Exploratory Factor Analyses of Caring Behaviors among Nursing Students' in Boromarajonani Colleges of Nursing under the Jurisdiction of PraboromarajchanokInstitute for Health Workforce Development

Thassanee Thipsungnoen[1*], Wunlapa Sabaiying[1], Niranat sansa[1] and Jindamas Kosolchuenvijit[2]

[1]Program in Education Sukhothai Thammathirat Open University,Nonthaburee, Thailand
[2]Boromarajonani College of Nursing, Bangkok, Thailand
*Corresponding author, Email: tussanee@knc.ac.th

Abstract

The purpose of this study was to analyze the construct factor of caring behaviors among nursing students from Boromarajonani Nursing Colleges under the jurisdiction of Praboromarajchanok Institute of Workforce Development. This research was divided into 2 phases: 1) interviewing 47 key informants, and 2) developing the questionnaire. The developed questionnaire was improved to the third draft and tested for content validity from seven experts, then it was tested for its reliability among 35 senior nursing students. The questionnaire met all the EFA's assumptions with the Cronbach's alpha coefficients at 0.60-0.98, the inter item correlations at 0.2-0.8 and all of the corrected item-total correlations at more than 0.3. Data were collected from 530 nursing students from five nursing colleges for its construct validity by using EFA. The results showed that there were four construct factors with 30 indicators. These construct factors could explain the variance of caring behavior of nursing students for 65.09%. The caring behavior measurement for the nursing students was at acceptable quality and could be used to evaluate nursing students in the context of nursing colleges under the Praboromarajchanok Institute.

The findings suggested that nursing instructors should include these four construct factors to assess caring behaviors among nursing students in order to develop their best caring performances.

Keywords: Caring behavior, Caring, Nursing students

1. Introduction

Praboromarajchanok Institute (PBRI) under the jurisdiction of the Ministry of Public Health (MoPH), Thailand is responsible for overseeing 30 nursing colleges to produce nurses with the Bachelor of Nursing Science degree. PBRI is the main institution that educates and trains most of the nursing personnel. These nurses are the major human resources for all levels of public hospitals under the Ministry of Public Health. The identity of the PBRI is "Wisdom of community for community", which means that the PBRI will produce and develop health personnel to work for the community health care systems. The aim of the nurses who graduate from the PBRI is to provide health care service with heart and humanity. These nurses are expected to provide friendly services, loving kindness, caring and concerns for problems and suffering of the clients as well as provide services to solve the problems and meet the needs of the clients and their families (Praboromarajchanok Institute, 2015). The PBRI has established a major policy, "Taking care of the client with the heart and humanity", for its nursing colleges as the main competency of the nursing graduates. This competency is the stem to develop the Bachelor of Nursing Science (BSN) Program of all nursing colleges under the PBRI.

The concept and theory of holistic nursing by the heart and humanity is defined as the philosophy of the curriculum to lead to the development competency of nursing graduates based on the concept of generosity (Boromarajonani College of Nursing, Nakhon Ratchasima, 2017). Each nursing college has provided knowledge on the concept and theory of caring for their college personnel. However, the caring behavior is an abstract concept and has various meanings. Therefore, implementation of its attributes into teaching and learning were limited (Kosolchuenvijit, 2008). In addition, nursing instructors understand caring behavior in different ways causing vague methods of teaching and learning and cultivating caring behaviors among nursing students. There were some studies related to the development of caring behaviors

744

assessment among nursing students conducted in the southern nursing college network. Luengarun, Wannasonted, and Chitviboon (2012) and Suebwonglee, Sujiva, and Wongwanich (2011) reported congruent results that there were five elements of caring behaviors among nursing students in the southern nursing college network. These elements were 1) Building good relationship, 2) Professional competency, 3) Respect and care like relatives, 4) Holistic approach, and 5) Caring with compassion and sympathy. These elements could explain the variance of caring behaviors for 41–60%. Since those studies were conducted within specific contexts and cultures, the application of the results to use in assessing the behavior of students in other sectors might be limited.

The assessment of caring behaviors among nursing students within the Thai context is needed. It should also be tested for its empirical data from nursing students representing from all regions of Thailand. The expected assessment will be used as the general measurement to measure share competency (caring behaviors) among all nursing colleges under the PBRI. Therefore, the researchers were interested to develop the assessment of caring behaviors among nursing students in nursing colleges under the PBRI. This assessment could be used as the consistent measurement and the guideline to develop caring behaviors among nursing students across all nursing colleges under the PBRI.

1.1 Literatures review

There were five studies related to developing the elements of caring behaviors among nursing students, nurses and nursing instructors in the Thai context. The most frequently reported components of caring behaviors were: 1) Having a relationship to build trust, 2) Comprehensive care, 3) Professional competency, 4) Care like relatives, 5) Respect for people, 6) Kindness and compassion, and 7) Encourage patients to value themselves (Daodee, 2008; Kosolchuenvijit, 2008; Leaungsomnapa, Timsuwan, & Promproh, 2008; Luengarun et al., 2012; Somsiri, Supipri, Wannawilai, & Chanjarain, 2008; Suebwonglee et al., 2011).

Based on Watson's interpersonal care theory, a basic theory of caring behavior is "Nursing is a care with generosity" (Watson, 1985). Watson explained the generosity of care that professional nurse practice on a daily basis was based on the values system and respecting human values of individuals. The nursing profession has instilled this value together with scientific knowledge and brought to nursing practice. That shows the application of shared knowledge between humanities knowledge and scientific knowledge in patient care. Both knowledges are the basis of caring. Watson used the term "carative factor" for influential factors in the care of the clients instead of the term "curative" as in medical care.

According to Watson (1985) in Watson's interpersonal care theory, the core of the theory of caring is that "humans cannot be treated as objects and that humans cannot be separated from self, other, nature, and the larger workforce." Her theory encompasses the whole world of nursing; with the emphasis placed on the interpersonal process between the care giver and care recipient. The theory is focused on "the centrality of human caring and on the caring-to-caring transpersonal relationship and its healing potential for both the one who is caring and the one who is being cared for" (Watson, 1985). The structure for the science of caring is built upon ten carative factors. These are: 1) Embrace: Altruistic values and practice loving kindness with self and others, 2) Inspire: Faith and hope and honor others, 3) Trust: Self and others by nurturing individual beliefs, personal growth and practices, 4) Nurture: Helping, trusting, caring relationships, 5) Forgive: and accept positive and negative feelings – authentically listen to another's story, 6) Deepen: Scientific problem solving methods for caring decision making, 7) Balance: Teaching and learning to address the individual needs, readiness and learning styles, 8) Co-Create: a healing environment for the physical and spiritual self which respects human dignity, 9) Minister: To basic physical, emotional and spiritual human needs, and 10) Open: to mystery and allow miracles to enter.

The concept of caring is a transpersonal caring relationship. This reflective / meditative approach emphasizes on the interactions between nurses and patients. Human to human relationship between nurse and client will help to gain mutual trust and help the nurse to meet the needs of the clients. In this research, the researcher uses Watson's caring theory as a study framework together with qualitative data collecting method by in-depth interviews with stakeholders in curriculum management processes of the nursing

colleges under the PBRI. The researchers summarized six main components that were consistent with both Watson's care factors and the generosity of caring behaviors according to Thai context to identity caring behaviors among nursing students from nursing colleges under the PBRI. These main components of caring behaviors among nursing students were: 1) Good relationship, 2) Solving problems using scientific procedures, 3) Providing comprehensive holistic care concerning psychological, physical, social and spiritual aspects, 4) Teaching process with understanding, 5) Willing to response to the clients 'needs, and 6) Respect the patient's individuality.

2. Objective

This study was aimed to analyze the construct factor of caring behaviors among nursing students from Boromarajonani Nursing Colleges under the jurisdiction of Praboromarajchano Institute of Workforce Development.

2.1 Scope of the Study

1. The population of the study was nursing students in Boromarajonani colleges of nursing under the PBRI and the subjects were the senior nursing students from five representative nursing colleges from all regions of Thailand. Total number of subjects was 530.

2. The variable was caring behaviors among nursing students from Boromarajonani colleges of nursing under the Praboromarajchanok Institute.

3. Methodology

Methodologies will be described according to the phase of study as followed:

Phase 1: Exploring caring behaviors among nursing students and developing questionnaire on caring behavior of nursing students. This phase consisted of two steps.

Step 1: *Exploring problems and conceptual framework.* In this step, the researchers reviewed literatures related to caring behaviors with generosity and concepts and theory of caring from both researches published in both Thai and English to create a study conceptual framework and a semi-structured interview for the caring behaviors appropriate in the Thai social context. In this step, quality of the tool was determined by testing content validity of the semi-structured interview by three experts. Face validity was tested with the Consistency Index (IOC), the results were between 0.6-1 and the tool was corrected following the advice of the experts.

Step 2: *Developing and testing the caring behaviors of nursing students questionnaire.* The sample or the key informants in research were stakeholders with caring behavior of nursing students. The main contributors were randomly selected by using snowball method according to the following qualifications: 1) Three experts with doctoral degree who had experience in nursing teaching and/ or academic publication about caring for generosity and were willing to participate in the research, 2) Five nursing instructors who were voted from the senior nursing students as a person with caring behaviors and agreed to participate in the research, 3) Five professional nurses from the practicum settings who were voted by the senior nursing students as the nurses with caring behaviors and agreed to participate in the research, 4) Twenty-four nursing students from the $2^{nd} - 4^{th}$ year, eight from each year, who were voted from their classmates as a person with caring behaviors and agreed to participate with this study, 5) Five patients were randomly selected from those who were admitted to Maharat Nakhonratchasima hospital and had been taken care by nursing students and consented to participate in the research, and 6) Five relatives of the patients who were admitted to Maharat Nakhonratchasima Hospital, had been taken care by nursing students for at least two days and agreed to participate in the research. A total of 47 subjects were interviewed about the caring behavior of nursing students by using individual in-depth with the semi-structured interview. The students also underwent the focus group discussion.

Data were analyzed for their content analysis with ATLAS.ti7 program to find the inductive conclusions. The results from content analysis about the characteristics of caring behavior of nursing students from all groups of key informants were ranked. The top ten characteristics from each group were

used as the inductive conclusions for developing the quantitative items in the caring behaviors questionnaire together with the elements from the literature review. The elements of caring behavior of nursing students found in this study to create the first draft of the questionnaire consisted of 14 elements with 130 items.

2: Developing questionnaire on caring behavior of nursing students. This phase consisted of two steps as described: In step 1 of this phase, the questionnaire was tested for its validity by five experts. The IOC values were 0.5-1.0. After this step, the questionnaire had 88 items with seven aspects. Those aspects were: 1) Provide care using participatory nursing procedures (11 items), 2) Provide care as the clients were relatives (20 items), 3) The sensitivity to responding to the needs of the clients (7 items), 4) Provide care with respect value and humanity of recipients (12 items), 5) Provide care under the code of ethics and professional skills (10 items), 6) Using problem solving skill suitable for the needs of the clients (18 item), and 7) Provide holistic care (10 items). The questionnaire was examined for its homogeneity of the item by among 35 seniors nursing students at Boromarajonani College of Nursing, Nakhonratchasima. The Cronbach's alpha coefficients were 0.98, 0.91, 0.84 and 0.60 respectively, the inter-item correlations were between 0.2 - 0.8 while the classification power (corrected item-total correlation) were between 0.31 and 0.83. The questionnaire was adjusted according to the standard of the instrument inspection before testing in the next step.

In step 2, the questionnaire was examined for its composition analysis for structural validation by analyzing the exploratory factor analysis (EFA). The data were collected from stratified sampling for five representative nursing colleges from each region of Thailand from 29 nursing colleges under the PBRI. According to Hox (2002), the survey study should collect data from at least 500 samples; therefore, all 541 seniors nursing students in academic year 2018 from five representative nursing colleges were invited to participate and complete the questionnaire online. There were 530 subjects who filled in the questionnaire completely, and the response rate was 97.97%. The representative nursing colleges were BCN Suphanburi (80 students), BCN Chainat (62 students), BCN Nakhonratchasima (167 students), BCN Lampang (153 students) and BCN Trang (68 students).

3.1 Data analysis

Before analyzing the composition, the researcher had examined the suitability of using factor analysis techniques to meet it basic assumptions as follows.

1) Examine correlation matrix analysis by analyzing the coefficients between all 30 variables using Pearson's Product Moment correlation to show relationships between each pair of variables. The results showed that the correlation coefficients were greater than 0.30.

2) Examine the identity matrix by using the Bartlett's test of sphericity. The result was statistically significant ($p < .01$) indicating that the hypothesis was rejected or the relationship between variables was not unity. Therefore, the variables were suitable for composition analysis.

3) Examine the extent or relationships between variables by using the Kaiser-Myer-Olkin index (KMO). The results were more than .5 (.948), indicating that the variables of all elements were the most appropriate level in composition analysis (Hair, Anderson, Tatham, & Black, 1998).

4) Examine the variances of each variable to find its communality. The results revealed that the communalities were between .50-.88; therefore, all variables could be included (Kaiyawan, 2013).

5) Examining the Multiple variate outliers by using Mahalanobish Distance (D^2). Any subjects with the values exceed the critical value of the Chi Square at df equaled to the number of variables would be eliminated. The results showed that there were five cases with multiple variate outliers and were cut out of the study.

Exploratory factor analysis (EFA) using principle component analysis technique and rotating axis with Varimax, the Eigenvalues were set at 1.0 and the elements were set at four. The researchers considered the cumulative variance of the extracted components at greater than 60% and arranged the elements according to the composition analysis results. Each component, the researchers considered the Cronbach's alpha coefficient at greater than .60, Inter-Item correlation matrix at greater than 0.3 and the KMO value at greater than 0.5. All of these criteria must be met to complete the composition analysis.

4. Results and Discussion

4.1 General information

The subjects were 530 senior Bachelor of Nursing Science students from five Boromarajonani colleges of nursing under the PBRI from all regions of Thailand (according to the regional network of the nursing colleges under the PBRI). The list of representative nursing colleges was BCN Suphanburi from the central network 1 (80 students, 15.1%), BCN Chainat from the central network 2 (62 students, 11.7%), BCN Nakhonratchasima from the north-eastern network (167 students, 31.5%), BCN Lampang from the northern network (153 students, 28.9%) and BCN Trang from the southern network (68 students, 12.8%).

4.2 Exploratory Factor Analysis

The results of examining the exploratory factor analysis of caring behaviors among the senior nursing students at nursing colleges under the PBRI revealed four compositions with the Eigenvalues between 1.501-10.981. The first composition could explain the variance of the caring behavior variable of nursing students for 36.605% whereas the rest compositions could explain the variance of caring behaviors among nursing students for 16, 6, and 5%, respectively. Details of each component are described as follows.

Factor 1: Holistic Nursing Care. This factor consisted of 10 items. The relationship values of the items were .76-.88. The factor loadings were .871-.906. The three items with the highest factor loadings were Env7: Plan the nursing processes that covered physical, mental, emotional, social and spiritual aspects, Env10: Provide care for patients to achieve physical comfort and Env8: Provide physical care and talk to psychological care of the patient, the factor loadings were .906, .905 and .904, respectively. In addition, all the items in this factor had the factor loadings of more than 0.50, the factor's Cronbach's coefficient was .98 as shown in Table 1, the KMO value was .97 and the Bartlett's Test of Sphericity was 7150.706 with statistical significance level at .01.

Factor 2: Building good relationship and trust. This factor is composed of 10 items. The relationship values of the items were 0.40-0.66. The factor loadings were .614- .782. The three items with the highest factor loadings were 1) Asking the patient's condition with caring, 2) Expressing good attitude to provide care consistently with body, speech and mind, 3) Talking to the patient with gentle voice, the factor loadings were .782, .768 and .767, respectively. In addition, all the items in this factor had the factor loadings more than 0.50, the factor's Cronbach's coefficient was .92 as shown in Table 1, the KMO value was .97 and the Bartlett's Test of Sphericity was 2622.274 with statistical significance level at .01.

Factor 3: Application of knowledge to care. This factor is composed of 7 items. The relationship values of the items were 0.570-0.723. The factor loadings were 0.570-0.723. The three items with the highest factor loadings were: 1) Following-up after teaching to help, 2) Providing counseling by assessing problems, causes, and finding solutions with the patients and 3) Evaluating after providing care, the factor loadings were .723, .715 and .707, respectively. In addition, all the items in this factor had the factor loadings more than 0.50, the factor's Cronbach's coefficient was .84 as shown in Table 1, the KMO value was .863 and the Bartlett's Test of Sphericity was 1228.64 with statistical significance level at .01.

Factor 4: Being sensitive to assess and response to the clients' needs. This factor is composed of 3 items. The relationship values of the items were .31-.43. The factor loadings were .558-.869. The three items with the highest factor loadings were: 1) Informing and offering help, 2) Providing activity of daily care for dependence clients, 3) Providing activity of daily care for dependence clients, the factor loadings were .723, .715 and .707, respectively. In addition, all the items in this factor had the factor loadings more than 0.50, the factor's Cronbach's coefficient was .60 as shown in Table 1, the KMO value was .863 and the Bartlett's Test of Sphericity was 1228.64 with statistical significance level at .01.

Table 1 Factor Loading from exploratory analysis with principal component and varimax rotation by item of the Caring Behavior of Student Nurse under the PBRI (CBSN-30) (N=530)

Variable	Factor 1	Factor 2	Factor 3	Factor 4
Env7	.906			
Env10	.905			
Env4	.904			
Env8	.903			
Env9	.899			
Env1	.893			
Env6	.889			
Env5	.879			
Env2	.877			
Env3	.871			
Rel1		.782		
Rel2		.768		
Rel4		.767		
Rel3		.747		
Rel6		.714		
Rel10		.696		
Rel8		.686		
Rel9		.654		
Rel7		.653		
Rel13		.614		
Nee8			.723	
Eth10			.715	
Nee7			.707	
Nee18			.691	
Eth6			.592	
Nee13			.573	
Eth5			.570	
Sen3				.869
Rel15				.679
Hol9				.558
Eigenvalues	10.981	4.970	2.076	5.002
% of Variance	36.605	16.568	6.919	5.002
% Cumulative	36.605	53.173	60.092	65.094
Cronbach's Coefficient	.98	.91	.84	.60

4.3 Discussion

The results showed that the caring behaviors among the senior nursing students at Boromarajonani nursing colleges under the Praboromarajchanok Institute consisted of four factors: 1) Providing care by using holistic nursing procedures, 2) Building good relationship and trust, 3) application of knowledge in care, and 4) Being sensitive to assess and response to the clients' needs. The discussions of these finding were detailed as follows:

1. Holistic Nursing Care is the first factor with ten items and factor loading between .871-.906. This factor could explain the variance of the caring behavior among nursing students up to 36.605% percent. Watson's caring theory focused on evaluating the needs of individuals in holistic and generosity manner. The need cannot be evaluated and responded separately but should be evaluated and responded with a holistic approach. The human needs can be categorized into: 1) Biophysical or physical needs, 2) Psychophysical Needs, 3) Psychosocial Needs and 4) Intrapersonal-Interpersonal Needs. These findings were congruent with Luengarun et al. (2012) who developed the caring behavioral care scale model of nursing students in the Southern nursing colleges network. The authors reported that emotional spiritual support could explain variance of caring behaviors among the nursing students for 26%. Furthermore, Suebwonglee et al. (2011) found that providing advice that covered both body and mind needs could explain the variance of caring behavior with generosity for up to 7.48%

2. Building good relationship and trust. This factor is composed of 10 items, with factor loading between .614-.782, and could explain the variance of caring behavior among nursing students for 16%. These findings were consistent with Watson's caring theory (Watson, 1985). Watson proposed the important factors of caring for generosity was helping-trust relationship. This relationship was similar to promoting and accepting both positive and negative emotional expressions of the clients. Sensitivity to one's feelings and other's feeling was the starting point of holistic care. Nursing is a science of care and must develop helping-trust relationship which will benefit the mind, social development and encouraging patients to seek health assistance. Therefore, the sensitivity of the interpersonal relationships is an important factor for providing care. The findings were congruent with Luengarun et al. (2012) who reported that effective communication was an integral component of the caring behaviors among nursing students.

3) Applying knowledge to care. There were seven items in this factor with factor loading ranging from 0.570 - 0.723 and could explain the variance of the caring behavior among nursing students for 6%. The findings were congruent with Luengarun et al. (2012) and Suebwonglee et al. (2011) who defined knowledge as essential professional competencies.

4) Being sensitive to assess and respond to the clients' needs. This factor is composed of three items, with factor loading ranged from 0.558 - 0.869 and could explain the variance of the caring behavior among nursing students for 5%. The findings were congruent with Luengarun et al. (2012) and Suebwonglee et al. (2011) who defined knowledge as authentic attention.

5. Conclusion

This study used qualitative and quantitative methods to develop a questionnaire on "Caring Behaviors among Nursing Students' in Boromarajonani Colleges of Nursing under the Jurisdiction of Praboromarajchanok Institute for Health Workforce Development". The content validity, face validity, construct validity, and reliability of this 30-item questionnaire were ensured by expert review, factor analysis and internal consistency respectively. The questionnaire developed in this study addressed the four-dimensional construct factors of caring behaviors among nursing students. It can be employed in practicum setting to evaluate the extent of nursing students' caring behaviors.

6. Acknowledgement

7.References

Boromarajonani College of Nursing, Nakhon Ratchasima. (2017). *Bachelor of nursing science program (Course update 2017)*. Nakhon Ratchasima: The College.

Colaizzi, P.(1978).*Psychological research as the Phenomenologist views it. In Existential-Phenomenological Alternatives for Psychology* (R. Valle R. & King M. eds), Oxford University Press, London p: 48-71.

Daodee, S. (2008). Using the caring theory for improving the quality of nursing practice *Journal of Nursing Quality*, *1*(Inaugural edition), 26–46.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, B. (1998). Factor analysis decision process. In *Multivariate data analysis*. 5th ed. (pp. 93–119). Upper Saddle River, NJ: Prentice Hall.

Hox, J. J. (2002). *Multilevel analysis: Techniques and applications*. Mahwah, NJ: Lawrence Erlbaum Associates.

Kaiyawan, Y. (2013). Principles of factor analysis or composition analysis. In *Multivariate statistical analysis for research* (pp. 103–152). Bangkok: Chulalongkorn University Press.

Kosolchuenvijit, J. (2008). *A development of the instructional model through integrating Buddhist concepts to nurture caring behaviors in nursing students*. Ph.D Dissertation, Education of Curriculum Research and Developmentm. Srinakharinwirot University.

Leaungsomnapa, Y., Timsuwan, B., & Promproh, S. (2008). Actor analysis of caring behavior among
    nursing insructure. *Nursing Journal of the Ministry of Public Health*, *19*(2), 1–16.

Luengarun, P., Wannasonted, S., & Chitviboon, A. (2012). The Development of nursing students' caring
    behavior scales. *Journal of Nursing and Education*, *5*(2), 90–103.

Praboromarajchanok Institute. (2015). *Graduate identity of Praboromarajchanok institute or Workforce
    Development, identity of Praboromarajchanok institute or Workforce Development, Graduate
    identity of Praboromarajchanok institute or Workforce Development.*Retrieved from
    https://bit.ly/2FX2D31.

Somsiri, K., Supipri, N., Wannawilai, P., & Chanjarain, K. (2008). *Needs of caring perceived by the
    ralatives of critically ill patients admitted in Songkhla hospital*. Songkhla: Boromarajonani
    College of Nursing, Songkhla.

Suebwonglee, C., Sujiva, S., & Wongwanich, S. (2011). Development of a nursing caring behavior
    assessment instrument using the cognitive interview technique. *SDU Research Journal Humanities
    and Social Sciences*, *7*(2), 127–142.

Watson, J. (1985). *Nursing: The philosophy and science of caring*. Boulder: Colorado Associated
    University Press.