for use...
in nursing (Halm 2018, Laibhen-Parkes et al. 2018). Therefore, there is an urgent need for nursing research to evaluate, modify and validate these tools for possible use in measuring the actual EBP competencies of nurses, instead of continuing to measure nurses’ EBP competencies via self-assessments.

The validated Berlin assessment tool (Fritsche et al. 2002) was developed by a panel of EBP experts to measure medical professionals’ actual EBP knowledge and skills through 15 multiple-choice (MC) questions that address one step of the EBP implementation process (i.e., critically appraising evidence) (Tilson et al. 2011; Ilic, 2009). Although the Berlin tool comprises a more objective measurement of EBP knowledge and skills in terms of critical appraisal, it does not assess the other key steps of the EBP implementation process and to date, it has only been designed to assess the EBP competence of medical and surgical specialists in the field of medicine (Ilic, 2009; Ilic et al. 2014; Ubbink et al. 2016). However, due to its’ brevity and format, it is quick to complete (approx. 15-20 minutes), administer and grade, because it does not require any judgment or interpretation of the results from the evaluator.

By contrast, the validated Fresno assessment tool (Ramos et al. 2003) which also was developed to more objectively measure medical professionals’ actual EBP knowledge and skills, consists of a choice of one out of two clinical scenarios, which is used as basis for answering 12 open-ended questions. The open-ended questions require the user to complete the steps of the EBP implementation process to provide answers to the selected clinical scenario, which in effect results in simultaneously assessing medical professionals’ EBP competencies in three steps of the EBP implementation process (i.e., Ask, Access &
Appraise). However, the Fresno assessment tool requires more time to complete (approx. 60 minutes) and grade, as expert knowledge is needed to evaluate and interpret the open-ended answers. The validated Fresno assessment tool has been modified for use in occupational therapy (McCluskey & Bishop 2009), physical therapy (Tilson 2010) and very recently, in nursing (Halm 2018, Laibhen-Parkes et al. 2018). In a systematic review of instruments for evaluating education in EBP (Shaneyfelt et al. 2006), the Berlin and Fresno assessment instruments were the only two tools classified as level 1 instruments in terms of their ability to evaluate competency in EBP. Level 1 instruments are required to demonstrate robust psychometric properties and possess an ability to discriminate between different levels of EBP expertise (i.e., novice, intermediate, or advanced level) across users (Ilic et al. 2014). In addition, the Berlin and Fresno assessment instruments are the only two instruments that simultaneously evaluate two different EBP domains, i.e., EBP knowledge and EBP skills, based on actual performance (Tilson et al. 2011). However, as both the Berlin and Fresno assessment tools primarily focus on evaluating the systematic search and critical appraisal skills of clinicians, it is important to take into account the individual EBP practice needs of the clinicians when selecting the instruments for evaluating their EBP competencies in practice. For example, assessment of the performance-based EBP competencies of busy clinicians who are only interested in applying summarized best evidence to their daily practice, should be assessed using instruments that measure their knowledge of how to conduct a critical appraisal and skills for applying pre-appraised evidence to practice (Tilson et al. 2011).

In addition, the Assessing Competency in Evidence-Based Medicine (ACE) instrument (Ilic et al. 2014) was developed to more objectively measure medical trainees’ actual EBP knowledge, skills, attitudes and implementation through 15 yes-or-no questions, which are
based one clinical scenario, a search strategy for a randomized controlled trial (RCT) and a hypothetical article abstract (Ilic et al. 2014). Similarly to the Fresno assessment tool, the validated ACE instrument simultaneously measures medical trainees’ EBP competencies across the first 4 steps of the EBP implementation process (i.e., Ask, Access, Appraise, & Apply). Taking approximately 13 minutes on average to complete, the ACE tool is quick and thus practical to use at busy clinical practice settings (Ilic et al. 2014). The ACE instrument is the first EBP competency evaluation instrument for simultaneously assessing users’ 4 domains of EBP competencies (i.e., EBP knowledge, skills, attitudes and implementation) across 4 of the 5 steps of the EBP implementation process (Ilic et al. 2014). In addition, the ACE instrument uses a dichotomous (i.e., yes-no) outcome measure, which does not require judgment or interpretation from the evaluator, in contrast with assessment tools that use formats with open-ended or multiple-choice questions (Ilic et al. 2014; Shaneyfelt et al. 2006). However, to date the ACE instrument has only been validated for use with medical trainees and has not been modified for use in healthcare disciplines other than medicine (Ilic et al. 2014). Furthermore, similarly to the Fresno assessment tool, the ACE assessment tool does not readily permit repeated use on the same cohort of participants, as both tools contain only 1-2 clinical scenarios. Therefore, it is important that future versions of both of these evaluation instruments for healthcare professionals’ EBP competencies will include alternate clinical scenarios to minimize the potential impact of recall bias on healthcare professionals’ test results. Table 2 summarizes the steps of the EBP implementation process covered by the selected validated EBP competency assessment tools measuring the actual, i.e., performance-based EBP competencies of healthcare professionals.
Although some nurse scientists (Spurlock & Wonder 2015; Stevens 2009) have developed validated instruments to measure an important domain of a comprehensive EBP competency assessment, i.e., nurses’ actual EBP knowledge, it is also important to recognize that both of these EBP knowledge tests nevertheless focus on evaluating only one domain of EBP competency. Therefore, nurses’ EBP knowledge measured by these instruments should not be equated with nurses’ skills or abilities to implement EBP. The 15 MC-question EBP knowledge test of the Evidence-Based Readiness Inventory (ERI, Stevens, 2009) was developed based on the national consensus EBP competency statements in nursing, using the Stevens Star Model of Knowledge Transformation© as its framework (Stevens, 2004). The ERI also includes 20 self-rated, Likert-style EBP competency statements. Another EBP competency assessment tool evaluating nurses’ actual EBP knowledge is the Evidence-Based Practice Knowledge Assessment in Nursing (EKAN, Spurlock & Wonder 2015), which is a 20 MC-question knowledge test designed to measure nurses’ actual EBP knowledge from domains specified in the AACN (2008) and QSEN (2007) competency frameworks (Wonder et al. 2017). Both EBP knowledge tests use a simple scoring method (correct-incorrect). The results of a recent study comparing the EBP knowledge levels of RNs working at Magnet® hospitals (Wonder et al. 2017) measured by the EKAN and the EBPQ (Upton & Upton, 2006) showed that nurses’ self-reported EBPQ scores were not significantly correlated with more objectively measured EBP knowledge via the EKAN (Wonder et al. 2017). However, the findings of a systematic review summarizing the self-rated instruments for evaluating nurses’ EBP competencies (Leung et al. 2014) assessed the EBPQ (Upton & Upton, 2006) as the instrument with the highest validity and as the most practical tool for evaluating nurses’ EBP competencies. Furthermore, Wonder and colleagues (2017) asserted that the lack of correlation between self-assessed and objectively measured knowledge is consistent with evidence from other healthcare disciplines such as medicine, where particularly related to
highly complex tasks such as EBP, low, non-significant correlations have consistently been found between self-ratings and performance-based assessments of critical appraisal skills and knowledge (Davis et al. 2006; Lai & Teng, 2011, Blanch-Hartigan, 2011). Key characteristics of selected EBP competency assessment tools measuring the actual EBP competencies of healthcare professionals are presented in Table 3.

**Other instruments to evaluate EBP competencies of healthcare professionals**

The Objective Structured Clinical Exam (OSCE) simulating real-world clinical situations that students may encounter in clinical practice settings has been widely used in medicine, nursing and other healthcare disciplines to advance students’ clinical competencies. The OSCE exam has demonstrated being a pragmatic tool for assessing students’ clinical competencies and their communication skills. In addition, a video application of the OSCE, i.e., an Objective Structured Video Exam (OSVE), has also been developed and used in e.g., geriatrics education (Simpson et al. 2008). Moreover, several modifications of the OSCE to specifically measure the EBP competencies of healthcare professionals have been developed primarily in medicine, although few of these modifications simultaneously assess the 4 steps of the EBP implementation process and none use validated instruments to evaluate medical students’ EBP competence (Fliegel et al. 2002; Frohna et al. 2006; Tudiver et al. 2009). However, these modifications of OSCE exams for use in EBP competency measurement have not been modified for use in healthcare disciplines other than medicine. In addition, EBP interactive computer games (Davidson & Candy 2016; Mick 2016) have been designed and used in teaching EBP through game-based learning in recent years to help advance healthcare professionals’ EBP competencies, but similarly to the OSCE exams, most of the interactive computer games focus on only one step of the EBP implementation process and most of the
games do not incorporate validated instruments to measure the performance-based EBP competencies of healthcare professionals.

**Implications for nursing**

Although systematic implementation of EBP is well-known to improve care quality and patient outcomes, several studies have shown that the majority of nurses and other healthcare professionals do not consistently engage in EBP in their daily practice. Reasons for this include healthcare professionals’ limited EBP competencies, as indicated by the results of several recent systematic reviews, where nurses and other healthcare professionals rated their own EBP knowledge and skills to be at a level insufficient for integrating best evidence into daily practice (Condon et al. 2016; Saunders & Vehviläinen-Julkunen 2015; Scurlock-Evans et al. 2014; Upton et al. 2014). Therefore, to increase systematic implementation of EBP in daily practice, the first priority of organizational leaders should be to strengthen nurses’ and other healthcare professionals’ EBP knowledge and skills, i.e., advance precisely those EBP competencies that should be evaluated by more objective instruments measuring healthcare professionals’ actual, or performance-based EBP competencies. Using validated instruments to more objectively and accurately evaluate nurses’ and other healthcare professionals’ actual EBP competencies also provides key measurements for establishing competency standards for healthcare professionals to attain, which then can be used as standards against which to measure their level of performance in implementing EBP, i.e., in exhibiting EBP behaviors in daily practice. In addition, measuring nurses’ and other healthcare professionals’ level of EBP competence more objectively provides healthcare organizations with a more accurate picture of their employees’ capabilities to engage in EBP across the steps of the EBP implementation process. This includes their readiness to integrate best evidence into daily practice, which is essential for systematic implementation of EBP and thus, for improving
care quality and clinical outcomes in healthcare organizations. It also means that
organizational leaders should use more objectively measured evidence of healthcare
professionals’ EBP competencies when making decisions on healthcare professionals’
continuing education curricula and professional development programs.

Furthermore, the widespread confusion and misconceptions about the basic concepts of EBP,
which recent systematic and integrative reviews have shown to still exist among large
proportions of nurses and other healthcare professionals (Condon et al. 2016; Saunders &
Vehviläinen-Julkunen 2015; Scurlock-Evans et al. 2014; Upton et al. 2014), should be
addressed with evidence-based continuing education programs delivered by Advanced
Practice Nurses (APNs), other EBP mentors and EBP experts with advanced-level EBP
competencies. Using these EBP experts to deliver the continuing education is preferred based
on the results of previous studies indicating that nurses and other healthcare professionals
prefer human sources of information such as peers and colleagues over peer-reviewed written
sources. Furthermore, several studies have shown that using EBP mentors to teach healthcare
professionals how to integrate best evidence into their daily practice is an effective strategy to
advance their EBP implementation at clinical practice settings (Levin et al. 2011; Dogherty et
professionals’ attitudes, knowledge and skills of EBP advance their EBP uptake, adoption
and implementation and help them better negotiate the common barriers to EBP
implementation, which in turn assist healthcare organizations in achieving higher-quality care
and improved patient outcomes at a lower cost.
CONCLUSION

This discussion paper revealed that there are few validated instruments published in the international literature that more objectively measure the actual, i.e., performance-based EBP competencies of healthcare professionals and students, instead of evaluating the perceived EBP competencies of healthcare professionals via self-assessments. Although some performance-based measures have been modified from medicine for use in physical and occupational therapy, the first nursing research studies for their modification and use in nursing has only recently been completed, despite a growing evidence base showing poor accuracy of self-rated instruments in evaluating directly measurable constructs, such as evidence-based practice knowledge and skills. Therefore, a concerted effort is urgently needed to conduct well-designed, rigorously nursing research studies that focus on evaluating the existing, validated instruments assessing actual EBP competencies developed in other healthcare disciplines for possible modification, validation and use in nursing.

As EBP is a shared competency and the steps of EBP implementation are universal regardless of the country, culture of origin, or healthcare discipline of the clinician, EBP competencies should be evaluated with validated instruments assessing the EBP competencies of all clinicians across healthcare disciplines, i.e., interdisciplinary assessment tools that measure the universal EBP competencies of healthcare professionals from any healthcare discipline. In addition, new assessment tools more objectively measuring healthcare professionals’ actual, performance-based EBP knowledge and skills, instead of continuing to measure perceived, self-rated EBP competencies, should be collaboratively developed and validated for use across healthcare disciplines. Finally, performance-based instruments that simultaneously assess several EBP competency domains required for completing the steps of the EBP
implementation process should be developed and validated for use across healthcare disciplines.

**Author Contributions:**

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*):

1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;

2) drafting the article or revising it critically for important intellectual content.

* [http://www.icmje.org/recommendations/](http://www.icmje.org/recommendations/)

**References**


This article is protected by copyright. All rights reserved.


This article is protected by copyright. All rights reserved.


This article is protected by copyright. All rights reserved.


Stevens, K. R. (2009). *Essential Evidence-Based Practice Competencies in Nursing.* (2nd ed.) San Antonio, TX: The Academic Center for Evidence-Based Practice (ACE), University of Texas Health Science Center


This article is protected by copyright. All rights reserved.


Table 1. Steps of the EBP implementation process (Melnyk et al. 2014), the primary domains of EBP competence required in each step, and types of competency assessment recommended per step (modified from Tilson et al. 2011).

<table>
<thead>
<tr>
<th>Steps of the EBP Implementation process</th>
<th>Primary domains of EBP competence</th>
<th>Types of competency assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. Cultivating the spirit of inquiry</td>
<td>EBP attitudes &amp; beliefs</td>
<td>Self-report, observation</td>
</tr>
<tr>
<td>1. Recognizing evidence needs and</td>
<td>EBP knowledge &amp; skills</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>formulating a researchable clinical</td>
<td>(primarily identifying needs for</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>question</td>
<td>evidence &amp; formulating PICOT†</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>2. Systematically searching for,</td>
<td>EBP knowledge &amp; skills</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>selecting, and retrieving best</td>
<td>(primarily databases &amp; search</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>evidence</td>
<td>techniques)</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>3. Critically appraising best evidence for validity and applicability</td>
<td>EBP knowledge &amp; skills (primarily statistics, appraisal &amp; summary skills)</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>4. Integrating best evidence with</td>
<td>EBP skills (primarily synthesis</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>clinician’s expertise, patient</td>
<td>skills &amp; application to practice</td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>preferences and values into clinical decision-making in patient care</td>
<td></td>
<td>Performance-based assessment, cognitive testing</td>
</tr>
<tr>
<td>5. Evaluating the outcomes of practice change</td>
<td>EBP behavior, benefits to patients</td>
<td>Activity monitoring, observation, patient outcomes</td>
</tr>
<tr>
<td>6. Disseminating the results of practice change</td>
<td>Reaction to experience, communication skills</td>
<td>Self-report, observation</td>
</tr>
</tbody>
</table>

†PICOT: P=Population, I=Intervention, C=Comparison, O=Outcome, T=time
Table 2. Steps of the EBP implementation process (‘the 5 A’s† by Straus et al. 2011) covered by validated, performance-based EBP knowledge and/or skills assessment tools

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask (formulate a searchable clinical question)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Access (systematically search for best evidence)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraise (critically appraise the best evidence)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply (integrate the best evidence into daily practice)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Assess (evaluate the process of making the practice change)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

†The 5 A’s: Ask, Access, Appraise, Apply, and Assess (Straus et al. 2011)

‡ACE: Assessing Competence in Evidence-Based Medicine (Ilic et al. 2013)

§ERI: Evidence-Based Practice Readiness Inventory (Stevens 2009)

¶EKAN: Evidence-Based Practice Knowledge Assessment in Nursing (Spurlock & Wonder 2015)
Table 3. Summary of key characteristics for selected validated EBP competency assessment tools evaluating performance-based EBP knowledge and/or skills of healthcare professionals

<table>
<thead>
<tr>
<th>Key characteristics of selected validated EBP knowledge and/or skills assessment tools</th>
<th>The Berlin assessment tool (Fritsche et al. 2002)</th>
<th>The Fresno assessment tool (Ramos et al. 2003)</th>
<th>The ACE assessment tool (Ilic et al. 2013)</th>
<th>The EBP knowledge test of the ERI (Stevens 2009)</th>
<th>The EKAN (Spurlock &amp; Wonder 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures multiple EBP competency domains† at the same time</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Estimated average time required of participants to complete instrument‡</td>
<td>A</td>
<td>H</td>
<td>L</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Estimated average time required of evaluator to complete grading of instrument§</td>
<td>L</td>
<td>A</td>
<td>L</td>
<td>L</td>
<td>A</td>
</tr>
<tr>
<td>Grading requires expert knowledge of evaluator to interpret results</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Likelihood of recall bias with multiple use of instrument in same participant cohort¶</td>
<td>L</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>

†EBP competency domains = EBP knowledge, EBP skills, EBP attitudes/beliefs, and EBP implementation/behaviors; Y = Yes; N = No
‡Estimated average time to complete instrument: L = Low (<15 minutes), A = average (15 to 30 minutes); High (>30 minutes)
§Estimated average time to grade instrument: L = Low (<15 minutes); A = average (15 to 30 minutes); High (>30 minutes)
¶Likelihood of recall bias: L = Low; H = High