Pacific Rim International Journal of Nursing Research

Concept Mapping: An Effective Strategy for Clinical Teaching in Nursing

The clinical practice component of nursing education is a dynamic, constantly changing, real-life environment in which nursing students have to integrate theoretical knowledge into practice based on the nursing process. Critical thinking is a core competency of baccalaureate nursing education. Concept mapping is an active learning and teaching which helps nurse educators to develop critical thinking and problem solving.[1] It has been suggested as a learning strategy to encourage nursing students to think critically[2] as it stimulates the use of thinking skills such as analysis, inference, and evaluation, thus encouraging the development of critical thinking.[3,4] This article plays a key role as a clinical teaching strategy among baccalaureate nursing students.

Concept mapping

Thirty years ago, Novak and Godwin developed concept maps based upon Ausubel's assimilation theory within meaningful theory in 1984.[5,6,7] Novak promoted meaningful learning by creating concept mapping to represent an ideational framework specific to knowledge domain. Concept mapping involves making diagrams showing the relationships between concepts, which are connected with labelled arrows, in a downward-branching hierarchical structure.[6] Steps in a concept mapping process in health include 1) selecting the client and analyzing their data 2) identifying and placing the main concept at the top of the map, 3) identifying sub-concepts 4) tying the main and sub-concepts together with linking words that have meaning, 5) looking for cross-linkages between the main and sub-concepts, and 6) discussing, sharing, thinking about, and revising. At present, concept mapping can be created by CampTools, software that is available at no cost on http://cmap.inmc.us.[7] In healthcare education, especially nursing, several researchers have found that concept mapping is a powerful strategy to promote meaningful learning. [6,7]

Concept mapping and critical thinking

Critical thinking is an essential competency for professional nursing practice in baccalaureate education.[1] Appropriate critical thinking is necessary for today's nurses in making decisions that improve the quality of nursing care.[8] Among several strategies that promote critical thinking skills in nursing students, concept mapping has been used in all levels of nursing education. This mapping not only allow nursing faculty to evaluate the students' understanding of the complex patient care needs, but also promotes critical thinking in clinical setting.[9,10]

Concept mapping in clinical teaching

In 2012, Sinatra-Wilhelm supported that the concept mapping technique enables critical thinking skills in nursing students with a study comparing the impact of using nursing care plans and concept mapping on enhancing critical thinking skills among sophomore baccalaureate nursing students in medical-surgical clinical rotations. The research tool was The California Critical Thinking Skills Test. The findings confirmed that the concept mapping technique can improve critical thinking skills in the clinical practice better than a nursing care plan does.[11]

In a recent study, achievement in teaching was demonstrated using a case study method combined with concept mapping to work on the ability development of nursing process in clinical settings among nursing students, compared with using nursing care plans.[12] The findings showed that this concept mapping strategy was superior in improving the students' ability development of the nursing process. Moreover the students had high satisfaction levels due of an increase in their critical thinking, active learning, and clinical problem solving.[12]

A systematic review of 13 trials and meta-analysis of 11 about the effectiveness of concept mapping on developing critical thinking in nursing education was conducted.[9] The pooled effect size found that compared with traditional methods of teaching, concept mapping could improve subjects' critical thinking ability measured by California Critical Thinking Disposition Inventory (CCTDI), California Critical Thinking Skill Test (CCTST) and Critical Thinking Scale (CTS). The subgroup analyses showed that concept mapping improved the score of all subscales. The result of this review indicated that concept mapping could affect the critical thinking affective dispositions and critical thinking cognitive skills.[9] The traditional nursing care plan is a linear format based on nursing process. This format format inhibits nursing students from viewing the whole picture of patient needs, for the nursing process is a dynamic activity not a linear activity as a nursing care plan is.[11] All this supports why concept mapping should be used with nursing students.

In our experiences with third-year baccalaureate nursing students in a medical-surgical clinical rotation (adult nursing), a small group of 6-8 students practice for three days a week for four weeks. We use a concept mapping method to teach them to create a plan of care for their assigned patients.. The students are introduced and practice developing concept maps based on nursing process in the classroom using case studies. After receiving a brief overview about concept mapping process and examples, they are asked to develop a one-page concept map in the form of nursing diagnoses, purposes, supporting data, outcome criteria, and interventions. In addition, the students have to prioritize the nursing diagnoses and show linkages and relationships between them. During these clinical days, each student gives care to their assigned patient for three days in row. They are asked to develop a one-page concept mapping of their case assignment individually and present their concept mapping in pre- and post-conference. Moreover they analyze and explain their concept mapping with the nursing instructor. On the last clinical days in the fourth week, they are asked to give feedback regarding their experiences on the concept mapping process of clinical teaching. Developing concept mapping is a new experience for all of the students. They indicate both positive and negative feedbacks in their new practice journeys. The positive feedback includes that they:

1) can see a plan of care in a whole picture;
2) feel very interested, are motivated to think and reason out better, and have an enhanced holistic approach;
3) can give a clear understanding of nursing diagnoses and interventions;
4) are encouraged to critically think and believe their thinking process has changed;
5) consider that making a nursing plan this way is less time consuming than using traditional care planning;
6) have increased chances to share and care within the group;
7) communicate more with the other students and their nursing instructor; and
8) are given an excellent way of creating a plan of patient care including interpreting problems.

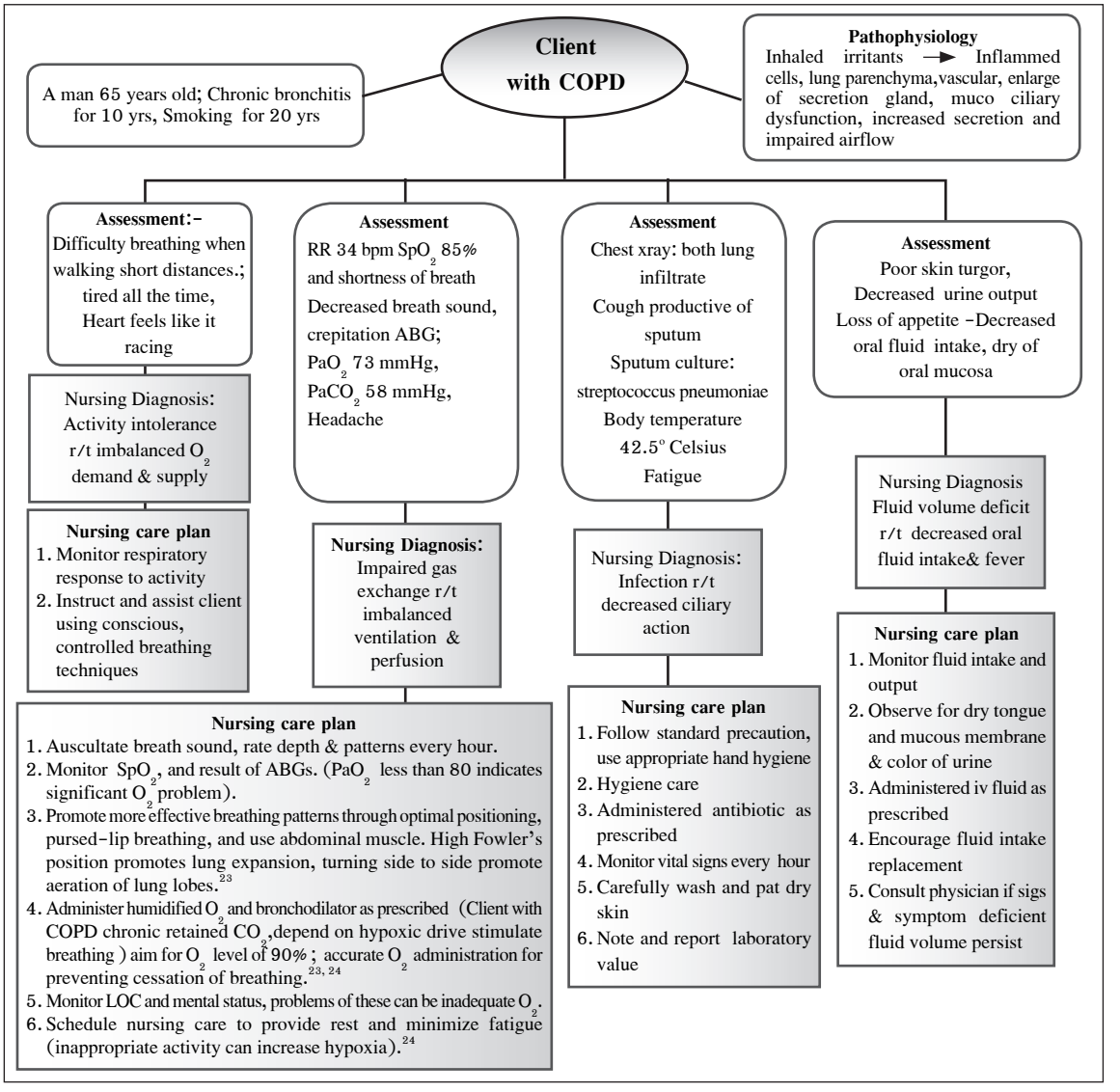
Commonly many of our nursing students express comments like "We should learn this method since the first day that we begin our practice on the clinic, you know!" Three students stated "Everything in one page is much better than so many pages of a nursing care plan." Another two students said, "We have to think and rethink, read and reread again and again before putting them all in a picture. It is not easy but worthy." All of them agreed that the nursing instructors are really helpful. The negative student feedback on care planning using concept mapping included:

1) struggling with the nursing diagnoses;
2) difficult to create in the beginning; and
3) having to study many textbooks for one map.

Although most of the students feel at the beginning that creating a concept map is very hard, by the end of the fourth week after they have been motivated, encouraged, and had their minds opened, they perceived that the concept mapping strategy gives them very meaningful learning experiences. And we as nursing instructors who

teach in both the classroom and clinical practice, have learned from experiences with students that the teaching strategy is worthy for nursing instructors as well. This teaching strategy enhances instructors′ ability to clearly identify the level of knowledge and understanding that our students have associated with their assignments. Also, best of all, this strategy encourages the instructors to better understand students' thinking.

An example of concept mapping in clinical teaching is shown in Figure 1 to depict the nursing process for a client with obstructive pulmonary disease (COPD).



Note; r/t= Related to; RR = Respiratory Rate; bmp= breaths per minute ; LOC = Level Of Conscious SpO_2 = pulse oximeter oxygen saturation; PaO_2 = Partial pressure of arterial oxygen, $PaCO_2$ = Partial pressure of arterial carbon dioxide

Figure 1: Concept mapping in client with COPD

Conclusion: Concept mapping should be considered as a modern approach in clinical teaching of nursing students for it is an excellent tool to enhance critical thinking in their practice. It is essential students should grow and graduate with critical thinking skills, so they can provide quality nursing care in the profession. Finally, in order to progress concept mapping as a strategy taught in all baccalaureate nursing programs, the following questions need to be examined by nurse educators across Thailand and other countries by in-depth research:

Can the transition of nursing students to professional nurses be facilitated by the concept mapping strategy?

How does being able to utilize concept mapping in theory and practice relate to student success on the nursing licensing examination?

Correspondence to:

Wichitra Kusoom, RN, MS, MPA, Associate Professor, Faculty of Nursing, Bangkokthonburi University, Thailand. Email: vikkusoom@yahoo.com

Ratana Charuwanno, RN, PhD, Assistant Professor, Kuakarun Faculty of Nursing, Navamindradhiraj University, Thailand. Email: ratanach@yahoo.com

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