ORIGINAL ARTICLE

The Effectiveness of a Concept Mapping Care Plan in Evaluating Nursing Students' Achievement in Clinical Practice

Rusnani Ab Latif[1], Akehsan Dahlan[2], Mohd Zarawi Mat Nor[3]

[1] Faculty of Health Sciences, Universiti Teknologi MARA Cawangan Pulau Pinang, Campus Bertam,13200, Kepala Batas, Pulau Pinang, Malaysia
[2] Faculty of Health Sciences, Universiti Teknologi MARA, Campus Puncak Alam, 42300, Bandar Puncak Alam, Selangor, Malaysia
[3] Department of Medical Education, Universiti Sains Malaysia, 16150, Kubang Kerian, Kelantan, Malaysia

ABSTRACT

Introduction: Most nursing educators strive for excellence in both academics and practical abilities. It's a method for determining how successful nurse educators perform. Nowadays, nursing learners are encouraged to acquire a continually increasing body of information and to employ technical expertise in a world of rapid change, as portrayed by concept mapping care plans. This concept mapping care plan (CMCP) was validated and evaluated in three rounds by 10 expert panels implementing the Delphi method. It was used to assess nursing students' academic performance in clinical practice. **Methods:** This quasi-experimental study was conducted on 218 second-year nursing students, which having 109 respondents respectively. Respondents were randomly assigned into a control group (lecture-based) and an experimental group (concept mapping). The respondents was chosen based on zones from four nursing colleges under Institut Latihan Kementerian Kesihatan Malaysia (ILKKM). Significant p-values were considered as those less than 0.05. **Results:** The experimental group's mean CMCP scores during clinical practices were 65.23, whereas the control groups were 59.33. The paired t-test with a p-value of 0.05 indicates that there are significantly different between the experimental and control groups. **Conclusion:** The purpose of employing concept mapping as a teaching method during clinical setting is to allow students to examine theory knowledge and apply it in a clinical setting. Researchers believe that CMCP can be used to replace current nursing process used in clinical practice. Furthermore, CMCP can help students enhance their learning and become much more innovative.
Malaysian Journal of Medicine and Health Sciences (2022) 18(8):50-58. doi:10.47836/mjmhs18.8.8

Keywords: Concept mapping care plan (CMCP), clinical practices, nursing students' achievement, Delphi technique.

Corresponding Author:
Dr Rusnani Ab Latif, PhD
Email: rusnani@uitm.edu.my
Tel: +604-5623444

INTRODUCTION

Attachment at clinical practises is a core part of nursing education. Attachment to clinical practises provides students with training, responsibility, and education of patient care. As learners are exposed for patients that require significant nursing interventions, the practical educational environment has a huge impact on learning and professional advancement. They are significantly engaged in learning via nursing practice (1). The most significant stressors identified by nursing students are clinical assignment stress and workload of nursing care plan or nursing process task (2). As a result of this, concept mapping care plan is effective in improving students' clinical practice training because it able to help and provide the students with the appropriate and clear information regarding patient care needs. According to the findings of the research, concepts mapping enables students to comprehend how aspects in patient care are interconnected and to anticipate issues (3). They individually examine and supervise patients and, using a comprehensive approach, determine what patients require to achieve and maintain good health.

Students not only learned content information by practicing concept mapping, but they also improved their problem-solving, critical thinking, communication, and active learning skills (4). CMCP improved critical thinking among nursing students, allowing them to analyse, assess, and evaluate data that is relevant to patient care. During the clinical context, it will transform students from passive to active learners. Students are able to develop a map of content while constructing

the maps, allowing them to engage in cognitive abilities such as analysis, assessment, and reasoning, which is an example of analytical thinking development (5).

The CMCP can simply be used by student nurses to evaluate their performance in clinical settings. Previous study reported that when compared to the control group, medical students who were educated through concept mapping had higher critical thinking scores. In order to make competent knowledge-based assessment and treatment choices during patient care, medical students must have excellent problem solving skills (6). Similar study done conducted an experiment to see how concept mapping affects the development of critical thinking skills in nursing students. The results showed that students who were assigned to the concept mapping group had higher cognitive scores than those in the control group. The study suggested that concept mapping be used as a teaching approach to help students develop valuable skills in their cognitive domain (7). In the clinical setting, concept maps can be evaluated based on how comprehensive the data assessment is, whether the data is correlated with accurate diagnosis and treatment as well as problems, whether the care plans and treatments are precise and appropriate, and whether the connections between the theories are explicitly expressed but also reliable (8). CMCP can help in promoting meaningful learning in daily clinical practice.

Learners who participate in a meaningful learning experience will gain emotional importance and confidence as a result of their understanding (9). Students gain a deeper understanding of the interconnections between patient data and disease processes by employing idea mapping, which gives them a "greater picture" about how to care for patients (10). The client is placed in the center of the image in concept mapping, which is focused on a clinical concept of illness or disease (11). The implementation of concept mapping stimulates students' cognitive thinking since it improves their insight of client needs and relates to client care. According to previous research, concept mapping is an effective method of instruction for fostering metacognitive thinking and a holistic approach to learning (12). Excellent patient outcomes are associated with nurses that involved in critical thinking in their nursing profession (13). They also concluded in their study that nursing care may be suboptimal at best without the development of critical thinking abilities, which has an impact on patient outcomes (14). If the CMCP is regularly practiced and reinforced in the clinical field, the abilities of using it will improve even more. It necessitates a successful synthesis of theory and clinical practice (15). Therefore, the researcher wants to develop CMCP to assess nursing students' academic achievement in clinical area and to enhance their student-centered learning approach. It is time to foster student innovation and creativity in accordance to the Ministry of Education's demand for Higher Order Thinking Skills (HOTS), which the Ministry of Health could not disregard. Nursing students' knowledge and understanding were found to be increased as a result of concept mapping care plans, as well as the quality of clinical instruction.

MATERIALS AND METHODS

The study employed a two-group quasi-experimental design with pre- and post-tests. This study was carried out based on the random selection of 17 nursing colleges under the Institusi Latihan Kementerian Kesihatan Malaysia (ILKKM) in Malaysia. To choose a representative sample for the study, a multi-stage sampling method was performed. The population of the study was chosen based on zones from four nursing colleges. The East Zone is comprised of the Institut Latihan Kementerian Kesihatan Malaysia (ILKKM) Kubang Kerian Nursing College in Kelantan, the Northern Zone of ILKKM Pulau Pinang in Penang, the Central Zone of Kolej Sains Kesihatan Bersekutu (KSKB) Sungai Buluh, and the Southern Zone of ILKKM Melaka. The students were randomly placed in two groups: control (KSKB Sungai Buluh and ILKKM Melaka) and experimental (KSKB Sungai Buluh and ILKKM Melaka) (ILKKM Kubang Kerian and ILKKM Pulau Pinang). All four nursing college directors of nursing granted permission. The total number of population for four colleges selected was 254. The sample size is obtained using a sample size of 218 respondents and a confidence level of 95% (16). Each of the experimental and control groups included 109 respondents. The Inclusion criteria were: semester four from second year Diploma in Nursing Program students from East zone is Kolej Kejururawatan Kubang Kerian (KKKK), Kelantan, North zone is Kolej Kejururawatan Pulau Pinang (KKPP), Central zone is Kolej Sains Kesihatan Bersekutu (KSKB) Sungai Buluh and Southern zone is Kolej Kejururawatan Melaka (KJM); Had not previously used concept mapping and students who are willing and consented to participate in this study.

Data Collection

The Delphi technique was used to validate a concept mapping care plan (see Figure 1).

In order to reach a consensus on a CMCP, a three-round Delphi technique was used. The consensus was reached after ten expert committees deliberated. On a 5-point Likert scale, participants were asked to score the category response from first round, where one is "Very Irrelevant" and five being "Very Relevant." The Statistical Package for the Social Sciences for Windows (SPSS) version 23.0 analysis was used to analyze the data. A paired t-test was performed to compare the concept mapping care plan in clinical settings between the experiment and control groups.

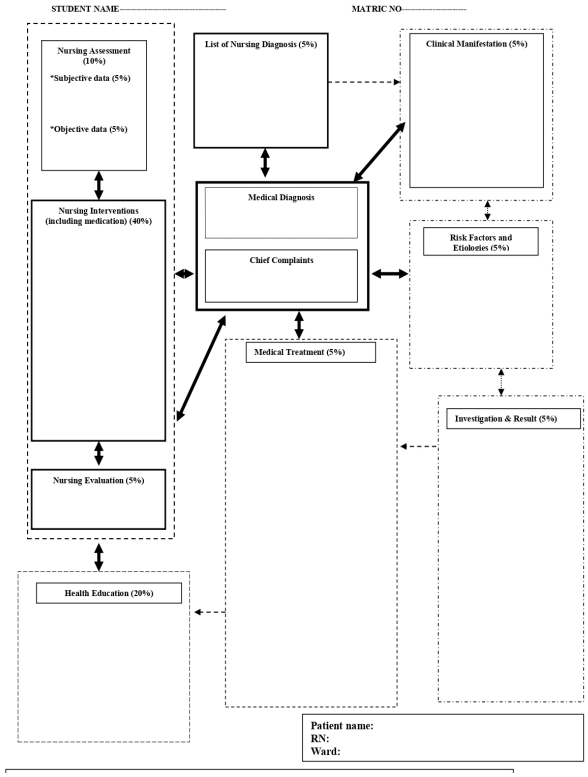

Figure 1: Assesment Using Concept Mapping Care Plan

The CMCP was scored in three categories: poor (33.3 %), moderate (>33.3-66.6 %), and high (>66.6 %) (17). This grading criterion is comprised of the following nine components: (1) Clinical manifestation (5%), (2) Risk factors and etiologies (5%), (3) Investigation and result (5%), (4) Medical care (5%), (5) Nursing diagnosis (subjective and objective data) (10%), (6) List of Nursing Diagnosis (5%), (7) Nursing intervention (including medicines) (40%), (8) Nursing evaluation (5%), and (9) Health education (20%). Its purpose was to promote a patient-centered approach. Its purpose was to promote a patient-centered approach. The students were told to complete the following tasks:

i. Identify the patient medical diagnosis as involves the concepts in a box in the middle of the page.
ii. Include the patient's diagnosis, principal complaint, or reason for being admitted to the hospital.
iii. Include all the recognized nursing diagnoses as possible in the boxes relevant to the main box depending on the patient history illness complaints or reason for admission.
iv. Make a list of the subjective and objective data related with each nursing diagnosis identified in the case study.
v. Provide the most recent information on medical diagnosis, patient's medical history, risk factors and etiologies, diagnostic tests, therapies, and medications under the relevant nursing diagnoses.
vi. Generate a checklist of nursing interventions that are connected to the primary nursing diagnosis.
vii. After all of the nursing interventions have been completed, generate a checklist of the nursing evaluation.
viii. Generate a checklist of the nursing education that the client should get in relation to their problems.

Data Collection and Analysis of Delphi technique

The Delphi Technique was used to reach a consensus on a concept mapping care plan. The CMCP was validated by a ten member's expert panel with six from the University Sains Malaysia (USM) and four from Kubang Kerian Nursing College. They have worked as a medical lecturer and a nursing lecturer, and they have more than five years of professional experience. The experts were offered the option to evaluate the prejudices and concerns of those other members of the group in an unbiased context where they may express their thoughts. Data was collected using the Delphi technique, and the survey's validity was strengthened by involving experts in the validation process (18, 19). The Delphi approach is utilized indefinitely until an agreement has been reached. The median, interquartile range, and quartile deviation were used to evaluate the experts' consensus data acquired in rounds one, two, and three. As a consequence, the CMCP unanimously agreed when all of the statements received a medium consensus value of 4 or more, indicate that the significance of the statements was high, and poor if the median value becomes less than 3.5.

Questionnaires are used as a data collecting instrument in the Delphi technique. Each expert panel was allotted two weeks for each round of Delphi (20); however, it took two months due to schedule constraints and the final expert panel. The questionnaires were distributed through email and conventional mail. The questionnaires were accompanied by a formal letter requesting that the experts engage on the Delphi panel. A brief explanation of the Delphi technique was provided, along with directions for completing the questionnaire. When the Delphi round's deadline approached, the researcher addressed a follow-up e-mail to all Delphi panels to serve as a gentle reminder. To simplify monitoring of returned responses as well as recording the individual's input and convenience of data analysis, each expert was assigned a code name [i.e. P1 = Panel 1; P2 = Panel 2; and so on]. To ensure the simplicity of completion and return of the questionnaires, a user-friendly questionnaire was developed using a word document. In Delphi surveys, measures of central tendency and dispersion (standard deviation and interquartile range) are typically used to convey information about respondents' collective judgements (21).

i. Delphi Round One

The CMCP questionnaire had nine items in round one. During the first round, the expert panels were given a survey questionnaires about concept mapping care plan components. The researcher provided a guideline for

the expert panels in terms of the score to be assigned. The overall rating is 100. In the first round, the Delphi panels were given closed-ended, five-point Likert scale questions to assess their degree of agreement with a set of statements about the relative importance of the researcher's concept mapping care plan. The value 1 indicates "strongly disagreeing," whereas the value 5 indicates "strongly agreeing" (22). The researcher combines the information obtained into a questionnaire survey after receiving participant responses. The round one category responses were graded on a scale of 1 to 5, with 1 indicating very irrelevant, 2 indicating not relevant, 3 indicating less significant, 4 indicating relevant, and 5 indicating very relevant.

For the second round of data collecting, this questionnaire was used as the questionnaire survey. It should be emphasized that implementing a structured questionnaire in round one based on a thorough literature review is an appropriate and typical adaptation to the Delphi process framework. A modified Delphi procedure can be employed if fundamental information about the target issue is accessible and usable (23). The round one questionnaire responses were analyzed using descriptive statistics in SPSS version 23.0. The mean and median scores have been used to analyze the data. The researcher employs the mean and median scores from the five-point Likert-type scale data. In the literature, it is usually advised to adopt a median score based on a five-point Likert-type scale data (24, 25, 26). Measures of central tendency (means, median, and mode) and level of dispersion (standard deviation and inter-quartile range) are used in Delphi studies to provide information about respondents' aggregated opinions (27).

ii. Delphi Round Two

After receiving all of the participant comments, the researcher condensed it all into a single statement. Each Delphi participant was given a new questionnaire in the second round and asked to rate the items that the researcher had summarised due to the information they had provided in the first round. As a consequence, Delphi panels may be asked to rate or rating items in order to assess their early priority. Round two yields a list of areas of disagreement and agreement (28). In several circumstances, Delphi respondents were asked to explain their reasoning for rating priorities among items (26). The Delphi results from round one, as well as expert views, were incorporated in round two. The mean and median scores were used to analyse the data. The results of the second round of Delphi were based on a 5-point Likert scale.

In the second phase, the median and interquartile range were calculated. In the second phase of analysis, the median and interquartile range of responses were applied. The items were organized in lowest to highest, starting with the highest and ending with the lowest. The degree of expert agreement was evaluated using the median score. During this phase, consensus began to emerge, and the final results may be seen in the responses of the participants (26). For the initial feedback questionnaires, the frequency of central tendency was computed for the median and interquartile range. As a result, for each expert's relationship to each item, the interquartile range was a more accurate calculation than the mean. In other words, it was intended to reflect the wide range of opinions held by the experts on each topic. The inter quartile range was defined as the difference between the third and first quartiles of a set of data.

iii. Delphi Round Three

In the third round, each Delphi panel was given the questionnaire containing the questions and scores presented by the researcher in the previous round, then he or she was asked to alter his or her judgments in order to establish an agreement. All panels were asked to expand on their responses, this time using the same rating scale and any additional information. In creating the Delphi rounds three surveys, the suggestions and feedback received in round two were taken into consideration. The survey was successful in obtaining widespread consensus on the CMCP. During this round, Delphi panels were given the opportunity to clarify both the content and their judgments of the degree of importance of the items. The additional topics, together with their ratings, minority opinions, and those that gained consensus, were submitted to the panel. This round provided participants with one final opportunity to review their decisions.

The experts can keep their previous reply from round two, where their answers were provided as interquartile ranges, in the third round. If their original answers were beyond the interquartile range, experts may revise them in the third round, or they may choose to keep their out-of-quartile answers and explain why. The third round aimed to achieve consensus and close the gap between the experts' diverse points of view. The data was evaluated after the third round, and the median and interquartile range were computed. The third round of the Delphi survey was used to gather information from the expert panel. After each Delphi round, the significance and agreement were established before making an interpretation.

Previously, the median value of the group response and the interquartile range distribution were often employed as measures of relevance and agreement (20, 29, 30). In this study, the median, interquartile range, and quartile deviation from first round, second, and third data were used to examine the experts' consensus data. The importance level was divided into two levels, while the level of agreement was divided into three levels (high, medium, and no consensus). If the quartile deviation is less than or equal to 0.5, the level of consensus is high; if it is between 0.5 and 1, there is no consensus; and if it is greater than 1, there is no consensus. The

relevance level was extremely high if the median value was 4 or greater; if the median value was less than 3.5, the relevance level was extremely low.

Ethical Approval

The UiTM Research Ethics Committee, Faculty of Health Sciences, approved this study under the number 600-RMI (5/1/6). REC/119/15. A letter of approval was given to Bahagian Pengurusan Latihan (BPL) and the Directors of Nursing Colleges, Institusi Latihan Kementerian Kesihatan Malaysia (ILKKM) before this study project could commence. The researcher was explaining to the participants the study's purpose and method. The researcher also assured the respondents that their replies would be kept private and solely used for academic purposes. Written informed permission from all subjects was acquired.

RESULT

a. Results of validation process

The researchers used an equation as a guidance in this study to determine the consensus and significance of items (20) (see table I & II). The formula was used in Microsoft SPSS version 23.0 to determine the interquartile range value (Q3-Q1), which had been reported in a Round Three (R3) survey. The data from Round Three (R3) was described normally. The following is the formula for calculating deviation (QD):

$$QD = \frac{\text{Inter-quartile range}}{2}$$

$$= \frac{(Q3-Q1)}{2}$$

Table I: Level of consensus and importance on classifications of consensus was determined at three levels[adapted from Norizan (20)]

Quartile Deviation(QD)	Level of Consensus	Median	Level of Importance
Less or equal to 0.5 (QD≤0.5)	High	4 and above (M≥4)	High
More than 0.5 and less than or equal to 1.0 (0.5≤QD≤1.0)	Moderate	3.5 and less (M≤3.5)	Low
More than 1.0 (QD≥1.0)	Low and no consensus	-	-

Table II: Description of the Classifications [adapted from Norizan (20)]

Level	Description
High importance – high consensus	Items that achieved high consensus with QD value of less or equal to 0.5, but are regarded as important and very important with median of 4 and above [(QD≤0.5) and (M≥4)]
High importance – moderate consensus	Items that achieved moderate consensus with QD value of more than 0.5 and less of equal to 1.0, but are regarded as important and very important with median 4 and above [(0.5<QD≤1.0) and (M≥4)]
High importance – no consensus	Items that did not achieve consensus with QD value of more than 1.0, but are regarded as important and very important with median of 4 and above [(QD>1.0) and (M≥4)]
Low importance – high consensus	Items that achieved high consensus with QD value of less or equal to 0.5, but are regarded as moderate and not important with median of 3.5 and less [(QD≤0.5) and (M≤3.5)]
Low importance – moderate consensus	Items that achieved moderate consensus with QD value of more than 0.5 and less of equal to 1.0, but are regarded as moderate and not important with median of 3.5 and less [(QD≤0.5) and (M≤3.5)]
Low importance – no consensus	Items that did not achieve consensus with QD value of more than 1.0, but are regarded as moderate and not important with median of 3.5 and less [(QD≤0.5) and (M≤3.5)]

Table III: Consensus in concept mapping care plan through three rounds Delphi Technique.

Item	Rounds of Delphi								
	Round 1			Round 2			Round 3		
	Median	Mean	QD	Median	Mean	QD	Median	Mean	QD
Statement 1	5.0	4.7	0.5	5.0	4.7	0.5	5.0	4.7	0.5
Statement 2	5.0	4.7	0.5	5.0	4.7	0.5	5.0	4.7	0.5
Statement 3	5.0	5.0	0	5.0	4.7	0.5	5.0	4.7	0.5
Statement 4	5.0	5.0	0	5.0	4.4	1	5.0	4.7	0.5
Statement 5	5.0	5.0	0	5.0	4.4	1	5.0	4.7	0.5
Statement 6	5.0	5.0	0	5.0	4.7	0.5	5.0	4.7	0.5
Statement 7	5.0	4.7	0.5	5.0	4.1	1.5	5.0	4.7	0.5
Statement 8	5.0	5.0	0	5.0	4.7	0.5	5.0	4.7	0.5
Statement 9	5.0	5.0	0	5.0	4.7	0.5	5.0	4.7	0.5

The Quartile Deviation (QD) of the assertions was less than or equal to 0.5 (QD0.5) for the first, second, and third Delphi rounds, showing a good consensus in the concept mapping framework for this study. To put it another way, all expert panel remarks should fall in between 1 and 5(very relevant). The median score was used to evaluate the level of expert agreement, and the results show that the medium result was greater than 4 in all three Delphi rounds. According to the report, the statements were rated as having a high level of importance, as displayed in table III.

a. A descriptive statistic on nursing students' academic achievement during clinical practices.

The data from the respondents was separated into three groups of mean score based on the student's grade level (see table IV). Respondents data were divided into three groups of score average depending on student grade level, with Low (<33.3), Moderate (>33.3-66.6%) and High grade (>66.6%). The experimental group shows a higher grade score with the student got grade high was 52(47.7%) compared with control group that only got 37(33.9%). However the control group shows higher score in Moderate grade (n=72, 66.1%) compared than experimental group (n=57, 52.3%). However, no respondents get low grade below than 33.3%.

Table IV: Descriptive analysis for concept mapping care plan scores at clinical practice among experimental and control groups (N=218)

Concept mapping care plan scores	Experimental group		Control group	
	n	%	n	%
Low(<33.3%)	-	-	-	-
Moderate (>33.3-66.6%)	57	52.3	72	66.1
High(>66.6%)	52	47.7	37	33.9

b. A descriptive analysis of pre-test and post-test scores on achievement test of the students taught through concept mapping and lecture method

As it is displays in table V, the descriptive analysis of pre and post-test scores on achievement test of the respondents taught through concept mapping and lecture method. Results obtained from data analysis are presented according to the objective of the study; on the effect of teaching strategies using concept mapping and lecture on student achievement mean scores. Results shows that the respondents taught using concept mapping had achievement mean scores of 11.23 and a standard deviation of 2.59 while at post-test, the achievement mean scores was 13.19, standard deviation 1.71 and a mean gain scores of 1.96. On the other hand, respondents taught using lecture method had an achievement mean scores of 10.71 and standard deviation of 2.23 in the pre-test and post-test achievement which the mean scores of 12.60, a standard deviation of 1.64 with mean gain scores of 1.89. This implies that the experimental group appears to have performed better than the control group in the achievement test and shows the result of the post-test increase steadily.

Table V: Descriptive analysis of pre-test and post-test scores on achievement test of the students taught through concept mapping and lecture method (n=218).

Teaching strategy	N	Pre-test		Post-test		Mean gain score
		Mean	SD	Mean	SD	
Concept Mapping (Experimental group)	109	11.23	2.59	13.19	1.71	1.96
Lecture (Control group)	109	10.71	2.23	12.60	1.64	1.89

c. Inferential statistic on nursing students' academic achievement during clinical practices.

Table VI indicates that respondents taught through concept mapping (experiment group) having higher mean gain scores on concept mapping care plan at clinical practices compared than using lecture method (control group). As descriptive statistics were used to compare the means of both the two different groups on CMCP within clinical practice, the experimental group's mean score was 65.24, SD= 9.28, whereas the control group's mean score was 59.33, SD= 11.26. A paired t-test with t (4.54, 108) and p-value 0.05 indicated that the experimental and control groups differed statistically. In terms of CMCP scores, the experimental group exceeded the control group. As a result, the hypothesis asserts that there is a substantial difference in academic achievement of diploma nursing students during clinical settings between students taught using concept mapping and students taught using lecture technique

Table VI: Comparison mean scores of concept mapping care plan during clinical practice between experiment and control groups (n=218)

Test	Group	N	Mean	SD	df	t-value	p-value
Concept Mapping Care Plan	Experimental	109	65.24	9.28	108	4.54	0.01*
	Control	109	59.34	11.26			

*p<0.05 significant

DISCUSSION

a. CMCP consensus achieved by a three-round Delphi technique.

Delphi approaches are a very well and commonly used method of gathering information from participants in a certain field (21). The Delphi technique can be used indefinitely until consensus is reached (21). Since it collects data from a panel of selected people via a questionnaire survey distributed in subsequent rounds, the Delphi technique is suited as a consensus mechanism (31). During the evaluation process, the researcher employed three rounds of Delphi techniques to evaluate the CMCP (9 items). According to the Delphi processes, the statements' Quartile Deviation (QD) was less than or equal to 0.5, indicating a high level of consensus. To put it another way, all expert panel comments are assigned a score ranging from 1 to 5 (very relevant). The CMCP helps students prepare for clinical practices. In nursing education, concept mapping has indeed been implemented as a teaching approach to help students better understand and connect theories to the nursing process. The students were able to identify patient problems and interconnections with this CMCP based on patient data analyses and a comprehensive nursing care plan.

b. To examine the effectiveness of the CMCP on the academic achievement during clinical practices.

In this study, students in the experimental group improved their CMCP scores and performed better than students in the lecture group. Applying concept mapping techniques increases students' critical thinking skills (as measured by concept map care plan scores) and academic achievement, according to the present findings of this study (as measured by post-test scores). Concept mapping has been employed in nursing education as a teaching method to help students better understand and connect concepts with the nursing process. By CMCP, the student and nursing educator were able to uncover interconnections in patient data, analyze the data, and design comprehensive nursing care. Previous research suggests that CMCP be used instead of regular care plans or nurse care plans to facilitate learning how patients' multiple problems are interconnected (12, 32, 33).

By implementing inclusive and its implementation in practice, the CMCP will make it easier for nursing students to comprehend. This inequality may have a negative effect on the health of care provided, job satisfaction, advancement, and professional development, as well as others' impressions of nursing. Clinical educators must be able and encouraged to provide students with the knowledge and skills they need to address patient needs; thus, high-quality nursing education can be established if nursing faculty members shift their clinical teaching approaches and instead adhere to routine training (34).

The concept map care plans, as shown, have already been implemented at the overseas hospital. By connecting the gap between theory and practice, the CMCP will help students understand the care plan. This inequality may have an adverse effect on the quality of care provided, job satisfaction, advancement and professional development, and public perceptions of nursing. The effectiveness of nursing education and clinical experiences obtained throughout nursing education influences nurses' ability to transition to clinical roles after graduation (35). One of the most important skills in preparing nursing students for clinical practice is critical thinking (36). It is because critical thinking enables them to successfully manage patients' problems, make the best clinical judgments, have better control over important clinical conditions, and deliver safe and quality care (37). In today's workforce, it's essential to prepare them with critical thinking skills. Nursing people with positive skills will be able to conduct specific operations more effectively than students with weak skills. This has an impact on the future quality of work, whether it is of greater or lower quality.

Study limitations

One of the limitation of this study is sample size is small, which consists of 218 respondents from Diploma Nursing students that was selected by four zones (North, South, West and Central). Consequently, the results of this study not generalized the finding for Institute Latihan Kementerian Kesihatan Malaysia (ILKKM) nursing students in Malaysia that have seventeen nursing colleges. This may not allow for generalizing the findings to the entire of Diploma Nursing students under ILKKM. Despite these limitations, furthermore this study is focused on nursing students under ILKKM only and does not involve private nursing student in Malaysia.

CONCLUSION

Nursing students will use CMCP to examine any problems that the patient may be suffering before seeking to resolve the situation through effective decision making. This will help to build critical thinking skills and the ability to think outside the box. Nursing educators should employ CMCP as an assessment approach to help students learn to think critically and perform well after graduating. The goal of adopting concept mapping as a teaching approach during clinical setting is to enable students to integrate and absorb theory in a clinical context. Nursing students must be able to use concept mapping to transition real teaching objectives from the classroom to primary care, which requires critical thinking and problem-solving capabilities.

The researchers believes that CMCP could be used to substitute standard nursing processes in clinical settings. This is attributable to the fact that the CMCP process is similar to the nursing process phases of assessment, planning, implementation, and evaluation of future

nursing intervention. This process was also important in the critical thinking process. Researchers believe that modifications to the nursing curriculum are required, for example, rather than rote memorization, students should be supported in comprehending concepts by enhancing student-centred learning strategies. According to the researchers, all allied health educators should incorporate idea mapping methodologies into their teaching methods. CMCP has the ability to increase students' problem-solving skills in situations that are challenging. If a student has steady and sustainable interpersonal and intrapersonal emotional capacities, the country will benefit from a body of professional energy sources. This is in keeping with the vision and objective of the Ministry of Health's, ILKKM, which is to develop competent and knowledgeable nurses.

ACKNOWLEDGEMENTS

The researchers would like to acknowledge all of the participants, especially Bahagian Pengurusan Latihan (BPL) and the directors of four nursing colleges, ILKKM Kubang Kerian (Kejururawatan), Kelantan, Northern zone ILKKM Pulau Pinang, Penang, ILKKM Melaka, and Kolej Kesihatan Sains Bersekutu, Sungai Buluh, for their permission and participants.

REFERENCES

1. Manninen, K., Scheja, M, Henriksson, E. W., & Silŏn, C. Self-centeredness or patient- centeredness-final year nursing students' experiences of learning at a clinical education ward. Journal of Nursing Education and Practice. 2013; 3(12):187-198.
2. Ab Latif, R., & Mat Nor, M. Z. Stressor and coping strategies during clinical Practices among diploma nursing students. Education in Medicine Journal. 2016;8(3):21-33.http://dx.doi.org/10.5959/eimj.v8i3.422
3. Harrison, S., & Gibbons, C. Nursing students' perceptions of concept maps: From theory to practice. Nursing Education Perspectives. 2013; 34(6):395-399.
4. Erasmus, C. J. Concept mapping as a strategy to enhance learning and engage students in the classroom. Journal of Family and Consumer Sciences Education. 2013; 31(1):27-35. Available at http://www.natefacs.org/JFCSE/v31no1/v31no1Erasmus.pdf
5. Wheeler, L. A., & Collins, S. K. R. The influence of concept mapping on critical thinking in baccalaureate nursing students. Journal of Professional Nursing. 2003; 19(6): 339-346.
6. Maryam A, Mohammadreza D, Abdolhussein S, Ghobad R, Javad K. Effect of Concept Mapping Education on Critical Thinking Skills of Medical Students: A Quasi-experimental Study. Ethiopian Journal of Health Sciences. 2021; 31(2).
7. Kaddoura, M., Van-Dyke, O., & Yang, Q. Impact of a Concept Map Teaching Approach on Nursing Students' Critical Thinking Skills. Nursing & Health sciences. 2016; 18(3), 350-354. doi:10.1111/nhs.12277
8. Oermann, M., Saewert, K., Charasika, M., & Yarbrough, S. Assessment and grading practices in schools of nursing: national survey findings part 1. Nursing Education Perspectives. 2009; 30(5):274-278.
9. Novak, J, D. & Gowin, D. B. Learning how to learn. New York: Cambridge University Press; 1984.
10. Hsu, L. Developing concept maps from problem-based learning scenario discussions. Journal of Advanced Nursing. 2004; 48(5), 510-518. Retrieved June 20, 2020, from CINAHL with Full Text database.
11. Taylor, J., & Wros, P. Concept mapping: a nursing model for care planning. Journal of Nursing Education. 2007; 46(5): 211-216. Retrieved June 20, 2020, from CINAHL with Full Text database.
12. Chabeli, M. M. 'Concept-mapping as a teaching method to facilitate critical thinking in nursing education: A review of the literature'. Health SA Gesondheid. 2010; 15(1), Art. #432, 7 pages.
13. Forneris, S., & Peden- McAlpine, C. Evaluation of a reflective learning intervention to improve critical thinking in novice nurses. Journal of Advanced Nursing. 2007; 57(4): 410-421.
14. Hicks-Moore, S. L., & Pastirik, P. J. Evaluating critical thinking in clinical concept maps: A pilot study. International Journal of Nursing Education Scholarship. 2006; 3(1). Retrieved from http://www.bepress.com/ijnes/vol3/iss1/art27
15. Oermann, M., Saewert, K., Charasika, M., & Yarbrough, S. Assessment and grading practices in schools of nursing: national survey findings part 1. Nursing Education Perspectives. 2009; 30(5):274-278.
16. Krejcie, R. V & Morgan, D. W. Small-Sample Techniques. The NEA Research Bulletin, 38 (December, 1960), p. 99; 1970.
17. Ainsley, J. CEO Analysis: Ten Years of analysis of the course experience questionnaire surveys symposium 2003: Canberra; 2003.
18. Dalkey, N. C. An experimental study of group opinion. Futures. 1969; 1 (5):408-426.
19. Wilhelm, W. Alchemy of the oracle: The Delphi technique. The Delta Pi Epsilon Journal. 2001; 43(1):6-26.
20. Norizan, A. R. Computer Competency of In-Service ESL Teachers in Malaysia Secondary Schools. PhD Thesis, Universiti Kebangsaan Malaysia; 2003.
21. Ab Latif, R, Mohamed, R, Dahlan, A., & Mat Nor M.Z. Using Delphi technique: making sense of consensus in concept mapping structure and multiple choice questions (MCQ). Education in Medicine Journal. 2016; 8(3): 89–98. http://dx.doi.

org/10.5959/eimj.v8i3.421
22. Kostovich, C., Poradzisz, M., Wood, K., & O'Brien, K. Learning style preference and student aptitude for concept maps. Journal of Nursing Education. 2007; 46(5):225- 232
23. Kerlinger, F. N. Foundations of behavioral research. New York: Holt, Rinehart, and Winston, Inc; 1973.
24. Hill, K. Q., & Fowles, J. The methodological worth of the Delphi forecasting technique. Technological Forecasting and Social Change. 1975; 7: 179-192.
25. Eckman, C. A. Development of an instrument to evaluate intercollegiate athletic coaches: A modified Delphi study. West Virginia University, Morgantown; 1983.
26. Jacobs, J. M. Essential assessment criteria for physical education teacher education programs: A Delphi study. West Virginia University, Morgantown; 1996.
27. Hasson, F., Keeney, S., & McKenna, H. Research guidelines for the Delphi survey technique. Journal of Advanced Nursing. 2000; 32 (4):1008-1015.
28. Ludwig, B. G. Internationalizing Extension: An exploration of the characteristics evident in a state university Extension system that achieves internationalization. The Ohio State University, Columbus; 1994.
29. Saedah Siraj. & Azdalila Ali. Principal's projections on the Malaysian secondary school future curriculum. International Education Studies. 2008; 1(4):61-78.
30. Ahmad Sobri, S. Reka bentuk kurikulum m-pembelajaran sekolah menengah. Universiti Malaya; 2009.
31. Hsu, Chia-Chien and B. Sandford. "The Delphi Technique: Making Sense of Consensus." Practical Assessment, Research and Evaluation. 2007; 12(10).
32. Kostovich, C., Poradzisz, M., Wood, K., & O'Brien, K. (2007). Learning style preference and student aptitude for concept maps. Journal of Nursing Education, 46(5), 225- 232.
33. Abel, W. M., & Freeze, M. Evaluation of concept mapping in an associate Degree nursing program. Journal of Nursing Education. 2006; 45(9): 356-365.
34. Li-Ling, H. An analysis of clinical teacher behavior in a nursing practicum in Taiwan. Journal of Clinical Nursing. 2006; 15(5):619-628. doi:10.11 11/j.1365-2702.2006.01332. x
35. Reid-Searl, K., & Dwyer, T. Clinical placements for undergraduate nursing students: An educators' guide. Australian Nursing Journal. 2005; 12(9): 21-23. Retrieved from Academic Search Premier database.
36. Kaya, H., Şenyuva, E., & Bodur, G. Developing critical thinking disposition and emotional intelligence of nursing students: a longitudinal research Nurse Educ. Today, 2017; 48:72-77, 10.1016/j.nedt.2016.09.011
37. Kaddoura, M.A., Van Dyke, O., Yang, Q. Correlation between critical thinking skills and national council licensure examination for registered nurses success in accelerated bachelor nursing students Teach. Learn. Nurs. 2017; 12 (1):7, 10.1016/j.teln.2016.08.004