National Council of State Boards of Nursing

Systematic Review of Studies of Nursing Education Outcomes: An Evolving Review

Nancy Spector, PhD, RN, Director of Education

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The systematic review is an integral part of evidence-based health care. One of the best definitions of evidence-based medicine (which can be applied to health care in general) is "…the integration of best research evidence with clinical expertise and patient values" (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000, p. 1). This is a comprehensive definition that doesn't just include the results of the best studies, but it also considers clinical expertise and the patients' needs. When applying evidence-based health care to nursing education, we should employ the best studies available, integrated with the expertise of qualified and experienced nursing faculty and the values and needs of our students.

A systematic review is the overview of several randomized trials of the same intervention or treatment for the same situation or condition; this overview systematically and critically reviews and combines all the studies, providing a better answer than the results from just one study (Sackett et al., 2000). Since there are not a lot of randomized trials available on nursing education, this systematic review is intended to be a critical analysis of evidence supporting, or not supporting, nursing education strategies and learning environments. It is important to note that this is an evolving review that will continually change as more research becomes available.

Systematic reviews consider the strength of the evidence for a particular strategy. Therefore, in this review the levels of evidence, or hierarchies of the studies, are identified. There are several ways that researchers classify research studies. One system is to grade the studies on a rating of I to V. Level I studies are large randomized control trials (RCTs); level II studies are RCTs with 50 subjects or fewer; level III are smaller cohort or case-control and cohort studies; level IV evidence come from case reports and low-level case-control and cohort studies; finally, level V is expert or consensus based on experience, physiology or biological principles. Another system uses the levels A through D to designate the strength of the evidence. Grade A is the strongest evidence, while grade D is the weakest (Mayer, 2004).

Many systematic reviews only use randomized controlled trials; however, that would limit the results in this review. Therefore, in this review, the level of evidence will be rated as adapted from Gallagher (2003) and Polit & Beck (2004). Gallagher (2003), while writing a clinical article, used a meaningful, easily understood method of rating studies. To avoid confusion, Polit and Beck's description of Level II nonexperimental studies was used to be more in line with nursing studies.

It is important for nurses to strongly consider the level of evidence when making decisions to use research in their practice. Level II or III evidence should not be discounted. If those studies are done well, they can begin to identify relationships, obtain information about populations and help us to understand the viewpoints and realities of those under study (Polit & Beck, 2004). Further studies can corroborate these findings or study the variables in a more controlled design. For the purposes of this review, the levels of the studies will be identified as:

Â **Level I.** A properly conducted randomized controlled trial, systematic review or meta- analysis.

Â **Level II.** Other studies, such as *quasi-experimental***,** correlational, descriptive, survey, evaluation, and qualitative.

Â **Level III.** Expert opinions or consensus statements

The databases used to retrieve these studies were CINAHL, Medline and ERIC. Keywords used were: education, nursing, teaching, education research, learning methods, learning strategies, research-based education, and outcomes of education. The Reference Librarian at Rush Medical Center School of Nursing assisted in identifying appropriate articles. All issues not available at the Rush University School of Nursing were ordered.

The following criteria were used to select the studies:

Â Study of educational outcomes.

Â Identification of a design.

Â Sample description.

Â Comparison being studied or objective of the study (for noncomparison studies).

Â Reporting of results.

Â English-only studies (including countries outside the United States).

References

Gallagher, R. (2003). An approach to dsypnea in advanced disease. *Canadian Family Physician*, *49*, 1611-1616.

Mayer, D. (2004). Essential evidence-based medicine. Cambridge: University Press.

Polit, D.F. & Beck, C.T. (2004). *Nursing research: Principles and methods*. Philadelphia: Lippincott Williams & Wilkins.

Sackett, D. L., Strauss, S.E., Richardson, W.S., Rosenberg, W., & Haynes, R.B. (2000). *Evidence-based medicine*. London: Churchill Livingstone.

Article	Sample	Comparison Studied	Study Procedures	Key Results	Strengths & Weaknesses

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	degree program, second-degree students, and RN BSN students.				Â Authors attested to adequate reliability and validity of the course evaluation tool, though no statistics were provided; exam psychometrics weren't cited.	Â Online nursing courses can be just as effective as traditional lecture courses.
Epstein, R. M. & Hundert, E. M. (2002). Defining and assessing professional competence. *JAMA*, *287*(2), 226-235. ***Level I***	195 relevant citations.	Â Propose a definition of professional competence. Â Review current means for assessing it and to suggest new approaches of assessment.	Â Used the MEDLINE database from 1966 to 2001 and referenced lists of relevant articles for English-language studies. Â Excluded articles that are purely descriptive, duplicate reports, reviews, and opinions and position statements.	Â Definition of "professional competence:" ***the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values and reflection in daily practice for the benefit of the individual and community being served***. Â Common methods: subjective assessment by supervisors, multiple-choice exams evaluating factual knowledge and abstract problem solving, and standardized patient to 200neg1te0T$4(e)9		

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efficacy. *CIN: Computers, Informatics, Nursing, 22*(1), 26-33. ***Level II***	universities participated in the study. The students were mixed gender, ethnically diverse and their ages ranged from 19 to 42 years.	text only, text and image, multimedia and interactive multimedia.	designed criterion-based tests involving basic math problems and drug calculations; the Mathematical Self Efficacy Scale (MSES); Student Satisfaction Survey, which was investigator designed. The scales were given at intervals, as described. The results were analyzed with descriptive statistics, one-way analysis of covariance and one-way analysis of variance.	at the post treatment and follow-up treatment periods. Â Results indicated that a one-hour intervention is not sufficient to correct the deep-seated math problem that has been documented by educators for many years. Â The study showed that the computer-based learning modules did not impede the students' learning. Â Interactive multimedia group students were more satisfied with this method of		

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	71.8%		validity and reliability were established. Â The teaching intervention was a five-minute videotape on antibiotic-resistance teaching, and content validity was established. Â Participants were randomly assigned to one of the four groups. Â A data recall task was presented immediately after the videotape, which required the information learned while watching the videotape to be transferred into long-term memory to be recalled. Â Analysis of covariance was used in analysis.		with random selection, were uneven regarding having taken a microbiology course; therefore, the original findings showed no differences. They found differences when they omitted those students who had taken a microbiology course. However, that decreased their sample size from 78 to 48. Â The distractions and noise were realistic. Â The teaching was only done by videotape, thereby negating teacher/student interaction, which could clarify misperceptions.	complete a cost-benefit analysis for each option, implement changes, and evaluate the effectiveness of the changes for health-learning outcomes.
Miller, S. K. (2003). A comparison of student outcomes following problem-based learning instruction versus traditional lecture learning in a graduate pharmacology course. *Journal of the American Academy of Nurse Practitioners*, *15*(12), 550-556. ***Level II***	Convenience sample of 12 APRN students in the control group and 10 APRN students in the intervention group.	The medical literature has studied problem-based learning more comprehensively than nursing. Therefore, this study compared student performance and satisfaction in problem-based learning to a traditional lecture format in pharmacology.	Â The study design was experimental, post-test only, though the sample wasn't randomly selected. Â They cite that they didn't need a pretest because it was a homogenous sample. Â The same faculty member taught each class. Â The students were blinded to the fact that another teaching method was being used, and the groups were 50 miles apart from each other. Â The Student Satisfaction with Learning Tool had respectable content validity and test-retest reliability. Â No psychometrics were supplied for the midterm exam and final exams. Â The Students' t tests for independent samples were used for analyzing	Â Student satisfaction scores showed no significant differences between the groups. Â Midterm exams showed no significant differences between the groups. Â		

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			differences. Â The teacher did not know whether she was grading a control or experimental exam.			
Murphy, M. (1995). Open learning: the managers' and educationalists' perspective. [Electronic Version]. *Journal of Advanced Nursing*, *21*(5), 1016-1023. *Level II*	Participants for this study were from a college of nursing and its clinical links. Setting was England.	Describe the feelings and motivations of nurse educators and managers toward open-learning programs. The definition they used was that open learning relates to an educational philosophy where the learners have access not just to educational products, but to the means of shaping their own learning.	Â Qualitative study using guided, standardized interviews with an open-ended, in-depth interview technique. Â Tape-recorded interviews were transcribed verbatim. Â Situation analysis was used, requiring detailed, searching and concrete analysis of the data collected to 'get inside the information." Â A theoretical framework was devised that combines the philosophies of humanistic education and Knowles' andragogical assumptions for learning with concepts of student empowerment and increasing clinical competence.	Â Both practice and educators valued open-learning as a mode of program delivery appropriate for a practice profession. Â Both groups confused the concepts of open and distance learning. Â All interviewees agreed that open learning would help to close the theory-practice gap. Â The interviewees saw open learning as a way of empowering the learner. Â The findings showed that practice and education aren't working collaboratively, but each are functioning with their own competitive market in mind.	Â Lack of clarity of definition within both groups as to what exactly open-learning is. Â Sample selection process was not made clear. Â Line-by-line coding of interview transcripts allowed for comprehensive results. Â Researcher acknowledged that some would use the survey method, and yet she cogently argued that the survey method hands over the data collection from the researcher to the informant. Â Researcher acknowledged the lack of rigor with open interviews, and yet she argued that a rigid interview could be dominated by the researcher's agenda.	Â Educators and practitioners saw clinical experiences as vital in the education of nurses, and open-learning would only be a part of teaching nursing students. Â Open-learning is often confused by nurse educators and managers as being distance-learning.
Platzer, H. Blake, D., & Ashford, D. (2000). An evaluation of process and outcomes from learning through reflective practice groups on a post-registration nursing course. [Electronic Version]. *Journal of Advanced Nursing*, 31(3), 689-695. *Level II*	30 students were followed for two years in England.	Develop a better understanding of the use of groups and discussions to facilitate reflective practice.	Â Groups were qualitatively evaluated by the use of in-depth, semistructured interviews. Â Interviews were audio-recorded and transcribed. They were analyzed using a qualitative software analysis package (QST NUD-IST version 3). Â The data were coded and categorized as themes emerged.	Â The students reported significant development in their critical thinking abilities. Â The reported greater autonomy to question the ***status quo***. Â The participants reported a less rule-bound approach to their practice (relates to Benner's work). Â Their learning in the reflective practice groups can best be understood in terms of an increase in professionalism.	Â Self reports can be biased. Â No measurements of critical thinking were made. Â The reliability of the coding and categorization was not discussed.	Â Excellent qualitative evidence to support the need for students to reflect in groups and discussions about their practice.
Schaefer, K. M. & Zygmont, D. (2003). Analyzing the teaching style of nursing faculty: Does it promote a student-centered or	Sample consisted of 178 females and nine males. Mean age of 50.	Â Describe the predominate teaching styles of nursing faculty as either teacher-centered or student-centered.	Â Descriptive correlation design with triangulation of methods was used. Â Principles of Adult Learning scale (PALS) was used to	Â Participants were more teacher than student centered; their written philosophies revealed both teacher-centered and student-centered approaches.	Â Nice literature review. Â Investigators met to achieve consensus about themes with the narrative data. Â Questionable generalizability beyond	Â Excellent suggestions were given for assisting faculty to move to a more student-centered environment, and perhaps the boards of

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			required use of Web resources for completion. Â Learning outcomes were measured with online exams. Â Generic students were taught the same content with a traditional methodology and took an “almost identical” exam.		was acceptable; no validity data were provided.	

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				clinical picture, their clinical decision making capabilities are limited. The researcher questions whether traditional clinical rotations are as effective as a consistent clinical experience.		clinical environment, they began to assume the nursing role. Â Until students understand the clinical picture, their clinical decision-making capabilities are limited. Yet, they need knowledge, experience and self-confidence to understand the clinical picture.
Yates, P. Jackie, C. Moyle, W. & Wollin, J. (1997). Peer mentorship in clinical education: outcomes of a pilot programme for first year students. *Nurse Education Today*, *17*, 508-514. ***Level II***	55 of 323 first year students enrolled in the Bachelor of Nursing program agreed to participate. Eight peer mentors were selected from students in the second year of the program to facilitate the sessions. The setting was Australia. 55 randomly selected non-participants served as the controls.	Examine the potential of peer mentorship to assist students to improve their clinical learning outcomes.	Â Five sessions of one to two hours' duration were held every two to three weeks during the 14-week semester. Â Sessions focused specifically on strategies for negotiating the clinical environment, promoting learning from clinical experience, and debriefing of events and experiences during clinical practicums. Â Measurement included pre- and post-program questionnaires, a focus group interview, review of mentor journals, and a statistical analysis of the differences in clinical ratings between the participants and non-participants.	Â The program was perceived to provide a considerable amount of help to participating students, particularly in reducing anxiety and increasing confidence. Â There were no differences between the groups related to clinical instructor ratings. Â Mentors felt the program had assisted students with increasing confidence and reduced anxiety. Â Students were less satisfied with issues such as timing and organization of the sessions. Â Students spoke of their concerns about the need for practice of clinical skills to improve their confidence and reduce anxiety.	Â Evaluations were comprehensive. Â Because the protégés were volunteers, there may have been a systematic bias.	Â Students feel it is important to integrate both theory and practice. Â Most clinical teachers agree that lack of confidence and anxiety can have detrimental effects on student learning, and the strategy of using peer mentors may

Conclusion

This is an ongoing project where we are continuing to search for studies that meet the specified criteria. A limitation of any systematic review is that it is only good as the quality of research that it covers. As discussed in strengths and weaknesses, oftentimes sample sizes were small and controls were lacking. The study criteria for this systematic review were not as stringent as some reviews so that the breadth of the literature could be reviewed. The review identifies strengths and weaknesses of the studies so that the reader can decide how to use these findings.

Three Level I systematic reviews were identified. Epstein & Hundert (2002) defined “professional competence” and provided some guidance for boards for assessing the competence of health care workers. Greenhalgh (2001) identified 12 prospective randomized studies of medical students for the purpose of evaluating computer-assisted learning. They suggest that computer-based learning can be effective, though the aim should be to use a variety of teaching strategies. Issenberg et al. (2005) conducted a systematic review of high-fidelity medical simulations for learning and found them to be valuable adjuncts to learning when carried out under the right conditions.

Five of the studies provided evidence that qualified faculty were important for teaching nursing students, though there was no literature about specific qualifications. Two studies specifically identified the need to improve students’ confidence levels before they can effectively think critically when caring for patients. Five studies provided evidence that clinical experiences improve students’ abilities to think critically when caring for patients, though there were no studies found that investigated specific numbers of clinical hours. Likewise, there were no studies that evaluated those programs that do not have, or have very limited, clinical experiences. Two studies found that reflective practice was a very important strategy for teaching nursing students to critically think. There were four studies that showed no differences in learning outcomes with online courses versus traditional courses, and one found online courses had significantly better student outcomes, though that particular study was not well controlled and should be replicated. Other research investigated some very specific issues, including:

- Validating the need to evaluate structure, process and results/outcomes when evaluating
- programs.
- Validating personal improvement courses for teaching continuous quality improvement.
- Decreasing environmental noises and distractions in order to enhance learning.
- Problem-based learning, compared to traditional learning, was investigated.
- Provided good guidelines for assisting the faculty members in moving towards a more student-centered way of teaching.
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