

MODERN METHODS OF TEACHING HEALTH SCIENCE STUDENTS IN EVIDENCE-BASED PRACTICE – A REVIEW OF THE WORLD SCIENTIFIC LITERATURE

Joanna Gotlib, Mariusz Panczyk, Jarosława Belowska

*Division of Teaching and Outcomes of Education, Faculty of Health Science, Medical
University of Warsaw (POLAND)*

Abstract

Background:

The present world literature widely discusses the use of *Evidence-based Practice* in selected groups of professionals in health sciences.

The aim of the study:

The aim of the study was to analyse the up-to-date world scientific literature on a broadly defined issue of modern methods of teaching health science students regarding the use of recent research results in everyday clinical practice, i.e. *Evidence-based Practice*.

Material and methods:

The analysis involved the world scientific literature indexed in the following databases: EMBASE, PROQUEST, PUBMED, and SCOPUS. The analysis comprised articles written in English between the years 2000 and 2013 (date of publication: between January 1st, 2000 and November 12th, 2013). A total of 1001 articles on the use of *EBP* in selected groups of professionals in health sciences were found, including 43 publications devoted to methods of teaching *EBP* to students; EMBASE - 1 item, Proquest - 11 items, PUBMED - 10 items, Scopus - 21 items. Since 5 publications were indexed in several databases at the same time, 38 publications were qualified for the analysis.

Results:

Publications devoted to teaching *EBP* to nurses were prevailing. A series of 6 specialist publications entitled *Understanding research* was found in the *Practising Midwife*. One of the publications was devoted to Physiotherapy students; none of the publications was devoted to Nutrition students.

Conclusions:

1. There is a need to increase the awareness of academic teachers regarding the necessity for modern teaching of evidence-based everyday clinical practice to students.
2. The limitations in teaching students how to use research evidence in their professional practice are objective and they require system changes with reference to the clinical training of health science students.

Keywords: evidence-based practice, safety, effectiveness, efficiency, care quality, teaching, health sciences.

1 BACKGROUND

Evidence-based practice (EBP) is a problem-solving approach to clinical care that incorporates the conscious use of the current best available evidence, a clinician's expertise, and the patient's values. The notion of EBP is now central to the planning and implementation of health care systems internationally [1-38].

Evidence-based practice means integrating individual clinical expertise with the best available evidence from systematic research. Together with clinical expertise, patients' values and knowledge, and the context, this knowledge should improve the quality of the information on which decisions are based. Clinical decisions need to consider the current best evidence. Sackett et al. described five steps in achieving this process:

- Formulate an answerable question.

- Seek evidence to answer the question.
- Critically appraise the evidence. Apply the evidence, integrating the results with clinical expertise and patients' values.
- Evaluate the effectiveness and efficiency of the process [1-38].

As EBP rapidly replaces the traditional paradigm of authority in health care decision making, health professionals have an obligation to access knowledge, apply this in practice, and lead others to use it appropriately. In fact, the Institute of Medicine named EBP as one of five core competencies that all health professionals should possess to meet the needs of the twenty-first-century health care system. To meet this need, the Health Professions Educational Summit has employed EBP as one of the core competencies for health care education, and an EBP movement is underway [3-6].

All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches and informatics.

While much of the discussion surrounding EBP in the literature has been about how to introduce and/or expand its use in the clinical setting, a significant challenge has been introducing and integrating the content in the curricula of nursing schools and integrating the processes of EBP into clinical teaching. This is an even greater challenge given the fact that curriculum change is generally a slow, deliberative process involving many stakeholders.

Curriculum change can be thought of in similar terms to EBP since both involve decision making, both make use of the best available evidence, both use the expertise of frontline people (clinician expertise vs. educator expertise), and both incorporate values and preferences (patients vs. students). Both are systematic efforts that require thoughtful analysis, documentation, and outcomes. Both enable stakeholders to respond to the knowledge explosion that clearly affects best practices in patient care and nursing education.

Several educational strategies for the introduction of EBP to education have been discussed [3-8]. Finding practical teaching strategies for EBP is challenging for educators. Although there are reports on successes in teaching EBP, information about the strategies and effectiveness of EBP integration in education is limited [9-14].

Educators are being challenged to maintain quality in light of increasing numbers of students, declining numbers of experienced faculty, societal mandates, and rapid changes in health care. The scholarship underlying the practice of nursing education, or evidence-based education, must continue to be explored through the design, testing, and refinement of education strategies from nursing and other disciplines. The involvement of every educator in this process will help create institutional valuing that serves to retain inquisitive and reflective educators in academic settings, while expanding evidence-based education in nursing [5].

Evidence-based teaching practice is the validation, generation, application, and perpetuation of those methods that facilitate the preparation of skilled and thoughtful nurses who function in a constantly evolving, global health care environment. It is the incorporation of the doing of the teaching with the study of the teaching, with teaching encompassing all of the roles and capacities from administrator to advisor. Evidence-based education can parallel the process of evidence-based practice in its scholarly approach to advancing knowledge. It requires exploring education in other fields and disciplines and listening to our students, as well as critically examining what we do and how we do it, with the goal of learning to do it better [5].

Many authors found that students' appreciation for research is linked to EBP and that such an appreciation is significantly associated with formal education about research. This suggests a need for more effective teaching strategies. We can teach EBP by building the curriculum on a constructivist foundation and using student-centered, evidence-based teaching strategies as a framework on which to build [8-22].

2 THE AIM OF THE STUDY

The aim of the study was to analyse the up-to-date world scientific literature on a broadly defined issue of modern methods of teaching health science students regarding the use of recent research results in everyday clinical practice, i.e. *Evidence-based Practice*.

3 MATERIAL AND METHODS

The analysis involved the world scientific literature indexed in the following databases: EMBASE, PROQUEST, PUBMED, and SCOPUS. The analysis comprised articles written in English between the years 2000 and 2013 (date of publication: between January 1st, 2000 and November 12th, 2013). A total of 1001 articles on the use of *EBP* in selected groups of professionals in health sciences were found, including 43 publications devoted to methods of teaching *EBP* to students; EMBASE - 1 item, Proquest - 11 items, PUBMED - 10 items, Scopus - 21 items. Since 6 publications were indexed in several databases at the same time, 38 publications were qualified for the analysis [1-38]. Among the 37 publications [1-37], 16 of them had no available full texts and were excluded from the final analysis [23-37]. A total of 22 publications were included in the final analysis [1-22].

4 RESULTS

Among the 22 publications, 11 of them were original papers, and 11 of them were original (Tab. 1)

Tab. 1. The kind of papers

No.	Author	Kind of paper
1	La Rocco SA.	Review article
2	Rolloff M.	Review article
3	Oh EG.	Original article
4	MacLaren JE.	Original article
5	Emerson RJ.	Review article
6	Smith-Strøm H.	Original article
7	Meeker MA.	Original article
8	Aronson BS.	Original article
9	Levin RF.	Review article
10	Penz KL.	Review article
11	Logan PA.	Review article
12	Vessey JA.	Review article
13	Constantinou M.	Original article
14	Smith DR	Review article
15	Stichler JF.	Original article
16	Allan HT.	Review article
17	Preheim GJ.	Review article
18	Kim SC.	Original article
19	Vessey JA	Original article
20	Martin F.	Original article
21	Ozsoy SA.	Original article
22	Fineout-Overholt E.	Review article

Tab. 2. The most common problems with teaching EBP

No.	The most common problems with teaching EBP
1	Misconceptions about teaching EBP
2	Lack of philosophical framework for the curriculum
3	Administrative support
4	Mentorship
5	Time
6	Information literacy skills
7	Resources (financial, limited access to electronic data sources)
8	Poor understanding of statistics
9	Inconsistent basic knowledge and experience with research

Publications devoted to teaching EBP to nurses were prevailing. A series of 6 specialist publications entitled *Understanding research* was found in the *Practising Midwife*. One of the publications was devoted to Physiotherapy students; none of the publications was devoted to Nutrition Students.

Tab. 3. Affiliations of authors, who publish papers concerning methods of teaching EBP

No.	Author	Affiliation
1	La Rocco SA.	Division of Nursing, Curry College, Milton, Massachusetts, USA
2	Rolloff M.	University of Northern Colorado, USA
3	Oh EG.	College of Nursing, Yonsei University, Seoul, Korea
4	MacLaren JE.	Department of Anesthesiology, University of California, Irvine, USA
5	Emerson RJ.	Washington State University, Intercollegiate College of Nursing, USA
6	Smith-Strøm H.	Department of Nursing, Betanien Diaconal University College, Norway
7	Meeker MA.	School of Nursing, the State University of New York, USA
8	Aronson BS.	Department of Nursing, Southern Connecticut State University, USA
9	Levin RF.	Pace University, New York, USA
10	Penz KL.	College of Nursing, University of Saskatchewan, Canada
11	Logan PA.	Charles Sturt University, School of Biomedical Science, Dubbo, Australia
12	Vessey JA.	School of Nursing, Boston College, USA
13	Constantinou M.	School of Physiotherapy and Exercise Science, Griffith University, Australia
14	Smith DR	School of Health Sciences, University of Newcastle, Ourimbah, Australia
15	Stichler JF.	San Diego State University, USA
16	Allan HT.	Centre for Research in Nursing and Midwifery Education, University of Surrey, United Kingdom
17	Preheim GJ.	University of Colorado Denver, College of Nursing, USA
18	Kim SC.	San Diego State University, San Diego, California, USA
19	Vessey JA	School of Nursing, Boston College, USA
20	Martin F.	School of Nursing in Athens, Medical College of Georgia, Athens, Georgia
21	Ozsoy SA.	Department of Public Health, School of Nursing, Ege University, Bornova-Izmir, Turkey
22	Fineout-Overholt E.	No information

Tab. 4. Journals, which publish papers concerning methods of teaching EBP

No.	Journal	Total Cites	Impact Factor	5-Year Impact Factor
1	Journal of Medical Colleges of PLA	-	-	-
2	Nursing Education Perspectives	-	-	-
3	Journal of Nursing Education	1609	0.761	1.204
4	Research and Theory for Nursing Practice	203	0.606	-
5	The Journal of Continuing Education in Nursing	-	-	-
6	Journal of Nursing Management	1575	1.142	1.822
7	Journal of Professional Nursing	788	0.883	1.107
8	Physiotherapy	1198	2.106	1.755
9	Nursing and Health Sciences	-	-	-
10	Nurse Education Today	2503	1.456	1.641
11	Journal of Advanced Nursing	11383	1.685	2.462
12	Journal of the American Academy of Nurse Practitioners	926	0.868	1.186
13	Worldviews on Evidence-Based Nursing	468	2.318	2.296

5 DISCUSSION

Evidence-based practice (EBP) is a problem-solving approach to clinical care that incorporates the conscious use of the current best available evidence, a clinician's expertise, and the patient's values [1-37]. The notion of EBP is now central to the planning and implementation of health care systems internationally [1-37]. As EBP rapidly replaces the traditional paradigm of authority in health care decision making, health professionals have an obligation to access knowledge, apply this in practice, and lead others to use it appropriately [3]. In fact, the Institute of Medicine named EBP as one of five core competencies that all health professionals should possess to meet the needs of the twenty-first-century health care system [3].

To meet this need, the Health Professions Educational Summit has employed EBP as one of the core competencies for health care education, and an EBP movement is underway in nursing as well. Several educational strategies for the introduction of EBP to undergraduate baccalaureate nursing education have been discussed [1-37].

Baccalaureate education, in preparing nursing students for generalist practice, focuses in part on students' ability to integrate research findings and other evidence into the design and provision of care. There are five identified steps to the successful integration of EBP, in which the practitioner: a) learns how to ask researchable questions, b) locates evidence that might answer the questions, c) analyses studies to determine their appropriateness as answers to the questions, d) integrates patients' values and clinicians' skills into the evidence found, and e) evaluates the effectiveness of the first four steps in answering the questions [2].

Most professional nursing education programs have included a course in nursing research but often have neglected the more meaningful pursuit of clinical scholarship, i.e., the application of research to the clinical setting, the resolution of clinical problems, and dissemination of results [2].

While a research course is a standard part of the baccalaureate curriculum, evidence suggests that these courses are ineffective in advancing EBP in nurses [2].

While most faculty members demonstrate knowledge and competencies in the traditional research process, many do not have the knowledge, attitudes, or competencies in EBP to include the content in their coursework or student assignments. Barriers and facilitators to the adoption of teaching and practice of EBP in nursing have been identified by researchers [16].

Misconceptions about teaching EBP; lack of philosophical framework for the curriculum, administrative support, mentorship, time, information literacy skills, or resources (financial, limited access to electronic data sources); poor understanding of statistics; and inconsistent basic knowledge and experience with research have been consistently reported as barriers. With a push from nursing service to meet regulatory requirements to constantly improve patient outcomes and Magnet's emphasis on professional nursing practice, faculty are challenged to use an evidence-based approach in their own educational practice and to teach students to appreciate and practice an evidence-based approach to nursing care [16].

Most studies have been focused in one of two areas: nursing students' perceptions of the value of research, and their skills in information literacy [1-37].

Several authors have outlined a number of strategies to teaching EBP including skills in asking focused clinical questions, searching electronic databases for evidence, critically analyzing the evidence, and determining if the published evidence fits with their clinical situations and justifies making a change in practice [16].

Many authors described an innovation decision process teaching strategy (I-DPTS) that was based on Roger's model of diffusion of innovation. The I-DPTS was a collaborative process between the school of nursing and community hospitals. The four phases consisted of (1) getting started (forming groups, collaborating with each other and the librarian, and identifying clinical problems), (2) implementation (advanced literature search, research article critique, and decisions about best practice), (3) dissemination (oral and poster presentation and preparation of manuscripts), and (4) appraisal of student assignments (peer evaluation of students' research grids, presentations, and an EBP nursing policy). In an evaluation of the I-DPTS, the faculty viewed the process positively and reported that the process facilitated development of students' leadership skills, critical thinking, communication (presentation, conflict resolution, collaboration), and overall professionalism. Student evaluation of the I-DPTS was not as positive as the faculty perspective. Students valued the "real-life" experience and saw direct application to their practice but struggled with managing group work when not all students completed their assigned obligations. Although this was frustrating to students, faculty identified the learning opportunities in conflict resolution and problem solving. Overall, the I-DPTS was a useful strategy in teaching baccalaureate students about EBP and provided an experiential method for students to develop competencies to overcome perceived barriers to using research to guide clinical practice. Searching for evidence is a critical competency for EBP as is interpreting the key messages in the article and critically analyzing the articles applicability to clinical situation or current problem. It has been demonstrated that integrating information literacy and evidence search assignments in the curriculum program enhanced students' competencies and confidence in searching databases and in assessing the usefulness of specific studies. Expanding readings beyond the text and lecture materials and using an integrated search approach in class assignments has been viewed as a helpful strategy in advancing students' knowledge and skill in EBP. Having the students find articles pertinent to the clinical or seminar topic, critique the article, and determine its usefulness in answering a clinical question has been recommended by many as a strategy to enhance undergraduate student skills. Most researchers and educators agree that undergraduate and master's level education should focus on research appraisal and research translation to practice with the doctoral levels focusing on knowledge generation. Building on this foundation, faculty teaching graduate students may expand the assignments to include the requirement for the student to use the information to develop clinical protocols or for leadership students to create an innovation or management change project. Most authors agree that including EBP in the curriculum at all levels of education for nurses is a "paradigm shift that is long overdue" [16].

To sum up, to improve patient outcomes currently and in the future, it is important that an evidence-based approach to nursing care be incorporated into clinical practice settings. Nurse educators and clinical nurse educators have a mandate to model and facilitate evidence-based nursing through learning activities. Unfortunately, issues present within clinical practice settings have made this approach difficult for registered nurses to fully incorporate into practice. There are few issues inhibiting evidence-based nursing, such as time factors, access to information and resources, nurses' research knowledge, skills, and learning opportunities, and the current nursing culture [11].

6 CONCLUSIONS

1. There is a need to increase the awareness of academic teachers regarding the necessity for modern teaching of evidence-based everyday clinical practice to students.

2. The limitations in teaching students how to use research evidence in their professional practice are objective and they require system changes with reference to the clinical training of health science students.

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