

Measurement of Midwifery Clinical Leadership Among Nursing Students: Exploratory Factor Analysis

Umasawan Chooha ¹, Nadsuda Chotwattanakulchai ², Jirawun Sirisome¹

¹Department of Maternal-Newborn Nursing and Midwifery, Faculty of Nursing Rajamangala University of Technology Thanyaburi, Pathum Thani, Thailand; ²Department of Maternal-Newborn Nursing and Midwifery, Srisavarindhira Thai Red Cross Institute of Nursing, Bangkok, Thailand

Correspondence: Umasawan Chooha; Nadsuda Chotwattanakulchai, Email umasawan_C@rmutt.ac.th; nadsuda.c@stin.ac.th

Purpose: The aim of this study was to report the development measurement of midwifery clinical leadership instruments among nursing students.

Methods: Specifically, the five-component concepts defined by Katz and Standards Midwifery Practice were used to build items for midwifery clinical leadership instruments. This study also used Netemeyer's "Guidelines in Scale Development" to develop an instrument for midwifery clinical leadership among nursing students. The sample used for the research was 9 experts and 330 nursing students in the fourth year of being selected by multi-stage sampling. The instruments used in the study were an interview guide and a questionnaire. The data were analyzed by content analysis and factor analysis (exploratory factor analysis: EFA).

Results: Three separate data collections were used for the development of these instruments. The outcome of the content validity assessment was a 60-items questionnaire, Item-Objective Congruence (IOC) 0.94. The results of EFA yielded an instrument with 58 items in four-component. The final value of the Kaiser–Meyer–Olkin (KMO) and Bartlett's Test was 0.956.

Conclusion: The instruments present a good interpretation of the data and were consistent with the personality attributes. The questionnaire was designed to measure with strong loading of measurement.

Keywords: measurement, midwifery clinical leadership, nursing students

Introduction

Leadership is vital to the nursing and midwifery professions because the nursing and midwifery professions require teamwork and coordination of cooperation on multidisciplinary teams. Nurses who possess leadership skills in persuasion, invitation, advice or gaining the acceptance of others and practices aimed at organizational success as a whole.^{1–4} Leadership is an essential qualification for every professional nurse.

Clinical leadership in midwifery entails influencing and motivating others to provide clinically effective care by demonstrating clinical excellence and supporting and guiding colleagues through mentorship, supervision, and inspiration. It is also concerned with demonstrating the distinct contribution of midwifery within multidisciplinary contexts. Midwifery clinical leaders not only contribute to effective patient care but also give their disciplines a voice by participating in policy development and collaborating with other members of the interdisciplinary team. As a result, preparing nursing students for leadership is critical.

The undergraduate nursing program in Thailand requires a minimum of 120 credits for education course management and a minimum of 12 credits for Maternal-Newborn Nursing and Midwifery.⁵ Nursing students will complete 270–300 hours of clinical practice in the antenatal care, delivery, and postpartum departments. At this time, it is extremely difficult to promote clinical leadership in midwifery. As a result, it is critical to creating a midwifery clinical leadership scale for nursing students. This was to put nursing students' clinical leadership in midwifery to the test as well as bring the results to let us continue to improve teaching in order to improve clinical leadership in midwifery for nursing students.

A questionnaire was created to assess nursing students' midwifery clinical leadership. This questionnaire assessed midwifery clinical leadership from the perspective of academic experts from midwives and Academic experts in leadership theory (the questionnaire's target population) through a series of statements (questionnaire items) that help to evaluate. The questionnaire items are organized or structured into five components that represent the dimensions of midwifery clinical leadership through the items in each component: (1) Professional Values in Caring; (2) Caring Relationships; (3) Quality services; (4) Patient Safety; and (5) Self-management. The questionnaire was designed by a research team based on leadership characteristics, behaviors, and midwifery standards, which corresponded with the roles of nursing students and education management of the undergraduate nursing curriculum.⁵⁻⁷

This article describes how exploratory factor analysis (EFA) was used to determine the elements of midwifery clinical leadership for nursing students to use as an instrument in measuring nursing students before and after engaging in nursing practice in the subject of mother and child nursing and midwifery. The tool can also be used to evaluate nursing students' progress toward midwifery clinical leadership.

Methods

The purpose of this study was to report the development measurement of midwifery clinical leadership instrument among nursing students. The sample size of the study was 330 subjects in the fourth year, who were selected by multi-stage sampling from four public education institutes. The sample completed the questionnaires by using Google Form, which took approximately 30 minutes to complete.

Research Procedures: The researcher carried out the following three steps:⁸

Step 1 – Qualitative methods were used to obtain, refine, and prioritize the elements (items) to be included in the questionnaire. It began with a scoping review of the literature, in which key issues to consider were identified and investigating concepts, theories pertaining to leadership characteristics, behaviors, and midwifery standards, which corresponded with the roles of nursing students and education management of undergraduate nursing curriculum.^{6,7}

Step 2 – The second step involved refining themes through semi-structured interviews with key informants. This was followed by a series of conceptual validation sessions led by a panel of academic experts from midwives and academic experts in leadership theory. The researcher created a draft of questions that were organized into five domains based on a review of articles that combined theoretical and value-based leadership skills approach⁶ and midwifery standards.⁷ Create a measurement of midwifery clinical leadership for nursing students using the items derived from the analysis and processing of the interview results to create a measurement of midwifery clinical leadership for nursing students containing 60 items.

The following scoring criteria were set for the measurement of midwifery clinical leadership for nursing students, which was based on 5-Likert scales (Likert, 1967)⁹ as follows:

5 means maximum nursing student practice for that item.

4 means high nursing student practice for that item.

3 means moderate nursing student practice for that item.

2 means low nursing student practice for that item.

1 means lowest nursing student practice for that item.

The weights of the mean scores were interpreted at five levels were as follows:

A mean score of 4.51–5.00 means the highest level of midwifery clinical leadership.

A mean score of 3.51–4.50 means a high level of midwifery clinical leadership.

A mean score of 2.51–3.50 means a moderate level of midwifery clinical leadership.

A mean score of 1.51–2.50 means a low level of midwifery clinical leadership.

A mean score of 1.00–1.50 means the lowest level of midwifery clinical leadership.

Validation Analysis of the Questionnaire

The validity property aims to measure the ability of an instrument to adequately measure a theoretical construct. It denotes the extent to which a measurement is consistently related to other measurements, as well as the theoretical hypotheses that define the phenomenon or construct to be measured. Exploratory factor analysis is proposed to assess the questionnaire's validity.

Based on the responses of the participants, the factor analysis seeks to provide information about the relationship between the items of the questionnaire. Based on their degree of correlation, this will reveal a common meaning between the items. The goal of this analysis is to provide the optimal number of factors within the questionnaire, as well as the list of items that will comprise each factor. In other words, the exploratory analysis will propose an alternative structure/organization of the questionnaire or subscales within the questionnaire, which, once validated, could be used for various independent purposes depending on the needs of the organization.

Step 3 – Data collection: To carry out the validation study and to conduct the factor analysis, a collection target of around 330 responses was set a priori before data collection. For data collection, a Google form was used and distributed to a convenience sample of around 600 nursing students from all Thailand regions. Finally, a total of 330 responses were collected. The respondents were approached by the research team and had previously agreed to participate in the study before answering the questionnaire.

Results

The purpose of this study was to report the development measurement of midwifery clinical leadership instrument among nursing students. The results of the analysis of the component of midwifery are as follows:

A principal component analysis (PCA) was run on a 60-question questionnaire that measured desired characteristics on 330 nursing students. The suitability of PCA was assessed prior to analysis. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.3. The overall Kaiser–Meyer–Olkin (KMO) measure was 0.956 with individual KMO measures all greater than 0.7, classifications of “middling” to “meritorious” according to Kaiser (1974).¹⁰ Bartlett’s test of sphericity was statistically significant ($p < 0.001$), indicating that the data were likely factorizable and are presented in Table 1.

PCA revealed five components that had eigenvalues greater than one and which explained 46.3%, 6.6%, 4.2%, 3.4% and 1.8% of the total variance, respectively. Visual inspection of the scree plot indicated that four components should be retained (Cattell, 1966).¹¹ In addition, a four-component solution met the interpretability criterion. As such, four components retained are presented in Figure 1, Table 2

The four-component solution explained 62.651% of the total variance. A varimax orthogonal rotation was employed to aid interpretability. The rotated solution exhibited “simple structure”.¹² The interpretation of the data was consistent with the personality attributes the questionnaire was designed to measure with strong loadings of Professional Values in Caring items on Component 1, Caring Relationships items on Component 2, Quality and Safety items on Component 3 and Self-management items on Component 4. Component loadings and communalities of the rotated solution are presented in Table 3.

According to Table 2, the component of midwifery clinical leadership among nursing students are composed of four components and 58 items as follows:

Component 1: Factor loading was between 0.554 and 0.825. This component is called “Professional Values in Caring” and is composed of 17 items. The main ideas include administering nursing by adhering to ethical, moral and professional codes of conduct meeting the standards of the nursing profession through patient-centered care, respect for human value and dignity and administering nursing with humbleness.

Component 2: Factor loading was between 0.466 and 0.720. The component is called “Caring Relationships” and is composed of 18 items. The main ideas include attentive service provision and empowerment of service recipients.

Table 1 KMO and Bartlett’s Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.956
Bartlett’s Test of Sphericity	Approx. Chi-square	18,804.700
	df	1770
	Sig	0.000

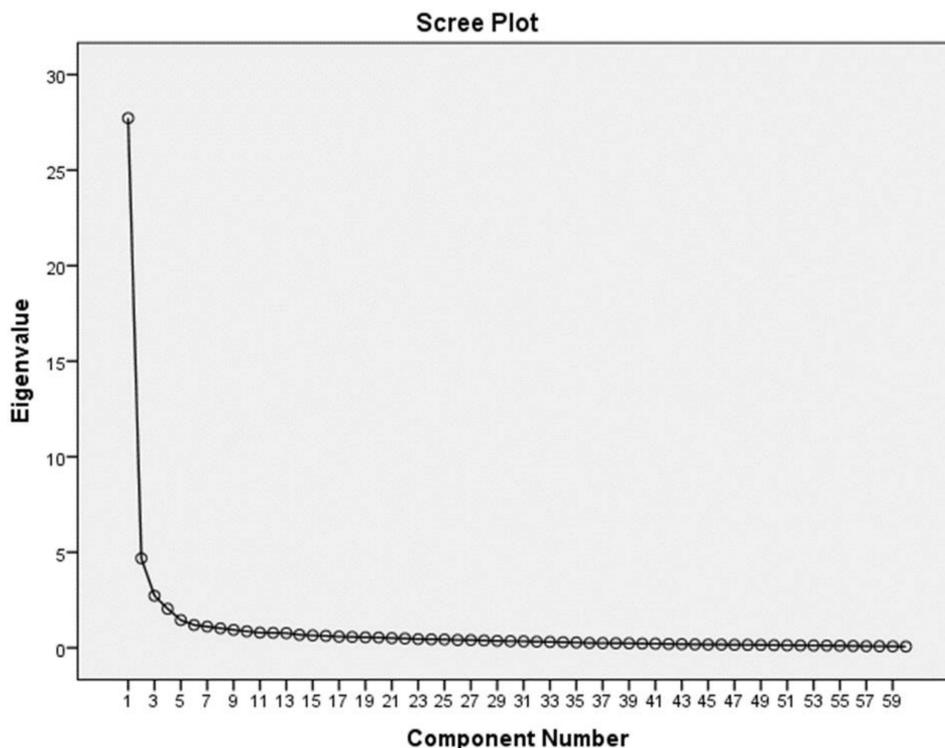


Figure 1 Graph of eigenvalues after factor analysis.

Component 3: Factor loading was between 0.495 and 0.723. The component is called “Quality and Safety” and is composed of 13 items. The main ideas include service quality and safety standards for service recipients.

Component 4: Factor loading was between 0.468 and 0.731. The component is called “Self-management” and is composed of 10 items. The main ideas include self-management and the development of self-efficacy.

Table 2 Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	28.145	46.909	46.909	27.813	46.355	46.355	11.958	19.931	19.931
2	4.367	7.278	54.187	4.010	6.683	53.038	10.396	17.326	37.257
3	2.896	4.827	59.014	2.548	4.246	57.284	8.037	13.394	50.652
4	2.537	4.229	63.242	2.097	3.495	60.779	5.796	9.659	60.311
5	1.494	2.489	65.732	1.123	1.872	62.651	1.404	2.340	62.651
6	1.459	2.432	68.164						
7	1.187	1.979	70.143						
8	1.045	1.741	71.884						
9	0.935	1.558	73.442						
10	0.878	1.463	74.904						
11	0.801	1.335	76.239						
12	0.777	1.295	77.534						
13	0.709	1.182	78.716						
14	0.699	1.165	79.882						
15	0.623	1.038	80.920						

(Continued)

Table 2 (Continued).

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
16	0.568	0.947	81.867						
17	0.564	0.941	82.807						
18	0.537	0.895	83.702						
19	0.529	0.881	84.583						
20	0.501	0.834	85.418						
21	0.478	0.797	86.214						
22	0.463	0.772	86.986						
23	0.421	0.701	87.688						
24	0.409	0.681	88.369						
25	0.407	0.678	89.047						
26	0.372	0.620	89.667						
27	0.359	0.598	90.265						
28	0.351	0.584	90.849						
29	0.329	0.548	91.397						
30	0.310	0.516	91.913						
31	0.304	0.506	92.419						
32	0.285	0.474	92.893						
33	0.271	0.452	93.345						
34	0.246	0.411	93.756						
35	0.244	0.406	94.162						
36	0.232	0.387	94.549						
37	0.218	0.363	94.912						
38	0.214	0.357	95.269						
39	0.206	0.343	95.612						
40	0.200	0.333	95.946						
41	0.190	0.317	96.263						
42	0.183	0.304	96.567						
43	0.174	0.289	96.857						
44	0.164	0.273	97.129						
45	0.153	0.254	97.384						
46	0.145	0.242	97.625						
47	0.143	0.238	97.863						
48	0.135	0.226	98.089						
49	0.130	0.217	98.306						
50	0.128	0.213	98.519						
51	0.121	0.202	98.722						
52	0.111	0.185	98.907						
53	0.104	0.173	99.080						
54	0.098	0.163	99.243						
55	0.089	0.149	99.392						
56	0.088	0.146	99.538						
57	0.079	0.131	99.669						
58	0.070	0.117	99.786						
59	0.069	0.115	99.900						
60	0.060	0.100	100.000						

Note: Extraction method: principal axis factoring.

Table 3 Factor Loading After Varimax Rotating

Items	Component 1	Component 2	Component 3	Component 4
I respect the opinions of others.	0.825			
I always ask mothers for permission before performing nursing activities.	0.808			
I administer nursing practice to mothers with impartiality and equality.	0.797			
I attentively listen to mothers share their childbirth experiences.	0.789			
I respect mothers' beliefs and values.	0.764			
I cheerfully and casually greet mothers with a smile.	0.761			
I always willingly answer the questions of mothers and their families.	0.739			
I respect the decisions of mothers and families.	0.737			
I always explain nursing activities and nursing reasons for the mothers before administering nursing practice.	0.724			
I can work together with team members well.	0.716			
I provide care for mothers politely and gently.	0.705			
I like working together as a team, so we can solve problems together.	0.620			
I never disclose mothers' information to other people not involved in treatment.	0.610			
I avoid unnecessarily exposing mothers.	0.589			
I care for mothers and newborns by adhering to ethical, moral and professional codes of conduct.	0.554			
I like performing activities that prompt learning and creative thinking.	0.554			
I practice nursing to meet professional standards.	0.554			
I provide attentive care and prevent potential hazards with every mother during childbirth.		0.720		
I always record nursing activities in medical records.		0.718		
I never neglect keeping women in childbirth company and massage their backs to relieve labor pain.		0.705		
I gently administer nursing to newborns.		0.703		
I empower women in childbirth to have confidence in their ability to confront labor pain and get ready for delivery.		0.699		
I assess the results of my nursing practice and developmental guidelines for improvement.		0.692		

I can help postpartum mothers and make suggestions about the right ways to breastfeed.		0.691		
I pay attention to arranging the surroundings of postpartum mothers, so they can fully rest.		0.684		
I administer nursing care to newborns accurately and quickly.		0.677		
I am confident in teaching postpartum mothers how to bathe their newborns.		0.641		
I can examine pregnant women appropriately and accurately.		0.639		
I offer advice about getting ready for childbirth to every pregnant woman in the late stages of pregnancy.		0.637		
I encourage postpartum mothers whenever they are able to perform an activity themselves.		0.628		
When I assess fetal heartbeat and discover an anomaly, I repeat the examination and report to my professor right away.		0.597		
I can make decisions and assist in childbirth with confidence.		0.560		
I offer opportunities for mothers to ask questions and vent their feelings.		0.528		
If seek knowledge about innovations or evidence-based practice, so I can use the knowledge as guidelines for the care of mothers and newborns.		0.485		
I administer nursing with confidence.		0.466		
I can fully and accurately assess and solve the problems of mothers			0.723	
I immediately put new, creative ideas into practice.			0.715	
I usually discover things other people never expected.			0.698	
I like challenges.			0.670	
I can make clinical decisions to solve the problems of women giving birth who have complex problems.			0.658	
I use medical equipment accurately and competently.			0.647	
I make clinical decisions based on evidenced-based practice.			0.629	
I assess the individual needs of women in childbirth in order to make plans based on the needs of the women.			0.608	
I can communicate with foreign mothers well.			0.578	
I can apply communication technology in providing care for service recipients.			0.565	
I can use proper medical technology in administering nursing care to mothers and newborns.			0.525	

(Continued)

Table 3 (Continued).

Items	Component 1	Component 2	Component 3	Component 4
I can assess the pain of women in childbirth based on presenting symptoms and length of labor.			0.519	
When new medical equipment is available, I always study the methods for using it.			0.495	
I always set personal short-, mid-, and long-term goals.				0.731
I always plan my work schedule.				0.671
I manage my time to make the best out of each day.				0.636
I am interested in learning things through various channels, such as youtube.com for constant self-improvement.				0.611
If I do something well as intended, I always reward myself.				0.551
When I encounter problems, I sometimes speak loudly to myself to help get through it.				0.544
I like solving problems hands-on and by myself.				0.513
When I want to be successful in the future, I have to be determined to achieve set goals.				0.485
Eat healthy foods and manage a balanced diet every day for good health.				0.484
Care for personal health and strength by exercising and getting adequate rest.				0.468

Discussion

Given that EFA can be used as a method to reduce the number of items in a scale, As stated above, obtaining simple structure is a goal of EFA achieved by looking for loadings that are substantial (0.30 and above). This paper presents a new instrument for the assessment of midwifery clinical leadership for nursing students. We identified four components: professional values in caring; caring relationships; quality and safety; self-management.

Professional Values in Caring

“Professional Values in Caring” is composed of 17 items and shows Factor loading was between 0.554 and 0.825. The main ideas include administering nursing by adhering to ethical, moral and professional codes of conduct meeting the standards of the nursing profession through patient-centered care, respect for human value and dignity and administering nursing with humbleness. The data set show factor loading was between 0.554–0.825 it represents variables correlation to a large extent.

Professional values in caring are considered the core of mother and child nursing and midwifery, because midwives are key persons in the health of mothers and children, as well as reproductive health, in the continual care of mothers and newborns from pregnancy to childbirth and the postpartum period. Therefore, midwives need to be people with knowledge and understanding of the roles of midwives in compliance with the law, and professional codes of conduct based on the standards of the World Health Organization, including the competencies and scope of midwifery, so nursing upholds the principles, ethics and morals of patient-centered nursing, respect for human value and dignity and administration of nursing with humbleness. The development of nursing students with awareness of professional values has to begin with studies from the perspectives of nursing students concerning professional values before they actually have a perspective on this issue and give more or less value to their importance. The development of nursing students to recognize the importance of professional values begins with various aspects. For example, a study by Poorchangizi et al who studied professional values from nursing students’ perspective found that nursing students give importance to the confidentiality of patients and safeguarding patients’ right to privacy. Based on this study, it might be concluded that nursing students give importance to professional values in caring,¹³ which corresponds with the findings of a study by Mayelafshar et al, who gave importance to professional values in caring,¹⁴ but in contrast to the findings of a study by Poreddi et al. The present study showed that nurses have high professional and ethical values, although they perceive that the most important values are those related to direct patient care.¹⁵ Nevertheless, professional and ethical values are of primary importance in nursing, because nurses with good professional and ethical values in nursing have positive effects on nursing quality.

Caring Relationships

“Caring Relationships” is composed of 18 items and shows Factor loading was between 0.466 and 0.720. The main ideas include attentive service provision and empowerment of service recipients. The data set shows factor loading was between 0.466 and 0.720, and it represents variables correlation to a large extent.

Caring Relationships means that the nurse focuses on the needs, limitations, and potential of the person.¹⁶ The nurses have to be authentic and adaptive to the person in need of care and the situation.¹⁷ Good relationships might also improve persons’ satisfaction with nursing care.¹⁸ The professional relationship is an important aspect of nursing care and can have both positive and negative effects on persons’ experiences with nursing care and care quality.^{17,19} Providing quality nursing care in meeting human needs through effective communication and teaching is crucial for promoting a holistic patient approach, improving psychosocial support and nurse–patient interaction, and attaining greater satisfaction with health care provided.²⁰ Thus, caring relationships are vital in the nursing of midwives, because caring for mothers and infants requires care for both mothers and fetuses until the postpartum period. Midwives need to continue providing care for postpartum mothers and newborns. If midwives have good, caring relationships, the result will be quality of care. Nursing students can develop caring relationships during their studies.²¹

Quality and Safety

“Quality and Safety” is composed of 13 items and shows Factor loading was between 0.495 and 0.723. The main ideas include service quality and safety standards for service recipients. The data set shows factor loading was between 0.495–0.723, and it represents variables correlation to a large extent.

In providing nursing care for service recipients, service quality and patient safety are the most important factors. And in obstetrical nursing, the safety of mothers and infants is the most important factor.⁷ The graduate nursing curriculum at every institution gives importance to producing nursing graduates with quality, ethics, morals and nursing with primary consideration given to quality and patient safety.⁵ Nurses with good knowledge, skills and attitudes about their profession have good self-management and will be able to provide safe, efficient care for patients.²²

Self-Management

“Self-management” is composed of 10 items and shows Factor loading was between 0.468 and 0.731. The component is main ideas include self-management and the development of self-efficacy. The data set shows factor loading was between 0.468–0.731, and it represents variables correlation to a large extent.

Self-management is assessment of personal knowledge, skills and abilities and setting feasible goals, building motivation in order to achieve set goals, following up on the progress toward achieving those goals.²³ Self-management involves the development and use of cognitive, behavioral, and emotional strategies to maintain a satisfactory quality of life; if nursing students can engage in good self-management, they will experience positive effects in their daily lives and future work.²²

Conclusion

The instrument presents a good interpretation of the data and was consistent with the personality attributes the questionnaire was designed to measure with strong loading of measurement.

Ethical Approval and Consent to Participate

All the participants voluntarily participated in this study and provided written informed consent. The ethics committee of the Rajamangala University of Technology Thanyaburi approved this study project code: RMUTT_REC No. Exp 32/64 on 3 September 2021. We confirm that all methods were carried out in accordance with the guidelines and regulations of the biomedical research ethics committee at the Rajamangala University of Technology Thanyaburi.

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Disclosure

The authors report no conflicts of interest in relation to this work.

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