

Concept Mapping a Nursing Model for Care Planning

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Abstract: A concept mapping is a way of representing relationships between ideas, images, or words. The purpose of this study is to evaluate the effectiveness of concept mapping as a learning strategy for UG nursing students to plan and evaluate nursing care during their clinical practice. A quasi-experimental pre- and post test design was used to examine the content and differences of concept map care plans constructed by B.Sc. Nursing students (N=50) of selected nursing institution of Uttarakhand. Total enumeration sampling technique was used for data collection. Pre test mean= 8.48, & SD=2.636 and post test mean=14.78, & SD=3.218., "t"-value is 11.317, shows a significance improvement, which indicated concept mapping care planning is highly effective strategy for nursing students in clinical care nursing. Students completed a Satisfaction rating scale to evaluate student's level of satisfaction with use of concept map care planning, on satisfaction rating scale minimum score = 37, maximum score =56, mean =49.1 & SD =3.818, in which 25% of sample scored >47, & 50% of sample scored 49 or <49, & 75% of sample scored between 47 to 52, which is very high. It shows satisfaction level of Nursing Students regarding concept mapping care plan is very high.

Keywords: Concept mapping, nursing model, care planning

1. Background

Nursing education encounter many challenges and continuously attempt to improve teaching and learning strategies in theory and practice. With the advanced clinical practice and complexity of students' assessment, nursing students who are the future nurses needs to improve their critical thinking and problem solving skills. The role of nurse educators is to develop critical thinking abilities of students through engaging students in active learning and move from the traditional linear way of thinking. Concept mapping (CM) is one strategy that makes learning meaningful^[1].

A concept map is a way of representing relationships between ideas, images, or words. Technique for visualizing these relationships among different concepts is called concept mapping. Concept maps are used to stimulate the generation of ideas, and are believed to aid creativity. Concept maps are widely used in education. Though it may be challenging to evaluate what level of construction on a concept map represents a meaningful level of understanding by students. Concept maps should show both breadth and depth of knowledge.^[2]

Today's clinical nursing environment is more complex than ever before. As a rapidly advancing profession, nursing demands higher cognitive skills from nurses. Critical creative thinking and clinical judgement is viewed as essential skills for every health professional (Potgiete, 2012)^[3].

Strong proponents of concept mapping as a learning tool, Professors Charlene Moske-Weber and Donna Hills in the department of nursing are using concept mapping to teach and assess their students. Required to complete two concept maps (one surrounding a pediatric concept and another surrounding a concept related to Women's Health) each

semester, students are free to choose which concepts they map and are encouraged to choose those that challenge them most. Moske-Weber and Hills believe that along with developing soft skills such as independent learning, concept mapping allows students to identify specific learning needs and use their own creative strategies to complete them. Curricular freedom such as this can be empowering to students (Broom, 2015).^[4]

Concept mapping help under graduate nursing students apply old and new knowledge, expand their critical thinking ability. Concept mapping make learning fun and effective. Perhaps most impressive, concept mapping prepare them for future clinical decision making and allowed them insight into the holistic aspects of nursing care.

2. Need for the Study

Preparing, organizing and planning care for patients is challenging for nursing students. Learning in the clinical setting needs to encourage students to build upon prior knowledge. Faculty need to employ methods whereby students learn concepts in a meaningful way and develop the skills necessary to enable them to continue to acquire knowledge. A concept map is a creative teaching method that can enhance a student's critical thinking and communication skills in clinical settings.

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Nursing care plans have helped students learn problem solving for nursing practice, but creativity and the interrelationship of patient problems are not stimulated by their linear nature. Joining mind mapping with care planning forces connections, engages whole brain thinking, and stimulates creativity^[6].

Concept maps allows the student to see the connections between ideas that they already have; connect new ideas to their existing knowledge; and organize ideas in a logical, but not rigid, structure that allows new information or viewpoints to be included in the future. Mapping procedures have been found to motivate students to represent ideas visually, thus causing them to analyze, evaluate, and think critically. In this case, students do not need to copy the care plan from the textbook any more. They have the ability to explore a specific care plan for every patient by using concept mapping.^[7]

A concept map presents information in a meaningful way using diagrams to uncover the students thought process in relation to patient problems and interventions; a visual representation of a student's thinking. The use of concept maps in the clinical arena helps students prepare their plan of care for their assigned patient in an organized fashion for their clinical experience. Processing client data using concept maps helps students to form interrelationships with their individual patient issues and helps the student to visualize the patient as a whole.

3. Review of Literature

For the present study an extensive review of research and non-research literature relevant to the study was undertaken to develop deeper insight into the problem and to build the foundation of the study. Out of that, a few literature information which are thought to be supportive to the study focus, are presented here under the following sub-headings:-

- **Concept mapping in nursing**
- **Concept mapping in other discipline**

A study conducted by **Muhammad Safdar**, et al. describes the procedure of developing an instructional tool, 'concept mapping' and its effectiveness in making the material meaningful to the students. In Pakistan, the traditional way of teaching science subjects at all levels at school relies heavily on memorization. The up-to-date data obtained from qualitative and quantitative research strongly supports the value of concept mapping as an instructional tool both for cognitive and affective gains. This study seeks to contribute to this development by considering how the insights of David Ausubel (1968) can be converted into an effective and efficient instructional method. It was found that concept maps help improving achievement of the students and make learning more meaningful so that retrieval is possible.^[8]

In another study by the same researcher, **Muhammad Safdar**, et al. made the laboratory work meaningful through Concept maps and V Diagram. This paper describes how these tools (concept map and V diagram) help in improving the standard of learning in the science laboratory. Most of the countries of the third world like Pakistan rely heavily on the parrot fashion learning of facts in science at school level, hence students cannot understand the concepts and unable to solve the everyday life problems. In the light of the work reported here, these instructional tools help in making the learning more meaningful. This study seeks to contribute to this development by considering how the effective use of these tools can be converted into effective and efficient instructional method, looking specifically at

physics. It was found that the concept maps and V diagram help to improve the performance of the students and make the learning more meaningful in the physical science laboratories.^[9]

Joseph D. Novak in his study- A theory of education: meaningful learning underlies the constructive integration of thinking, feeling, and acting leading to empowerment for commitment and responsibility, traces the history of research and practice that led to the development of my Theory of Education. Based on David Ausubel's assimilation theory of meaningful learning and constructivist epistemology, the theory includes five elements: teacher, learner, subject matter, context, and evaluation, each of which must be integrated constructively to effect high levels of meaningful learning. The development and use of concept mapping to facilitate meaningful learning is discussed and a New Model for Education is presented that builds upon the theory and associated practices.^[10]

Purpose

The purpose of this study is to evaluate the effectiveness of concept mapping as a learning strategy for UG nursing students to plan and evaluate nursing care during their clinical practice.

Objectives

- To assess the effectiveness of concept mapping in clinical judgment skill of UG Nursing Students in clinical practice.
- To assess the UG Nursing Student's satisfaction level with concept mapping.

Hypothesis:

- **Hypothesis:** will be tested at 0.05 level of significance
- **H0:** There will be no significant difference between the mean pre test & post test scores of nursing students regarding concept mapping care plan in term of clinical judgment skill.
- **H1:** There will be a significant difference between the mean pre test & post test scores of nursing students regarding concept mapping care plan in term of clinical judgment skill.

4. Methodology

Design and Sample

A quasi-experimental pre- and post test design was used to examine the content and differences of concept map care plans constructed by B.Sc. Nursing third year students (N=55) of selected nursing institution of Utrakhnad, who were enrolled in year 2018-19. Total enumeration sampling technique was used for data collection. But 5 students were absent during pre test and teaching program, they were excluded from the study. So the data was analyzed for 50 students. Students created the CMs at the beginning and end of a clinical posting of paediatric course 2019. This was the third clinical course for students, who had prepared traditional care plans in the prior two courses. In addition, for this study, students completed a Satisfaction rating scale

to evaluate student's level of satisfaction with use of concept map care planning.

Data Collection Tools

Based on the objectives and the conceptual framework of the study, the following instruments were developed in order to generate the data:-

For Objective 1 - Concept mapping grading criteria to assess the effectiveness of concept mapping in clinical judgment skill.

Scoring concept mapping care plan

Investigators scored concept mapping care plan by assigning points for the presence of ten items: main health concern, two nursing diagnosis, prioritization of diagnosis, supporting data, goals, interventions, evaluation of care, teaching, cross-links, map is containing a single page, has multiple clear hierarchies, and is well laid out. (see Table 1).The number of maximum points varied per item from 1 to 4 for 20 total points for the CM.

Table 1: CM Grading Criteria

S. No.	Items	Maximum possible points
1.	The client's main health concern is presented in the middle of the page.	1
2.	Two clearly stated nursing diagnoses (NANDA) are present.	2
3.	Nursing diagnosis are prioritized for the client	2
4.	Subjective and objective data support the nursing diagnosis.	4
5.	Goals for each diagnosis are behaviourally stated with time frame that is specific, measurable, attainable & realistic	2
6.	Nursing intervention related to nursing diagnosis is enabling the client to achieve the stated goal.	2
7.	Evaluation addresses if the goal is met, additionally indicates if the goal is not met, what changes need to make, if the goal should be continued, deleted, or replaced with another goal.	2
8.	Teaching was relevant to the nursing diagnosis and realistic.	2
9.	Cross links are present and describe succinctly & accurately all the relationship.	2
10.	Map is containing in a single page, has multiple clear hierarchies, and is well laid out.	1

Concept mapping care plan prepared by the student



Figure 1

For Objective 2-A 15 point satisfaction rating scale is used to evaluate students level of satisfaction with use of concept map care planning, one qualitative written response was analyze for common theme. The investigators developed a 16-item questionnaire consisting of 15four-point Likert scale items that determined amount of learning (4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree). In addition, an open-ended question asking if there was anything else about learning with the use of concept mapping they would like to say.

Validity and Reliability

The content validity of data collection tools were established by 5 experts who were teaching faculty in Nursing and biostatistician. Reliability of the tool was established by Cronbach alpha and the value of 'r' was found to be 0.82.Pre-test established feasibility of the research tools. The pilot study was conducted on 10% of the total sample size. The researcher found the tools were suitable to conduct the study. The plan of statistical analysis was worked out. No major problem was faced by the researcher during the pilot study.

Data Collection Technique

Each Student developed two concept maps, one before teaching & one after teaching for concept mapping care plan during their clinical posting. During their clinical posting a 2 hrs interactive teaching was given regarding concept mapping care plan. The concept mapping care plan were scored by the investigator. In addition, for this study, students were ask to complete a satisfaction rating scale to evaluate their level of satisfaction with use of concept map care planning.

Data Collection Procedure

Formal administrative permission was obtained. Data was collected from 1st February 2019 to 25th February 2019. Students were told that the purpose of the study was to evaluate the effectiveness of concept mapping on student learning and that neither participation nor nonparticipation would affect their grades. Students signed a consent form granting permission for their CMs and comments to be evaluated and included in publications. All students in the course were required to take part in the class activity of concept mapping. However, those who did not wish to participate in the study would not have their CMs and

comments included in data analysis. All students in the course chose to participate in the study. Investigator removed student names from papers and assigned codes, therefore investigators did not have knowledge of which students created the CMs. Additionally, students were asked to not place names on the satisfaction rating scale & questionnaires. During their clinical posting for paediatric course, students cared for clients. Students asked to create one concept mapping care plan for their client before teaching for concept mapping care plan during their clinical posting. After pre test a 2 hrs interactive teaching was given regarding concept mapping care plan. And then students asked to create one concept mapping care plan for their client after teaching. The CMs were scored by the investigator. In addition, for this study, students were asked to complete a satisfaction rating scale to evaluate their level of satisfaction with use of concept map care planning.

5. Analysis and Interpretation

Section I

Table 2: Frequency and percentage distribution of Sample by their personal Information

Variable		All n=50		Total Percentage
		Frequency	%	
Gender	Female	44	88.00	100
	Male	6	12.00	
Qualification	12 th	50	100	100
	Graduate	0	0	
Marital Status	Unmarried	50	100	100
	Married	0	0	
Attended class/ workshop/ seminar on concept mapping	Yes	0	0	100
	No	50	100	

Data presented in table 2 shows that-As regard to gender 44 sample subjects' maximum nursing students 88% were female and only 6 sample 12% were male. In relation to their qualification all 50 nursing students 100% were 12th passed. In relation to their marital status all 50 nursing students 100% were unmarried. All the nursing students have not attended any class/ workshop/ seminar on concept mapping.

Section II

Table 3: Evaluate effectiveness of concept mapping care plan by comparing pre-test and post test concept map

Variable	Observations	Mean	St. Error	Std. Deviation	t Value	Inference
Pre-test	50	8.48	3.7278	2.6360	11.3171	S
Post-test	50	14.74	4.5518	3.2186		
Diff	50	-6.26	5.5314	3.9113		

The table 3 it is evident that the referring to tabulated T value at 49 degree of freedom for the 0.05 level of significance, Tabulated "T" value less than calculated t value, so null hypothesis will be rejected.

The study was to test the effectiveness of utilizing CM, all the CMs submitted by students at the beginning and at the end of the course were evaluate. Pre test mean= 8.48, & SD=2.636 and post test mean- 14.78, & SD=3.218., "t"-value is 11.317, which shows a significance improvement of CM care plan, which indicated concept mapping care

planning is highly effective strategy for nursing students in clinical care nursing.

Section III

Table 4: Satisfaction of Nursing Students regarding concept mapping care plan

Variable	N	Min	Max	Mean	SD	p25	p50	p75
Satisfaction	50	37	56	49.1	3.818	47	49	52

Table 4 shows that in the satisfaction rating scale minimum score is 37, maximum score is 56, mean is 49.1 & SD is 3.818

25% of sample scored more than 47

50% of sample scored 49 or less than 49, which shows on satisfaction rating scale their satisfaction is very high 75% of sample scored between 47 to 52, which is very high. It shows their satisfaction level is very high

Student Satisfaction and Self-Assessment of Learning Questionnaire

A 15 point satisfaction rating scale is used to evaluate students level of satisfaction with use of concept map care planning, one qualitative written response was analyze for common theme. In present study on satisfaction rating scale minimum score is 37, maximum score is 56, mean is 49.1 & SD is 3.818, in which 25% of sample scored more than 47, & 50% of sample scored 49 or less than 49, & 75% of sample scored between 47 to 52, which is very high. It shows satisfaction level of Nursing Students regarding concept mapping care plan is very high.

In satisfaction rating scale an open ended question asking if there was anything else about learning with the use of concept mapping they would like to say. Overall students did not have difficulty identifying the components of the nursing care plan, because they had prepared traditional care plans for two prior courses. Total 38 students wrote the comments on the questionnaire (34 were in favour of concept mapping and 4 did not like the activity).

Students' positive comments about concept mapping included:

- It is a good concept to recaptulize any information in little time & enhances the memory. It would be better if we add concept mapping in everything, then everything would be so easy; like notes, files, projects & ever in exams.
- It is easy to understand & demonstrate a lot of connections in a single page.
- Concept mapping was fun.
- It is an easy way to plan the nursing care.
- It is easy to understand & time saving process.

Students' negative comments about concept mapping included:

- Concept mapping though is an effective method but it is quite difficult to comprehend the data as it is too much complex.
- It is messy because a lot of information in single page.
- According to me, this concept creates overloading of information at one time.

The overwhelmingly positive response to the concept map in the clinical setting by the students supports concept mapping care planning as an effective learning strategy. Some student's dissatisfaction with concept mapping may be related to the learning style of the students. Mueller et al. (2001) suggested that concept mapping may be more difficult for persons who are linear thinkers, and their CMs will appear as a flowchart form.

6. Discussion

This study supported concept mapping a nursing model for care planning to improve clinical judgmental skill. The study supported concept mapping as a learning strategy for nursing students in clinical setting & extended their knowledge in clinical care nursing. A previous study conducted by Rachel Adema-Hannes and Maurine Parzen (2005),^[11] a pilot project was implemented to evaluate the perceived effectiveness and feasibility of the use of concept maps in a clinical setting, the study supported that Concept maps in the clinical setting provide students with a visual tool to prepare and understand the complex interconnectedness of client data and found the concept map to be extremely useful in assessing the student's knowledge, preparedness and ability to make linkages between concepts.

A previous study conducted by Hanem M. Moahmed (2013)^[12] was to test the effectiveness of utilizing CM, all the CMs submitted by students at the beginning and at the end of the course were evaluate. Comparing results showed that the first set of 9 CMs were less complex, and showed invalid links between concepts. Mean was reported as 6.6 (0.3), and range (6 -10). The final individual set of CMs showed a mean of 8.7(0.5), and range (8.6-10). There was a significance improvement of the CMs over the time ($t = 5.11$, $df = 18$, $p = .03$) indicating that utilizing CM had significant effect on students' learning. In present study Pre test mean= 8.48, & SD=2.636 and post test mean- 14.78, & SD=3.218., "t"-value is 11.317, which shows a significance improvement of CM care plan, which indicated concept mapping care planning is highly effective strategy for nursing students in clinical care nursing

In present study a 15 point satisfaction rating scale is used to evaluate students level of satisfaction with use of concept map care planning, one qualitative written response was analyze for common theme. On satisfaction rating scale minimum score is 37, maximum score is 56, mean is 49.1 & SD is 3.818, in which 25% of sample scored more than 47, & 50% of sample scored 49 or less than 49, & 75% of sample scored between 47 to 52, which is very high. It shows satisfaction level of Nursing Students regarding concept mapping care plan is very high. A previous study conducted by Susan MH, et al (2006)^[13] Student self-evaluation of learning and satisfaction questionnaires were evaluated by calculating the means and standard deviations of each of the 20 Likert items (1-5 range). Students' qualitative written responses on the final questionnaire item were analyzed for common themes. Selected results of the questionnaire are analyzed which shows their satisfaction score is higher regarding concept mapping care plan in community setting.

7. Conclusion

Findings of the study concluded that concept mapping is an effective & feasible learning strategy in clinical setting. Concept maps in the clinical setting provide students with a visual tool to prepare and understand the complex interconnectedness of client data. The comprehensiveness of students' care plans improved when they diagrammed the main concepts and relationships between concepts. The satisfaction level of Nursing Students regarding concept mapping care plan is very high. Concept mapping is an effective learning strategy to help students apply new knowledge and skills to clients with complex health-care needs. Nursing is a complex combination of academic and practical skill integration which requires the effective integration of theory to practice. Concept maps represent a clear picture of what student's are thinking and has been shown to be a successful strategy to use in the clinical area. A concept map is a creative learning strategy that can enhance a student's clinical judgmental skill and communication skills in clinical settings.

8. Recommendations

- 1) On the basis of findings of the study, the following recommendations are offered for future research.
- 2) A similar study can be conducted by adopting true experimental research approach with pre test- post test control group design and on a larger sample groups.
- 3) Because nursing care is often complex and changes in each setting, Students are best served if they are helped to learn how to process new information rather than memorize care required in a specific setting.
- 4) The overwhelmingly positive response to the concept map in the clinical setting by the students supports further in depth studies to evaluate its ability to link nursing theory to practice.

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