CORE EVIDENCE-BASED PRACTICE COMPETENCIES AND LEARNING OUTCOMES FOR EUROPEAN NURSES: CONSENSUS STATEMENTS

Running head: Evidence-based practice competencies for European nurses

Abstract

Background and/or rationale: Consensus on evidence-based practice (EBP) competencies and associated learning outcomes for registered nurses has not yet been achieved in the European context.

Aims: To establish a set of core EBP competencies for nurses and the most important EBP learning outcomes encompassing attitudes, knowledge, and skills dimensions for implementation into nursing education in European countries.

Methods: A multi-phase modified Delphi survey was conducted: Phase 1 - a literature review; Phase 2 - a two-round consensus of experts; Phase 3 - a Delphi survey. Experts from six European countries participated.

Results/findings: In Phase 1, 88 records were selected and 835 statements extracted, which were grouped according to the seven steps of EBP. After removing 157 duplicates, the remaining competencies (n = 678) were evaluated in Phase 2. Then, a two-round expert consensus was reached, with 24 competencies and 120 learning outcomes identified and divided into affective, cognitive, and skills domains. In Phase 3, based on a Delphi survey expert consensus, all evaluated statements were included in a final set of competencies and learning outcomes. Only two learning outcomes were recommended for allocation to a different domain, four were reformulated as suggested, with no further changes to the others.

Linking evidence to action:

- The set of EBP competencies and learning outcomes can guide nurse educators, managers and EBP stakeholders in the development of contents that incorporate EBP knowledge, skills, and attitudes into education programs.
- Prioritizing the EBP competencies and learning outcomes that are most necessary, and adapting them to every context, will provide healthcare organizations with guidelines for enhancing the continuing education of nurses.
- These results could facilitate the development of effective tools for assessing nursing students' and nurses' perception of competencies required for EBP processes.

Keywords: Evidence-based practice, Competency, Consensus, Delphi survey, Learning outcome, Learning, Nursing education, Nurse

Background and significance of the study

A thorough integration of the best scientific evidence into daily practice is key to effective improvement of quality of care and patient outcomes (Saunders, Gallagher-Ford, & Vehviläinen-Julkunen, 2019). The World Health Organization, therefore, states that it is imperative for countries in the WHO European Region to consider the benefits of evidence-based practice (EBP) and to focus on continuous improvement in quality of care. Nurses, as the largest group of healthcare professionals, play a key role in providing effective, safe and evidence-based care, which requires the translation of research results into EBP (World Health Organization, 2017). To ensure safe and quality nursing practice, the acquisition of EBP competency is essential (Orta et al., 2016); however, most nurses are not prepared for EBP (Oh et al., 2010; Patelarou et al., 2017; Saunders, & Vehviläinen-Julkunen, 2016), which manifests itself as insufficient knowledge, values, and competencies for understanding and use of EBP

(Skela-Savič et al., 2017). Although they are familiar with the concept of EBP, have a positive attitude towards it, and, moreover, believe that EBP may improve the quality of care and patient outcomes, nurses perceive their own EBP skills to be inadequate and do not feel qualified to apply EBP in their work (Melnyk et al., 2018; Skela-Savič et al., 2016; Zeleníková et al., 2016).

Expectations of improvement in EBP quality generate new professional competencies that allow healthcare professionals and organizations to clarify performance expectations regarding EBP and succinctly outline the expected competencies for successful application of best evidence to daily care (Saunders, Gallagher-Ford, & Vehviläinen-Julkunen, 2019). As the education of nurses has developed from hospital-based training to a competence-based curriculum, set core competencies have become crucial for effective nursing training (Reeves, Fox, & Hodges, 2009). The 2015 Competency Framework, based on the European directive 2013/55/EU, recognized implementation of scientific findings into EBP as a central competency of the undergraduate education of nurses in the European Union (European Federation of Nurses Associations, 2015). In addition, the European Federation of Nurses Associations (EFN, 2014) defined four categories of nursing care providers in a document entitled "EFN Matrix on the Four Categories of the Nursing Care Continuum", which also introduced EBP tasks at the level of Specialist Nurse and Advanced Practice Nurse. EBP has also been recognized as a central competency by the Quality and Safety Education for Nurses (QSEN) project, a global nursing initiative whose purpose is to meet the challenge of preparing future nurses with the knowledge, skills, and attitudes necessary to continuously improve the quality and safety of the healthcare system they work in. Together with representatives of 11 other professional organizations, the QSEN Institute has defined quality and safety competencies for nursing, and has proposed targets for the knowledge, skills, and attitudes to be developed in nursing graduate programs for each competency. Besides competencies in patient-centred care, teamwork and collaboration, quality improvement, safety, and informatics, they also defined competencies for EBP (Cronenwett et al, 2007; QSEN, 2020).

Conceptual framework

There is no single definition of the concept of competency. For the purpose of this study, we consider competency as "the capacity of nurses to integrate cognitive, affective and psychomotor abilities in nursing care provision" (Miller, Hoggan, Pringle, & West, 1988). Similarly, Leung, Trevena and Waters (2016) view competency as the combination of complex attributes of knowledge, skills, and attitudes with the ability to make professional judgements and to perform intelligently in specific situations. In the field of education, the relationship between competencies and learning outcomes has been widely discussed. It has been pointed out, that competencies with a narrow focus can be regarded as learning outcomes (Kennedy, Hyland, & Ryan, 2009). These support the competencies, are at a greater level of detail, and form the basis of both learning and assessment (Oliver et al., 2008). To ensure clarity of meaning, it is, therefore, recommended to translate competencies into learning outcomes - that is, to express the required competency in terms of students' or professionals' accomplishment of specific learning outcomes (Kennedy, Hyland, & Ryan, 2009).

Generally, EBP competencies arise from key EBP principles and steps that are universal (Saunders, Gallagher-Ford, & Vehviläinen-Julkunen, 2019). Laibhen-Parkes (2014) suggest that EBP competency is the ability to ask clinically relevant questions for the purposes of acquiring, appraising, applying, and assessing multiple sources of knowledge within the context of caring for a particular patient, group, or community. Over the last decade, several national EBP competency frameworks have emerged, with the USA as a leading pioneer. Stevens (2009)

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reported a national consensus on essential competencies for EBP in nursing, reached through a process involving a panel of experts. These original competency statements were classified across the undergraduate, masters, and doctoral levels of nursing preparation and organized into the five stages of knowledge transformation according to the ACE Star Model of Knowledge Transformation (Stevens, 2004). More recently, Melnyk et al. (2014) developed a new set of EBP competencies for practicing registered nurses and advanced practice nurses in real-world healthcare settings. These competencies are more focused on developing practice capabilities that nurses must acquire to implement EBP. The results served as a starting point for establishing consensus on the key content of the essential EBP competencies for registered and advanced practice nurses among Finnish nurse panellists (Saunders, Gallagher-Ford, & Vehviläinen-Julkunen, 2019). A study by Australian authors Leung, Trevena and Waters (2016) designed a competency framework for measuring EBP knowledge and skills based on the five-step EBP model. Another set of core EBP competencies for healthcare professionals was identified using a Delphi survey, following a systematic literature review (Albarqouni et al., 2018).

Although previous work can be a useful starting point, in European healthcare, EBP is rarely an integral part of patient care or nursing education curricula (Ruzafa-Martínez, 2019). Therefore, the main and most urgent task remains working effectively to develop and provide professional education that facilitates the implementation of EBP (Lehane et al., 2019). Agreement on EBP competencies and associated learning outcomes for registered nurses has not yet been achieved in the European context. Stakeholders in academic and clinical settings need a properly constructed set of competencies and learning outcomes outlining what nursing students and nurses should know, understand, and be able to do (and to what degree of proficieny), using language and contexts that indicate the level at which they will be assessed. The present proposal focuses on providing these outputs through the collaboration of six European higher education institutions participating in a project funded by the European Erasmus+ Programme (Ruzafa-Martínez, 2019).

Purpose/aim

The aim was to establish a set of core EBP competencies for nurses and the most important EBP learning outcomes encompassing attitudes, knowledge, and skills dimensions for implementation into nursing education in European countries, including undergraduate, graduate, and continuing education programs.

Methods

Design

A multi-phase modified Delphi survey. Phase 1 - a literature review on EBP competencies; Phase 2 - two-round expert consensus to prioritize the most essential EBP competencies and learning outcomes; and Phase 3 - a Delphi survey to establish a final set of core EBP competencies and learning outcomes for nurses.

Phase 1: a literature review on EBP competencies

In Phase 1 (January-February 2019), a literature review was conducted to identify and analyze studies focusing on EBP competencies for nurses. Research teams from the Czech Republic, Greece, Italy, Poland, Slovenia, and Spain participated in the review. Studies were identified using a search strategy and predefined criteria in the bibliographic databases CINAHL Plus with Full Text, SpringerLink, Cochrane Library, ProQuest, ScienceDirect, Web of Science, SCOPUS, EBSCO, PubMed, EMBASE, and PsycINFO, as well as in national databases in all

the participating countries. Each database was searched by two researchers from the different countries. For the present study, a *Data Extraction Protocol* was created (Supplement 1).
Using content analysis (Bengtsson, 2016), two researchers (JD and DJ) identified EBP competencies for nurses in the studies and grouped them according to the seven steps of EBP (Melnyk, & Fineout-Overholt, 2015). Subsequently, the set of competencies was revised (MRM and AJRM) and duplicate and irrelevant items were excluded.

Phase 2: two-round expert consensus to prioritize the most essential EBP competencies and learning outcomes

In the first round (April 2019), the project research team, consisting of two researchers from each participating country (i.e. 12 in total), analyzed and assessed EBP competency statements, rating the adequacy of all items to their EBP steps, from 0 points (completely inadequate) to 100 points (completely adequate). They also evaluated the clarity and intelligibility of the wording of competencies. An EBP statement was maintained in the selected domain when a predefined consensus level of at least 70% of the experts was achieved. The assessed statements were revised and some of the items were reworded and reassigned to other steps of EBP, as necessary.

In the second round (May-June 2019), the research team reviewed the selected statements and allocated them to the corresponding affective, cognitive, skills, or practical domains. If necessary, statements were rewritten or new ones were added. According to the conceptual framework adopted in the study, competencies were considered to be statements of a general nature consisting of a subset of learning outcomes, as defined by Kennedy, Hyland and Ryan (2009). A qualitative evaluation of the results allowed identification of two levels of specificity in the statements selected. Some were written as practical competencies or behavioral actions coinciding with statements allocated to the practical domain, while the more specific statements were assigned to the other domains (affective, cognitive, and skills) and deemed learning outcomes. Consequently, the research team agreed to consider statements from the practical domain (24 items in total) as specific competencies. The remaining statements were deemed learning outcomes, which were assessed in the next phase.

Phase 3: a Delphi survey to establish a final set of core EBP competencies and learning outcomes for nurses

The set of core EBP competencies for nurses, together with learning outcomes selected during Phase 2 were assessed using a Delphi survey (McPherson et al., 2018) by a selection of experts from all the participating countries. Experts for the survey panel were designated in accordance with the following predefined criteria: healthcare professionals nationally renowned for EBP or the development of instruments, from different practice profiles and geographical areas in Europe. Members of the research team did not take part in the Delphi survey. Specific instructions were sent to each expert, including an explanation of the aim of the study and a description of Phases 1 and 2, which had generated the initial set of competencies and learning outcomes. Survey collection was conducted in the period September-October 2019. Learning outcomes were assessed on a Likert scale ranging from 0 points (completely irrelevant) to 5 points (completely relevant). The experts also evaluated the clarity and intelligibility of the wording of competencies and learning outcomes and their adequacy to their domains and EPB steps. Based on the panel's assessment, the competencies and learning outcomes were revised by two researchers (JD and DJ). Learning outcomes with an average score of less than four points were excluded.

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Ethical issues

The study complied with the Declaration of Helsinki. Participants were informed that their consent was assumed if they responded to the survey. Anonymity and confidentiality were assured regarding use of data.

Data analyses

A content analysis was performed in order to detect and introduce new proposals or reformulations of statements. Descriptive statistics were conducted (mean, standard deviation, absolute frequency, relative frequency), using SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA).

Results/findings

Initially, a literature review was conducted (Supplement 2). A total of 21,039 records were found. Of these, 3,654 duplicates were excluded. Subsequently, 15,356 records were excluded by title, 1,727 records were excluded by abstract, and 214 were excluded by full-text screening. The basic set of documents to be analyzed comprised 88 records from 1998 to 2018, including EBP competency reviews and consensus studies for nurses and allied healthcare professionals (Supplement 3). Many of the statements were constructed on the basis of previous works. Based on content analysis of the basic set, EBP competencies for nurses were identified (n = 835). After statements were grouped into the seven EBP steps, duplicate and irrelevant statements were excluded (n = 157) as shown in Supplement 4. Most statements were placed in Step 3 - "*Critically appraise the evidence that has been collected for its validity, reliability, and applicability, then synthesize that evidence*" (25.6%), and Step 2 - "*Search for and collect the most relevant and best evidence to answer the clinical question*" (20.3%). The lowest percentage of statements was in Step 6 - "*Disseminate the outcomes of the EBP decision or change*". Regarding excluded statements, 29.3% were placed in Step 2 and 15.2% in Step 1.

The remaining competencies (n = 678) were evaluated in the first round (Phase 2), and based on the scores of adequacy to each EBP step, 188 statements were retained (Supplement 4). In the second round (Phase 2), statements were allocated to the cognitive, affective, skills, or practical domains; no agreement was reached on 45 statements, one statement was added to Step 6, and 51 statements were reformulated. This second subset of statements (n=144) was subjected to qualitative analysis and, according to the conceptual framework adopted in the study, a set of core EBP competencies for nurses (n = 24) and learning outcomes (n = 120) was generated. Twenty-three of the selected competencies are part of the EBP competency framework by Melnyk et al. (2014). Competencies 5, 6, 7, 13, 15 and 23 were minimally reformulated. Competency 16 was considered similar to competency 7 and eliminated. A new competency was added in Step 5 - *"Interpret obtained outcomes after the evaluation of an evidence-based changed practice"*.

Finally, in Phase 3, the set of core EBP competencies for nurses and learning outcomes was submitted for evaluation to 30 members of an international panel of experts (Supplement 5) conducting a Delphi survey. Consensus was reached in the first round, with mean scores of all learning outcomes of four or higher (range 4.0 - 4.9), and the final set of core EBP competencies for nurses and relevant learning outcomes was established without changing the number from the previous phase. Minimal changes were suggested by the experts. In Step 3, two statements from the affective domain were reassigned, one to the cognitive domain, and the other to the skills domain. Four statements were reformulated. Overall, the set included 24 competencies and 120 learning outcomes (Supplement 6). The distribution of competencies and learning outcomes is quite balanced, with the smallest number of statements in Step 1 - "*Ask the burning*

clinical question", and the greatest number of statements in Step 4 - "*Integrate the evidence*". In the initial set of statements, Steps 2 - "*Search*" and 3 - "*Critical appraisal*" had the highest *reduction in statements (around 10%) because much of them were redundant and received a low rating. ~~Conversely~~, This meant that statements in Steps 5 - "Evaluate outcomes" and 6 -* "*Disseminate*" increased the relative proportion over the total by approximately 6-8% in the final set. The proportion of learning outcomes was 18.3% in the affective domain, 29.1% in the cognitive domain, and more than half (52.5%) in the skills domain (Supplement 4).

Discussion

Nursing faculties and healthcare systems aim to ensure that healthcare professionals are competent in their clinical practice, including EBP, as recommended by international organizations and institutions (European Federation of Nurses Associations, 2015; World Health Organization, 2017; Cronenwett et al., 2007; QSEN, 2020). This has led to an increased interest in establishing an EBP competency framework for nurses, mainly in the USA (Stevens, 2009; Melnyk et al., 2014) and Australia (Leung, Trevena, & Waters, 2016). Based on an updated literature review and consensus of experts from the Czech Republic, Greece, Italy, Poland, Slovenia, and Spain, 24 EBP competencies and 120 learning outcomes for general nurses and advanced nurses were identified. This is the first study to establish a set of EBP competencies and learning outcomes within the European nursing context.

The proposed framework has several advantages over existing ones. Our proposed competency framework is supported by a conceptual background that understands competency (Laibhen-Parkes, 2014) as a cluster of related attitudes, knowledge, and skills that have a major impact on one's job (role or responsibilities), and are demonstrated when a person is able to perform certain tasks within a defined context of professional practice. The reviewed statements showed two levels of specificity that, according to educational theories (Kennedy, Hyland, & Ryan, 2009), permitted us to separate specific competencies and learning outcomes grouped into affective, cognitive, and skills domains. Consensus was achieved regarding competency statements using, with minor modifications, the EBP competency framework by Melnyk et al. (2014) as the basis, as previously done in a Finnish context (Saunders, Gallagher-Ford, & Vehviläinen-Julkunen, 2019). The seven EBP steps as defined by Melnyk and Fineout-Overholt (2015) allowed allocation of competencies and learning outcomes in a systematic way, following the EBP process, with the incorporation of two new steps compared to previous EBP competency frameworks based on the generic five-step EBP model (Straus, et al., 2011; Leung, Trevena, & Waters, 2016; Albarqouni, Hoffmann, & Glasziou, 2018): Step 0 - "*Cultivate a spirit of inquiry within an EBP culture and environment*", and Step 6 - "*Disseminate the outcomes of the EBP decision or change*".

Our framework incorporates 120 learning outcomes classified into affective, cognitive, and skills domains, and is associated with the most appropriate competencies and the seven-step EBP process. Previous frameworks have used the same three domains (Cronenwett et al., 2007; QSEN, 2020) but in a less detailed manner. In our proposal, the distribution of competencies and learning outcomes is very balanced, an uncommon feature. In the aforementioned competency frameworks, the acquire and appraise steps show a greater concentration of statements (Leung, Trevena, & Waters, 2016; Albarqouni, Hoffmann, & Glasziou, 2018), and are usually overrepresented in educational strategies (Albarqouni, Hoffmann, & Glasziou, 2018). Our proposal tries to resolve this anomaly, with special attention paid to developing learning outcomes in the implementation, evaluation, and dissemination steps in more detail. In these steps, learning outcomes are mainly represented in the skills domain, highlighting its relevance to the acquisition of EBP competencies.

Nursing research conducted in Europe has been criticized as being predominantly descriptive, unnecessary, and of little relevance to clinical practice (Richards, Hanssen, & Borglin, 2018). As nurses globally account for the greatest proportion of healthcare professionals, it may be assumed that the expected EBP outcome of providing the best possible care at the lowest possible cost in a limited-resource setting can be achieved only rarely (Closs & Cheater, 1999). This will result in serious consequences for quality of care, as well as for patient safety and outcomes (Saunders, & Vehviläinen-Julkunen, 2016). Changes in healthcare mean there is an urgent need to educate nurses to be competent in EBP. Changes in practice must be reflected by changes in education (Oh et al., 2010).

Our study also indicated that EBP teaching varies between countries, and that knowledge of EBP is integrated into bachelor's and master's study programs in different ways. EBP content is mainly included as part of subjects that incorporate only certain of its concepts, or as a stand-alone course (Skela-Savič et al., 2020). Healthcare facilities, together with education providers, face the challenge of finding the most effective way of training and further educating nurses in EBP. One of the sign of effectiveness of university courses is that upon completing EBP courses, students are able to apply their EBP skills (Zeleníková et al., 2014).

The set of competencies and learning outcomes has been adapted and developed to respond to the specific learning needs of the nursing discipline. It is necessary to design new strategies for teaching EBP (Aglen, 2016). The organization of EBP into affective, cognitive, and skills domains, as suggested (Ramis et al., 2019), may serve as guidance for developing and harmonizing the content of teaching and teaching principles, and strategies that may improve EBP competencies in nurses.

Study limitation and future research

The heterogeneity and differences in development between nursing levels in EBP across European countries has not facilitated differentiation between competencies and learning outcomes for general and advanced nurses. Experts from Finland found that some of Melnyk's competencies for general nurses required the knowledge and skills of advanced nurses (Saunders, Gallagher-Ford, & Vehviläinen-Julkunen, 2019). This implies the need for future research, perhaps first at national levels, to achieve consensus and to define the competency level of EBP for general and advanced nurses in Europe, and to develop a common framework to facilitate curriculum development and continuing education.

Linking evidence to action

- The set of EBP competencies and learning outcomes can guide nurse educators, managers, and EBP stakeholders in the development of contents that incorporate EBP knowledge, skills, and attitudes into education programmes.
- Prioritizing the EBP competencies and learning outcomes that are most necessary, and adapting them to every context, will provide healthcare organizations with guidelines for enhancing the continuing education of nurses.
- These results could facilitate the development of effective tools for assessing nursing students' and nurses' perception of competencies required for EBP processes.

Conclusions

Based on a literature review and expert consensus, a set of core EBP competencies for nurses and the most important EBP learning outcomes was developed for implementation into nursing education programs across European countries.

Acknowledgements

We would like to express our gratitude to all experts who participated in the Delphi survey.

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DATA EXTRACTION PROTOCOL
Activity dates:
Start 2nd January 2019
End 28th of February 2019

Title of review
Definition EBP competencies for general and advanced nurses.

Objective
Identify and analyze studies focusing on EBP competencies for general and advanced nurses.

Review questions
What are core EBP competencies for general and advanced nurses?

Keywords in alphabetical order
Competence; Curriculum; Evidence-based Practice; Evidence-based Nursing, Learning; Nurse; Nursing Degree; Skills; Nurse

Research limits	
Language	English and languages of the participants (Spanish, Polish, Italian, Greek, Slovenian and Czech)
Year of publication	1998-2018
Type of documents	Observational, quasi-experimental and experimental studies, reviews, reports and guidelines.

Selection criteria	
Inclusion criteria	Studies focusing on EBP competencies for nurses and other health care professionals. Note: We must collect the competencies separately nurses, and other health care professionals. Many of this competencies are common with other HC professionals.
Exclusion criteria	Not at this moment (maybe we could include any criteria after the review)

Core bibliographic databases	
International databases	CINAHL Plus with Full Text
	SpringerLink
	Cochrane Library
	ProQuest
	ScienceDirect
	Web of Knowledge
	SCOPUS
	EBSCO
	PubMed
	EMBASE
	PsycINFO
	others (each team could add other international Databases that they will use in their searches)
National databases	bibliographic databases of Spanish, Polish, Italian, Greek, Slovenian and Czech
Other resources	Associations, Institutions Webpages Books, Thesis

Search operator
Boolean operators - binary operator (AND, OR).

Search terms	
1.	(evidence-based practice OR evidence-based nursing OR EBP OR EBN) AND (competence OR skills) AND nurse
2.	(evidence-based practice OR evidence-based nursing OR EBP OR EBN) AND curriculum AND nursing degree AND (learning OR teaching)

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Data storage
For data storage use Mendeley. That will permit to storage and share the records. You can download the app for your computer from www.mendelay.com. It is free and you can create a desk version that is very easy to manage.

Data extraction
For data extraction use PRISMA Flow Diagram. (http://prisma-statement.org/prismastatement/flowdiagram.aspx)

Data evaluation	
Analysis of selected data	Description of the records in a table showing the next information (Enter in DRIVE and include your Data into the file "Competences on EBP Systematic Review". Each team has to use their own country sheet): Complete reference, Language, Type of document, author, year of publication, title, type of study, geographical location, objectives, methods, measure, sample, results, set of competences specifically for nurses and set of competences for other healthcare professions, conclusion.

Final Report	
Set of competences	Final report including a set of competences selected after the review. It is important to include a list of the competences in English. Avoid to duplicate competences. Note: We must collect the competencies separately nurses, and other health care professionals. Many of this competencies are common with other HC professionals.

ANNEX I

You have to indicate the next information regarding your search. Repeat this annex for each database where you search:

1.- Database name

2.- Search date

3.- Searching terms used. (At the protocol we have the English searching terms but maybe this is not adequate for your own language database, and you have to modify in anyway the terms. No problem but always we have to clarify the searching terms).

4.- Limits included if is appropriated.

5.- Results (number of registers)

6.- Selected registers (after read the title and abstract we have to indicate the number of registers that we are going to select for reading full text).

Finally, we have to extract the data of the selected register at the excel that you will find in DRIVE and include your Data into the file "Competences on EBP Systematic Review". Each team has to use their own country sheet.

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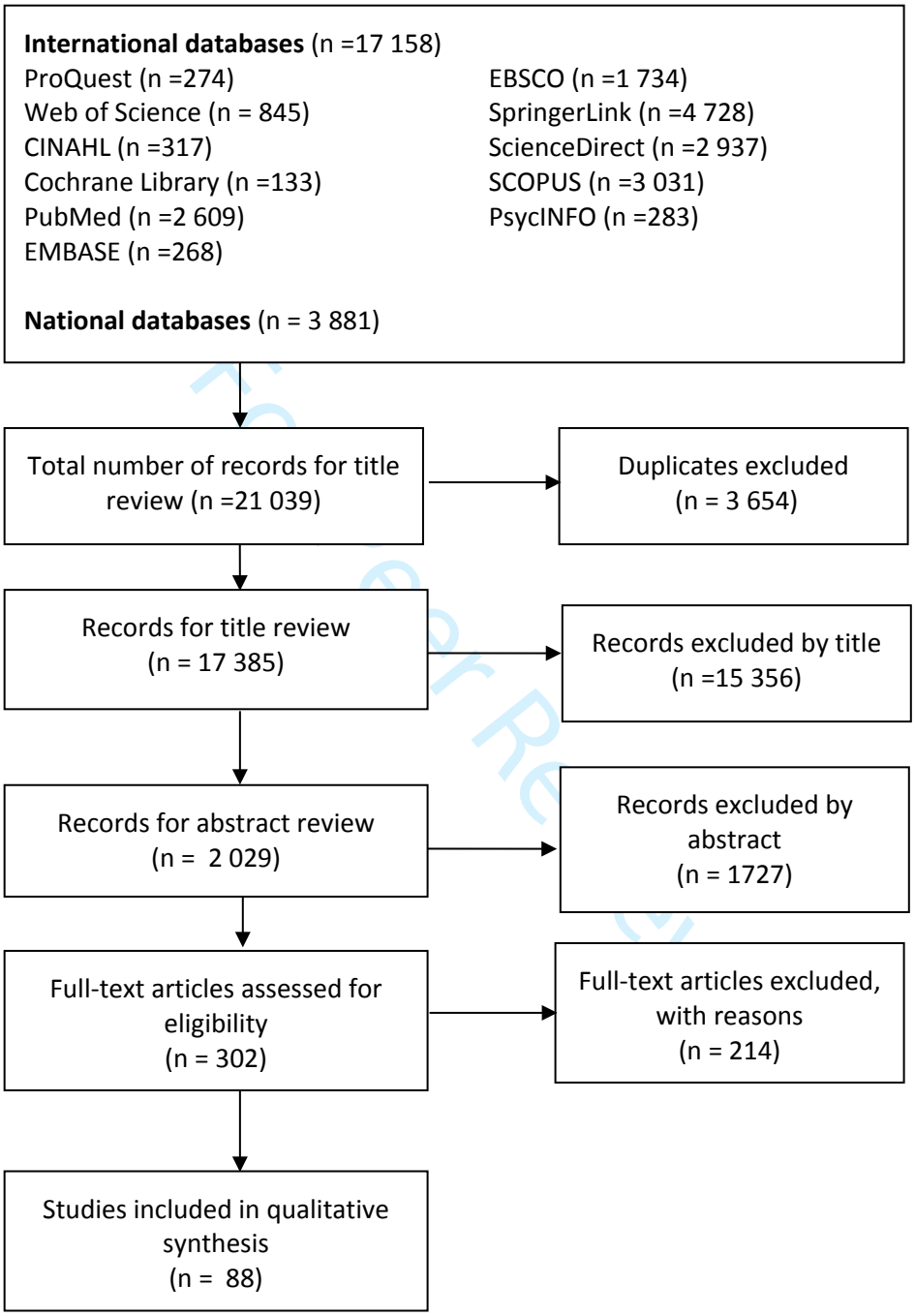
Supplement 2 PRISMA Flow Diagram (Moher et al., 2009)



Supplement 3 Characteristics of included studies

Author/s	Year of publication	Title of the document	DOI of article
French B	1998	Developing skills for evidence-based practice	10.1016/s0260-6917(98)80034-8
Johnson JM, Leung GM, Fielding R, Tin KY, Lai-Mong Ho	2003	The development and validation of a knowledge, attitude and behaviour questionnaire to assess undergraduate evidence-based practice teaching and learning	10.1046/j.1365-2923.2003.01678.x
McNeil BJ, Elfrink VL, Bickford CJ, Pierce ST, Beyea SC, Averill C, Klappenbach C	2003	Nursing Information Technology Knowledge, Skills, and Preparation of Student Nurses, Nursing Faculty, and Clinicians: A U.S. Survey	not specified
Burke LE, Schlenk EA, Sereika SM, Cohen SM, Happ MB, Dorman JS	2005	Developing Research Competence to Support Evidence-Based Practice	10.1016/j.profnurs.2005.10.011
Callister LC, Matsumura G, Lookinland S, Mangum S, Loucks C	2005	Inquiry in Baccalaureate Nursing Education: Fostering Evidence-Based Practice	not specified
Pierce ST	2005	Integrating Evidence-Based Practice into Nursing Curricula	not specified
Thompson C, McCaughan D, Cullum N, Sheldon T, Raynor P	2005	Barriers to Evidence-Based Practice in Primary Care Nursing--Why Viewing Decision-Making as Context Is Helpful	10.1111/j.1365-2648.2005.03609.x
Upton D, Upton P	2006	Development of an Evidence-Based Practice Questionnaire for Nurses	10.1111/j.1365-2648.2006.03739.x
Gerrish K, Ashworth P, Lacey A, Bailey J, Cooke J, Kendall S, McNeilly E	2007	Factors influencing the development of evidence-based practice: a research tool	10.1111/j.1365-2648.2006.04112.x
Sheriff KL, Wallis M, Chaboy W	2007	Nurses' Attitudes to and Perceptions of Knowledge and Skills Regarding Evidence-Based Practice	10.1111/j.1440-172X.2007.00651.x
Emerson RJ, Records K	2008	Today's challenge, tomorrow's excellence: the practice of evidence-based education	10.3928/01484834-20080801-04
Hart P, Eaton LA, Buckner M, Morrow BN, Barrett DT, Fraser DD, Hooks D, Sharrer RL	2008	Effectiveness of a Computer-Based Educational Program on Nurses' Knowledge, Attitude, and Skill Level Related to Evidence-Based Practice	10.1111/j.1741-6787.2008.00123.x
Kring DL	2008	Clinical nurse specialist practice domains and evidence-based practice competencies: A matrix of influence	10.1097/01.NUR.0000311706.38404.cf
Meeker MA, Jones JM, Flanagan NA	2008	Teaching undergraduate nursing research from an evidence-based practice perspective	10.3928/01484834-20080801-06
Munroe D, Duffy P, Fisher Ch	2008	Nurse Knowledge, Skills, and Attitudes Related to Evidence-Based Practice: Before and After Organizational Supports	not specified
Schmidt NA	2008	Evidence-Based Practice in the Nursing Curriculum: Ponderings on Design and Implementation	not specified
Singleton J, Levin R	2008	Strategies for Learning Evidence-Based Practice: Critically Appraising Clinical Practice Guidelines	10.3928/01484834-20080801-07
Smith-Strøm H, Nortvedt MW	2008	Evaluation of Evidence-Based Methods Used to Teach Nursing Students to Critically Appraise Evidence	10.3928/01484834-20080801-08
Bradley D, Dixon JF	2009	Staff nurses creating safe passage with evidence-based practice	10.1016/j.cnur.2008.10.002
Brown CE, Kim SC, Stichler JF, Fields W	2009	Predictors of knowledge, attitudes, use and future use of evidence-based practice among baccalaureate nursing students at two universities	10.1016/j.nedt.2009.10.021
Hockenberry M, Brown T, Walden M, Barrera P	2009	Teaching Evidence-Based Practice Skills in a Hospital	10.3928/00220124-20090101-08
Ilic D	2009	Assessing competency in Evidence Based Practice: strengths and limitations of current tools in practice	10.1186/1472-6920-9-53
Patterson R, Carter-Templeton H, Russell C	2009	Information Literacy: Using LISTEN Project Strategies to Equip Nurses Worldwide	not specified
Waters D, Crisp J, Rychetnik L, Barratt A	2009	Views on evidence from nursing and midwifery opinion leaders	10.1016/j.nedt.2009.04.006

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Geum OE, Sunah K, So Sun K, Sue K, Eun Yong Ch et al.	2010	Integrating Evidence-Based Practice into RN-to-BSN Clinical Nursing Education	10.3928/01484834-20100331-02
Missal B, Schafer BK, Halm MA, Schaffer MA	2010	A University and Health Care Organization Partnership to Prepare Nurses for Evidence-Based Practice	10.3928/01484834-20100430-06
Foo S, Majid S, Mokhtar IA, Zhang X, Luyt B, Chang YK, Theng YL	2011	Nurses' Perception of Evidence-Based Practice at the National University Hospital of Singapore	10.3928/00220124-20110516-04
Gerrish K, Guillaume L, Kirshbaum M, McDonnell A, Tod A, Nolan M	2011	Factors influencing the contribution of advanced practice nurses to promoting evidence-based practice among front-line nurses: findings from a cross-sectional survey	10.1111/j.1365-2648.2010.05560.x
Dalheim A, Harthug S, Nilsen RM, Nortvedt MW	2012	Factors influencing the development of evidence-based practice among nurses: a self-report survey	10.1186/1472-6963-12-367
Hagler D, Mays MZ, Stillwell SB, Kastenbaum B, Brooks R, Fineout-Overholt E, Williamson KM, Jirsak J	2012	Preparing Clinical Preceptors to Support Nursing Students in Evidence-Based Practice	10.3928/00220124-20120815-27
Mokhtar IA, Majid S, Foo S, Zhang X, Theng YL, Chang YK, Luyt B	2012	Evidence-based Practice and Related Information Literacy Skills of Nurses in Singapore: An Exploratory Case Study	10.1177/1460458211434753
Mollon D, Fields W, Gallo AM, Wagener R, Soucy J, Gustafson B, Kim SC	2012	Staff Practice, Attitudes, and Knowledge/Skills Regarding Evidence-Based Practice Before and After an Educational Intervention	10.3928/00220124-20120716-89
Rudman A, Gustavsson P, Ehrenberg A, Boström AM, Wallin L	2012	Registered Nurses' Evidence-Based Practice: A Longitudinal Study of the First Five Years After Graduation	10.1016/j.ijnurstu.2012.07.007
Youn-Jung S, Sun-Hee K, Young-Su P, Soo-Kyoung L, Yun L	2012	The Influence of Information Retrieval Skill on Evidence Based Practice Competency in Clinical Nurses	10.7475/kjan.2012.24.6.635
Finotto S, Carpanoni M, Turroni EC, Camellini R, Mecugni D	2013	Teaching evidence-based practice: Developing a curriculum model to foster evidence-based practice in undergraduate student nurses	10.1016/j.nepr.2013.03.021
Gerrish K, Cooke J	2013	Factors influencing evidence-based practice among community nurses	10.1111/j.1365-2648.2006.04112.x
Heiwe S, Johansson E, Nilsson-Kajermo K, Säflund K, Olin AO	2013	Outcomes of a Multiprofessional Educational Intervention in Evidence-Based Practice	not specified
Ruzafa-Martinez M, Lopez-Iborra L, Moreno-Casbas T, Madrigal-Torres M	2013	Development and validation of the competence in evidence based practice questionnaire (EBP-COQ) among nursing students	10.1186/1472-6920-13-19
Thorsteinsson HS	2013	Icelandic Nurses' Beliefs, Skills, and Resources Associated with Evidence-Based Practice and Related Factors: A National Survey	10.1111/j.1741-6787.2012.00260.x
Ammouri AA, Raddaha AA, Dsouza P, Geethakrishnan R, Noronha JA, Obeidat AA, Shakman L	2014	Evidence-Based Practice: Knowledge, Attitudes, Practice and Perceived Barriers Among Nurses in Oman	not specified
Laibhen-Parkes N	2014	Evidence-Based Practice Competence:A Concept Analysis	10.1111/2047-3095.12035
Leung K, Trevena L, Waters D	2014	Systematic review of instrument for measuring nurses knowledge, skills and attitudes for evidence-based practice	10.1111/jan.12454
Melnyk BM, Gallagher-Ford L, Long LE, Fineout-Overholt E	2014	The Establishment of Evidence-Based Practice Competencies for Practicing Registered Nurses and Advanced Practice Nurses in Real-World Clinical Settings: Proficiencies to Improve Healthcare Quality, Reliability, Patient Outcomes, and Costs	10.1111/wvn.12021
Stokke K, Olsen NR, Espehaug B, Nortvedt MW	2014	Evidence based practice beliefs and implementation among nurses: a cross-sectional study	10.1186/1472-6955-13-8
Thorsteinsson HS, Sveinsdóttir H	2014	Readiness for and Predictors of Evidence-Based Practice of Acute-Care Nurses: A Cross-Sectional Postal Survey	10.1111/scs.12083
Zelenikova R, Jarosová D	2014	Perception of the effectiveness of evidence-based practice courses by Czech nursing and midwifery students	10.15452/CEJNM.2014.05.0013

For Review Only

Dotson BJ, Lewis LS, Aucoin JW, Murray S, Chapin D, Walters P	2015	Teaching evidence-based practice (EBP) across a four-semester nursing curriculum	not specified
Farokhzadian J, Khajouei R, Ahmadian L	2015	Evaluating factors associated with implementing evidence-based practice in nursing	10.1111/jep.12480
Karki S, Acharya R, Budhwani H, Shrestha P, Chalise P, Shrestha U, Gautam K, Wilson L	2015	Perceptions and Attitudes towards Evidence Based Practice among Nurses and Nursing Students in Nepal	10.3126/kumj.v13i4.16829
Melnyk BM, Gallagher-Ford L	2015	Implementing the New Essential Evidence-Based Practice Competencies in Real-world Clinical and Academic Settings: Moving From Evidence to Action in Improving Healthcare Quality and Patient Outcomes	10.1111/wvn.12089
Ock GM, Yeongmi H, Jeong Sook K	2015	Development and validation of an instrument to assess knowledge and skills of evidence-based nursing	10.1111/jocn.12754
Phelps SF, Hyde L, Wolf JP	2015	Introducing Information Literacy Competency Standards for Nursing	10.1097/NNE.0000000000000170
Ramos-Morcillo AJ, Fernandez-Salazar S, Ruzafa-Martinez M, Del-Pino-Casado R	2015	Effectiveness of a Brief, Basic Evidence-Based Practice Course for Clinical Nurses	10.1111/wvn.12103
Yeon-Sook K, Jimee K, Mi-Mi P	2015	Factors Influencing Competency in Evidence-based Practice among Clinical Nurses	10.11111/jkana.2015.21.2.143
Bissett KM, Cvach M, White KM	2016	Improving Competence and Confidence With Evidence-Based Practice Among Nurses: Outcomes of a Quality Improvement Project	10.1097/NND.0000000000000293
Bostwick L, Linden L	2016	Evaluation Criteria for Nursing Student Application of Evidence-Based Practice: A Delphi Study	10.3928/01484834-20160516-06
Davidson SJ, Candy L	2016	Teaching EBP Using Game-Based Learning: Improving the Student Experience	10.1111/wvn.12152
Ehrenberg A, Gustavsson P, Wallin L, Bostrom AM, Rudman A	2016	New Graduate Nurses' Developmental Trajectories for Capability Beliefs Concerning Core Competencies for Healthcare Professionals: A National Cohort Study on Patient-Centered Care, Teamwork, and Evidence-based Practice	10.1111/wvn.12178
Leung K, Trevena L, Waters D	2016	Development of a competency framework for evidence-based practice in nursing	10.1016/j.nedt.2016.01.026
Malik G, McKenna L, Griffiths D	2016	Envisaging the use of evidence-based practice (EBP): how nurse academics facilitate EBP use in theory and practice across Australian undergraduate programmes	10.1111/jocn.13705
Mallion J, Brooke J	2016	Community- and hospital-based nurses' implementation of evidence-based practice: are there any differences?	10.12968/bjcn.2016.21.3.148
Orta R, Messmer PR, Valdes GR, Turkel M, Fields SD, Wei ChC	2016	Knowledge and Competency of Nursing Faculty Regarding Evidence-Based Practice	10.3928/00220124-20160817-08
Zabaleta-del-Olmo E, Subirana-Casacuberta M, Ara-Pérez A, Escuredo-Rodríguez B, Ríos-Rodríguez MÁ, Carrés-Esteve L, Ondiviela-Cariteu À	2016	Developing Evidence-Based Practice Questionnaire for Community Health Nurses: Reliability and Validity of a Spanish Adaptation	10.1111/jocn.13078
Azar FE, Rezapour A, Isfahani HM, Azami-Aghdash S, Kalavani K, Mahmoudi F	2017	Evidence-based medicine performance among health care providers in Iranian hospitals: A nationwide survey	10.14196/mjiri.31.77
Hamaideh SH	2017	Sources of Knowledge and Barriers of Implementing Evidence-Based Practice Among Mental Health Nurses in Saudi Arabia	10.1111/ppc.12156
Hande K, CuT W, Robbins HM, Kennedy BB, Christenbury T	2017	Leveling Evidence-based Practice Across the Nursing Curriculum	not specified
Moore L	2017	Effectiveness of an Online Educational Module in Improving Evidence-Based Practice Skills of Practicing Registered Nurses	10.1111/wvn.12214
Mulenga Ch, Naidoo JR	2017	Nurses' knowledge, attitudes and practices regarding evidence-based practice in the prevention of mother-to-child transmission of HIV programme in Malawi	10.4102/curationis.v40i1.1656

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Patelarou AE, Katsouli K, Stamou A, Vivilaki V, Koukia E, Sifaki-Pistolla D, Patelarou E	2017	Attitudes, knowledge and perceptions of psychiatric nurses about evidence-based practice	not specified
Reid J, Briggs J, Carlisle S, Scott D, Lewis C	2017	Enhancing utility and understanding of evidence based practice through undergraduate nurse educationkrusz	10.1186/s12912-017-0251-1
Rojjanasrirat W, Rice J	2017	Evidence-based practice knowledge, attitudes, and practice of online graduate nursing students	10.1016/j.nedt.2017.04.005
Skela-Savič B, Hvalič-Touzery S, Pesjak K	2017	Professional Values and Competencies as Explanatory Factors for the Use of Evidence-Based Practice in Nursing	10.1111/jan.13280
Spiva LA, Hart PL, Patrick S, Waggoner J, Jackson Ch, Threatt JT	2017	Effectiveness of an Evidence-Based Practice Nurse Mentor Training Program	10.1111/wvn.12219
Thomas A, Han L, Osler BP, Turnbull EA, Douglas E	2017	Students' attitudes and perceptions of teaching and assessment of evidence based practice in an occupational therapy professional Master's curriculum: a mixed methods study	10.1186/s12909-017-0895-2
Albarqouni L, Hoffmann T, Straus S, Olsen NR, Young T, Ilic D, et al.	2018	Core Competencies in Evidence-Based Practice for Health Professionals: Consensus Statement Based on a Systematic Review and Delphi Survey	10.1001/jamanetworkopen.2018.0281
Arechabala MC, Salamanca MIC, Silva NR, Acuña MR, Aldunate PC	2018	Implementación de la práctica basada en evidencia en el currículo de Enfermería/Implementation of evidence based practice in the nursing curriculum.	not specified
Cuia Ch, Lia Y, Genb D, Zhang H, Zinc Ch	2018	The effectiveness of evidence-based nursing on development of nursing students' critical thinking: A meta-analysis	10.1016/j.nedt.2018.02.036
Goota WE, Keersa JC, Kuipersa R, Niewegb RMB, Grootc M	2018	The effect of a multifaceted evidence-based practice programme for nurses on knowledge, skills, attitudes, and perceived barriers: A cohort study	10.1016/j.nedt.2018.01.008
Hannele S, Vehvilainen-Julkunen K	2018	Key considerations for selecting instruments when evaluating healthcare professionals' evidence-based practice competencies: A discussion paper	10.1111/jan.13802
Horntvedt MT, Nordsteien A, Fermann T, Severinsson E	2018	Strategies for teaching evidence-based practice in nursing education: a thematic literature review	10.1186/s12909-018-1278-z
Hsieh PL, Chen SH, Chang LC	2018	School Nurses' Perceptions, Knowledge, and Related Factors Associated with Evidence-Based Practice in Taiwan	10.3390/ijerph15091845
Laibhen-Parkes N, Kimble LP, Melnyk BM, Sudia T, Codone S	2018	An Adaptation of the Original Fresno Test to Measure Evidence-Based Practice Competence in Pediatric Bedside Nurses	10.1111/wvn.12289
Melnyk BM	2018	Breaking Down Silos and Making Use of the Evidence-Based Practice Competencies in Healthcare and Academic Programs: An Urgent Call to Action	10.1111/wvn.12271
Melnyk BM, Gallagher-Ford L, Zellefrow C, Tucker S, Thomas B, Sinnott LT, Tan A	2018	The First U.S. Study on Nurses' Evidence-Based Practice Competencies Indicates Major Deficits That Threaten Healthcare Quality, Safety, and Patient Outcomes	10.1111/wvn.12269
Saunders H, Vehviläinen-Julkunen K	2018	Key considerations for selecting instruments when evaluating healthcare professionals'evidence-based practice competencies: A discussion paper	10.1111/jan.13802
Schuman CJ, Ploutz-Snyder RJ, Titler MG	2018	Development and Testing of the Nurse Manager EBP Competency Scale	10.1177/0193945917728249
Yonkaitis CF	2018	Evidence-Based Practice and School Nurse Practice: A Review of Literature	10.1177/1059840517728108
Youssefa NFA, Alshraifeenb A, Alnuaimic K, Uptond P	2018	Egyptian and Jordanian nurse educators' perception of barriers preventing the implementation of evidence-based practice: A cross-sectional study	10.1016/j.nedt.2018.01.035

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Supplement 4 Sequence of selection and distribution of statements along the 3 phases of the study

Phase 1			
	Initial set of competencies n (%)	Excluded statements n (%)	Output Phase 1 n (%)
Step 0	79 (9.4)	14 (9.9)	65 (9.6)
Step 1	81 (9.7)	24 (15.2)	57 (8.4)
Step 2	170 (20.3)	46 (29.3)	124 (18.3)
Step 3	214 (25.6)	23 (1.4)	191 (28.2)
Step 4	132 (15.8)	8 (5.1)	124 (18.3)
Step 5	69 (8.2)	4 (2.5)	65 (9.6)
Step 6	56 (6.7)	4 (2.5)	52 (7.7)
Without allocation	34 (4.0)	34 (21.6)	0 (0)
Total	835 (100)	157 (100)	678 (100)

Phase 2 / Round 1			
	Output Phase 1 n (%)	Excluded statements n (%)	Output Round 1 n (%)
Step 0	65 (9.6)	39 (8)	26 (13.8)
Step 1	57 (8.4)	40 (8.2)	17 (9.0)
Step 2	124 (18.3)	92 (18.8)	32 (17.0)
Step 3	191 (28.2)	156 (31.8)	35 (18.6)
Step 4	124 (18.3)	89 (18.2)	35 (18.6)
Step 5	65 (9.6)	42 8.6)	23 (12.2)
Step 6	52 (7.7)	32 (6.5)	20 (10.6)
Total	678 (100)	490 (100)	188 (100)

Phase 2 / Round 2			
	Output Round 1 n (%)	Excluded or added statements (n)	Output Total n (competencies-learning outcomes)
Step 0	26 (13.8)	- 3	23 (5-18)
Step 1	17 (9.0)	- 6	11 (1-10)
Step 2	32 (17.0)	- 13	19 (2-17)
Step 3	35 (18.6)	- 12	23 (4-19)
Step 4	35 (18.6)	- 9	26 (4-22)
Step 5	23 (12.2)	- 2	21 (4-17)
Step 6	20 (10.6)	+1	21 (4-17)
Total	188 (100)	45	144 (24-120)

Phase 3					
Step	**Competencies**	**Learning Outcomes**			
		Affective domain	**Cognitive domain**	**Skills domain**	**Σ**
Step 0	5	5	6	7	18
Step 1	1	2	3	5	10
Step 2	2	1	7	9	17
Step 3	4	2	9	8	19
Step 4	4	5	2	15	22
Step 5	4	2	5	10	17
Step 6	4	3	4	10	17
Total	24	22	35	63	120

Supplement 5 Characteristics of the Delphi survey participants

Characteristic	mean (SD)
Age, years	47.8 (8.4)
EBP teaching experience, years	8.1 (4.2)
Clinical experience, years	13.7 (8.1)
	n (%)
Age, years	
< 30	0 (0)
30-44	11 (36.7)
45-59	17 (56.6)
≥ 60	2 (6.7)
Sex	
Female	25 (83.3)
Male	5 (16.7)
Countries	
Czech Republic	6 (20)
Greece	5 (16.6)
Italy	5 (16.6)
Poland	4 (13.4)
Slovenia	4 (13.4)
Spain	6 (20)
Current role	
Academic	28 (93.4)
Clinical	1 (3.3)
Research	1 (3.3)
Setting or institution	
University	27 (90.1)
Hospital	0 (0)
Other	3 (9.9)
Currently teaching EBP	
Yes	21 (70.1)
No	9 (29.9)

SD - standard deviation

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Supplement 6 Set of core EBP competencies and relevant learning outcomes for general and advanced nurses

STEP 0. CULTIVATE A SPIRIT OF INQUIRY WITHIN AN EBP CULTURE AND ENVIRONMENT		
Competencies	**Learning outcomes related to EBP competency for nursing roles**	
• Questions clinical practices for the purpose of improving the quality of care. • Describes clinical problems using internal evidence (evidence generated internally within a clinical setting, such as patient assessment data, outcomes management, and quality improvement data). • Participates to establish and sustain an evidence-based practice culture. • Mentors others in evidence-based decision making and the EPB process. • Implements strategies to establish and sustain an EBP culture.	*Affective domain*	• Assumes the role of a change agent for the organization. • Believes that EBP results are the best clinical care for patients. • Fosters EBP organizational culture, infrastructure, and teamwork. • Supports a culture of inquiry. • Understand the impact of the clinical practice questioning on improving individual/group health outcomes.
	Cognitive domain	• Describes ethical principles related to variation in practice and EBP. • Explains the purpose and importance of EBP in clinical practice. • Explains the significance of practice variation related to evidence-based care. • Justifies that 7 steps of EBP help to make decisions in clinical practice. • Defines EBP as the integration of the best research evidence with clinical expertise and the patient's unique values and circumstances. • Understands the distinction between using research to inform a clinical decision-making vs conducting research.
	Skills domain	• Identifies gaps in the clinical practice. • Identifies the need for change based on evidence. • Acts as a resource on current, rapidly advancing evidence-based quality initiatives and change forces. • Addresses clinical problems and quality improvement issues with the evidence-based practice process. • Participates in the organizational culture of evidence-based quality improvement in care. • Provides leadership for integrating EBP in clinical practice. • Facilitates movement of practice change through formal institutional channels collaborating with stakeholders and resource managers.
STEP 1. ASK THE BURNING CLINICAL QUESTION IN THE FORMAT THAT WILL YIELD THE MOST RELEVANT AND BEST EVIDENCE (I.E., PICOT FORMAT)		
Competencies	**Learning outcomes related to EBP competency for nursing roles**	
• Converts a clinical problem into an answerable, clinical question using a structured format (i.e.:	*Affective domain*	• Recognizes the relevance of meaningful clinical questions to address clinical practice. • Keeps an open mind to be an inquiry about the clinical practice.

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PICO(T) or others).	*Cognitive domain*	• Differentiates the key components of a structured, clinical question (PICO(T) format or others). • Explains the difference between the types of questions that cannot typically be answered by research (background questions) and those that can (foreground questions). • Identifies different types of clinical questions, such as questions about treatment, diagnosis, prognosis, etiology, and meaning.
	Skills domain	• Formulates a structured question in response to clinical query/issue. • Classifies the major study designs for each type of clinical question. • Identifies clinical problems that can be addressed through evidence-based practice. • Uses frequency and relevance criteria to prioritize clinical questions. • Uses generic accepted terminology in creating a structured, clinical question.
STEP 2. SEARCH FOR AND COLLECT THE MOST RELEVANT AND BEST EVIDENCE TO ANSWER THE CLINICAL QUESTION (E.G., SEARCHING FOR SYSTEMATIC REVIEWS, INCLUDING META-ANALYSES)		
Competencies	**Learning outcomes related to EBP competency for nursing roles**	
• Searches for external evidence (evidence generated from research) to answer focused clinical questions. • Systematically conducts and an exhaustive search for external evidence to answer a clinical question	*Affective domain*	• Is aware that it is necessary to screen and select the appropriate information to answer a clinical question.
	Cognitive domain	• Recognizes major document types and resources included on principal bibliographic databases. • Classifies scientific evidence as primary research evidence, synthesis (systematic reviews) and evidence summary¨. • Describes the hierarchy search of a clinical question. • Describes the principal health sciences and allied sciences bibliographic databases/resources to search. • Details the search strategies (controls vocabulary, thesaurus, keywords, limit function, and Boolean operators). • Distinguishes scientific evidence as primary research evidence and preappraised literature (systematic reviews, clinical practice guidelines, evidence summaries,…) • Distinguishes between filtered (pre-appraised) and unfiltered (un-appraised) database resources and recognizes the common databases in use (e.g. Medline, CINHAL,…)
	Skills domain	• Conducts a systematic approach to search for evidence in appropriate databases (i.e., development of synonyms from the PICO question and correct use of Boolean operators per the database in a search). • Searches the literature on electronic databases and online repositories. • Constructs an appropriate search strategy for answering clinical questions. • Reviews and select the appropriate evidence after reading the title and abstract. • Demonstrates computer searching skills.

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		• Obtains the full text of articles and other evidence resources. • Understands the evidence written in English. • Uses available supports (healthcare librarians) that help her/him find the evidence to answer their clinical question. • Employs bibliographic databases tools (i.e. history, related articles, etc.).
STEP 3. CRITICALLY APPRAISE THE EVIDENCE THAT HAS BEEN COLLECTED FOR ITS VALIDITY, RELIABILITY, AND APPLICABILITY THEN SYNTHESIZE THAT EVIDENCE		
Competencies	**Learning outcomes related to EBP competency for nursing roles**	
• Critically appraises preappraised evidence (such as clinical practice guidelines, evidence-based policies and procedures, and evidence syntheses). • Critically appraises published research studies to determine their strength and applicability to clinical practice. • Evaluates and synthesizes a body of evidence gathered to determine its strength and applicability to clinical practice. • Leads a team to synthesize the evidence from primary research and preappraised evidence.	*Affective domain*	• Encourages to evaluate clinical practice guidelines and other evidence for applicability and feasibility in practice. • Appreciates the practical utility of research findings.
	Cognitive domain	• Distinguishes the importance of the difference between evidence-based documents and opinion-based documents. • Describes the different quality level of the designs of the investigation studies. • Explains the principal measures of association and the potential impact that allow evaluating the magnitude of the analyzed effect in investigation studies. • Explains the purpose and processes of a qualitative study • Identifies key criteria in any evidence reports using critical appraisal checklists. • Identifies the strengths and limitations of various types of research studies (quantitative and qualitative). • Identifies the biases in the principal investigation designs and the impact of these on the results. • Lists of advantages of pre-appraisal documents as a strong evidential foundation for clinical decision making. • Recognizes how qualitative research can inform the decision-making process.
	Skills domain	• Participates in institutional initiatives for evaluation and synthesis of a body of evidence gathered to determine its strength and applicability to clinical practice. • Assesses reliability, validity, and limitations of the research evidence. • Distinguishes the difference between clinical importance vs statistical significance. • Creates or participates on teams oriented to synthesize evidence. • Grades the research studies result in the following level of evidence (quality) and grades (strength) of recommendation. • Interprets different types of measures of association and effect, including key graphical presentations and confidence intervals. • Uses relevant appraisal tools to evaluate the evidence. • Interprets the grading of the certainty in evidence and the strength of recommendations.

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STEP 4. INTEGRATE THE EVIDENCE WITH ONE'S CLINICAL EXPERTISE AND THE PATIENT'S PREFERENCES AND VALUES TO IMPLEMENT A CLINICAL DECISION		
Competencies	**Learning outcomes related to EBP competency for nursing roles**	
• Collects practice data (e.g., individual patient data, quality improvement data) systematically as internal evidence for clinical decision making in the care of individuals, groups, and populations. • Integrates evidence gathered from external and internal sources in order to plan nursing care. • Implements practice changes based on evidence and clinical expertise and patient preferences to improve care processes and patient outcomes. • Leads transdisciplinary teams in applying synthesized evidence and internal evidence to initiate clinical decisions and practice changes to improve the health of individuals, groups, and populations.	*Affective domain*	• Chooses evidence-based approaches over routine as a base for own clinical decision making. • Considers the patients' preferences and values when designing interventions or protocol changes. • Promotes the delivery of care on the unit(s) or clinic(s) aligns with evidence-based practice recommendations. • Promotes practice changes based on evidence and clinical expertise and patient preferences to improve care processes and patient outcomes. • Purposes modifications at the workplace/organization to implement.
	Cognitive domain	• Describes potential barriers and supports to knowledge translation and strategies to overcome these. • Identifies the components of the change process using a planned change model.
	Skills domain	• Interviews individuals, families to identify patient health status. • Adapts synthesized knowledge and recommendations from clinical practice guidelines to accommodate local clients, populations, and settings. • Creates or participates in an implementation plan for incorporating the consideration of best evidence into clinical practice. • Engages patients in the decision-making process, using shared decision making, including explaining the evidence and integrating their preferences. • Creates strategies for supporting colleagues to implement practice changes. • Uses a comprehensive set of relevant variables within and across the system to measure the quality of care. • Uses organisational information (policies / guidelines, etc.) to change practice. • Changes clinical practice using guidelines/ evidence-based protocols. • Changes the clinical practice based on patient assessment data. • Uses organizational quality indicators to identify health needs in patients. • Delivers care using evidence-based CPGs and another types of evidence. • Explains evidence and discusses options with the patient in lay language. • Updates nursing guidelines/standards/rules. • Leads or participates the team to develop evidence-based practice recommendations for unit(s), clinic(s), and/ or organization. • Manages or participates an interdisciplinary team for implementing practice changes.
STEP 5. EVALUATE OUTCOMES OF THE PRACTICE DECISION OR CHANGE BASED ON EVIDENCE		

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Competencies	Learning outcomes related to EBP competency for nursing roles	
• Interprets obtained outcomes after the evaluation of an evidence-based changed practice. • Measures processes and outcomes of evidence-based clinical decisions. • Generates internal evidence (evidence generated internally within a clinical setting, such as patient assessment data, outcomes management, and quality improvement data) through outcomes management and EBP implementation projects to integrate best practices. • Evaluates outcomes of evidence-based decisions and practice changes for individuals, groups, and populations to determine best practices.	*Affective domain*	• Recognizes the need to evaluate the impact on outcomes. • Recognizes the importance of facilitating the evaluation (register) for the EBP.
	Cognitive domain	• Describes an evaluation plan to analyze the changes produced. • Identifies data and indicators to evaluate services for individuals, families, and groups. • Identifies a strategy for direct measures of care outcomes, e.g. derived from clinical documentation, case review, patient's feedback. • Relates cost outcomes and patient benefits. • Describes specifically safety and quality outcomes of nursing care.
	Skills domain	• Interprets analysis of indicators/outcomes in terms of quality of care. • Assesses the effectiveness of the interventions to determine improvement in patients or practice. • Changes practice based on patient outcome data. • Collects practice data (e.g., individual patient data, quality improvement data) systematically for clinical decision making in the care of individuals, groups, and populations. • Manages the interdisciplinary team for outcomes evaluation. • Evaluates the application of interventions and identify areas for improvement. • Implements processes to monitor and evaluate the impact of practice change (individual, service, and organization). • Participates in evidence-based quality improvement processes to evaluate outcomes of practice changes. • Participates in the review of practice outcomes, standards, and guidelines; review of policies, procedures, and guidelines based on evidence. • Uses audit and feedback of data as an implementation strategy to promote the use of the evidence-based practice in the unit(s) or clinic(s).
STEP 6. DISSEMINATE THE OUTCOMES OF THE EBP DECISION OR CHANGE		
Competencies	**Learning outcomes related to EBP competency for nursing roles**	
• Disseminates best practices supported by evidence to improve quality of care and patient outcomes. • Formulates evidence-based policies and procedures. • Leads or participates in the generation of external evidence with other healthcare professionals.	*Affective domain*	• Performs activities to disseminates EBP. • Believes in the importance related to communicate and share results of practice changes to colleagues, patients, and stakeholders. • Encourages experience sharing to emphasize the need for change and positive outcomes of change
	Cognitive domain	• Defines a variety of methods to disseminate results of practice changes tailored to communities/ populations. • Describes ethical, legal and policy guidelines in the dissemination of data and information.

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• Communicates best evidence to individuals, groups, colleagues, and policy makers**.**		• Identifies the principal sections of scientific communication (oral and poster presentations, papers, etc.). • Lists peer-reviewed journals and national-level meetings for dissemination of evidence-based practice outcomes.
	Skills domain	• Creates strategies for dissemination of evidence-based practice into the health care environment. • Prepares (or participates on) academic writings for results dissemination. • Synthetises (or participates on) the results of practice change in an understandable way. • Shares (or participates on) structural, process and patient outcomes from an EBP implementation project. • Gives feedback regarding patient outcomes and achieves to colleagues in a constructive way. • Utilizes the information and communications technology in sharing results of practice changes. • Adapts (or participates on) the communication of obtained outcomes to the different audiences (patients, colleagues, policy makers) and/or media and audiences. • Demonstrates public speaking and active listening skills. • Leads or participates in interdisciplinary teams, including patients and professional associations to the dissemination of outcomes. • Discusses implications of research with colleagues.

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