

Concept Mapping and Student's Critical Thinking in Nursing Administration Course.

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Abstract

Background: Concept mapping is an innovative approach in health care education. It considers one of the active teaching and learning methods promoting critical thinking. The students are better able to organize knowledge, create Connections, and develop clinical judgment skills that ultimately improve patient safety and quality care .**Aim:** the present study aimed to investigate the effect of using concept mapping on students' critical thinking in nursing administration course. **Methods:** A quasi-experimental research design was used and the study sample included (376) students who were studied nursing administration course during the second semester of academic years 2018/2019 . They were divided into two groups experimental group (n=189) and control group (n=187). Data was collected by using, knowledge questionnaire regarding concept mapping of student's, Rubric for assessing concept maps, and California Critical Thinking Disposition Inventory **Results:** statistically significant difference was found between both pre and post awareness sessions among the study group regarding concept map knowledge. As well as, significant difference between both groups regarding the students' critical thinking disposition. In addition the study group students have change in perceived Critical thinking more than the students in the control group. **Conclusions:** Concept Maps are considered an effective educational methods to promote Critical thinking as it reflects of the learners' thinking process image. **Recommendation:** concept maps could be usefully used in other curricula and nursing instructors may improve the nursing core competency via using them into course teaching and learning process., the nursing students will be critical thinker and professionally patient care handling .

Key Words: Concept Mapping, Critical Thinking, Nursing Students

Introduction

scale, before applying of concept mapping as a teaching strategy to determine the baseline category of critical thinking for learners. Helping of nursing learners for applying sound clinical judgment and learning critical thinking has become both national and international amajor goal of programs related to nursing teaching and learning process,(**American Association of Colleges of Nursing (AACN), 2014**). Beneficial learning is very important to medical students as they need to keep pace with the rapid changes in science and the practice of medicine. Thus, in order to have competent nurses, there is a need to train nursing students in ways to become meaningful lifelong learners. It is evident, based on various research, that one strategy that can lead to meaningful learning is conceptual mapping,by using concept maps integration between basic medical science and clinical scenarios.is one approach that can contribute to meaningful learning. Also new knowledge is connected with prior knowledge; students will be able to switch from superficial to overarching thought patterns. Purposeful learning is the process of constructing integrated cognitive information architecture(**Billings & Halstead.,2009**).

Concept maps are creative learning approach in the education of health care. They are considered form of the active teaching and learning strategies promote students to think critically. Improving knowledge organization, establish communication links, and by developing skills of clinical judgment that ultimately patient safety will be improved through delivering quality care. Concept map represents the subject matter according to knowledge

using schematic connection between concepts, It can distinguished from other teaching strategies by proposition structure, which facilitates understanding of the relationships between concepts. A hierarchicy represented in a graphical structure manner, could be read from the top (**Schon,2017**).

Concept map consists of a main concept in the center of the map and then secondary concepts radiating from this center concept. Concept maps that are linear are slightly more complex because each concept has two concepts linked to it in a hierarchical structure. The most complex type of concept map is one where the map forms a net due to multiple interconnections created between concepts. Concept maps that demonstrate this highest level of complexity also demonstrate a deeper understanding of the material by the student. How complex a student makes their concept map can then give teachers insight into the level of understanding a student has about a certain subject (**Gericke& Wahlberg 2013**).

Concept maps enhance thinking in solving the problems critically to help students in organization of complicated data related to patient, address complex relationships, and provide comprehensive care. Nursing teachers growing awareness of need for teaching in a professional manner, through assessing, analyzing, planing, implementing and evaluating, and most importantly, to improve the teaching and learning quality. concept mapping is anadvanced method for successful learning. As it can help advance learning processes and develop skills needed by the student, such as critical thinking, organization of information, understanding complex relationships,,

make learning meaningful and effective (Latif et al. 2016).

Critical thinking (CT) includes seeking, obtaining, assessing, analyzing, synthesizing and visualizing information to develop one's self-awareness and act on appropriate solution or conclusion by using this information for becoming more creative as well as equip themselves with taking risk (Yıldırım., 2011) Critical Thinking has emotional and cognitive components. The emotional one include confidence. And contextual perspective and thinking, while cognitive includes analysis and application of standards and the transformation of knowledge (Scheffer&Rubinfeld,2010).

Critical thinking (CT) involves making meaningful, wise judgments due to participation in the analyzing and evaluating, , inference, interpretation and reasoning process (Facione, 1990). Clinicians are required to identify and analyze health problems carefully, while. The of inquiry sensation through curiosity , decisions and information questioning is essential for nurses during applying of tasks in complex and demanding clinical practices while increasing responsibility, independence, and promote disciplines collaboration (Pucer et al., 2014; Castledine, 2010).

Critical thinking" is meaningful conceptual thinking that includes the processes of enthusiastic intellect, evidence-based analysis, context setting, purposeful insightful and organization. The application of multiple dimensions of critical thinking to real critical situations implies the use of basic nursing skills needed for solving problems, which are traditional focus on making students to assess, diagnose, intervene and evaluate the effectiveness of a nursing intervention" (Tanner,

2006). "Critical thinking includes inquiry inquisitiveness dialogue with (educators, customers, staff,.), interaction, continuous thinking, and self-correction (Victor-Chmil, 2013) .

Nursing professionals witness the usefulness of enhancing disposition and skills of critical thinking and evaluating improvements as division of the course outcomes. Which not ended with the leaving of student nurse the classroom. Indeed, importance of critical thinking ability is increased when coming in contact with clinical problems focusing on met cognitive skills such as reasoning, and problem solving on a daily basis (Dwyer et al., 2015 ;Grieco, 2016).The concept map helped students organize ideas, plan their patient's care, set priorities, and think critically. Concept planning can be used individually or in group activity. Group learning, which provide participatory learning students work together to maximize their own in small groups so that students work together to each other's learning" (Johnson, D.W., Johnson, RT &Holubec, 1993)

Significance of the study

As a result of the advancement of science, , meaningful strategies of learning are becoming more and more important to nursing students to keep pace with these advancements as they relate to nursing practice. Hence, to become professional and having high qualifications, today's nursing students engaged for becoming lifelong self-learners. Concept maps help achieve significant learning by different ways. It is an activity help students to gain opportunities for organization, summarization, synthesis, analysis, and evaluation of different materials. Hence It promotes the nursing students' self-competence development, that used as

new practical activities of education (KumarManoj&Rizwaan 2013).The improvement of learners' Critical Thinking is very important for students. Learners can be familiar with teaching methods that lead to superficial rote learning that makes them become teachers Centered around knowledge. Traditional teaching methods may increase the gap between theory and perceived practice and this leads to teaching problems for nursing education as it leads to forgetting knowledge, which is difficult to apply in clinical situations. Therefore, the current study was conducted with the aim to investigate the effect of using concept mapping, on Critical Thinking among nursing students.

Aim of the Study

The study aimed to investigate the effect of using concept mapping on students critical thinking in nursing administration course.

Research hypothesis:

The concept map will enhance nursing students 'critical thinking in nursing administration course.

Methods

Research-design:

A Quasi Experimental research design was used to conduct this study.

Setting:

The study was conducted in the Department of Nursing Administration, Faculty of Nursing, Mansoura University, and it consists of eight academic departments of Nursing, one of which is the Department of Nursing Administration that teaches graduate and postgraduate students to be nurses and specialists with knowledge and knowledge of management and leadership skills in the context of the continuous change of the health care organization system.

Participants:

The study subjects included all 376 students who studied the Nursing Administration course in the 2018-2019 academic year. The sample was divided into two experimental groups (n = 189) and a control group (n = 187)

Tools for data collection:

For data collection Two tools used :

Tool(1):ConceptMapping uestionnaire

Format: Itconsists of three parts

part I: It is used to collect data on students' personal characteristics such as: age, gender and years of education.

part II: This part was developed by researchers after reviewing the relevant literature (Frag, 2017; Youssef & Mansour.,2012).used to assess knowledge of nursing student regarding concept mapping. It was consisted of 31 questions27 true and false questions and 5multiple choice questions It included questions related to concept mapping definition, goals, benefits, types, uses, components and steps for developing and drawing maps. System of scoring related to students' knowledge was:- Correct answer scored (1)- Incorrect answer scored (0) -The total scoring of nursing students' knowledge was calculated based on cut of value 50% as follows;Less than 50% considered poor.- 50 - less than 75% considered fair, 75-100% considered good.

part III: Concept Map Assessment

Rubric The concept map evaluation model developed by the researchers after the relevant literature reviewing(Frag., 2017;Youssef & Mansour 2012) in which the researchers created a qualitative assessment model to be used in conjunction with the quantitative analysis of the concept map structure. This criterion is divided into four sections for evaluation: structure, suggestion, relationship and

interpretation. Scoring system (response): It consists of three category points (3-1) for each statement, which exceeds the standard, meets the sufficient standard, and is below the standard.

Tool (2): California Critical Thinking Disposition Inventory (CCTDI), to evaluate nursing students critical thinking disposition in, and including 75 items grouped into seven dimensions include truthseeking (12 items), open-mindedness (12 items), analyticity (11 items), systematic (11 items), self confidence (9 items), inquisitiveness (10 items), and maturity (10 items). this tool developed by **Facione (1992)** and modified by **Meselhy (2015)**. Students responses with five- point likert scale as the following :- strongly disagree scored (1), disagree scored (2), neither agree nor disagree scored (3), agree scored (4), strongly agree scored (5).

Student 'nurses were classified on critical thinking disposition scale into three groups according to their mean percentage scores to questionnaire items as follow based on (**meselhy.,2015**):-

Score < 50% (Less than 187.5) was considered negatively disposed. Between 50% to 66.6% (187.5 – 249.75) was considered ambivalently disposed. Score > 66.6% (More than 249.75) was considered positively disposed.

Validity and Reliability .

The tools were reviewed by a committee of five nursing administration experts from various faculties specializations to validate the content and adjustments were made to the tools based on their observations. Test reliability was measured by means of a test-retest (Cronbach alpha) which produced internal consistency estimates ranging from 0.78 to 0.80.

Ethical considerations

Official permission was obtained by using an appropriate communication channel from the Dean of the Faculty of Nursing, Mansoura University, And the head of the department to obtain permission and assist in conducting the study at the college. The ethical approval was obtained from the Scientific Research and Ethics Committee, explanation of nature and purpose of the study provided to study participants. In the interview with the subjects. Students have the right to participate or refuse to study. The data collected has been kept confidential. The specificity of the study sample was emphasized.

pilot Study

For assessing the study feasibility, the sample accessibility, tools clarity, as well as determination of the required time for answering the questionnaire questions. pilot Study administered to 10% of the total sample size (38 students) No modifications to the data collection tools were required based on the pilot study results.

Data collection phases

The study was conducted through the following three stages: planning, implementation, and evaluation. All of these stages are approximately 4 months into the 2018/2019 academic year. Classes began from February 2019 to May 2019.

Planning phase:

Concept Maps were prepared to cover nursing administration course topics, then given them over to experts in this field to determine the validity of the content and conceptual map clarity. Accordingly, adjustments were made to the concept map.

Implementation phase:

The topics were taught to the control group on a traditional methods,

while by drawing concept maps the study group taught the same lectures, and the educational sessions were divided into 4 lectures: two theoretical sessions and two practical sessions, the first and second include orientation to all students about the objectives of the educational program, the outline and schedule, And the expected out comes. pre test of critical thinking of both the experimental and control groups by using critical thinking

In the study group prior to the implementation of concept mapping, a pre-test of the concept mapping questionnaire format: to assess students' knowledge regarding the concept mapping, it was distributed to the experimental group. The pretest took 20 minutes to be completed. Prior to the start of the lectures, the study group attended orientation sessions,. The third and fourth sessions include an introduction to the concept diagram for the experimental group, which received adequate explanation about (definition, types, uses, importance, benefits and applications) of concept mapping, and awareness of the steps needed to develop CM, training students on how to design the concept diagram focus on the lectures.

Through each lecture, the researchers design the lecture into a map form during explaining the lecture, then students were asked to create their own maps to reflect what they had understand. Then, the researchers corrected the concept maps that the students had created by using the rubrics system. Whenever there were any misconceptions, positive and constructive feedback was given to them by the researchers and, and a case scenario was also performed on some of the lectures (Communication, Motivation, and Conflict Management)

to prepare students to apply the concept map to solve problems in clinical settings.

Next, students were asked to prepare, design and deliver concept maps in small groups where the researchers gave the experimental group three assignments using CM in which each one after 3 lectures to ensure that the experimental group was well understood CM. Then correct the concept maps students constructed according to the rubrics system.

Evaluation phase: Evaluation of training program was done through post-test and conducted to both the experimental and control groups by administering concept mapping questionnaire format, and California Critical Thinking Disposition Inventory (CCTDI) The results of the pre and the post tests of the two groups were compared to assess the effect of using concept map .

Statistical analysis

The data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 22, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, Chi-square test (χ^2) used for the comparison between two groups and more . Student t-test was used for comparing between means of two groups of parametric data of independent samples,. Z value of Mann-whitney test was used for comparison between means of two groups of non-parametric data of independent samples,. F value of ANOVA test was calculated and used to compare between more than two means of parametric data,.

For comparison between more than two means of non-parametric data, Kruskal-Wallis (χ^2 value) was calculated.using Pearson's correlation coefficient (r) Correlation between variables was evaluated. Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance.

Results

Table(1) shows personal characteristics data of the studied students. The current study result shows that their mean age was (21.98 ± 1.22) , regarding gender more than two third (71.4%) were female .There was no statistically significant differences regarding their demographic characteristics except the number of received terms in both groups.

Table (1): personal characteristics data of the studied students (n=376).

Variables	The studied students (n=376)				χ^2	P
	Study group (n=189)		Control group (n=187)			
	n	%	N	%		
Age years:						
19-<21	59	31.2	69	36.9	1.351	0.245
21-23	130	68.8	118	63.1		
Range	19.00-23.00		19.00-23.00			
Mean±SD	20.75±0.64		20.65±0.61			
gender:						
Male	54	28.6	53	28.3	0.002	0.961
Female	135	71.4	134	71.7		
Living with:						
Family	176	93.1	171	91.4	0.372	0.542
Friends	13	6.9	16	8.6		
Residence:						
Urban	74	39.2	65	34.8	0.779	0.377
Rural	115	60.8	122	65.2		
Previous study:						
General secondary school	189	100	186	99.5	1.013	0.314
Nursing school	0	0	1	0.5		
No. of received terms:						
2-4	6	3.2	10	5.3	6.437	0.040*
5-7	175	92.6	176	94.1		
8 & 10	8	4.2	1	0.5		

Study group= students who were trained for application of concept maps

Control group= students who were not trained for application of concept maps

***Significant (P<0.05)**

Table (2) Illustrates mean scores of knowledge sub items about concept mapping among the study group pre and post test. It was noticed before training sessions that majority of the studied

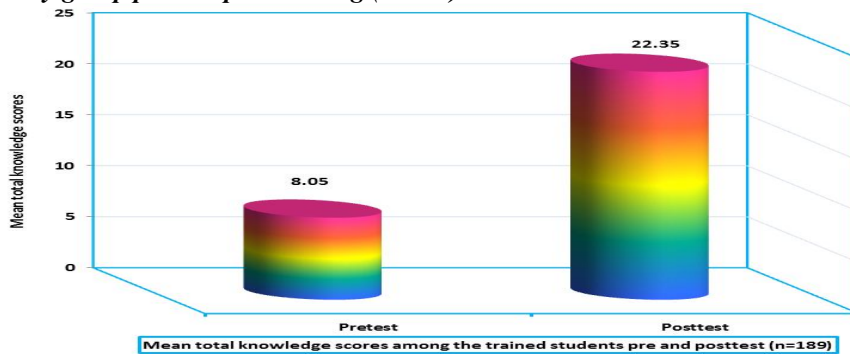
students (0.81%, 1.24%, 1.99%, .089%, 3.13%,) respectively were did not know definition , purposes, benefits, advantages, and practical application of concept mapping. On contrast, post training sessions, the majority of the study sample (3.06%, 3.69%, 6.44%, 2.51%, 6. 64%,) respectively became knowledgeable about concept mapping .there were statistically significant difference ($p=0.001$).

Table (2): Knowledge sub items scores about concept mapping among the studied students (study group) pre and post training (n=189).

Knowledge sub items about concept maps	No. of questions (Score)	Knowledge scores among The studied group (n=189)		Z value	P
		Pre test	Post test		
1-Definition of Concept Map:	4 (0-4)				
Mean±SD		0-4 0.81±0.96	0-4 3.06±1.31	13.346	0.0001*
2-Purposes of using Concept Maps as a teaching strategy:	5 (0-5)				
Mean±SD		0-5 1.24±1.18	0-5 3.69±2.02	10.690	0.0001*
3-benefits of using Concept Maps:	9 (0-9)				
Mean±SD		0-9 1.99±2.12	0-9 6.44±3.28	11.493	0.0001*
4-Advantages from using Concept Maps:	4 (0-4)				
Mean±SD		0-4 0.89±0.97	0-4 2.51±1.76	8.464	0.0001*
5-Practical applications for Students	9 (0-9)				
Mean±SD		0-9 3.13±2.33	0-9 6.64±2.90	11.315	0.0001*

*Statistically significant (P<0.05)Z value of Wilcoxon W test

Figure (1): Mean scores of total knowledge about concept mapping among the study group pre and post training (n=189).



Figure(1)Integratestotalknowledg e mean scores about concept mapping pre and post training among the study group. The students'' knowledge mean score was(8.05± 6.51)pre training.

While post training this values was improved to be (22.35± 9.13).

Table(3) Findings of application of rubrics system as evaluation tool for the study group of students based assignments .

Variables	Evaluation of application rubric sbased assignments (n=38)						P
	At beginning of semester (first assignment)		At middle of semester second) (assignment)		At end of semester (third assignment)		
	n	%	n	%	n	%	
Structure:							
Exceeds standard	20	52.6	25	65.8	38	100	34.328 0.0001*
Adequately meetsstandard	10	26.3	13	34.2	0	0	
Below standard	8	21.1	0	0	0	0	
Proposition:							
Exceeds standar	30	78.9	30	78.9	35	92.1	11.326 0.023*
Adequately meetsstandard	4	10.5	8	21.1	3	7.9	
Below standard	4	10.5	0	0	0	0	
Relationship:							
Exceeds standard	0	0	15	39.5	28	73.7	46.304 0.0001*
Adequately meetsstandard	30	78.9	20	52.6	10	26.3	
Below standard	8	21.1	3	7.9	0	0	
Exploratory:							
Exceeds standard	8	21.1	25	65.8	30	78.9	29.463 0.0001*
Adequately meetsstandard	25	65.8	10	26.3	8	21.1	
Below standard	5	13.2	3	7.9	0	0	

Table(3) Incorporates findings of application of concept map scoring rubric for *trained* group assignments shows high significant difference (p=0.001) between the 3 assignments of concept map rubrics that due to improvements in construction of map from beginning to the end.
*significant (P<0.05)

Table(4): Demonstrates total knowledge scores and level about concept mapping among the studied

students pre and post training the majority (91%) of study group had poor total knowledge level regarding concept mapping pre training, while post training it was improved to be two thirds (60%) of them had good total knowledge level regarding concept mapping. There were Statistically significant (P<0.05) between pre and post test].

Table (4): Total knowledge scores and level about concept mapping among the studied students pre and posttraining (n=189).

Total knowledge about concept maps	Total knowledge scores and level among the study group nurses (trained for application of concept maps) (n=189)				P
	Pre test		Post test		
	n	%	n	%	
Total knowledge level:					
Poor (<50%) (0-15)	172	91.0	27	14.3	228.278 0.0001*
Fair knowledge (50%-<75%) (16-23)	13	6.9	48	25.4	
Good knowledge (75%) (24-75)	4	2.1	114	60.3	
Total knowledge score: (0-31)					
Range	0-31		0-31		
Mean±SD	8.05±6.51		22.35±9.13		
Paired t-test	12.573				
P	0.0001*				
Change of total knowledge score post than pretest					
Range	-14.00 : 31.00				
Mean±SD	14.30±11.32				

*Statistically significant (P<0.05) Z value of Wilcoxon W test

Figure (2): Level of total CCTDI scale scores among the studied nurses (study and control group) pre and posttest (n=376)

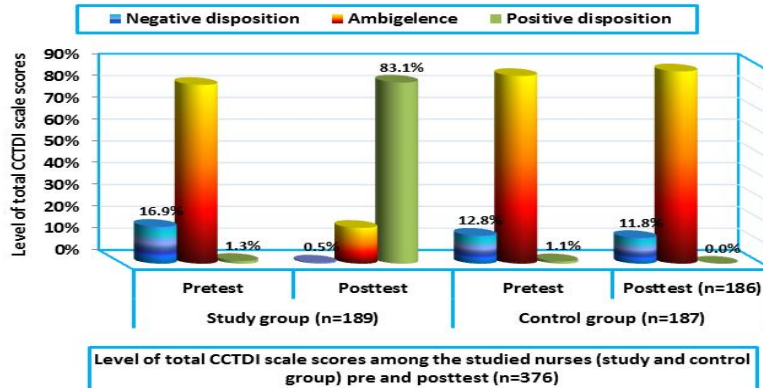


Figure 2 (illustrates Level of total CCTDI scale scores among the studied nurses (study and control group) pre and posttest. The studied students distribution according to critical thinking disposition

score pre and post testing Majority (82.0%) of the them had a ambivalence disposition regarding critical thinking scale pre test that increased to be (83.0%) positive disposition post test

Figure (3): Correlation between total knowledge scores and total critical thinking (CCTDI) scale scores among the study group post test

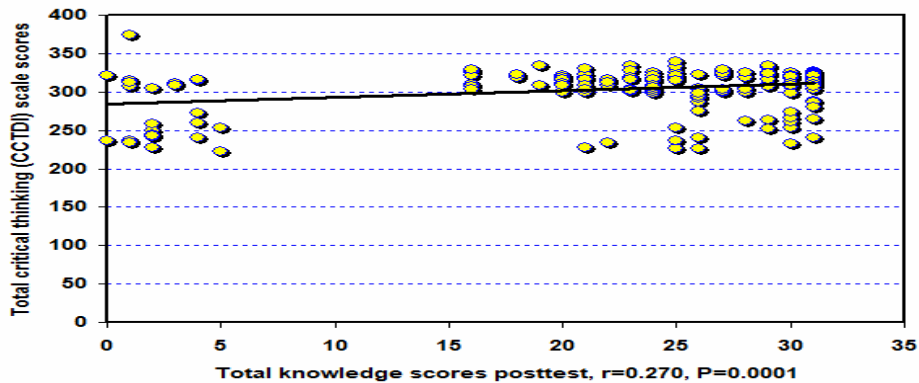


Figure (3): Correlation between total knowledge scores and total critical thinking (CCTDI) scale scores .There was a high statistical significant positive correlation (p=0.0001) and(r=0.270) between total knowledge scores and California critical thinking disposition inventory scale scores among the study group post test.

Discussion

Constructivism education is the process that enable persons to form their own knowledge understand through their individual experiences. Therefore, when the student communicates with new ideas or concepts, They prepares processing of the understand information's focus on his cultural experiences. Hence, concept maps provide retaining of newly aquired ideas through cognitive structuring by crafting visual maps of student ideas. When used effectively, students could take in a central idea and relate numerous supporting ideas thought process or personal experience (Jackson, 2016) This study was conducted to aimed to investigate the effect of using concept mapping on students critical thinking in nursing administration course.

According to the current study findings there were significant

improvement among nursing students as they became knowledgeable about concept mapping (definition, importance, benefits and steps for performing concept map) after training while pre training and awareness sessions they were not aware of concept map. This might be attributed to the fact that conceptual map is a new educational technique used for the study participants, so the students experience regarding this method increased after awareness sessions as they weren't have previous experience about it. This result was in the same line with Latif&Dahlan (2016) who reported that the level of knowledge in the concept map based learning group was significantly higher than that of students in the lecturebased group after the awareness sessions regarding the concept map. This finding agreed with,Moahmed(2013) who stated that in her study, there were significant improvement in the nursing students' knowledge regarding concept mapping.

As well as these finding were agreed with Ghojzadeh et al., (2014) who stated that Students at the end of the semester well known about concept map, uses of it in nursing education and construct integrated maps after

awareness sessions due to a significant difference regarding knowledge about concept mapping among the study group. develop a professional who is able to self-direct and to continue on the educational path, the individual must be skilled in the process of self-learning . These findings agreed with **Wilgis&Mcconnell (2013)** who confirmed that level of knowledge about the conceptual map improved between pre- and post-intervention. cognitive skills such as reasoning, critical thinking and problem solving is a must for nursing education. And nursing students prefer educational strategies assist in more information long-lasting when gained, and effectively used . For reaching such expected outcomes needs a paradigm shift in nursing education.

The present study findings revealed that most of the studied sample understand more about definition and purpose of concept map .These results supported by **Chenet al., (2011)** found that Concept mapping can help in representations of information graphically that helps them to integrate their new knowledge with what they have learned previously. helping students to easily classify their knowledge, make them coherent to make a deeper understanding rather than memorizing a series of concepts. build explicit links and relations between concepts. In the same line **Bittencourt (2013)** reported that concept map is alternative method for evaluation the process of teaching and learning and can be applied for, scientific research ,education and in nursing practices.

Current study results revealed that all members of the sample have knowledge about how to use concept map and by using it, encourages students to think critically and improve their

educational level. With the support of **Akeju (2012)** who found that concept maps are a method that provide a visual representation of the acquired information. learning methods focuses on visual teaching promote understanding, stimulate thinking, enforce integration of new knowledge, and identify misinterpretation and misconceptions. As well as **Saouma&Attieh (2008)** stated more than ever that conceptual mapping improves ability of a student's to assess patients comprehensively, patient data synthesis even complicated , and building relationships between data in a healthcare environment.

Also **Kaddoura et al.,(2016)** suggested that conceptual mapping is beneficial for nursing students learning in their clinical environment, and added to that similar with **Papathanasiou et al., (2014)** concluded that concept maps not only support meaningful learning and knowledge building, but the ability to apply a concept map used to show skills of critical thinking and Creativity of learners.

The current study findings incorporate that all members of the study sample have knowledgable about how to create a conceptual map, and these results were. Likewise with **Barchok, Too &Ngeno (2013)** found that the steps for creating concept maps in healthcare, occur through certain major steps as follows: developing a basic framework action diagram, analyzing then categorizing the collected data in the form of a personal or objective diagnosis, and correlating data which are subjective or objective , setting goals, interventions, outcomes, and finally assessing patient responses and progression in his health state.

The present study finding showed that CM improve students understanding,

synthesis and reflection of concept map on course content that most of student exceeds standard of map assignments when evaluated by rubric assessment method. This may be explained by the researchers continuous guidance and the continuous assessment feedback given to the students for improving their assignments (drawing the concept map). This was supported by **Youssef & Mansour (2012)** who found CM strategy more effectively improve active and deep approaches to learning and also emphasized the learners advancement than the lecture based method.

These findings were consistent with **Abu Hasheesh, Al-Mostafa & Obeidat (2011)** who emphasized that CM teaching technique promoting significant learning, in which learning achieved by learners ability to make organization and relation between the newly information and concepts with in cognitive mental structures. Also in the same line with **Nirmala & Shakuntala, (2011)** founded that the rubric scores pretest and post test in comparison were difference in all the construction structure criterion sections of concept map except the map hierarchy.

Furthermore **Khurais & Salih (2017)** who mentioned that using the concept map evaluation model, this conceptual mapping have direct relation to students' independent abilities for problem solving, and this finding is contradicted by **Farag (2017)** who said that near to half of the study sample had average scores, The other half not reach a satisfied scores and no one achieve the perfect concept map in the first assignment. by application of the rubric score for assessing their constructed maps .

The current study findings revealed that most of the students had low level regarding critical thinking disposition, while this level was improved after the intervention. may be attributed to the using of concept maps to help students organize, analyze, and synthesize information and relate data to healthcare concepts. The concept map assignment includes arranging conceptshierarchy that illustrates the links between concepts which foster critical thinking. These results were confirmed by **Jaafarpour et al., (2016)** concluded that, using of concept maps increases requirements of students toward thinking outside the traditional linear approach in nursing student participation, and the use of this educational practice can have a positive impact on students' academic performance. Similarly **Obied & Gad (2017)** they found that critical thinking (CT) scores improved significantly from pretest in students who received an experimental conceptual map intervention. The study revealed that the information gained by applying concept mapping is better to be understand and transferred to long lasting memory, making students more enthusiastic and eager to self- learning.

These findings are consistent with **Moattari et al., (2014)** concluded that concept map is an effective tool to improve ability of students to think critically. It also consistent with **Lee et al. (2013)** The results of this study showed that over time teaching strategy intervention such using concept mapping stimulate students to think critically, and it eases the transfer of acquired knowledge in to clinical practice, reduce anxiety level, of students and is positive linked to high order clinical reasoning and evaluation. they also, recommend to integrating concept mapping with

clinical scenarios, simulations,. activities during actual clinical practice.

Similarly **Kaddoura et al., (2016)** reported through concept mapping students transformed from rote acquisition of knowledge to deep and purposful approach to learning, thus, students perceived positive feelings as they actively participating in the learning process. A similar study conducted by **Atay&Karabacak (2012)** revealed that concept mapping improved students' critical thinking skills, based on conceptual mapping instruction and over time implementation, In comparison to students used the column format to complete nursing care plans .On the same line **Papathanasiou et al.,(2014)** his study focus on enhancement of essential skills for nursing through nursing care plan that helps them to practice decision- making skills and critical thinking through educational experience. Nurse educators have important responsibility to foster critical thinking skills level into nursing care plans in clinical environments.

The current study findings are consistent with **Ellermanetal .,(2006)**concluded thatstudents were required to create links and make connection between the two data bases in order to make nursing diagnoses through logic models for teaching nursing process. There were significant difference using concept mapping found in students' ability of critical thinking. Concept maps assist in enhancing of Cognitive Learning. In addition to **Kostovich etal ., (2007)**they found that improving of students critical thinking skills is achieved through requiring them to concept map.Their ability to perform well on concept maps,not affected by learning style preference . This observation is

supported in a similar study by **Akinsanya&Williams' (2004)**stated thatinquiry based learning by challenging students to form concept mapping is important for the programof nursing education. And suggest thatconcept maps assists students reaching higher levels of cognitive learning that achieve creativity. leading to support construction of knowledge and meaningful learning.

These results were confirmed by **Paucardupont&Marchand(2014)**findings of the study illustrated that nursing students metacognitive skills are developed by CM and has shown usefulness of it in clinical reasoning learning and improve the diagnostic evaluation. Added to that **Hsu LL(2016)** concluded that when using concept map teaching strategy neurological care for nursing students outcome-based educational method can engage nursing students to take different approach to medicine, which can result in better neurological nursing care. Furthermore,The current study findings are consistent with a study by **Rasoulzadeh et al., (2015)** highlight the fact that when using concept map as Conventional Methods found that the effect of the conceptual map on students' practical skills, significant difference in comparison to the control groups .

On the other hand, the current study findings are contraindicated to **Bixler et al., (2015)** found that no statistical significant difference in critical thinking scores when measured pretest to posttest by using drawing maps approach. They concluded that although the difference in CT scores was not significant, the study evidenced a great important need starting toward the developing of a curricula that improve students CT. Moreover, **Romanko (2016)** concluded that although applying

of concept maps. Absence of significance differences in the means scores of critical thinking between the post-test of the both groups experimental and control . And in an attempt to explain these findings,were related to the time of introducing concept mapping intervention to the nursing students. As, beneficial time for introducing this teaching technique to them in the program, prior to determination of their preference teaching style.

Conclusion

The results of the current study, showed an improvement in critical thinking scores of the experimental group as compared to control group, the researcher concluded that teaching with concept mapping may foster critical thinking skills than using traditional method.

Recommendation

- Curriculum of nursing must be developed and understanding various teaching and learning strategies enhance meaningful learning and improve students critical thinking ,through using student centered learning approach, instead of rote memorization of facts.
- Concept Map as an effective teaching technique could be prepared in pre-requisite courses for helping learners to critically think preparing for academic program.
- Academic staff and management must use suitable and creative teaching methods, and maintain supportive learning environment to foster active learning, and critical thinking skills

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