Evidence-Based Practice Competence in Nursing Students: An Exploratory Study With Important Implications for Educators

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ABSTRACT

Background: Evidence-based practice (EBP) is a core pillar of nursing education and an expectation in clinical practice. Students struggle to conceptualize the use of EBP into actual clinical practice despite the development of EBP competencies.

Aims: This study explored perceptions of EBP education and competence in baccalaureate students using Melnyk’s (Worldviews on Evidence-Based Nursing, 11, 2014 and 5) EBP competencies for practicing registered nurses as a basis for comparison.

Methods: The researchers used a sequential, mixed-methods design. A survey was developed to assess information sources and patterns of use, and semistructured interviews explored factors affecting students’ understanding of EBP and information-seeking behaviors in the clinical setting.

Findings: There were 118 participants in the survey and 12 in follow-up interviews. A major theme was that participants had difficulties distinguishing between EBP and research. Students were able to identify experiences that fostered attainment of basic EBP competencies, such as searching for evidence, but were less able to describe higher-order activities such as integrating evidence to plan EBP changes or disseminating best practices.

Linking Evidence to Action: Clinical learning environments are an ideal place to apply and see EBP in action, but nurse educators cannot assume students arrive ready to apply EBP knowledge and skills to clinical practice. Nurse educators need evidence-based tools to assess student EBP competence across a variety of settings. Research examining the generalizability of the EBP competencies in varying curricular models as well as didactic and clinical settings is needed.

BACKGROUND

In 2001, the Institute of Medicine recommended that decision-making in health care be evidence-based and less influenced by subjective perspectives of a single provider or facility (Institute of Medicine, 2001). The American Association of Colleges of Nursing’s (AACN) Essentials of Baccalaureate Education for Professional Nursing Practice (2008) made evidence-based practice (EBP) a core pillar of nursing education. However, despite this history of EBP as a norm in professional nursing, “[nursing] graduates continue to leave their educational experience with negative attitudes toward research along with perceptions that EBP takes too much time and cannot be realistically implemented in real-world clinical practice settings” (Melnyk & Fineout-Overholt, 2012, p. 415). Prior research has typically focused on teaching information literacy knowledge and skills as a means to improve EBP knowledge (Florin, Ehrenberg, Wallin, & Gustavsson, 2012; Keib, Cailor, Kiersma, & Chen, 2017). However, this does not address issues with attitudes toward EBP and adoption of EBP in clinical care. Therefore, nurse educators continue to explore new instructional and curricular designs to better teach EBP and bridge the academic and practice environments.

One emerging method for redesigning nursing and health professional curricula is competency-based education (CBE). Competency incorporates the integration of knowledge, skills, and attitudes that can link to specific areas of practice (Pijl-Zieber, Barton, Konkin, Awosoga, & Caine, 2013). In a 2017 consensus statement, health professionals acknowledged the need for a CBE system to advance health professional education to better meet the needs of complex, dynamic systems and communities (Josiah Macy Jr. Foundation, 2017). The AACN (2017) has integrated recommendations from the Macy Foundation into proposals, including the use of time-variant CBE, which will advance further evolutions in nursing education. As CBE is developed and implemented in a variety of nursing programs, nurse educators and program administrators must address...
significant issues, including assessment and measurement of competence, general versus specific competency, and CBE correlation with outcome attainment on licensing examinations (Gravina, 2017; Pijl-Zieber et al., 2013).

Different EBP competencies have been developed over the last several years. Most recently, Melnyk, Gallagher-Ford, Long, and Fineout-Overholt (2014) published a set of 13 research-based EBP competencies for practicing registered nurses and an additional 11 for advanced practice nurses. The competencies have been most directly used in a study of practicing registered nurses (Melnyk et al., 2018). Although these various competencies are available, limited research is available that maps the competencies to nursing EBP curricula or shows whether the competencies improve student competence (Melnyk, 2018). Given the call for the baccalaureate degree for entry to practice and the expectation in practice settings for evidence-based care, EBP competence must be integrated into the curriculum (Academic Progression Task Force, 2017; Institute of Medicine, 2010).

Current nursing education research related to undergraduate student attitudes about EBP continues to identify barriers in adoption and use. As previously mentioned, students struggle to conceptualize the use of EBP into actual clinical practice (Brooke, Hvalič-Touzery, & Skela-Savič, 2015; Malik, McKenna, & Griffiths, 2016; Melnyk & Fineout-Overholt, 2012; Moch, Cronje, & Branson, 2010). Students do not see EBP modeled by practicing nurses, and students focus more on the clinical delivery of care (Brooke et al., 2015; Ryan, 2016). Some students tend to lack confidence in their abilities; new nurses do not feel like they have enough experience or expertise to communicate EBP findings or influence change in practice (Blackman & Giles, 2017; Ryan, 2016). To overcome these issues, some researchers have advocated for a broader scaffolding of EBP curriculum to support tiered development over time (Blackman & Giles, 2017; Malik, McKenna, & Griffiths, 2015; Ryan, 2016; Scurlock-Evans, Upton, Rouse, & Upton, 2017). Despite this recommendation, most literature discussing EBP curricula for baccalaureate nursing education focuses on academic activities and does not address clinical education and practice (Hung, Huang, Tsai, & Chang, 2015; Malik et al., 2016). Researchers refer to this issue as the “theory–practice gap.” Limited evidence is available to understand how EBP knowledge, skills, and attitudes look across a curriculum and what specific competencies need to be better addressed.

**RESEARCH OBJECTIVE**

The aim of this study was to explore perceptions of EBP education and competence in undergraduate students at the midpoint in their nursing education using Melnyk et al.’s (2014) EBP competencies for practicing registered nurses as a basis for comparison. Due to the theory–practice gap, researchers focused on how clinical education specifically addressed EBP competencies.

**METHODS**

**Context**

JMU is a public institution located in Virginia. The traditional BSN program admits 90 students twice a year, at the start of their junior year. The BSN curriculum spans four semesters, and students complete at least one clinical experience linked with a didactic course each semester. Every clinical course contains at least one course objective that addresses the application of scholarship in practice and specifically focuses on the integration of EBP. Students are issued iPads as a resource to support their coursework.

**Participants**

Students were recruited from their second-semester courses at the end of the semester. Students received an invitation to participate in the survey via email and via announcement within the learning management system for each clinical course. In the second semester of the BSN program, students complete three clinical rotations: women’s health, adult health, and psychiatric mental health. Due to the large cohort size, not all students were completing clinicals at the same location across clinical courses. All three clinical courses had postclinical assignments after each day to assess learning objectives. To control for cohort differences, recruitment consisted of one cohort in fall 2015 and a second cohort in spring 2016. The total possible population eligible for the study was 180 students.

**Design**

The researchers used a sequential, mixed-methods design. A quantitative survey was developed by the researchers to identify clinical locations, information sources used, and patterns of information behaviors before, during, and after the clinical day. These time periods captured when students were either preparing, participating in, or completing clinical care or related clinical coursework. Upon completion of the survey, participants were invited to participate in individual, semistructured interviews exploring the factors impacting their understanding of EBP and information-seeking behaviors in each clinical course and setting. Given that EBP is a multistep process, Melnyk et al.’s (2014) EBP competencies for practicing registered nurses were used to structure the interview to ensure all areas of EBP were assessed; participants received a copy of these competencies to review and address during the interviews, which were conducted by the researchers. Nursing faculty teaching in the clinical courses piloted the survey and interview questions. This study was approved by the JMU Institutional Review Board.

**Data Analysis**

Quantitative survey responses were collected and demographic trends were analyzed using Microsoft Excel 2016. Interviews were audio-recorded and uploaded to a secure server for data transcription by an independent transcriptionist. Interview transcripts were reviewed by
the researchers, and identifying information was removed to maintain participant anonymity. QSR International’s NVivo 11 (QSR International Inc., Burlington, MA, USA) was used to code and aggregate qualitative interview responses. The researchers analyzed each digital transcript for major themes. The responses were coded into 13 themes that aligned with Melnyk et al.’s (2014) EBP competencies for practicing registered nurses. Both researchers analyzed the qualitative interview transcripts individually and independently from one another. The researchers then compared coding logs and reached 100 percent agreement on coded data within each theme and each competency.

**FINDINGS**

There were 118 students who participated in the survey. Participants reported having an average of 6 years’ experience using mobile technologies such as a cell phone or iPad. The most significant trends from the survey related to information sources used and patterns of information-seeking behaviors throughout the clinical experiences. Participants most frequently used information sources before the clinical day began and seldom used them during the clinical day (Figure S1). The types of sources used also shifted dramatically across the before, during, and after clinical time periods.

Of the survey respondents, 12 volunteered to further participate in individual, semistructured interviews. From those, 140 significant statements emerged. A major overall theme was that participants experienced difficulty distinguishing between EBP and research. Significant statements corresponded with each of the 13 EBP competencies in varying distributions. The density of responses in the first six competencies was evident due to curriculum structure and exposure to foundational lower-level competencies. All participants readily described activities around the initial six competencies with the exception of competency 3. Participants were less able to describe activities or experiences that integrated competencies 11, 12, or 13. In addition, participants identified experience with a competency as opposed to actual attainment of competency.

**Major Theme: Confusing EBP and Research**

In response to the interview question about how participants defined EBP, one theme emerged: Participants confused EBP and research. Participants gravitated toward describing EBP in terms of traditional research activities and focused heavily on defining evidence as research articles or scientific experiments. “Normally it is something that I… or nurse sees a problem or something that they think might correlate and so they run an experiment.” “I would say… it’s got to be like any scientific study, so it’s got to be something that can be repeated.”

Participants were unable to define or provide examples of EBP in action. There were very few references to patient values and preferences as other evidence to inform EBP. Participants were not clear about how they would engage with EBP as nurses (see Table S1).

**Competency 1: Questions clinical practice (12 participants, 48 responses)**

The participants indicated a variety of questioning behaviors and critical thinking skills, but they generally had not grasped the concept of improving care quality via questioning and inquiry. The majority of questions that participants mentioned asking were fact-based, particularly around knowing certain medications, laboratories, and protocols. Low confidence and lack of knowledge were mentioned as barriers to asking questions: “I just feel like I’m at such an elementary level where like I’m still having people tell me to go look up things as opposed to me doing it on my own.”

Participants identified critical thinking via asking questions, but the majority of higher-order questions were prompted by faculty. Two main patterns emerged for the types of questions asked and how the participants achieved deeper questioning. Faculty encouraged development of critical thinking through questioning that cultivated deductive and inductive reasoning skills. Participants referred to these reasoning skills as “the big picture” and “looking at the patient.”

**Competency 2: Describes clinical problems with evidence generated within a clinical setting (12 participants, 39 responses)**

Three types of activities contributed to participants’ ability to describe clinical problems with internal evidence. The process involved three steps: (a) having or receiving information, such as through previous knowledge, reading, listening, or observation; (b) comprehending the information; and (c) communicating the information, either through oral or written means. Description is often considered an example of the learning objective “comprehension” in Bloom’s Taxonomy of Educational Objectives (Bart, 2008). The written patient care plan was the primary way participants identified with competency 2.

The academic and clinical environments supported participants’ description skills. The electronic health record (EHR) and shift report were cited as sources to gather patient information on past medical history, medications, laboratories, diagnoses, and health assessment data. Of note, participants did not mention gathering information on patient preferences or values.

Participants identified different venues and methods for communicating internal evidence. Informal communication occurred throughout the clinical day, either in response to faculty questions or during the postconference discussion with peers and faculty. Participants
mentioned different standardized methods for formal communication of patient data, such as SBAR (situation-background-assessment-results) and SOAPI (subjective-objective-assessment-plan-interventions). None of the participants mentioned describing clinical information in the facilities’ EHR system or in a handoff to the professional nurses, so they did not practice communicating internal evidence to other care providers.

**Competency 3: Develops questions using PICOT (10 participants, 17 responses)**
None of the participants could describe the activities within the PICOT acronym or how to use it to formulate clinical questions. One participant mentioned previously being introduced to the idea but was unable to remember why or where the instruction occurred: “Okay, that looks very familiar, but I do not remember what that is? You know what? We’ve been actually introduced [to] that in one of the classes. I don’t remember which class.”

**Competency 4: Searches for external evidence (12 participants, 82 responses). And Competency 5: Critically assesses preappraised evidence (12 participants, 64 responses)**

**Competency 6: Critically assesses published research (12 participants, 48 responses)**
Participants described activities related to competencies 4, 5, and 6 as co-occurring, but their utilization varied depending on the time period within the clinical experience. As such, the findings for competencies 4, 5, and 6 are presented together. Participants most commonly described activities and experiences around competency 4. Participants also reported utilizing preappraised and published research studies within each clinical course.

In the survey results, preclinical had the highest number of searches for and use of external evidence (913 total responses). Preclinical searching and information utilization focused on preparing students to participate in care delivery for the next day and were largely supported by preappraised sources such as course materials (270 responses) and textbooks (249 responses). No published research studies were used during preclinical preparation.

During the clinical day, information searching and use were much less frequent compared to both the preclinical and postclinical day (508 total responses). According to responses to the survey, the most common method of searching for external evidence was Google (220 responses). Although Google was commonly cited, participants explained that Google was a springboard for finding a definition from a secondary website, like WebMD and Mayo Clinic. "For meds, DynaMed was, like, golden, and then pathophysiology, it helped sometimes, but sometimes I couldn’t totally understand it, so I would just Google things if [I] needed a clear understanding of it.”

When Google searches did not yield a desired quality of information, particularly on pathophysiology or laboratory value interpretation, participants described returning to preappraised sources. Participants also described unfamiliarity in using apps on their mobile devices to access preappraised sources.

“I haven’t used any of those. [laughs] I have ‘em on like my iPad. I don’t think I could access them. Maybe I didn’t download the passwords and they’re still on my iPad. But I’ve never touched them. I didn’t know really what they were.”

When preappraised resources were integrated within the EHR, participants described being able to access and use those sources easily.

[The EHR] will have this little icon, and you press it and it would click it and it would go into another website that gives you all the background on drugs, so we, I use that personally, and then if I’m missing information, then I’ll Google drugs.

During the postclinical experience, students completed a written patient care plan. As part of the assignment, students were required to include a journal article related to the patient and the plan of care. Participants described seeking published research studies as part of the clinical experience but did not see the utility of using published research studies to answer their everyday clinical questions. One participant noted:

I’m going to PubMed or any specific search engines that are approved for practice to be used, I feel like if I search MRSA it’ll give me specific studies on MRSA. Like different studies. It won’t tell me what MRSA is, so… I would use that but I would use that after clinicals.

Instead, participants described searching research databases to find published research articles that supported their clinical nursing interventions. Google (197 responses) and course materials (163 responses) were the most common resources consulted postclinical. Participants described reviewing author credentials, year of publication, journal title, and sample size as critical appraisal criteria to determine quality and strength to clinical practice. Beyond this assessment, participants struggled with determining applicability of the article findings to their clinical experience.

**Competency 7: Participates in the evaluation and synthesis of a body of evidence (eight participants, 21 responses)**
Patient data were gathered before the clinical to guide what external information to research. On average, students...
used eight sources of external evidence before the clinical encounter, four during, and six after. A written clinical care plan was due upon the conclusion of the clinical experience. These assignments were described as force-fitting exercises where participants used a deductive approach to find a study that seemed to apply to the patient. "The assignment didn’t require me to really think about why I was doing it. I’m just like, it relates to my patient, this is why I’m doing it. But it didn’t really require me to say this is what’s going behind the care to my patient or maybe this isn’t.

There was little description of how relevancy to the care plan was determined. In addition, participants reported receiving little to no feedback from their instructor on their application of research to their patient cases. Linking EBP to practice was described as a completion exercise.

Competency 8: Systematically collects practice data to plan for clinical decision-making (11 participants, 33 responses)
A majority of participants cited examples of gathering internal evidence but did not connect these activities to EBP. Practice data were largely captured at the individual level, such as nursing assessments, to assist in determining whether clinical decisions were meeting patient care goals.

I guess that goes pretty much with describing clinical problems using internal evidence, so paying attention to your patients, their assessments, and making sure you’re doing those for yourself, because the computers have assessments, but it’s important to do your own personal assessment on your patient so that you know if anything has changed with them, and you can see if their status has altered in any kind of way.

Competency 9: Integrates evidence sources to plan EBP changes (eight participants, 25 responses)
Participants did identify seeing this competency modeled by some instructors and nurses and self-identified that this competency was an area for future development. A simple reflection assignment prompt focused on summarizing an article and relating it to their patient. However, one participant described the prompt as having more robust characteristics:

So we had to say why we chose this [article] for our patient, what are the implications of it for future nursing practice, what would you have done differently if you would have been presented with this information before you went to clinical.

The ability to summarize articles does provide a good foundation, but using this information to change care delivery or practice decisions addresses the intent of this competency.

Competency 10: Implements practice changes based on evidence, clinical expertise, and patient preferences (eight participants, 18 responses)
Participant assumptions that EBP primarily involved using research articles complicated the participants’ ability to associate their current clinical education with this competency. As previously noted, patient values and preferences were rarely discussed as part of collecting internal data. "I didn’t really experience like the nurses or my clinical professors referring to like research a lot, but they would just stick to the policy at their facility and things that are known to improve patient outcomes.”

In addition, the written care plan structure emphasized observation and documentation, while the external evidence occurred afterward, so this separation created a barrier for participants integrating both activities and creating change in practice. Only one participant identified observing competency 10 in practice, as modeled by the instructor.

Competency 11: Evaluates outcomes of evidence-based decisions and practice changes to determine best practices (six participants, 13 responses)
Participants had difficulty describing attainment of competency 11. Among the descriptions, participants provided a simplistic evaluation such as, “This one was met, this one wasn’t met.” Participants that provided a deeper evaluation frequently made the connection between this competency and its relationship to understanding and completing the nursing process. “I feel like I can work through that pretty well, like going through the nursing process with a patient and developing goals with them and see how it works for them during the day.”

Competency 12: Disseminates EBP best practices (three participants, three responses)
The only example a student could associate with this competency involved seeing a professor model the behavior.
We learned how to test for a blood clot in the legs… it’s called like the Homans’ sign. And so we had learned that that’s what you’re supposed to do in one class… so then… [my instructor is] like hey, there’s new evidence that shows we don’t do that anymore.

However, the student also went on to note that while practice should be updated, the test questions they were using did not reflect the improved practice.

**Competency 13: Engages in sustaining EBP culture (four participants, eight responses)**

There were very few examples that students identified with this competency. One student still saw EBP as a separate activity from actual clinical practice:

> At least my clinical or like the preceptors that we work with, I haven’t seen them do or like talk about them participating in research. It’s mainly cause they’re at their jobs and not going to think about the research right now. They’re like, ‘Oh hey! Someone’s throwing up over there and I have to give them their nebulizer treatment,’ so they’ve got too much to like worry about with that.

**Limitations**

Limitations of this study include relying on retrospective data collection from participants. The participants in this study were recruited from a traditional, upper-division-admission baccalaureate nursing program within a 4-year public university in the United States, which may limit generalizability of findings. In addition, some preappraised evidence sources used by students in this sample, such as Lexicomp or DynaMed Plus, may not be available in other nursing schools and may alter students’ experiences in accessing preappraised evidence. Although the researchers collected information about participants’ clinical sites, response rates were too small to reliably evaluate differences based on instructor or location. Furthermore, participant demographics such as age and gender were not obtained; the sample was derived from a relatively homogenous population in a traditional BSN program, which is 90 percent female and between the ages of 19–21 years old. Course assignment changes and the addition of DynaMed Plus as a resource between the two cohorts also may have impacted study findings.

**DISCUSSION**

Clinical settings are an ideal place to explore, appraise, and apply research and evidence-based findings to practice. Participants in this study were not aware of Melnyk et al.’s (2014) EBP competencies for practicing registered nurses, yet they were able to identify basic activities and attributes of EBP from their current educational experience.

Participants had difficulty differentiating EBP activities from research and scientific inquiry, the latter of which had been the predominant focus of their education to this point. In this study, participants knew about various preappraised and unappraised evidence sources. Although participants were introduced to electronic resources and apps to support clinical practice in the didactic setting, the translation of skill into productive searching and retrieval of relevant information during the point of care experience was lacking.

The role and activities of other healthcare providers in the clinical environments also impacted participant perceptions of EBP. Participants recalled examples of certain instructors emphasizing EBP and research during the clinical experience. They were less able to articulate or recall specific examples of nurses modeling the integration of EBP competencies in practice and perceived the hands-on patient care as a distraction to utilizing EBP competencies. Previous research also describes ongoing difficulties in practicing registered nurses implementing EBP in their workplace (Warren et al., 2016). Students described some role-modeling by clinical faculty on how to find evidence-based resources and integrate them into practice, but participants were less able to articulate how they could arrive at this level of synthesis themselves, which is congruent with evidence suggesting nursing students lack support in utilizing and applying evidence in their practice (Ryan, 2016). Although this study did not assess nurse faculty or practicing nurses and their EBP knowledge and skill, current literature suggests that practicing registered nurses self-assess their EBP competency as below average (Melnyk et al., 2018). Whether this was a barrier for nurses was not directly assessed in this study; however, this may pose a challenge for nurse educators when considering curricular interventions in clinical experiences, thereby perpetuating the theory-practice gap.

Findings from this study suggest that clinical course activities are largely focused on the application of research or evidence-based sources to clinical practice. This is done primarily through written case studies or discussion where students discuss relevant findings in comparison to their patient. As mentioned, there is less focus on clinical experiences that integrate the nurse as a role model of EBP and an active partner in changing care practice based on evidence (Ryan, 2016). There is little description or evidence to support how students are assessed in integrating evidence-based sources in written work or discussion and whether they receive any feedback on this skill. Competencies related to collecting data, as well as critically appraising research and evidence-based findings, are clearly occurring within the clinical experience, despite participants not consistently identifying these as part of the EBP competencies.

**CONCLUSIONS AND IMPLICATIONS**

Clinical learning environments are an ideal place to apply and see EBP in action to enhance patient care delivery.
Findings from this study suggest nurse educators not only need to model EBP competence but also guide students in the application of the EBP competencies for their own practice. Nurse educators cannot assume students arrive ready to apply EBP knowledge and skills to clinical practice, and they must carefully consider expected knowledge, skill, and behavior outcomes by student level. Melnyk et al.'s (2014) EBP competencies for practicing registered nurses have the potential to support curriculum-wide integration of EBP across both clinical and didactic settings.

The findings from this research suggest that additional consideration be given to the formative steps in knowledge, skill, and attitude attainment to develop EBP competence. Further, research examining the generalizability of the EBP competencies in varying curricular models, as well as didactic and clinical settings is needed. The application of CBE in nursing education would ensure that students enter practice with the competencies needed to engage in their own professional practice. Given the expansiveness of CBE and practice-specific competencies, nurse educators must examine competencies for curricular integration. In addition, nurse educators must collaborate with stakeholders to forge partnerships so that clinical experiences reinforce the application of EBP competencies specifically. WVN

LINKING EVIDENCE TO ACTION

• Research versus evidence-based practice needs to be clearly differentiated for students.
• Educators should be integrating the EBP competencies throughout their curriculum to ensure that students achieve them by graduation.
• Educators must role model EBP themselves.
• Clinical experiences that integrate nurses as role models of EBP and active partners in changing care practice based on evidence should be included in academic program experiences.

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SUPPORTING INFORMATION
Additional supporting information may be found in the online version of this article at the publisher’s web site:

Figure S1. Total number of participant responses about types of resources used across all clinical courses, by point of encounter.
Table S1. Distribution of references within each of Melnyk et al.’s (2014) EBP competencies for practicing registered nurses.