

Educating for Evidence-Based Practice

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Several countries have developed policy initiatives that require health care to be evidence based and health science students to study under an evidence-based curriculum as well as learn how to practice in an evidence-based way. Evidence-based nursing (EBN) is too new to have any actual research on which to base a curriculum. However, in the absence of evidence, several schools of nursing have moved or are moving forward. This article presents ideas and examples gleaned from colleagues around the world on the *why's* and *how's* of teaching EBN. Finally, this article calls for the funding and planning of an evaluation of evidence-based curricula and teaching strategies for continued development of the field. (Index words: Education; Evidence-based practice; Nursing) *J Prof Nurs* 21:345–350, 2005. © 2005 Elsevier Inc. All rights reserved.

EVIDENCE-BASED PRACTICE (EBP) is the integration of the best research evidence with clinical expertise and patient values to facilitate clinical decision making (Sackett, Strauss, Richardson, Rosenberg, & Haynes, 2000). In nursing, health care resources must also be considered in decision making. In evidence-based nursing (EBN), four components are weighted in decision making: research evidence, patient values, clinician skills, and resource availability (DiCenso, Cullum, & Ciliska, 1998). Although the model is often depicted as four equal-sized intersecting circles, the weights are never equal in decision making; thus, the circles are never of equal size. In many clinical circumstances, resource availability or constraints and patient preferences take priority. In the past, research evidence has rarely been

considered; interventions were based on history or usual care, as taught to clinicians during their early training. With EBN's emphasis on the consideration of research evidence in decision making, some clinicians claim that EBN promotes an approach that ignores patients' wishes. This is not the case at all—and it is important to emphasize this here. Research has probably received more emphasis than the other three quadrants as a means to shift the pendulum to the consideration of research evidence.

The process of EBN involves the following stages:

1. Asking a clinical question
2. Searching the literature for relevant research
3. Critically appraising what has been found
If change is warranted by the research evidence and if it fits with clinician skills, resource availability, and patient preferences, then the following stages also take place:
4. Implementing the change in practice
5. Evaluating the change in practice

This article will consider and will attempt to counter the arguments for *if* EBN should be taught, then follow with suggestions from around the world for *how* it might be taught. One of the major issues facing education about EBN is that it has not been evaluated—there is no evidence! What limited research exists has been in conducted in the field of medicine and mostly at the postgraduate level (Coomarasamy & Khan, 2004; Hatala & Guyatt, 2002). Therefore, this article is largely a “think piece” as opposed to a presentation of research evidence. It gives examples of how various faculties of nursing are moving toward an evidence-based curriculum and are teaching the evidence-based process. Examples of expectations of learners at various levels and of assignments for student evaluation are given.

Arguments Against Teaching EBN in Nursing Curricula

The first hurdle to face in moving toward an EBN curriculum is to overcome arguments against it. The

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most frequently encountered arguments experienced from nursing educators are explored subsequently.

“EBN IS SIMPLY THE FLAVOR OF THE MONTH”

Although awareness of EBN has grown tremendously, some claim that it is the “flavor of the month.” They believe that there is no real reason to adopt EBP as it will be short lived and the nursing profession will be onto the next “flavor” eventually. In addition, they claim that people have lived through other phases and that, consequently, this too will pass.

However, several countries have passed policies demanding accountability, that health care be evidence based, that curricula for health sciences students be evidence based, and that students learn the evidence-based care process. For example, the U.S. Institute of Medicine Report and the Board on Health Care Services’ Health Professions Education Summit defined core competencies for all health care professionals, one of which includes EBP (*Fineout-Overholt & Johnston, 2005*). Such policies reduce the likelihood that EBN will only be a short-term endeavor and compel health care workers and educators to demonstrate how EBN has been implemented and how the research–practice gap will be overcome.

“I AM USING EXAMPLES FROM RECENT HIGH-QUALITY EVIDENCE IN MY TEACHING, SO I AM TEACHING EBN”

Although using recent evidence in teaching is an advancement over teaching from outdated texts, it does not constitute the minimum for teaching EBN. Clinicians practice, for many years into the future, what they were taught in their basic education. Succumbing to this argument will help ensure that clinicians will continue to practice as they were taught, even at the end of their careers. As a clinician, by 2025, would you want your former students to care for you using evidence that you taught them in 2005? More likely, you would want them to treat you with evidence that is current and of high quality in 2025. If you do not teach the EBN process, then they will not be able to maintain their practice based on evidence.

“THE CURRICULUM IS SO JAMMED, I CANNOT TAKE THE TIME OUT TO TEACH THE EBN PROCESS”

This argument usually follows directly from the previous argument. A nurse educator can never cover everything in the field. There are hard choices to be

made about curriculum content. With the government-level policy developments for health care providers to use evidence in decision making, it becomes imperative that students learn the process in their basic education.

“I TEACH THE EBN PROCESS, BUT THEN THE STUDENTS GO TO THE CLINICAL AREAS WHERE THEY ARE NOT ALLOWED TO PUT THE EVIDENCE INTO PRACTICE”

It is true that students will continue to encounter staff who are not open to change—those who do not understand the accountability that they have to their patients, to the organization, or to their profession to be evidence based. Students need to understand that they have policy documentation to support them. They also need to understand the change process, to appreciate resistance, and to learn how to get support for themselves.

“SPECIALTY EXAMINATIONS ARE NOT EVIDENCE BASED”

Some faculty claim that specialty examinations are not evidence based—that they are based on common textbooks that are outdated. For their students to pass, they have to either teach students what is in the text even if it is contrary to current evidence or teach both and ensure that the students understand how the answer for the examination and the answer for clinical practice differ. The students are caught in the dissonance.

It is difficult to establish as to what extent this is a real problem, but the opinions are strongly voiced by some faculty. Certification examinations are usually confidential and faculty are not allowed to see examination questions, so this argument may be an urban legend. However, it behooves licensing bodies to base examinations on recent evidence. Of course, there will always be a degree of “catch up” as it takes time for new questions to be written, tested, and incorporated into examinations. In the meantime, it is hoped that the number of such problematic questions will be small enough that they will not determine a passing or failing status for students.

Student Expectations and Evaluation Strategies

This section moves from *whether* to teach EBN to *how* to teach EBN. As noted, there is no available evidence evaluating curricula or teaching EBN. However, several people have postulated that more than a course on EBP is needed; rather, a paradigm

shift is required to move from traditional education to curricula focused on the integration of EBP (Kessenich, Guyatt, & DiCenso, 1997; Fineout-Overholt & Johnston, 2005).

Curriculum possibilities across the spectrum of undergraduate and graduate education and faculty development will be presented. The ideas and strategies presented, which have been gleaned from colleagues around the world, should be taken as possibilities and not known evaluated entities. They do not represent one curriculum but do bits and pieces of curricula, courses, and evaluation strategies from many schools.

UNDERGRADUATE EDUCATION

What are Appropriate Expectations?

It is very rare that a baccalaureate-prepared nurse would be awarded a research grant as a principle investigator, yet we continue to teach basic research methods and statistics as a requirement in the undergraduate program, preparing students to be “evidence generators” (Fineout-Overholt & Johnston, 2005). In a traditional research class, most students do not believe that they will ever develop a research project, so their motivation to learn is minimal; they find the course lacking in relevance, boring, or even frightening (Kessenich et al., 1997). Knowledge from traditional research courses does not translate to the ability to confidently read and critique research literature.

Alternatively, we should expect that baccalaureate graduates will be good consumers of research—“evidence users” (Fineout-Overholt & Johnston, 2005)—such that they can find, appraise, and use research within the evidence-based process. Banning (2005) discovered that nurse prescribers were able to define the research process but not the evidence-based process. They often confused EBP as being the same thing as an original research question under investigation with primary data collection from patients (Banning, 2005).

Being able to use research within the EBN process involves skills different from those that can be achieved in usual research and statistics courses. What is required is not one class but an evidence-based curriculum where skills development and expectations of use of evidence are embedded across courses and across years in the academic and clinical settings. It is uncertain as to what extent research conducted in postgraduate medicine can generalize to undergraduate nursing education. However,

Coomarasamy and Khan (2004), in a systematic review of 23 studies, found that stand-alone classroom teaching of evidence-based medicine or critical appraisal courses improved knowledge but that clinically integrated teaching also improved skills, attitudes, and behaviors.

The following are some examples of leveling expectations of students across a 4-year curriculum. First-year students can learn how to frame clinical questions and to search common databases such as CINAHL and PubMed (Kessenich et al., 1997). Any clinical experience can be used in one-to-one clinical teaching or in group teaching to generate issues and unknown information for first-year students. The same strategies could be built on in second year, where the students would go on to learn about critical appraisal of interventions, systematic reviews, and qualitative research. This would also be good to link with teaching content such as searching databases (e.g., the Cochrane Library), ideally taught by health librarians. Third-year students could learn to appraise practice guidelines and to search sources such as the National Guidelines Clearinghouse. Final-year students might integrate a change theory by considering how a piece of evidence can be used to change practice on a particular clinical unit. In all clinical courses, students can be required to identify then incorporate evidence into care plans as they become more skilled in the process.

Research and statistics are highly valuable, and, when taught within critical appraisal, they take on more meaning, relevance, and significance to the students. Students still learn about different research designs, both quantitative and qualitative, and how to match the best research design to the clinical question under consideration. Concepts such as sources of bias, reliability and validity of measurements, and adequacy of follow-up can be integrated into critical appraisal courses. Relevant statistics are also included in critiquing skills. *t* Tests, odds ratios, relative risks, risk reduction, and numbers needed to treat become understood in relation to specific designs used in real studies. Emphasis is on the interpretation and meaning that they have in a study, not on the methods of calculation.

Clinicians claim that they lack time to conduct searches and critique evidence; while still students, they need to learn how and where to quickly find appraised literature and synthesized evidence. Haynes (2005) developed a pyramid of resources for clinicians to use (see Figure 1). Starting from the bottom, evidence comes from individual *studies*; these are

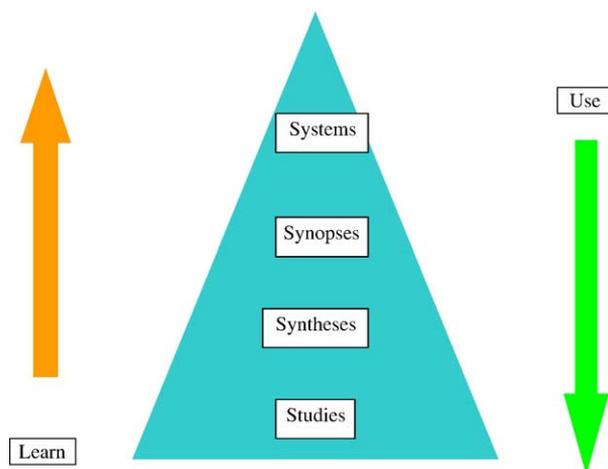


Figure 1. The “4S” levels of organization of evidence from research. Adapted from Haynes (2005).

gathered together in *syntheses* or systematic reviews; high-quality reviews are brought together in *synopses*—the journals, such as *Evidence-Based Nursing*, that abstract preappraised reviews and individual studies. All of the lower-level information can be integrated into *systems* such as decision support systems and practice guidelines. As shown in Figure 1, utilization takes place from top to bottom. If there are systems or practice guidelines in place, they would be the most efficient sources of information; if there is none, the nurses would look for synopses, then systematic reviews, and then individual studies to apply to a particular clinical question. However, in teaching, it is most efficient for students to learn how to appraise the levels in reverse, starting with individual studies. Concepts of design, biases, and reliability and validity of measurements need to be understood before one can adequately critique systematic reviews and practice guidelines integrated at the system level.

Examples of Assignments

At the undergraduate level, small assignments for lower-level students have required that they develop clinical questions (Flemming, 1998) for each clinical patient assignment. Students may later be required to hand in a copy of their saved search strategies that go with the clinical question. The requirements for the search can vary but, at the undergraduate level, should not focus on being exhaustive and finding everything there is on a topic but on finding high-quality evidence quickly, a skill that will be more usable upon entering the workforce.

In upper levels, students can be asked to submit a critical appraisal of a study, systematic review, or practice guideline. It can be an in-depth critique or summary of strengths and weaknesses. At some point, they need to practice giving a short oral synopsis of a study and their critique, which they might give to work colleagues or managers. This should include the study’s purpose, its major findings, its major methodological strengths and weaknesses, and a decision about whether there are fatal flaws that would preclude the possible application of the findings to the EBN process. If students only practice reporting the in-depth critical appraisal and study content, they will not master the skills of quickly transmitting important information, as would be required in a team meeting or in an actual clinical situation.

GRADUATE EDUCATION

What are Appropriate Expectations?

Depending on the students, the school, and date of the students’ undergraduate education, students may enter graduate school without knowing the EBN process. In the short to medium term, courses will have to be available for them to catch up on how to state a clinical question, basic search skills, critical appraisal of intervention studies, systematic reviews, guidelines, and qualitative studies. Then they can go on to more in-depth searching and learning about critical appraisal of other types of clinical questions such as assessment (diagnosis), prognosis, harm, prevention, quality of life, quality of care, and economic evaluation.

In graduate school, most students are required to take research methods and statistics courses but, again, may not readily be able to translate the content to skills required to be good consumers of research. They may need practice with the translation, in courses and clinical practice. If the students have already taken graduate-level research and statistics courses, critical appraisal content usually proceeds at a faster pace, then they may go on to focus more on utilization of research evidence at the institutional level, such as by adapting, revising, or developing relevant practice guidelines. As masters and doctoral graduates, it is an expectation that graduates can assess organizations and individuals within them and plan a strategy for implementation of practice change. This requires an understanding of the literature about barriers to research utilization, an understanding of models for implementing EBP, and an ability to use the change process.

Some graduate programs will offer courses on how to conduct systematic reviews and guideline development. Indeed, some have explicit assumptions that the literature review section of any thesis will be conducted as a systematic review.

Examples of Assignments

Some of the assignments as those for undergraduates might be required for graduate students. However, an integrative article has been reported to be highly useful to graduate students. In an integrative article, students pose a question from their clinical practice, present their search strategies, include the three best articles found along with a critique of each, and declare a decision regarding the suitability of the evidence, from a quality perspective, for implementation in clinical practice. In addition, the students are asked to complete an assessment of their work environment as to the barriers and facilitators that exist in terms of the organization, the culture, and the individuals in the environment as well as to recommend a plan for implementation. As many such plans take years to implement, it is not realistic to expect implementation to take place; nonetheless, graduate students could also be required to indicate criteria and processes for the evaluation of such an implementation plan.

A possible group graduate student assignment might be the development of practice guidelines for a particular clinical issue. This would require finding and critically appraising existing guidelines or, alternatively, conducting a systematic review of the literature and then developing guidelines. Again, implementation is probably outside the realm of expectation, but the development of an implementation and evaluation plan would be a useful exercise.

CONTINUING EDUCATION

In another generation, all nurses graduating will be well equipped to be good consumers of research and to bring quality evidence to bear on decisions with patients in practice situations. In the meantime, what level of skill in use of EBN is expected of practicing nurses? Once again, current policies in many countries expect that patients are cared for by nurses who use the evidence-based process. Do all nurses, from the personal care attendants to the advanced practice nurses, need these skills?

Probably not—everyone may be practicing based on high-quality research evidence but may not be doing so directly. That is, some nurses may use practice

guidelines or standard care maps that are highly evidence based but may not actually appreciate them or be aware of the underlying evidence. Every nurse may not know how to search for and critique research studies. This means that some people in various clinical areas need the skills to find, critique, and use evidence, but not everyone needs to be able to do so.

What is required is a culture of reflection on practice—of evaluating what is and what is not working with patients and what their preferences and personal reactions to care are—and a desire to look into alternative possibilities. A few anecdotal unevaluated strategies that seem to affect culture are question contests and “dinosaur” contests. In the first instance, where nurses at all levels of the staff are encouraged to submit questions about their clinical practice; questions are submitted to librarians, who often are able to find relevant research to bear upon the questions. The dinosaur contest asks clinicians to disclose interventions that are based on history and not on evidence. At the least, these strategies seem to promote a shift to more reflection on practice.

Nursing and health care organizations in several countries are attempting to develop current workforce EBN skills in a variety of ways that involve short courses delivered by a variety of media. Examples include the Victorian Center for Nursing Practice Research (Fineout-Overholt & Johnston, 2005) and the Sigma Theta Tau (2005) in the United States. Most often, these courses are intended to develop skills in defining a clinical question, conducting efficient search, and critically appraising studies. Journal clubs often accomplish the same purposes within a defined clinical area and go further to explore how the findings may be integrated into current practice.

PREPARING FACULTY

As in any new venture, faculty will vary in their adoption and teaching of an evidence-based curriculum, from innovators and early adopters to laggards (Rodgers, 1995). Some will be wildly enthusiastic and some will be resentful and unwilling to acknowledge that they need skills development in the area. Policy development, curriculum and school accreditation, employee expectations of graduates, and specialty certification examinations will all help push the adoption.

The faculty must role model that the EBN process is more than just research utilization and that it is also about making decisions considering patient values

and preferences, available resources, and clinician expertise. Professors who currently teach research courses have the knowledge to convert to a focus on consuming research. However, they may be the most resistant to changing their course content and process. Some schools have begun by sending faculty away for skills development; others bring in outsiders for faculty training. Whichever way is chosen, it is important to keep in mind the need to have a critical mass of people who have skills, enthusiasm, and authority to carry the evidence-based curriculum forward. A concentrated workshop format may allow an attitude shift to occur, which will open faculty to the possibility of learning new skills.

It is very important to prepare preceptors. They are critical to the success of the integration of EBN into clinical courses; yet the preceptors typically have less time for continuing education or faculty development. As such, any faculty curriculum development project needs to ensure that all preceptors are given time to learn the content and the process of EBP and how to role model it, so that they can adequately support the students.

Conclusion

This article has emphasized that teaching research and statistics courses is not enough to enable graduates to practice in the evidence-based way that is demanded of current policies. The ideal curriculum revision is to integrate EBN across levels and courses, starting with deciding on expectations of student skills and performance at various levels, developing assignments that reflect those expectations, and offering faculty development as required. As with any planned change, a critical mass of committed people and particular champions who will help build and maintain the momentum required to make curriculum revision and evaluation are required.

An even greater challenge is to conduct curriculum and teaching evaluation, which is sorely lacking in nursing. Funding bodies need to follow from the policy directives, to provide resources for such evaluation, so that 10 years from now, we would have moved beyond describing examples (as in this current article) to having evidence to guide curriculum design and teaching strategies.

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