



THE STUDY OF VALIDITY, RELIABILITY AND FEASIBILITY OF TOOLS TO ASSESS CRITICAL THINKING AND DECISION-MAKING SKILLS OF AUXILIARY NURSE-MIDWIVES IN COMMUNITY HEALTH SETTING

Nursing

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ABSTRACT

Critical thinking and decision-making skills are essential for assessing the patient's problems and requirements and implementing therapeutic nursing actions. Tools that are reliable and valid are required for assessing and evaluating the critical thinking and decision-making skills of ANMs in managing health situations of maternal and child health problems in a community health setting. **Objective:** To assess the validity, reliability, and feasibility of tools to assess the critical thinking and decision-making skills of auxiliary nurse-midwives in a community health setting. **Material and Methods:** This study was conducted in the following phases: Preparatory phase of literature search, validation phase for content and language, and checking the reliability of modified standard tools. **For validity:** Content validity was determined by a Delphi round with a panel of 10 experts in the various fields related to the critical thinking and decision-making ability of ANM, and language validity was done by two experts in the fields of English and Hindi. Tryout was done on twenty auxiliary nurse-midwives working in a selected community health centre. For reliability, Cronbach's alpha reliability coefficient, item-total score correlation coefficient, and stability analysis (test-retest) were examined. For the tool to assess the critical thinking skills (CACTiM), the overall Cronbach's-alpha reliability coefficient value was 0.924 and item to total score correlation coefficients were 0.80, 0.74, 0.76, and 0.71, respectively for all five subscales. The correlation coefficient for test-retest was 0.87. For the tool to assess the clinical decision making skills (CDMNS), the Cronbach alpha value was 0.91. Item to total score correlation coefficients were 0.85, 0.84, 0.80, and 0.91, respectively for all four subscales. **Results:** A valid and reliable measurement scales to determine the critical thinking and decision-making skills of auxiliary nurse midwives has been modified as per Indian set up. These tools were found to be practically feasible to apply to ANMs in community health settings.

KEYWORDS

CT skill, DM Skill, CACTiM, CDMNS, ANM

INTRODUCTION

To ensure a safe, efficient, and effective nursing intervention done by nurses in the process of managing patient's problems and decision-making, critical thinking is a vital activity (Ioanna V. Papathanassiou). The cognitive skill of Critical thinking analyse an ANM's ability to think systematically and logically in crisis health situations to ensure safe nursing practise and quality care. Analysis, Interpretation, Inference making, Explanation, Evaluation, and self-regulation² (Loscin RC 2001) on the basis of step-wise nursing management (Assessment, Diagnosis, Planning, Implementation, and Evaluation) of selected crisis situations in maternal and child health³. (M. Chabeli, 2007).

Clinical decision-making is an essential part of nursing care. The nurse's wise choices directly affect the patient's recovery (Pramila R)⁴. There is a need for more study on how well nurses can assess the current situation and make sound decisions. A nurse's ability to approach her superior with a remedy if she thinks she lacks the knowledge or expertise to do so must be examined. A nurse's ability to make clinical decisions is heavily influenced by both their education and previous work experience⁵ (Moore, 1996).

Critical thinking and clinical decision-making are essential for assessing the patient's requirements, identifying relevant problems, and planning, implementing, and evaluating therapeutic nursing actions (Benner P)⁶. Managing a crisis situation in health is difficult due to the unexpectedness and unpredictability of its severity. A standardised tool for assessing and exclusively evaluating the critical thinking skills and decision-making skills of ANMs in managing the crisis situations of maternal and child health problems has not yet been developed.

There are few validated and reliable commercially available tools for testing these skills in nurses. Finding out how ANMs see clinical decision-making and developing and evaluating their abilities is critical. Thus, credible and reliable measuring techniques are necessary to assess nurse midwife's perceptions and decision-making processes in clinical settings.

MATERIALS AND METHODS:

To assess the critical thinking and decision-making skills of ANMs, a methodological study design was conducted to find valid and reliable tools from available standardised scales. These tools were then modified to fit the needs and objectives of the research on ANMs' in managing crisis situations of maternal and child health problems in an Indian setting.

PHASE I-Preparatory phase:

STEP-I A detailed review of the literature was performed to identify studies that used tools to assess the CT and DM skills of ANMs. A health electronic research survey of MEDLINE, EMBASE, PsycINFO, and CINAHL was done. Several studies around the world used standardised tools to assess the critical thinking and decision-making skills of hospital nurses and nursing students. In India, there were neither studies on ANM nor tools for evaluating them were found. The Carter Assessment of Critical Thinking in Midwifery (CACTiM)⁷, Australia is the only standardised instrument designed exclusively to assess Nurses critical thinking in midwifery practice. We encountered just one appropriate tool to assess ANMs' opinions of decision-making is HM Jenkin's Clinical Decision Making in Nursing Scale (CDMNS)⁸.

STEP-II-Modification of items in the tools

The next step involved was further assessment of the content of the tools based on ANM's critical thinking skills and decision-making skills in managing health situations of Community Health Settings of our country. Few items were modified in language and content after consulting with subject experts. master trainers, medical officers, LHV's, and ANMs. In Critical Thinking Assessment scale (CACTiM) scale very limited changes were made in the items: Fourteenth item of "If problems arise when caring for the woman, I try to seek the root cause" changed to "If problems arise when caring for the client, I try to seek the root cause from woman and family" The 25th item of "I question unwritten rules in midwifery practise that are not evidence-based" was changed to "I may question unwritten rules in midwifery practise that are not evidence-based". The twenty-seventh item, "I evaluate my own practise and its effect on women and others," has been changed to "I evaluate my own practise and its effect on women and children."

The Ninth item of CDMNS scale "I assist clients in exercising their rights to make decisions about their own care" was changed to "I assist clients and families in exercising their rights to make decisions about their own care", The twentieth item of CDMNS "I include clients as sources of information, evaluation and re-evaluation of consequences changed to "I include clients and their family as sources of information, evaluation and re-evaluation of consequence" and the 34th item, "In the clinical setting, I keep in mind the course objectives for the day's experience" changed to "In the clinical setting, I keep in mind the objectives for the day's experience."

Face & Content Validity

During this phase, the face validity and content validity of the tool were

achieved through the Delphi technique. Each question in the scales was assessed by the experts on a 4-point scale: 1 = not relevant; 2 = needs revision; 3 = relevant but needs minor alteration; 4 = highly relevant. The guidelines that result are based on the findings of a Delphi study that involved 15 experts. The two subsequent rounds of Delphi were conducted. According to the expert's advice, very few items were changed in wording, and some other items were deleted. They made sure that the information listed in the tool was pertinent to the subject. Evaluations of expert opinions were made with the Content Validity Index (Polit & Beck, 2006).⁹ The Content Validity Index (CVI) was calculated both for the items and the scale. The overall value of the Content Validity Index (CVI) for Critical Thinking Assessment scale (CACTiM) in the first round was 0.93 and the second round was 0.98. The overall value of the Content Validity Index for Clinical Decision making in Nursing Scale (CDMNS) in the first round was 0.94 and the second round was 0.98.

Linguistic Validity.

To ensure the scale's validity, the original tools were translated from English to Hindi by language specialists who are competent in both languages. The most applicable terms from the scale translations were selected to develop a single scale. After re-translating the tools into English, two experts who had never seen an English version of the scale and were fluent in both languages re-translated the Hindi version to see if the meaning was the same. When compared to the original, there were no significant variations in the semantics of the items on the back-translated scale. The linguistic validity of the CACTiM and CDMNS, tools for ANMs has been established.

Phase 3: Reliability

The samples were 20 ANMs randomly selected from the community health setting of Lucknow, UP, India. ANMs who provided their informed consent to take part in this study were eligible to be considered as participants. Permission was obtained from the concerned authors to use the modified tools. The institutional ethics committee granted ethical approval. Formal administrative permission was obtained from the DGFW office, Lucknow, UP. The mean age of the ANMs was 35 years, and the majority of them had clinical experience of 6 to 10 years. Participants were informed on the study's objectives, and all who agreed to take part in the reliability assessment completed out scale. During data collection, participants were informed about the aim and scope of the study.

To check the reliability of tool to assess the critical thinking skills, the data was analysed by SPSS (Version-26). Table 2(a)&(b) shows that when corrected item to total correlation was applied on 30 items of the tool, the overall Cronbach's-alpha reliability coefficient value of the scale was 0.924. Twenty six items had an item score to total score correlation of between 0.2 and 0.924, whereas 4 items in the tool had an item score to total score correlation of 0.2 showing their incompatibility with the overall tool. When the individual item was deleted, the value of Cronbach's alpha was not increased even for a single item of the tool. That means, all items were contributing to the total reliability of the tool, and any single item could not be discarded. The results were discussed with Delphi panellists; the majority were in favour of keeping all items because they were equally important in the assessment of critical thinking skills, even if the low correlation was indicated in the individual item score.

Table1 : Reliability of Sub scales of Carter Assessment of Critical Thinking in Midwifery (CACTiM)

SL No	Subscales	Cronbach's Alpha
1	Seeks Information	0.80
2	Reflects on Practice	0.74
3	Facilitates Shared Decision making	0.76
4	Evaluates Practice	0.76
5	Motivational Learning	0.71

The CACTiM's scale consists of five subscales with 30 items in each, in which subscales of Seeks Information: 07 items, Reflects on Practice: 07 items; Facilitated Shared Decision Making: 5 items, Evaluates practice: 06 items; and Motivational Learning: 05 items On a six-point Likert Scale, responses range from "strongly agree" to "strongly disagree."

Subscale 1: Seeks information

This seven-item subscale had good internal reliability (Cronbach's alpha of .80). This subscale's total mean score was 26.9 (SD = 5.24) out

of a possible score of 42. An analysis of the relationship between the subscale information seeking and the CACTiM (Student version) revealed a strong positive correlation between this subscale and the total scale ($r = .80, p < .001$).

Subscale 2: Reflects on practice

This seven-item scale had lower internal reliability (Cronbach's alpha of .74). The scale's total mean score was 24.5 (SD = 5.96) out of a possible 42. This subscale had a strong correlation with the overall scale ($r = .74, p < .001$).

Subscale 3: Facilitates shared decision making

This five-item subscale had good internal reliability (Cronbach's alpha of .76). The scale total means the score was 17.4 (SD = 4.35) out of a possible 30. This subscale and the overall scale had a positive correlation ($r = .76, p < .001$).

Subscale 4: Evaluates practise

This six-item subscale demonstrated high reliability coefficient (Cronbach's alpha .76). Although values above 0.8 are preferred to ascertain reliability, values greater than 0.70 are an acceptable lower boundary for alpha coefficients (DeVellis, 2017, Nunnally, 1978). The scale total means the score was 21.45 (SD = 4.9) out of a possible 36. This subscale and the overall scale had a strong positive relationship ($r = .76, p < .001$).

Subscale 5: Motivated Strategies for Learning

This seven-item scale had lower internal reliability (Cronbach's alpha of .72). The mean total score for the 5 items in the sub-scale was 18.7 (SD = 3.49). These items' mean was lower than those within each CACTiM subscale. This subscale and the overall scale had a strong positive relationship ($r = .72, p < .001$). The total Cronbach's alpha reliability coefficient of the CACTiM was 0.92.

Table 2(a) : Reliability of Carter Assessment of Critical Thinking in Midwifery (CACTiM) –Part I

ITEMS	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I often find myself questioning things I hear or read in the training program to decide if I find them convincing	104.65	377.292	.460	.922
When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence	104.45	388.155	.340	.923
I treat the course material as a starting point and try to develop my own ideas about it	104.90	379.147	.435	.922
I try to play around with ideas of my own related to what I am learning in this program.	104.30	387.379	.265	.924
Whenever I read or hear an assertion or conclusion in this program, I think about possible alternatives.	104.60	376.147	.520	.921
I explore the woman's preferences of care and plan care accordingly	104.90	365.147	.638	.920
I sequence care and education to meet the individual needs of the woman and children	104.80	370.695	.548	.921

I choose relevant literature and education strategies to facilitate the patients decision making	104.95	374.787	.424	.923
I share relevant evidence and clinical guidelines related to the woman's individual choices	105.10	359.358	.735	.918
I use evidence to plan care according to the Patients individual circumstances	105.20	365.432	.638	.920
I often instinctively know what type of care is right for the patient	104.80	376.800	.499	.922
I liaise with colleagues at different levels about processes to optimise outcomes for the patient	104.80	393.747	*.108	.926
I consult resources (e.g. literature, guidelines, etc.) and experts to improve care	105.10	356.305	.798	.917
If problems arise when caring for the clients, I try to seek the root cause from women and family	105.50	363.947	.611	.920
I explore multiple solutions to a given situation	105.50	361.000	.734	.918
I seek clarification about clinical procedures or practice that appears inappropriate or unnecessary	105.20	351.747	.804	.917
Where needed, I negotiate a collaborative intervention plan with relevant health care providers	105.30	359.274	.782	.917

Table 2(b): Reliability of Carter Assessment of Critical Thinking in Midwifery (CACTiM)-Part II

ITEMS	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I can provide the rationale for following (or departing from) established guidelines and policies	104.40	386.674	.414	.923
I apply knowledge from past experiences to present situations	104.70	382.642	.388	.923
I continually analyse my own strengths and limitations in skills, knowledge and experience	104.90	375.989	.511	.921
I address my limitations in skills, knowledge and experience	104.40	390.147	.261	.924
I can recognise non-evidence based or non-woman centred practice by self and others	105.55	342.997	.897	.915

I voice my concerns about non-evidence based or non-woman centred practices by self and others	105.10	359.674	.649	.919
I identify organisational/ service improvement opportunities	105.20	362.168	.760	.918
I may question the 'unwritten rules' in midwifery practice that are not evidence-based	104.40	393.200	*.162	.925
I initiate professional dialogue around midwifery practice	104.80	375.221	.512	.921
I evaluate my practice and its effect on the Woman and children	105.10	371.147	.514	.921
I adjust my practice based on feedback from the client and others	104.45	393.103	*.113	.926
I recognise my attitudes, biases and values and their potential impact on practice	104.75	400.303	*-.061	.927
I debrief with a professional colleague following complex situations to improve my future practice	104.70	372.116	.446	.923

The overall Scale mean is 108.6

Overall reliability score is 0.924

*Item in the scale which shows the item to total correlation <0.2

Table 3(a): Reliability of checklist on Clinical Decision-Making Numerical Scale-Part I

Item-Total Statistics				
DESCRIPTIONS	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
If the clinical decision-making is vital and there is time, I conduct a thorough search for alternatives.	133.000	610.105	.347	.918
When a person is ill, his or her cultural values and beliefs are secondary to the implementation of health services.	132.800	617.221	.347	.918
Situational factors at the time determine the number of options I explore before making a decision.	133.250	602.408	.507	.917
Looking for new information in decision-making is more trouble than it's worth.	132.650	611.818	.363	.918
I use books or professional literature to look up things I don't understand.	132.950	605.208	.465	.917
A random approach for looking at options works best for me.	133.250	585.355	.689	.914
Brainstorming is a method I use when thinking of ideas for options.	133.150	615.924	.213	.920
I go out of my way to get as much information as possible to make decisions.	133.300	612.221	.250	.919

I assist clients and families in exercising their rights to make decisions about their own care	133.450	595.208	.512	.916	My past experiences have little to do with how actively I look at risks and benefits for decisions about clients	133.850	589.608	.556	.916
When my values conflict with those of my client, I am objective enough to handle the decision-making required for the situation.	133.550	608.682	.319	.919	When examining the consequences of options, I might choose, I am aware of the positive outcome for my clients.	133.850	589.608	.556	.916
I listen to, or consider expert advice or judgement, even though it may not be the choice I would make.	133.150	615.608	.263	.919	I select options that I have used successfully in similar circumstances in the past.	133.850	589.608	.556	.916
I solve a problem or make a decision without consulting anyone, using information available to me at the time.	133.150	627.503	.049	.921	If the risks are serious enough to cause problems, I reject the option.	133.850	589.608	.556	.916
I don't always take time to examine all the possible consequences of a decision I must make.	133.450	589.629	.600	.915	I examine the risks and benefits only for consequences that have serious implications.	133.850	589.608	.556	.916
I consider the future welfare of the family when I make the clinical decision that involves the individual.	133.850	595.082	.490	.917	I write out a list of positive and negative consequences when I am evaluating an important clinical decision.	133.850	589.608	.556	.916
I have little time or energy available to search for information.	133.850	599.082	.474	.917	I do not ask my peers to suggest options for my clinical decisions	133.300	597.695	.410	.918
I mentally list options before making a decision.	133.550	587.208	.574	.916	My professional values are inconsistent with my personal values.	132.650	630.976	*.016	.920
When examining consequences of options I might choose, I generally think through, "If I did this, then..."	133.650	601.292	.445	.917	My finding of alternatives seems to be largely a matter of luck.	133.550	621.734	*.120	.921
I consider even the remotest consequences before making a choice.	132.750	622.829	.210	.919	In the clinical setting I keep in mind the objectives for the day's experience.	133.300	581.274	.779	.913
The consensus among my peer group is important to me in making decisions.	133.050	605.418	.494	.917	The risks and benefits are the farthest thing from my mind when I have to make a decision.	133.300	618.432	*.186	.920
I include clients and families as sources of information. Evaluation and re-evaluation of consequences	133.250	606.303	.433	.917	When I have clinical decision to make, I consider the institutional priorities and standards.	133.850	589.608	.556	.916
I consider what my peers will say when I think about possible choices I could make.	132.750	613.987	.416	.918	I involve others in my decision-making only if the situation calls for it.	133.850	589.608	.556	.916
If a colleague recommends an option in a clinical decision-making situation, I adopt it rather than searching for options.	133.900	577.358	.660	.914	In my search for options, I include even those that might be thought of as "far out" or not feasible.	133.850	589.608	.556	.916
					Finding out about the client's objectives is a regular part of my clinical decision-making.	133.850	589.608	.556	.916

The overall Scale mean is 136.5
Overall reliability score is 0.919
*Item in the scale which shows the item to total correlation <0.2

Table 3(b): Reliability of checklist on Clinical Decision-Making Numerical Scale-Part II

Item-Total Statistics				
DESCRIPTIONS	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item Total Correlation	Cronbach's Alpha if Item Deleted
If a benefit is really great, I will favour it without looking at all the risks.	133.450	596.892	.433	.917
I search for new information randomly.	133.550	600.576	.482	.917

The overall Cronbach's-alpha reliability coefficient value of scale to assess the clinical decision-making skills was 0.919. Table 3(a)&(b) shows that when corrected item to total correlation was applied on 40 items of the tool, 37 items had item score to total score correlation between 0.2–0.924 whereas 03 items in the tool had item score to total score correlation <0.2, showing their incompatibility with the overall tool. The mean score of the CDMNS test was 136.85 and SD 2.516.

Table 4: Reliability of Subscales of Clinical Decision-Making Numerical Scale (Part II)

SL No	Subscales	Cronbach's Alpha
1	Search for alternatives or options	0.85
2	Search for information, unbiased assimilation of new information	0.84
3	Evaluation & Revaluation of Consequences	0.80
4	Canvassing of Objectives and Values	0.91

The CDMNS consists of four subscales with ten items each ($n = 40$ items) on clinical decision-making. Responses to questions on a five-point Likert scale range from "strongly agree" to "strongly disagree". The total Cronbach's alpha reliability coefficient of the CDMNS was 0.91. In the table, values of all four subscales were found to be 0.85, 0.84, 0.80, and 0.91 respectively. The mean score of the CDMNS test was 136.85, and the SD was 2.516.

Stability Analysis

CACTiM's Stability Analysis.

Stability was examined by comparing the test-retest Pearson correlation coefficients. The value of R is 0.87, which signifies there is a strong positive correlation between test-retest variables. A retest on the same subjects has been conducted after one week.

CDMNS's Stability;

This was examined by comparing the test-retest Pearson correlation coefficients. The value of R is 0.90, which signifies there is a strong positive correlation between test-retest variables. A retest on the same subjects has been conducted after one week.

DISCUSSION

ANMs are the primary level health care professionals in charge of providing need-based, client-centered, and demand-driven services directly to the community. Effective decision making in providing high-quality nursing care in both routine and emergency situations require the use of critical thinking skills. In this study, we tested the Validity, Reliability and stability of the modified versions of CACTiM and CDMNS for assessing the critical thinking and Decision-making skills of the auxiliary nurse-midwives working in community health centers. The amount to which a measuring tool represents the measured concept is known as content validity, and it is used to establish the validity of a measurement instrument. It is suggested that a minimum of six and a maximum of ten experts be consulted to determine the veracity of the information (Tanner).¹⁰ This study's final recommendations of the tool were based on the findings of a Delphi study participated by 10 experts. Content validity of the scale CACTiM was found to be 0.98.

The study also examined the linguistic validity of CACTiM and CDMNS in ANMs. The most generally employed approaches were translation of a scale from its original form to the target language and reverse translation. The knowledge and experience of the translators have a significant impact on the outcome. As a result, translators who are familiar with both cultures and languages should be chosen. The tool's linguistic comprehension was assessed. As a result, the scales were translated into Hindi by two individuals who are fluent in both languages. It was determined that the linguistic validity was correct. The content and language of the original were retained in the translation, and the latter was well received by the participants

Another important indicator of reliability is the Cronbach's alpha reliability coefficient. The total Cronbach's alpha reliability coefficient of the CACTiM was 0.92, which is similar to the findings of Carter. The coefficient alpha for the total scale was 0.92, demonstrating good internal consistency (DeVellis, 2017)¹¹ with values of .82, .87, 0.73, 0.81, and 0.80, respectively, in all five subscales. The results show that the scale items are consistent and complete. The modified scale's test-retest results demonstrate the measuring tool's consistency from practise to practise and its stability over time.

The total Cronbach's alpha reliability coefficient of the CDMNS was 0.919, which is in contrast to the findings of the study done in which the total Cronbach's alpha reliability coefficient of the CDMNS was .78, with values of .50, .44, .52, and .40, respectively, in all four subscales. The original CDMNS Cronbach's alpha was 0.83. Jenkins (1985) reported no dependability for the initial CDMNS subscales.

Baumberger-Henry (2005) determined it to be 0.81, with subscales of 0.53, 0.57, 0.58, and 0.51. Its Cronbach's alpha reliability coefficients were similar. The findings demonstrate that the scale items are consistent and comprehensive. The test-retest findings of the modified scale show that the measurement instrument is consistent from practise to practise and stable over time.

CONCLUSION

The modified Hindi versions of the Carter Critical Thinking Skills Scale (CACTiM) and Clinical Decision Making in Nursing Scale

(CDMNS) are reliable, valid and feasible tools for assessing the critical thinking skills and decision-making skills of ANMs in managing crisis situations of maternal and child health in community settings. The data acquired through this scale may be used to build ANMs' perspectives of decision-making and to improve their skills in managing health situations in community health settings.

Disclosure of Statement

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