

EFFECTIVENESS OF MIND-MAPPED CARE PLANS ON CRITICAL THINKING AND ATTITUDES TOWARD NURSING CARE PLANS AMONG B.SC. NURSING STUDENTS

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Abstract :

Background: Critical thinking is an important component of nursing education because nursing students are expected to interpret clinical information, identify patient problems, make reasoned decisions and plan appropriate care. Traditional linear nursing care plans may not always promote an integrated view of the patient. The present study evaluated a Mind-Mapped Care Plan (MMCP) approach as an innovative instructional strategy.

Aim: To evaluate the effectiveness of Mind-Mapped Care Plans on critical thinking skills and attitudes toward nursing care plans among III-year B.Sc. Nursing students.

Methods: A quantitative quasi-experimental before-and-after control-group design was used. A total of 257 III-year B.Sc. Nursing students from six selected nursing institutions in Indore, Madhya Pradesh, were selected by purposive sampling; 132 constituted the intervention group and 125 the control group. Data were collected using a demographic profile, a 30-item observational critical-thinking checklist, and a 30-item five-point Likert attitude scale. The intervention consisted of orientation and practice in preparing MMCPs for a myocardial infarction case scenario. Critical-thinking outcomes were assessed at three post-test time points (days 7, 14 and 21). Descriptive statistics, paired t-test, independent comparisons, Pearson correlation and association analyses were used.

Results: At the third post-test, 106 (approximately 80%) students in the intervention group demonstrated good critical-thinking skill, whereas only 1 (1%) student in the control group was reported in the good-skill category and none was in the excellent category. The overall critical-thinking mean percentage in the intervention group increased from 38% at pre-test to 69% at the third post-test, while the control group changed from 35% to 36%. The intervention-group critical-thinking pre/post comparison was statistically significant ($t=30.84$, $p<0.001$). Attitude scores in the intervention group increased from 59% to 71%, with a statistically significant pre/post difference ($t=12.35$, $p<0.001$), while the control group changed from 64% to 65%. The between-group third-post-test comparison was statistically significant for critical thinking (reported $t=39.73$, $p<0.001$) and attitude (reported $t=74.2$, $p<0.001$). No statistically significant correlation between critical-thinking skill and attitude was reported.

Conclusion: Within the limits of the quasi-experimental design, purposive sampling and single clinical case context, MMCP exposure was associated with substantial improvement in critical-thinking performance and a positive change in attitude toward nursing care plans among the participating nursing students.

Keywords: Clinical reasoning; visual learning; nursing process; active learning; baccalaureate education

INTRODUCTION

Nursing practice requires students to move beyond the acquisition of factual knowledge toward interpretation of clinical information, clinical reasoning, problem solving and sound decision-making. Critical thinking is recognized as an important component of nursing education and clinical practice.¹⁻³

The study was developed in response to the need for teaching strategies that promote active and integrated thinking in nursing education. Active-learning and constructivist approaches emphasize the learner's participation in connecting new information with prior knowledge.⁴⁻⁵

The proposed Mind-Mapped Care Plan combines the steps of the nursing process with a visual, interconnected

representation in which the patient or central clinical problem is placed at the centre and related assessment data, nursing diagnoses, outcomes and interventions are organized through branches and relationships.

The synopsis defines MMCP as an image-centred visual representation of the nursing process, using branching, geometric shapes, colour coding and interconnections to represent relationships among elements of patient care. The approach was intended to support visualization of the patient as a whole and to facilitate critical thinking and a constructive attitude toward care planning.

Earlier literature examined mind mapping, concept mapping, critical thinking and traditional nursing care plans. Studies have described mind-mapped or concept-mapped care planning as a visual strategy that can help students organize patient information and develop critical-thinking or clinical-reasoning processes, while other work has reported mixed findings depending on the assessment method and educational context.⁶⁻¹² Consequently, instructional approaches should be evaluated empirically rather than assumed to be universally superior.

The present study therefore examined whether structured exposure to MMCP could improve critical-thinking skill and attitude toward nursing care plans among III-year B.Sc. Nursing students.

Aim and Objectives

The study aimed to evaluate the effectiveness of Mind-Mapped Care Plans as an innovative instructional approach for developing critical-thinking skills and changing the attitude of nursing students toward nursing care plans.

- To assess critical-thinking skill and attitude toward the care plan before introducing MMCP in the control and intervention groups.
- To assess critical-thinking skill and attitude after introducing MMCP in the control and intervention groups.
- To determine the effectiveness of MMCP on critical-thinking skill.
- To determine the effectiveness of MMCP on attitude toward the care plan.
- To determine the relationship between critical-thinking skill and attitude toward the care plan.
- To determine the association between critical-thinking skill and selected demographic variables.
- To determine the association between attitude and selected demographic variables.

Hypotheses

- H1: There is a significant difference between pre-test and post-test critical-thinking and attitude scores in the intervention group.
- H2: There is a significant difference in post-test critical-thinking and attitude scores between the control and intervention groups.
- H3: There is a significant relationship between critical-thinking skill and attitude toward the care plan in the control and intervention groups.

- H4: There is a significant association between critical-thinking skill and selected demographic variables in the control and intervention groups.
- H5: There is a significant association between attitude and selected demographic variables in the control and intervention groups.

Materials and Methods

Research design and setting

A quantitative approach and quasi-experimental before-and-after control-group design were used. The study was conducted among III-year B.Sc. Nursing students from six selected nursing institutions in Indore, Madhya Pradesh. Three institutions contributed students to the intervention group and three to the control group. The research was conducted during 2020–2023.

Participants and sampling

The target population consisted of nursing students studying in recognized and affiliated nursing institutions in Indore, Madhya Pradesh. The sample comprised III-year B.Sc. Nursing students who fulfilled the inclusion criteria. A total of 257 students were selected using non-probability purposive sampling: 132 in the intervention group and 125 in the control group.

Variables and instruments

The independent variable was orientation to and use of the Mind-Mapped Care Plan as an instructional approach. The two dependent variables were critical-thinking skill and attitude toward the nursing care plan.

The data-collection instruments comprised four parts: (1) demographic variables; (2) a 30-item observational checklist for critical-thinking skill; (3) a 30-item five-point Likert scale assessing attitude toward the nursing care plan; and (4) a structured teaching module on MMCP. The critical-thinking checklist was scored as satisfactory/unsatisfactory, with a maximum score of 30. The attitude scale contained 30 positively and negatively worded statements, with a maximum score of 150.

The critical-thinking checklist covered analysis, interpretation, inference making, explanation, evaluation and self-regulation. The attitude scale covered cognitive, affective, technical and interpersonal competencies. Content validity was assessed by a panel of experts; the reported content validity index for the tool was 0.89. Inter-rater reliability of the observational checklist was reported as Kappa = 0.926, and Cronbach's alpha for the attitude scale was reported as >0.83.

Intervention and procedure

At baseline, students in both groups completed the demographic and attitude measures and were assessed for critical-thinking skill using a myocardial infarction case scenario. Students in the intervention group then received structured instruction in MMCP, including the nursing process, the concept of mind mapping, preparation principles, advantages and disadvantages compared with traditional care plans, sample MMCPs, the relationship between mind mapping and critical thinking, and practice exercises.

During the intervention, students were instructed to place the

client or central health concern at the centre of the map and develop interconnected branches containing subjective and objective data, nursing diagnoses, expected outcomes and nursing interventions. They were encouraged to use relationships, lines, shapes, images, symbols and other visual features to show the links among elements of care. The control group continued with the traditional nursing care-plan format.

Three post-test critical-thinking assessments were conducted at days 7, 14 and 21. The MMCP approach was revised for intervention-group students before each assessment. Both groups were subsequently assessed for attitude toward the nursing process. The control group was oriented to MMCP after completion of the post-test assessments.

Data analysis and ethics

Frequency and percentage were used for demographic characteristics. Mean and standard deviation were used for critical-thinking and attitude scores. Paired t-test and between-group comparisons were used for changes in scores, Pearson correlation was used to examine the relationship between critical-thinking skill and attitude, and association analyses were performed for selected demographic variables.

Critical-thinking skill

Table 1. Critical-thinking performance at pre-test and third post-test

Group	n	Pre-test mean %	Third post-test mean %	Change
Control	125	35%	36%	1 percentage point
Intervention	132	38%	69%	31 percentage points

The intervention group showed a marked increase in critical-thinking performance. The reported mean critical-thinking score increased from 11.47 ± 2.53 at pre-test to 20.6 ± 2.27 at the third post-test, corresponding to an increase from 38% to 69%. In the control group, the reported mean increased from 10.75 ± 3.01 to 11.9 ± 2.11 , corresponding to 35% and 36%, respectively.

The paired comparison in the intervention group was statistically significant (reported $t=30.84$, $p<0.001$). The comparison between the control and intervention groups at the

Attitude toward nursing care plans

Table 2. Attitude toward nursing care plans at pre-test and post-test

Group	n	Pre-test mean %	Third post-test mean %	Change
Control	125	64%	65%	1 percentage point
Intervention	132	59%	71%	12 percentage points

The intervention group's mean attitude percentage increased from 59% at pre-test to 71% at post-test. The reported mean score increased from 88.43 to 105.78, and the paired comparison was statistically significant ($t=12.35$, $p<0.001$). In the control group, the reported attitude percentage changed from 64% to 65%. The between-group post-test comparison was reported as statistically significant ($t=74.2$, $p<0.001$). The item-wise results indicated generally

The research proposal received institutional approval, ethical clearance was obtained, permission was taken from participating institutions, and participant confidentiality and voluntary participation were maintained. The control group was offered MMCP orientation after data collection. Statistical significance was set at $p<0.05$.

Results

Participant profile

The two groups were reported to be similar in several demographic characteristics. Approximately 94% of participants were aged 19–22 years. Female students constituted 96% of the control group and 90% of the intervention group. Selection of nursing as a profession by personal choice was reported for 71% of the intervention group and 68% of the control group. Most participants preferred clinical-side work after course completion.

Regarding institutional characteristics, the study included students from private nursing institutions. The reported institutional profiles included differences in institutional duration, locality, courses offered and clinical exposure.

relevant post-test was also reported as statistically significant ($t=39.73$, $p<0.001$). At the third post-test, 106 students (approximately 80%) in the intervention group were categorized as having good critical-thinking skill, while the control group had no students in the excellent category and only one student (1%) in the good-skill category.

Item-wise analysis reported higher intervention-group performance across the critical-thinking domains, including analysis, interpretation, inference making, explanation, evaluation and self-regulation.

favourable responses across the cognitive, affective, technical and interpersonal domains.

The thesis also reports that most participants in both groups were already in the favourable-attitude category at baseline. Therefore, the observed change in the intervention group should be interpreted as an increase within an already relatively favourable attitude profile rather than a change from an entirely unfavourable baseline.

Relationship and associations

No statistically significant correlation was reported between critical-thinking skill and attitude toward care plans. The reported pre-test correlation coefficients were $r=0.07$ in the control group and $r=0.11$ in the intervention group; post-test findings were also reported as non-significant, with $r=0.074$ in the control group and $r=0.03$ in the intervention group.

For critical-thinking skill, the third-post-test analysis in the intervention group identified statistically significant associations with selected institutional characteristics, including courses offered, clinical exposure, locality of the institution and duration since the institution was established. For attitude, a statistically significant association was reported with age in the intervention group. The thesis also reports multiple-regression analyses indicating that demographic/institutional variables accounted for a proportion of variance in post-test outcomes; interpretation of individual coefficients should be read together with the original statistical tables.

Discussion

The principal finding of the study was the substantial improvement in critical-thinking performance among students exposed to MMCP. The intervention-group mean percentage increased by 31 percentage points, whereas the control-group change was 1 percentage point. The pattern was also visible in categorical results, with most intervention-group students reaching the good-skill category by the third post-test.

A possible explanation, consistent with the study's conceptualization of MMCP, is that the visual arrangement requires students to connect assessment findings, nursing diagnoses, expected outcomes and interventions rather than recording each component only in a linear sequence. The intervention required students to identify relationships among clinical data and to represent these relationships visually. This is consistent with the study's intention to promote analysis, interpretation, inference, explanation, evaluation and self-regulation.

The findings are broadly consistent with published nursing-education literature describing visual mapping as a strategy for organizing patient information and supporting critical thinking.⁶⁻¹² At the same time, published studies have reported mixed findings when concept mapping is compared with traditional care planning, including differences across specific tests and learning outcomes.⁷⁻⁹ Therefore, the present findings should be interpreted as evidence from this particular quasi-experimental implementation rather than as proof that MMCP is superior for every nursing topic, learner group or assessment method.

The intervention group also demonstrated a statistically significant increase in attitude toward the nursing care plan. Because both groups began with generally favourable attitudes, the result may reflect strengthening of an existing positive orientation rather than a complete attitudinal transformation. The intervention may have made the care-planning process more visually understandable and engaging for participants, although the study design does not permit determination of which component of the intervention produced the change.

The absence of a significant correlation between critical-thinking skill and attitude is also relevant. Improvement in one outcome did not necessarily occur in proportion to the other. This suggests that cognitive performance and attitude toward care planning may represent related but distinguishable educational outcomes and may require separate assessment.

The observed associations with selected institutional variables indicate that learning outcomes may also be influenced by the educational environment and clinical exposure. These findings should be interpreted cautiously because the study used purposive sampling and institutions rather than individual students were allocated to intervention or control conditions.

Conclusion

In this quasi-experimental study of 257 III-year B.Sc. Nursing students, exposure to Mind-Mapped Care Plans was followed by a substantial increase in critical-thinking performance and a statistically significant improvement in attitude toward nursing care plans in the intervention group. The control group showed comparatively little change over the same period. The study therefore provides empirical support, within its design and setting, for incorporating MMCP as an active instructional strategy for nursing-process and care-plan learning.

The findings do not establish that MMCP will produce the same effects in all nursing students, topics or clinical settings. Further research using larger and more diverse samples, stronger allocation procedures and multiple clinical topics is warranted.

Implications for Nursing Education and Practice

- Nursing education: Faculty may consider integrating structured mind-mapping activities into nursing-process teaching, classroom case discussions, clinical conferences and care-plan exercises. Faculty development may be required so that educators can teach students how to construct clinically meaningful maps rather than merely attractive diagrams.
- Nursing practice: MMCP can be used as a learning strategy for connecting assessment findings, nursing diagnoses, outcomes and interventions. Its use in clinical settings should remain aligned with institutional documentation standards and should not replace required clinical records.
- Nursing administration: Academic and clinical administrators may support active teaching approaches through faculty training, teaching resources and opportunities for students to practise clinical reasoning in supervised settings.
- Nursing research: Future studies should examine MMCP across multiple nursing subjects and clinical conditions, use larger and more diverse samples, consider randomized or cluster-randomized designs where feasible, and assess retention of critical-thinking gains over longer follow-up periods.

Limitations

- The sample comprised 257 B.Sc. Nursing students, limiting generalizability to other nursing programmes and populations.

- Purposive sampling was used, which limits transferability of the findings.
- The study was conducted in selected nursing institutions in Indore, Madhya Pradesh; findings may not generalize to settings with different institutional characteristics.
- Critical-thinking skill was assessed using one myocardial infarction case scenario from Medical-Surgical Nursing-I.
- The study focused primarily on critical-thinking skill and attitude and did not evaluate all possible educational or clinical outcomes.

Recommendations

- Conduct larger studies involving nursing students from diverse institutions and regions.
- Replicate the intervention across different clinical conditions and nursing subjects.
- Use more robust allocation or randomized designs where feasible to strengthen causal inference.
- Conduct longitudinal studies to determine whether critical-thinking gains are retained over time.
- Examine MMCP alongside other active-learning strategies and assess both educational outcomes and clinically relevant performance.

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Declaration of Interest

The author declares no conflict of interest.

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Ethical Consideration

The research proposal received institutional approval and ethical clearance, permission was obtained from participating institutions, and participant confidentiality and voluntary participation were maintained. The control group was offered MMCP orientation after completion of the post-test assessments.

References

Miller MA, Malcolm NS. Critical thinking in the nursing curriculum. *Nurs Health Care*. 1990;11(2):67-73. PMID: 2314648. Available from: <https://pubmed.ncbi.nlm.nih.gov/2314648/>

Snyder M. Critical thinking: a foundation for consumer-focused care. *J Contin Educ Nurs*. 1993;24(5):206-210. doi:10.3928/0022-0122-19930901-05. Available from:

<https://pubmed.ncbi.nlm.nih.gov/7646589/>

Simpson E, Courtney M. Critical thinking in nursing education: literature review. *Int J Nurs Pract*. 2002;8(2):89-98. doi:10.1046/j.1440-172x.2002.00340.x. Available from: <https://pubmed.ncbi.nlm.nih.gov/11993582/>

Brandon AF, All AC. Constructivism theory analysis and application to curricula. *Nurs Educ Perspect*. 2010;31(2):89-92. doi:10.1043/1536-5026-31.2.89. Available from: <https://pubmed.ncbi.nlm.nih.gov/20455364/>

Kern CS, Bush KL, McCleish JM. Mind-mapped care plans: integrating an innovative educational tool as an alternative to traditional care plans. *J Nurs Educ*. 2006;45(4):112-119. doi:10.3928/01484834-20060401-04. Available from: <https://pubmed.ncbi.nlm.nih.gov/16629279/>

Mueller A, Johnston M, Bligh D. Joining mind mapping and care planning to enhance student critical thinking and achieve holistic nursing care. *Nurs Diagn*. 2002;13(1):24-27. doi:10.1111/j.1744-618x.2002.tb00161.x. Available from: <https://pubmed.ncbi.nlm.nih.gov/11951379/>

Atay S, Karabacak U. Care plans using concept maps and their effects on the critical thinking dispositions of nursing students. *Int J Nurs Pract*. 2012;18(3):233-239. doi:10.1111/j.1440-172X.2012.02034.x. Available from: <https://pubmed.ncbi.nlm.nih.gov/22621292/>

Wheeler LA, Collins SKR. The influence of concept mapping on critical thinking in baccalaureate nursing students. *J Prof Nurs*. 2003;19(6):339-346. doi:10.1016/S8755-7223(03)00134-0. Available from: <https://pubmed.ncbi.nlm.nih.gov/14689390/>

Sinatra-Wilhelm T. Nursing care plans versus concept maps in the enhancement of critical thinking skills in nursing students enrolled in a baccalaureate nursing program. *Creat Nurs*. 2012;18(2):78-84. doi:10.1891/1078-4535.18.2.78. Available from: <https://pubmed.ncbi.nlm.nih.gov/22856062/>

McDonald MS, Neumeier M, Olver ME. From linear care plan through concept map to Concepto-Plan: the creation of an innovative and holistic care plan. *Nurse Educ Pract*. 2018;31:171-176. doi:10.1016/j.nepr.2018.05.005. Available from: <https://pubmed.ncbi.nlm.nih.gov/29913348/>

Thapa M, Devi S, Mishra R. Charting critical paths: exploring how concept mapping amplifies nursing students' critical thinking and elevates patient care—A scoping review. *J Educ Health Promot*. 2025;14:67. doi:10.4103/jehp.jehp_644_24. Available from: <https://pubmed.ncbi.nlm.nih.gov/40144150/>

Schuster PM. Concept mapping: reducing clinical care plan paperwork and increasing learning. *Nurse Educ*. 2000;25(2):76-81. doi:10.1097/00006223-200003000-00009. Available from: <https://pubmed.ncbi.nlm.nih.gov/11052005/>

