

Evaluation of the Outcome-Present State Test Model as a Way to Teach Clinical Reasoning

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Abstract:

The Outcome-Present State Test (OPT) Model of Clinical Reasoning is a nursing process model designed to help students develop clinical reasoning skills. Although many nurse educators are using the OPT model as a teaching strategy, few are formally evaluating its use as a method. We used the OPT model as a teaching tool in an undergraduate psychiatric and mental health clinical nursing course and evaluated how quickly students became adept at using it. Most students mastered the use of the model; 29 of 43 students achieved the criterion score (a score greater than 65 on 3 or more models completed over 4 weeks). Not only did the students gain clinical reasoning skills, but they also used and learned more about the North American Nursing Diagnosis Association, Nursing Interventions Classification, and Nursing Outcomes Classification languages. Recommendations for future use of the model include adding client strengths and increasing focus on the quality of students' responses.

Article:

One goal of nurse educators is to help students learn to think like nurses. Thinking like a nurse involves knowing what information about a client is needed and how to collect that information (assessment); knowing how to organize the information collected to devise a plan of care (nursing diagnosis); identifying interventions that will help the client achieve desirable outcomes (planning and goal setting); and knowing how to evaluate the care and the client to decide how to help the client reach his or her desired level of health (evaluation). This is, of course, the nursing process. Being able to think like a nurse requires students to learn the language of the profession and how to problem solve or, more specific to nursing, clinically reason. Through the years, nurse educators have written about metacognition (Beitz, 1996; Kuiper, 2002), critical thinking (Facione & Facione, 1996) (for reviews, see Brunt, 2005; Simpson & Courtney, 2002; Turner, 2005), reflective practice (Benner, 1984; Jarvis, 1992; Murphy, 2005), and clinical reasoning (Carr, 2004; Kautz, Kuiper, Pesut, Knight-Brown, & Daneker, 2005; Murphy, 2004; Pesut & Herman, 1998, 1999). All of these are ways of thinking and learning used by nurse educators to identify which strategies best help nursing students learn to think like nurses. Yet, it is still unclear how best to teach students to develop these skills. There is debate about the meaning of these terms and the importance of each in the teaching-learning process.

Pesut and Herman (1998) proposed the Outcome- Present State Test (OPT) model as a tool to help nursing

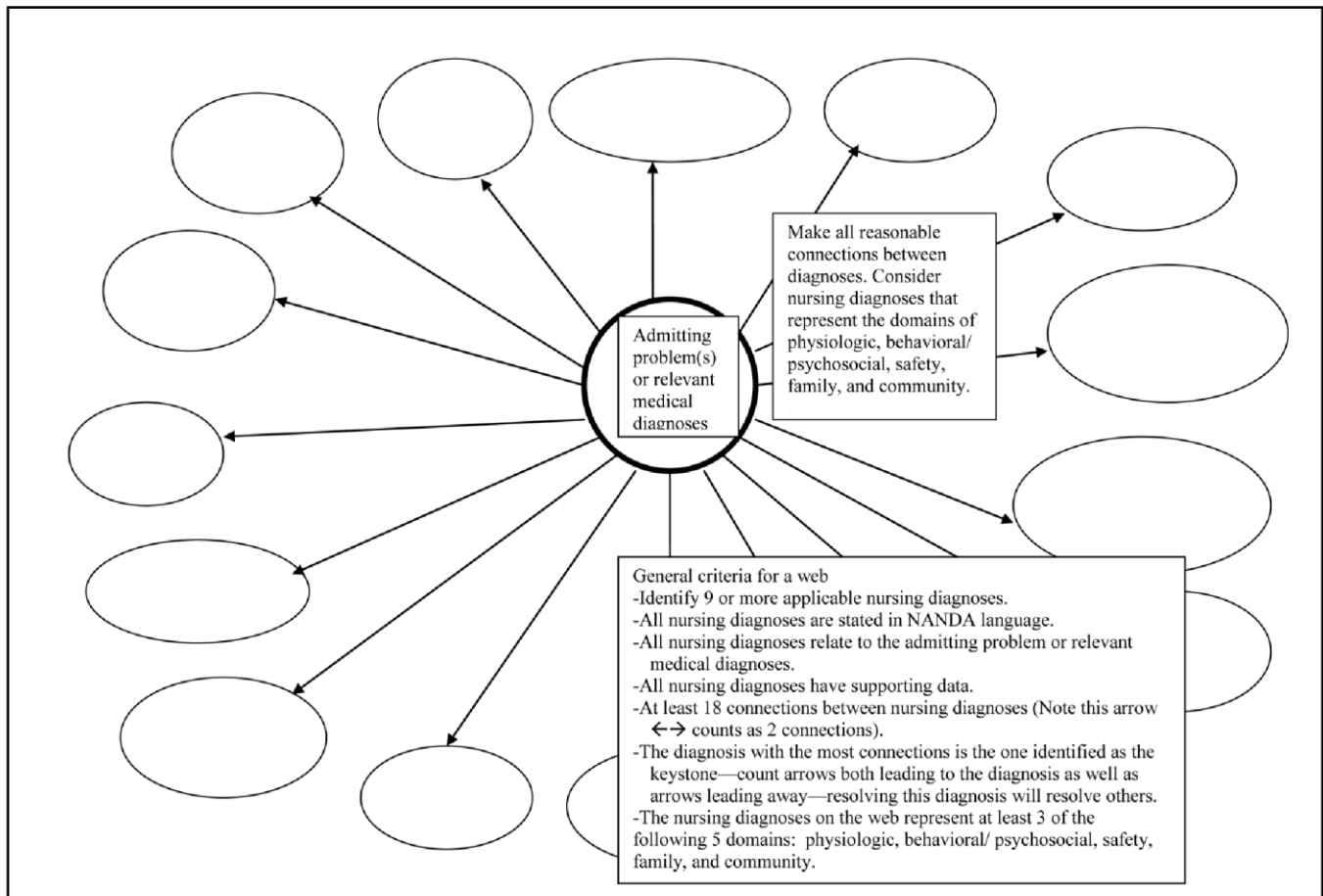


Figure 1. A teaching tool developed by the authors to assist students in completing the clinical reasoning web (Pesut & Herman, 1999). The criteria faculty use when evaluating a student's work are provided.
 Note. NANDA = North American Nursing Diagnosis Association.

students develop clinical reasoning skills. They described their model as a “third generation nursing process model” (p. 30). Pesut and Herman (1998) defined clinical reasoning as “the reflective, concurrent, creative, and critical thinking embedded in nursing practice” (p. 31). The OPT model requires students to use all of the elements of the nursing process and to build on prior knowledge in an iterative fashion to further hone nursing thinking skills. Although the OPT teaching method has been used in a variety of settings (Kautz et al., 2005; Reising, 2004), few studies formally evaluate student use of the model. This article reports a study designed to quantify the abilities of students in an undergraduate psychiatric-mental health nursing course to complete the cognitive activities used with clinical reasoning webs and the OPT model.

THE OPT MODEL

The OPT model (Pesut & Herman, 1999) focuses on outcomes and encourages backward thinking to move the client from his or her current health status (present state) to the desired (outcome) state. The components of the OPT model include the client-in-context story, keystone issue, cue logic, reflection, framing, testing, decision making, and judgments. A clinical reasoning web is another component of the process. The clinical reasoning web and OPT model can be seen in Figures 1 and 2. (For a complete description of the OPT model and its many parts, see Pesut & Herman, 1999).

Students complete the OPT model during and after data gathering, from both their client and other sources (e.g., family, laboratory reports), using an iterative and reflective process. Client information is noted on the OPT model worksheet in the client-in-context story section. Next, based on the information gathered in the assessment process, students identify all actual or potential North American Nursing Diagnosis Association (NANDA) diagnoses for their client and note these on the clinical reasoning web, along with the defining

characteristics that led them to include each diagnosis. After including all diagnoses, students connect these diagnoses with either one-pointed or two-pointed arrows, reflecting the relationships of each problem to the other problems. Pesut and Herman (1999) referred to this process as webbing. A one-pointed arrow is directed from a problem deemed to contribute to another identified problem. A two-pointed

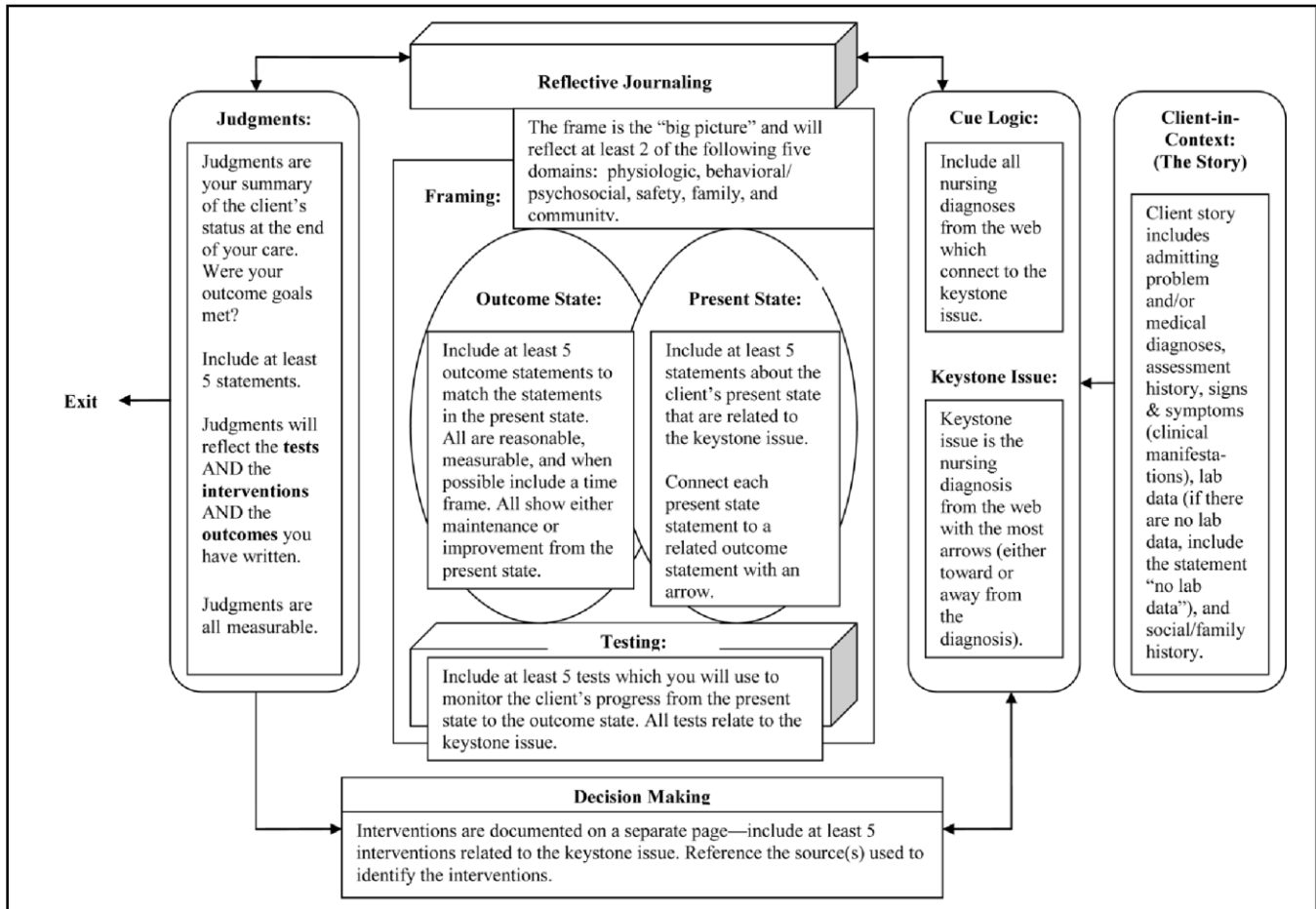


Figure 2. A teaching tool developed by the authors to assist students in completing the Outcome-Present State Test model (Pesut & Herman, 1999). The criteria faculty use when evaluating a student's work are provided.

arrow is used for problems deemed to contribute to each other's existence in a client. This is an important stage in the process because it leads to identification of the client's keystone issue, as students next count the arrow points for each nursing diagnosis. A diagnosis gets one point for each arrow directed toward and each arrow directed away from it. The nursing diagnosis with the most points is identified as the keystone issue for the client. Identifying the keystone issue is the first step in the clinical reasoning that arises from all the potential or actual problems identified from the client-in-context story. According to Pesut and Herman (1999), addressing the keystone issue with nursing interventions and helping the client resolve the keystone issue offers the potential to resolve other related nursing diagnoses.

Cue logic, a section of the model completed by students, involves capturing all other nursing diagnoses derived from reflecting on the context of the client's story (except the keystone issue). Framing is the process by which students gather all the background information from the client to derive a broad perspective on important issues or events relevant to the client's current condition. Framing of the situation allows for comparison of the present states and outcome states and helps students see the big picture, or frame, when providing care. The frame is written on the OPT model worksheet, which gives a structure to the thought processes involved in clinical reasoning (Pesut & Herman, 1999). The framing step in clinical reasoning is unique to the OPT model.

The present states are the client's presenting conditions, which are derived from the keystone issue, cue logic, and client-in-context story. Outcome states are optimal health states, formulated from the present health states. Comparisons of the present states and outcome states leads to evaluation of the gap between the two, which is used to determine actions to bring about the desired state. Ideally, the student should choose an indicator from a relevant Nursing Outcomes Classification (NOC) for the suggested diagnosis to form the outcome statement (Moorhead, Johnson, & Maas, 2004). Helping the client reach a desired state involves clinical reasoning and selection of appropriate interventions.

The decision making reasoning step involves making judgments about the strategies the nurse must use to help the client move from the present states to the desired outcome states. Ideally, these strategies would be Nursing Interventions Classification (NIC) activities from a suggested NIC for the selected diagnosis (Dochterman & Bulechek, 2004). The NIC activities help clients move from the present states to the desired outcome states (Johnson et al., 2006).

Tests are used to determine whether the interventions are correct, whether the keystone issue was correctly identified, and whether the client is moving toward the outcomes identified. The tests are used to make judgments about whether the nursing care is appropriate and the client is progressing toward the desired health state, or whether the model and thus the care need adjustment. The clinical reasoning web and OPT model depicted in Figures 1 and 2 include the instructions for completion that were given to students. These instructions were not a part of Pesut and Herman's original web and OPT model but were developed for use with students, related to this study. Students were instructed to provide minimum numbers of responses in each area of the web and model.

According to Pesut and Herman (1999), the most significant difference between the OPT model and earlier clinical reasoning and care planning methods is that this model emphasizes framing the client's story. For example, if a client has suicidal ideation, the way the nurse thinks about the situation may change if the nurse knows the client is hearing voices encouraging him or her to self-harm, if the client abuses illegal substances, or if the client has experienced a recent loss of a loved one due to death. These differences in the frame of the client's story significantly change planning and interventions for the client and, probably, the keystone issue. Clearly, all aspects of the model must be considered on the basis of the client story.

According to Reising (2004), one of the few educators whose work with the OPT model has been published, the model can be useful for students in a classroom setting even though it was developed for students' use in clinical settings when actually working with clients. Reising noted that when students use backwards thinking to move the client from the present state to the desired outcome state, this promotes metacognition, or the ability to engage in reflective critical thinking. According to Johnson et al. (2006), the OPT model is a strategy for teaching clinical decision making by use of NANDA, NIC, and NOC (NNN) language and their linkages. Thus, using the OPT model to teach clinical reasoning also teaches nursing language (NANDA, NIC, NOC) to students. Kautz, Kuiper, Pesut, and Williams (2006) studied students' use of NNN language when completing clinical reasoning webs and OPT model worksheets in a clinical practicum. They found that use of the clinical reasoning web and OPT model promoted use of NNN language.

Since the publication of Pesut and Herman's text *Clinical Reasoning: The Art and Science of Critical and Creative Thinking* in 1999, several schools of nursing have adopted the OPT model as a strategy to help students learn to think like nurses. However, the study by Kautz et al. (2005) is one of the few evaluation studies using the model. In that study, generic BSN students (N = 23) enrolled in a junior-level adult health (medical-surgical) nursing course completed clinical reasoning webs and OPT model worksheets on one client in a medical-surgical acute care unit each week for a minimum of 7 weeks. Faculty rated each section of the student's clinical reasoning webs and OPT model worksheets as either present or not present and gave the students feedback each week. Kautz et al. (2005) found that students learned all sections of the OPT model quickly, often within the first week or two of the clinical practicum. Framing was the hardest part of the model for students to learn. However, the authors recommended development of a rating scale (guidelines) for evaluating

student models. Kautz and Kuiper subsequently developed a rating tool, which was used in the current study, for use with the clinical reasoning web and OPT model (Table 1). The purpose of this study was to determine whether students in an undergraduate psychiatric-mental health nursing course could learn to complete the cognitive activities used with clinical reasoning webs and the OPT model. An assumption of this study was that the OPT model is a tool to teach clinical reasoning to nursing students (Pesut & Herman, 1999).

METHOD

Students in this study completed an OPT model and clinical reasoning web on one case study, before and after their clinical experiences in the course. In addition, during each week the students were assigned a client in the clinical setting, they completed an OPT model on that client. All models were scored using the rating tool depicted in Table 1. Descriptive statistics, correlations, and t tests were used to analyze the findings.

Sample

The sample consisted of students in an undergraduate psychiatric-mental health nursing course, recruited during one semester when the OPT model was used as a teaching strategy, who gave written consent for their models and demographic information to be included in an analysis of the model's effectiveness. Of the 45 stu-

TABLE 1
The Outcome-Present State Test (OPT) Model Rating Scale with NNN Criteria

Item	Total Possible Points	Week					
		1	2	3	4	5	6
Web							
1	5-9 NANDA (5 = 1 point, 9 = 5 points)	5					
2	5-9 NANDA have supporting data (5 = 1 point, 9 = 5 points)	5					
3	10-18 connections between NANDA (10 = 1 point, 18 = 5 points)	5					
4	NANDA related to admitting problem or medical diagnoses	1					
5	Connections lead to keystone	1					
6	NANDA represents at least 3 domains (1 point for each domain): physiologic, safety, family, behavioral/psychosocial, or community	3					
OPT model worksheet							
7	Client-in-context (CIC) story includes admitting problem or medical diagnoses	1					
8	CIC story includes assessment history	1					
9	CIC story includes signs and symptoms (clinical manifestations)	1					
10	CIC story includes laboratory data (values and interpretation or "no lab data")	1					
11	CIC story includes social/family	1					
12	KEYSTONE is NANDA diagnosis	1					
13	5 PRESENT STATE statements (specific behaviors) related to KEYSTONE (1 point each)	5					
14	5 OUTCOME STATE statements reflect improvement from PRESENT STATE or maintenance of PRESENT STATE (1 point each)	5					
15	5 OUTCOME STATE statements related to KEYSTONE—are measurable, realistic, and have time frame for reaching outcome (1 point each)	5					
16	5 INTERVENTIONS (decisions) related to OUTCOMES, each with rationale (1 point each)	5					
17	INTERVENTIONS are referenced	1					
18	5 TESTS related to outcomes (1 point each)	5					
19	JUDGMENTS include 5 statements (1 point each)	5					
20	JUDGMENTS include 5 statements which reflect TESTS (1 point each)	5					
21	JUDGMENTS include 5 statements which reflect INTERVENTIONS (1 point each)	5					
22	JUDGMENTS include 5 statements which reflect OUTCOMES (1 point each)	5					
23	FRAME reflects at least 2 of the following 5 domains: physiologic, behavior/psychosocial, safety, family, community (1 point for each domain)	2					
Total		74					

Note. Adapted from Kautz and Kuiper. The tool is a work in progress. The authors suggested that faculty adapt it to meet their particular needs. NNN = NANDA, NIC, and NOC; NANDA = North American Nursing Diagnosis Association; NIC = Nursing Interventions Classification; NOC = Nursing Outcomes Classification.

dents in the undergraduate psychiatric-mental health nursing course, 43 participated. Two students were absent on the day informed consent was obtained, and their work therefore was not included in the analysis. Institutional review board approval was obtained prior to use of the students' work for this study. The students' mean age was 24.95 years (SD = 3.88 years), and they worked a mean of 10.75 hours (SD = 11.79 hours) per week and took 12.47 credit hours (SD = 1.10 credit hours) of course work. By self-report, the students' mean grade point average was 3.69 (SD = 0.228) of a possible 4.0.

TABLE 2
Data for Students Who Did and Did Not Meet
the Criterion^a and Difference in Scores Between
Pretest and Posttest

	Criterion Met	<i>n</i>	Mean	<i>SD</i>
Pretest	No	14	59.21	7.26
	Yes	29	58.34	8.66
Posttest	No	14	66.86	3.32
	Yes	29	66.17	6.04
Difference	No	14	7.65	6.90
	Yes	29	7.83	10.48

^a The criterion score was a 64 on 3 or more Outcome-Present State Test models completed over 4 weeks.

Procedure

All students in the course were taught the OPT model and how to use it through an in-class discussion, followed by a cooperative demonstration of the model (the entire class participated in a sample model's development). After being taught how to use the OPT model and clinical reasoning web (using the web and OPT model in Figures 1 and 2), students were given a pretest case study on which to complete a model and web, prior to any psychiatric and mental health nursing clinical experiences in the course. Then, students were asked to complete OPT models on their assigned clients in the inpatient clinical setting until they had achieved a score of greater than 65 of 74 points, as measured using the rating tool, on three or more OPT models over a 4-week period during a 15-week clinical course. This criterion score used to reflect mastery of the OPT model was determined by a panel of expert psychiatric and mental health nurses.

On each weekly OPT model completed on an actual client in clinical, students were given written feedback on their models, including direction on how to improve the models. After all clinical experiences were completed, students were asked to complete an OPT model on the same case as in the pretest. No feedback was given on either the pretest or posttest case study.

The students' OPT models and clinical reasoning webs were rated using the OPT model rating tool depicted in Table 1. The rating tool was designed to quantify a student's ability to complete the cognitive activities used with clinical reasoning webs and the OPT model. The tool was designed so faculty could detect a student's level of thoroughness in completing each component of the model by counting the number of comments written under each section, and so faculty could assess the quality of the student's work by discerning whether all components of the model were related to each other. Students could earn from 0 to 74 total points for their work, with 0 to 5 points possible for most sections of the tool to mirror a Likert-type scale. In addition, a heavy emphasis (20 points) was placed on a student's ability to make judgments about the effectiveness of their interventions, appropriateness of their goals (outcome statements), and progress of the client toward meeting the goals (tests). Thus, judgment (evaluation) of care as a key piece of the circular aspect of clinical reasoning was emphasized.

To ensure consistency in the grading and scoring of the students' OPT models, all faculty (N = 5) involved in OPT model scoring and evaluation were trained in the use of the model and in scoring the model using the rating tool. Faculty also engaged in regular reliability checks. They met initially and scored several tools, compared scores, and discussed the rationale for decisions. Agreements were reached about how to handle situations in the future, and all decisions were documented. Throughout the time when the model was used as a teaching strategy, faculty met monthly to perform continuing reliability checks with each other, to avoid rater drift over time. Interrater reliability improved over time. Although not all faculty were present at each meeting,

during the first test scoring, four scorers were within 7 points of each other; at the second meeting, three faculty were within 5 points on two different test models; and at the third meeting, four faculty were within 4 points on one test model and within 1 point on another test model. The pretests and posttests using the standardized case study were scored after the semester ended. In two reliability checks of this scoring, four reviewers (two faculty and two graduate students who had been trained in scoring the OPT models) achieved scores within 3 points (69 to 71) on one model and within 4 points (65 to 68) on another, reflecting a high degree of interrater reliability in the scoring of both the monthly checks and the pretest and posttest OPT models.

RESULTS

Of a possible score of 74, the students' mean scores were 58.62 (SD = 8.15) on the pretest case study and 66.39 (SD = 5.28) on the posttest case study. A paired sample t test revealed a significant difference ($t = -5.439$, $df = 42$, $p < 0.001$) between the pretest and the posttest scores, indicating that students' ability to complete the model improved over time.

Of the 43 students who participated in the study, 14 students did not achieve the criterion score established as reflecting success in learning to use the OPT model (a score greater than 65 on 3 or more OPT models completed over a 4-week period). However, of these 14 students, 93% did reach a score greater than 65 on at least one of their models, and 64% attained a score greater than 65 on two of their models. Only one student never reached a score of greater than 65 on any models; however, this student achieved 65 on two models. No significant correlations were observed between any of the students' demographic variables and the speed with which the students achieved the criterion score. Table 2 provides the mean pretest and posttest scores for the 14 students who never met the criterion, as well as for the 29 students who did achieve the criterion. Of note, those who did not achieve the criterion had slightly higher mean scores on both the pretests and posttests, but the mean difference score between their pretest and posttest scores was slightly lower than that of those who achieved the criterion. As evidenced by the standard deviations, sometimes there was a wide spread in scores across the groups.

DISCUSSION

According to Pesut (2004), the OPT model is a model of reflection that promotes the management of client problems by examining present states or problems and outcomes simultaneously in a side-by-side comparison. This comparison leads to the identification of a keystone issue and results in the identification of desired outcomes for the problems. Interventions are identified and adopted, and then all aspects of the model are evaluated and included on the OPT model worksheet. Pesut suggested that the OPT model supports creative, critical, and circular systems thinking and helps students use NNN standardized nursing language. According to Pesut (2004), using NNN language along with the OPT model, students can achieve a higher level of thinking and effectively help their clients obtain desired outcomes.

Between the beginning and the end of the psychiatric- mental health nursing course in which the OPT model was used as a teaching strategy, students' ability to complete the model improved. Because the students gained in their ability to use the model, we believe they demonstrated improved ability in reflective clinical reasoning. However, further research is required to confirm that the OPT model is effective in developing nursing students' critical thinking and clinical reasoning skills. Few, if any, objective measures of clinical reasoning are used with nursing students. The rating tool in Table 1 was designed with the judgments sections more heavily weighted to focus on evaluation and the quality of the students' models. It was also designed to quantify the students' cognitive activities embedded in completing the clinical reasoning webs and OPT model worksheets. However, we did not use an additional tool to concurrently measure the students' clinical reasoning abilities and thus do not know whether quantifying a student's ability to complete clinical reasoning webs and OPT model worksheets is a valid method of measuring clinical reasoning skills.

Developing clinical reasoning skills is clearly a process for students. This study reflects the first time students in the psychiatric and mental health nursing course used this model during their nursing education. Given that approximately one third of the students in this study did not master the use of the OPT model on the basis of the

criterion set, perhaps subsequent nursing courses need to build on the foundational information taught during the psychiatric-mental health nursing course. This would allow students to continue to practice the skills required to complete a clinical reasoning web and OPT model.

The tool shown in Table 1 scores the number of NANDA diagnoses, present state statements, outcome state statements, tests, interventions, and judgments. The tool also rates whether all of these elements are related. However, the tool does not rate the quality of each decision the student makes or whether the interventions or outcomes are the best or most appropriate for a client. As psychiatric and mental health nursing instructors, we were frustrated with counting numbers of entries on the webs and OPT models. We are used to evaluating students' thinking through assignments such as interpersonal process recordings and other tools that provide a clearer view of what and how the student is thinking. We recommend faculty continue to develop tools to measure students' abilities to reason in their clinical practicums and test them with other tools to establish concurrent validity.

Strengthening the connections between all of the areas of the model—expecting students to make strong ties between their present state statements about their client, the desired outcome states, the interventions to be used to help the client achieve the desired outcomes, the tests used to measure the progress of the client in achieving these outcomes, and judgments about how well the model has worked—would add to students' learning. This could be done during a 1-day per week clinical experience by having students arrive at the clinical experience with their objective data already gathered (the student would have to come to clinical in advance of the actual experience to gather the data). Then the student and faculty member could together complete the model, and faculty could validate the student's thinking. For faculty to evaluate the student's ability to clinically reason, they need firsthand knowledge about the client for whom the model was developed.

There may be ways to streamline the model so it is less time consuming for the students (a common complaint from the students). Prompts should be added to the model to ensure that students identify client strengths, which then should be the focus of the nursing interventions and outcomes.

IMPLICATIONS FOR EDUCATION AND PRACTICE

In the past decade, the use of NNN nursing language has found a place in both nursing education and nursing textbooks (Keenan, Killeen, & Clingerman, 2002). This nursing language is also gaining momentum in the area of electronic patient charting. According to Lunney (2006), the electronic patient record will soon be implemented across the country, and it requires the use of NNN language. The OPT model and worksheets are a way to tie these NNN components together as a framework or template. The OPT model could become an electronic template from which to work in gathering and charting pertinent information about the client in context. Johnson et al. (2006) advocated that nurses will require knowledge of NIC, NOC, and the OPT model to be competent in decision making research and evidence-based practice. Thus, the model may be important not only for nursing students, but for nurses in practice as well.

IMPLICATIONS FOR RESEARCH

This study has indicated overall that undergraduate psychiatric-mental health nursing students quickly master the ability to complete the OPT model with either a case or an actual client. However, the OPT model needs to be compared with other strategies that promote clinical reasoning to test its criterion validity. Measuring nursing students' critical thinking outcomes using a tool such as the California Critical Thinking Dispositions Inventory (Facione, Facione, & Sanchez, 1994) would be a useful comparison with outcomes from the OPT model. In addition, testing the model with students in other clinical settings such as pediatric and mother-baby settings could lead to refinements of the model and the rating tool, and refinements to the model need to be tested to ensure they improve the teaching of clinical reasoning to students.

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