Effects of Problem-Based Learning on Clinical Reasoning in Occupational Therapy

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OBJECTIVE. Problem-based learning (PBL) has been described as an educational method that enhances clinical reasoning skills. The purpose of this study was to determine the effects of an intensive, problem-based course on the development of clinical reasoning skills of undergraduate occupational therapy students.

METHOD. A quasi-experimental pretest–posttest design was used with a convenience sample of 48 undergraduate seniors. All students participated in an intensive 5-week, 30-hour, PBL course scheduled just prior to Level II fieldwork. The Self-Assessment of Clinical Reflection and Reasoning (SACRR) developed by Royeen, Mu, Barrett, and Luebben (2001) was administered on the first and last days of the course.

RESULTS. The Wilcoxon Signed Ranks Test revealed statistically significant differences in pre- and posttest scores for 11 of 26 items on the SACRR. In addition, the overall total score increased from 96.88 to 102.55 (p < .01).

CONCLUSION. The results suggest that a short, but intensive PBL course in the senior year of an occupational therapy curriculum can significantly facilitate the development of students’ clinical reasoning skills.
progress toward her or his own goals. PBL uses significant contextualized and actual situations to drive learning. Reasoning and problem-solving skills become lifelong learning skills available to the student after graduation (Caterina & Stern, 2000; Royeen, 1995).

Barrows (1988) describes three components of the PBL case process: problem identification, self-directed study toward problem solving, and analysis of learning and application to practice. Albanese and Mitchell (1993) suggest that students learn by using resources they have accessed themselves. Once the group members have gained the needed information, they begin the process of problem resolution. They discuss options, research the effectiveness of treatments, generate lists of possible solutions, and investigate the appropriateness of these solutions to this case. Students must consider context and personal issues for each client in order to make choices and design appropriate interventions. The analysis component involves the generalization and transfer of this knowledge to other clients. This process is strengthened by comparing their client to other clients for classification of treatment approaches or assessment procedures.

Cumulative learning, when subjects or key points are introduced repeatedly at increasing levels of complexity, is threaded throughout the PBL process. Cumulative learning reinforces key principles and allows for gradual proficiency with higher-level skills and processing. Integrated learning introduces information as it relates to a case and requires clinical problem-solving skills. Integrated learning brings out new issues or twists in the case. For example, the discharge plans for a patient have changed from transfer to a nursing home to return to his residence with his wife. Students must now consider environmental demands, caregiver abilities, and recommended follow-up therapy in this situation. Faculty members develop cases in increasing complexity, with emphasis on integrated and cumulative learning experiences (Grain Communications, 1998).

Studies comparing problem-based curricula to conventional programs in the medical field suggest that PBL curricula provide student-centered learning environments and encourage inquisitive learning rather than rote memorization (Schmidt, Dauphine, & Patel, 1987). Students are responsible for their own learning and actively engage in the learning process with assessments of performance as well as knowledge (Bruhn, 1992). Motivation is increased and retention and transfer are improved (DeBruyn, 1998).

Medical students taught in a problem-based curriculum have demonstrated improved clinical reasoning skills, increased medical knowledge, improved factual knowledge, and improved time management skills (Schwarz, Burgett, Blue, Donnelly, & Sloan, 1997). PBL benefits include built-in motivators and learning to become life-long learners (Donner & Bickley, 1993). Occupational therapy students educated in the PBL format have reported the following benefits from this style of teaching: enhanced professional behaviors, integrating various aspects of their academic program, improved preparation for clinical fieldwork, enhanced clinical reasoning skills, improved self-confidence, and pursuit of self-directed and continued learning (Stern, 1997). However, it is important to recognize that much of the evidence supporting PBL is anecdotal and subjective. In addition, it has been noted that one of the weaknesses of the PBL approach is that students may have a lower level of knowledge of the basic sciences than students in traditional lecture-based classes. Little empirical research has been conducted on the efficacy of PBL in occupational therapy education (Vroman & MacRae, 1999).

Method

The purpose of this study was to determine the effects of an intensive, PBL course on the development of clinical reasoning skills of undergraduate occupational therapy students. A quasi-experimental pretest-posttest design was used with a convenience sample of 48 undergraduate occupational therapy senior students. All subjects participated in an intensive 5-week, 30-hour PBL course scheduled just prior to Level II fieldwork. The Self-Assessment of Clinical Reflection and Reasoning (SACRR), developed by Royeen et al. (2001), was administered to measure changes in clinical reasoning thought processes and behaviors.

The problem-based course in clinical reasoning is a required course in the curriculum and is sequenced just prior to the students’ Level II fieldwork. It was developed as a “capstone” course to facilitate the integration of all of the previous coursework related to clinical practice. Small group case-based tutorials were conducted for 6 hours per week (two 3-hour sessions) for 5 weeks. Each group consisted of 8–10 students in the senior year of an occupational therapy bachelor of science degree program.

Cases included content in the areas of pediatrics, adult physical rehabilitation, mental health, geriatrics, and community-based practice. Students worked cooperatively to identify the problems inherent in each case, to research information, and to report findings back to the group for discussion and analysis. Students served as group facilitators on a rotating basis and the instructor served as a consultant. Students actively participated in teaching one another while the faculty member provided guidance, challenge, and support.

Instrument

The Self-Assessment of Clinical Reflection and Reasoning (SACRR) was developed and tested by Royeen et al. (2001) as a means of evaluating the clinical reasoning skills of occupational therapy and physical therapy students and practitioners. The assessment items are based on Roth’s (1989) hierarchy of 24 behaviors or actions of the reflective process. Considering the SACRR is a relatively new tool, it demonstrates adequate psychometric properties. Measures of internal consistency using Cronbach’s alpha yielded a .87 for the pretest and a .92 for the posttest. The Spearman rank order correlation coefficient for test-retest reliability was an acceptable .60 (Royeen et al., 2001).

The SACRR consists of 26 items (see Table 1) that are rated on a five-point Likert scale with a rating of “5” indicating “strongly agree,” and a rating of “1” indicating “strongly disagree.” Each item addresses a different aspect of clinical reflection and reasoning. According to Royeen et al. (2001), the SACRR can be used to evaluate the effects of different educational methods.
on clinical reasoning. A limitation of this instrument is that it relies on the subject’s self-perception of clinical reasoning skills and behaviors rather than an objective measure of clinical reasoning performance. The SACRR was administered on the first day of the course as a pretest and on the last day of the clinical reasoning course as a posttest to determine changes in clinical reasoning. Data from the SACRR were entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 11.5; SPSS, Inc., 2002).

Results
A total of 48 undergraduate occupational therapy students participated in the clinical reasoning course. The participants ranged in age from 20 to 38 years, and the sample included 6 males and 42 females. Pre- and posttest scores were compared for each of the 26 items on the SACRR using the Wilcoxon Signed Ranks Test for nonparametric data. Of the 26 items, statistically significant improvements were noted on 11 of the items (see table 1). In addition, the students’ total scores (aggregate score for all 26 items) demonstrated statistically significant improvement upon completion of the problem-based, clinical reasoning course. Overall scores improved 5.67 points from 96.88 on the pretest to 102.55 on the posttest. This improvement was statistically significant at the p < .01 level.

Conclusion
The PBL course in this study had a statistically significant effect on students’ self-perception of their clinical reasoning skills and behaviors. Improvements were noted in over 40% of the items and in the total score on the SACRR. These 11 items clustered around three general themes: use of theory in treatment, questioning the potential efficacy of treatment, and use of specific clinical reasoning strategies. The clinical reasoning strategies that were perceived to increase in use included identifying assumptions, developing hypotheses, comparing and contrasting options, and contemplating “what if…” scenarios.

In the development and implementation of this problem-based course, the initial investment of faculty time for curriculum revision, course revisions, case development, and preparation of materials was considerable. However, the increase in students’ clinical reasoning abilities appears to justify the additional time and resources required.

Future studies need to focus on in vivo observation of students’ clinical reasoning skills and behavior, the long-term effects of PBL on clinical reasoning, and the use of control groups to determine the relative benefit of PBL in comparison to traditional learning approaches.

References


