The effect of concept mapping on clinical decision making skills of ICU nurses

Fakhri Dokht Akbari[1*], Malahat Nikravan Mofrad[2] and Azam Dabirian[2]

[1]Department of Nursing, Para Medicine Faculty, Behbahan University of Medical Sciences, Behbahan, Iran and [2]Department of Medical & Surgical Nursing, Faculty of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract: *Introduction:* Concept mapping is an innovative tool that would help hospital educators and nurses to promote their knowledge and clinical decision making skills. The aim of this study was to investigate the effect of concept mapping on clinical decision making skills of nurses working in the intensive care unit (ICU). *Methods:* The quasi-experimental, non-equivalent control group, pretest-posttest design was conducted among baccalaureate nurses working in an intensive care unit. Forty two nurses were recruited and data gathering was performed through a self-administered questionnaire. Statistical analysis was conducted by SPSS software package version 16.0. *Results:* Despite the significant difference between the mean pre-, post- and retention test scores (P<0.001), there was no significant correlation between these results and the nurses' gender. A negative significant association was found between age and improved post test scores (P=0.02). Work experience had a significant positive effect on post test score improvement (P<0.001). *Conclusion:* This study revealed that the concept mapping strategy had a significant effect on the clinical decision making skills of nurses. However, further research on a larger sample size is recommended to confirm the results.

Keywords: concept mapping, clinical decision making, intensive care unit nurse.

Introduction

Healthcare system is one of the most essential organizations with hefty budgets assigned to improve care quality and design sophisticated research to develop new and more effective medication, medical devices, and procedures. One main objective behind all these efforts is to help the medical team provide the patient with the most efficient care [1]. The nursing team play a crucial role in providing quality care as their decisions in particular situations may affect the patients' outcome. In other clinical decision making is a vital component of nursing practice that provides a well established correlation among unique processes that involve the interplay between knowledge of pre-existing pathological conditions, patient information, nursing care and experiential learning [2].

Clinical decision making is a vital component of nursing practice that provide a well established correlation among unique process that involves the interplay between knowledge of pre-existing pathological conditions, patient information, nursing care and experiential learning. Clinical decision making is a process that nurses undertake on a daily basis when they make judgments about the care that they provide to patients and management issues. As nurses become more experienced as care providers, the process becomes easier and more manageable and the forms of decision making become increasingly intricate [3]. Hence, from researchers' point of view, reasoning, critical thinking and problem solving are essential skills for nurses [4].

It is obvious that high quality nursing care requires well-educated nurses. This is while nursing students and novice nurses are not trained to translate their knowledge into practice and lack required decision-making and thinking skills, and at the same time hospitals do not have enough time and resources to train them [5]. Concept map is an effective strategy and a creative educational method to facilitate meaningful learning and enhance critical thinking and communication skills among nursing students [6-8]. The two-dimensional and schematic instrument was initially proposed by Novak and his

colleagues at Cornell University to improve the students' understanding of scientific concepts [9]. Concept drawing consists of nodes and lines. Every node represents a concept and the connecting lines indicate the relation and theorems between the two groups. In this regard the principal and comprehensive concepts are placed at the top, whereas the less important concepts are placed in lower levels (or surroundings) [10-16].

In view of the fact that meaningful learning is reported to be more effective than rote learning, the technique could be considered as an innovative tool for hospital and nursing educators to promote their knowledge and clinical decision making [8], as it enables novice nurses to think critically and form the relation between their patients' signs, symptoms, treatments, and interventions and develop the most efficient clinical decision [17, 18]. While the technique has shown successful results in the clinical setting, to our knowledge no study has evaluated its effects on clinical decision making in busy medical admission units such as intensive care where nurses face a different set of decision challenges [7, 19]. The present study was therefore designed to investigate the effect of concept mapping on clinical decision making skills in the Intensive Care Unit nurses.

Material and Methods

The quasi-experimental, non-equivalent group design was adopted for the pre-test, post-test study conducted among baccalaureate nurses working in the intensive care units of teaching hospitals affiliated to Ahvaz University of Medical Sciences, Khuzestan, Iran. 42 (7 males and 35 females) with a mean age of 30.63 ±3.57 years (ranging from 26 to 40 years) and a mean work experience of 6.89±3.57 who were in intensive care unit were invited to the study. The study was approved by the local ethics committee and a written informed consent was obtained from all the nurses.

In order to study the effects of concept mapping on clinical decision making, nurses were invited to attend the classes. During the sessions, the nurses were taught to design concept maps of the assigned topic based on their knowledge, experience and available articles and books. They were asked to create the maps using simple

examples, elaborate on the concepts, clarify misconceptions and share their experience through building concept maps reflecting the main objective of the orientation program to determine the clinical decision making in medical encounter in a visual form.

A pre- and post-test was taken at the beginning and end of every session. The retention test was taken four weeks after the last session. The questionnaire consisted of two main parts: the first section included questions on demographic characteristics and the second part on approach to mechanical ventilated patients according to PMP test (patient management problem), which is a valuable test to evaluate clinical decision making skills. The content validity of the questionnaire was verified by an expert panel, whereas its reliability was confirmed with in a pilot study (Cronbach alpha reliability coefficient = 80 percent).

Statistical analysis was conducted by SPSS software package version 16.0. Mean and standard deviation was calculated and T-test was used to determine the difference between the scores. P-values lower than 0.05 were considered as significant.

Results

Forty two nurses (7 males and 35 females) with the mean age of 30.63 ±3.57 years (ranging from 26 to 40 years) were recruited from teaching hospitals affiliated to Ahvaz University of Medical Sciences, Khuzestan, Iran. Their mean nursing work experience was about 3.39±2.35 years, ranging from 1 to 9 years. Mean pre test score was reported to be lower than that of both post- and retention tests (48.98 Vs 71.25; P<0.001, and 48.36 Vs 68.24; P<0.001). Despite a significant difference between the pre-, post-, and retention test results (P-value<0.001); the difference was not correlated with the nurses' gender (Table 1, 2, 3).

This is while a significant association was reported between their age (P-value =0.02), work experience (P-value<0.001) and progress noted in the post-test scores (Table4).

Table-1: Pre, post and retention test scores in male and female nurses					
Score	Women Mean ± SD	Men Mean ± SD	t	Df	P value
Pre-test	48.36± 8.89	44.71± 10.93	1.45	44	0.15
Post-test	71.12± 9.27	71.83± 10.79	-0.17	42	0.86
Retention test	68.24± 9.66	70.83± 8.93	-0.71	40	0.48

Table-2: The comparison of pre-test mean scores with post test mean scores				
Pre-test mean scores	Post test mean scores	t	Df	P value
48.98	71.25	-17.03	41	<0.001

Table-3: The comparison of pre-test mean scores with retention test mean scores				
Pre-test mean scores	Post test mean scores	t	Df	P value
48.98	68.24	-14.68	41	<0.001

Table-4: Correlation between the age and work experience and the pre- and post-test results of the studied nurses		
Variable	Progress of pre and post test score	P value
Age	-0.34	0.02
Work experience	-0.64	0<0001

Discussion

Concept mapping is considered as a beneficial teaching tool and an effective method to evaluate clinical decision making skills. The present study showed that even practicing concept mapping for a short time can enhance nurses' clinical decision making skills. Similarly, previous studies had shown that concept mapping can be successfully applied in various clinical settings [7, 17, 20]. In concordance with are results, many educators have reported that this tool can help enhance the clinical decision making skills of students and novice nurses in intensive situations. On the other hand, concept mapping is shown to be effective in changing the students' attitude from being a passive to an active learner and also to promote their clinical practice [21].

Alike many previous researches conducted in this field, concept mapping was shown to help encourage nurses to learn independently and translate their knowledge to practice [6, 10, 19]. While the effect of gender on the results was not previously studied, our research failed to show any association in this regard. This could be due to the fact that the majority of the nurses who were recruited in this study were female and thus further study on a larger group of male nurses should be performed.

This is while our results confirmed the fact that the nurses' baseline knowledge and work experience both affected the final results. In line with our results, Parsa Yekta et al and Adema-Hannes et al reported that concept mapping method is an effective tool on meaningful learning (17, 22].

Moreover, some studies showed improved critical thinking scores after use of concept mapping strategies. Moreover, it was shown that the think encouraged the students to think and decide independently, improving their confidence in translating knowledge into practice [20, 23, 24]. On the contrary to our results, Wheeler et al reported that concept mapping had no significant effect on baccalaureate nursing students' critical thinking skills. This could be explained by the small sample size of the study, measurement errors, or even differences in the curriculum. We also investigated the effect of some factors such as age and work experience of nurses on mean sucrose's progress. However, we could not find any other studies to investigate these factors.

Conclusion

Concept mapping as a teaching strategy can enhance clinical decision making skills among nurses. This is while the findings of this study should be applied with caution due to its small sample size. Thus further research is needed to confirm our results.

Acknowledgement

References

1. Majid S, Schubert F, Brendan L, Xue Z, Yin-Leng T, Yun-Ke C, ntan A. Adopting evidence-based practice in clinical decision making: nurses' perceptions, knowledge, and barriers. *J Med Libr Assoc.* 2011; 99(3):229-236.
2. Orme L, Maggs C. Decision-making in clinical practice: how do expert nurses, midwives and health visitors make decisions? *Nurse Education Today.*1993; 13(4):270-76.
3. O'Neill ES, Dluhy NC & Chun E. Modelling novice clinical reasoning for a computerised decision support system. *Journal of Advanced Nursing* 2005; 49: 68-77.
4. Lindeman CA. The future of nursing education. *J of Nurs Edu* 2000; 39(1):5-12.
5. Welk S. Designing clinical examples to promote pattern recognition: nursing education-based research and practical applications. *Journal of nursing education.* 2002; 41(2):53-61.
6. Baugh, Nancy G., and Mellott, Karen G. Clinical concept mapping as preparation for student nurses' clinical experiences. *Journal of Nursing Education.* 1998; 37(6):253-256.
7. Schuster, Pamela. Concept maps in clinical settings: improved clinical performance and effective patient care. *Dean's Notes.* 2003; 25(2):1-5.
8. Tyler, J. Grading concept maps care plans: validity and reliability. part2. Deans notes. *National student nurses association.* 2004; 25(3):1-2.
9. Novak DJ, Canas AJ. The theory underlying concept maps and how to construct and use them: Technical Report IHMC Cmap Tools 2006-01. Pensacola (FL): *Florida Institute of Human and Machine Cognition,* 2008. Retrieved from *http://cmap.ihmc.us/Publications /ResearchPapers/TheoryUnderlyingConceptMaps. pdf.*
10. Daley BJ. Concept maps: linking nursing theory to clinical nursing practice. *Journal of Continuing Education in Nursing.* 1996; 27:17-25.
11. All AC, Havens RL. Cognitive/concept mapping: a teaching strategy for nursing. *Journal of Advanced Nurs* 1997; 25(5):1210-9.
12. Irvine L. MC. Can concept mapping be used to promote meaningful learning in nurse education. *J Advanced Nurs* 1995; 21(5):1175-9.
13. Ausubel DP. Educational Psychology: A cognitive view. New York: *Holt, Reinhart & Winston Inc,* 1968.
14. Novak JD. Concept mapping: a useful tool for science education. *J Res in Scien Teach* 1990; 27:939-49.
15. Brian R, Gaines BR, Shaw ML. Web map: concept mapping on the web, knowledge science institute, *University Of Calgary, Alberta, Canada T2N 1N4,* 2003.
16. Beitz JM. Helping students learn and apply statistical analysis: a metacognitive approach. *Nurse Educator* 1998; 23(1):49-51.
17. Adema-Hannes R and Maurine Parzen Concept Mapping: Does It Promote Meaningful Learning in the Clinical Setting?. *College Quarterly Summer* 2005; 8(3):2-7.
18. Adema-Hannes, R. & Parzen, M.. Concept mapping: Does it promote meaningful learning in the clinical setting? *College Quarterly.* 2005; 8(3):1-7.
19. Schuster, PM. Concept mapping a critical-thinking approach to care planning. *Philadelphia FA. Davis,* 2002; 1-15.
20. Wilgis M, Connell J. Concept mapping: an educational strategy to improve graduate nurses critical thinking skills during a hospital orientation program. *The Journal of Continuing Education in Nursing.* 2008; 39(3):119-26.
21. Black P, Green N, Chapin BA and Owens C. Concept mapping: an alternative teaching strategy. *Pelican News.* 2000; 56(4):6-10.
22. Parsa Yekta Z, Nikbakht Nasrabadi A. Concept mapping as an educational strategy to Promote meaningful learning. *Journal of Medical Education.* 2004; 5(2):47-50.
23. Harpaz, Irit, Balik, Chaya, and Ehrenfeld, Mally. Concept mapping: an educational strategy for advancing nursing education. *Nursing Forum.* 2004; 39(2):27-30.
24. Nirmala T, Shakuntala BS. Concept mapping-an effective tool to promote critical thinking skills among nurses. *Nitte University Journal of Health Science.* 2011; 1(4):21-26.

*All correspondences to: Ms. Fakhri Dokht Akbari, Department of Nursing, Para Medicine Faculty, Behbahan University of Medical Sciences, Behbahan, Iran. E-mail ID: fd.akbari@gmail.com