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Development and Validation of the Questionnaire for Health Education Competency among Nurses in Vietnam

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ABSTRACT

Objective: Develop and validate the questionnaire to measure health education competencies of nurses. **Methods:** A cross-sectional descriptive study was conducted using qualitative and quantitative methods. The research was carried out in 2 phases, in which Phase I developed the questionnaire (Define the concept and content of the items to be measured; Build the initial questionnaire through consulting the experts); Phase II conducted the validity and reliability of the questionnaire (Investigate and test with the nurses; Test the validity; Test the reliability). **Results:** The structure of a questionnaire was determined to measure health education in 3 areas of knowledge, skills, and attitudes with 53 categories. The questionnaire was builded by consultation with 9 experts. Two categories (I-CVI scores < 0.78) were removed, forming an initial questionnaire with 51 items. The questionnaire was investigated and tested on 150 nurses. The rotating factor analysis gave results consistent with 45 categories in 3 areas of knowledge (2 categories - 15 items), skills (3 categories - 22 items), attitude (1 component - 8 items), explaining the variation of 62.61%, 64.48% and 82.07%, respectively. The group of nurses trained in health education had higher knowledge, skills and attitudes than the untrained group (p<0.05), the nurse group with long-term working experience had a higher score of knowledge, skills and attitude than the new group of nurses with (p<0.01). The intrinsic reliability of the questionnaire is evaluated well with the Cronbach alpha value of each component and the whole scale from 0.84 to 0.95; Reliability was repeated through a re-test of 35 nurses, and the ICC correlation coefficient was from 0.97 to 0.99. **Conclusion:** The health education competency questionnaire has been developed as a reliable and valuable measurement, may assist nursing educators and researchers in assessing the health education competence of nurses during clinical training.

Keywords: development, validation, questionnaire, health education competencies, nurses

INTRODUCTION

Implementing health education is an important role of nurses, through health education, nurses provide patients and their families with the necessary knowledge and skills to coordinate well in care. health care, prevention, treatment and early detection of complications, reducing the economic burden on the family as well as society.[1-3] For health education for patients to be effective, the capacity of nurses plays an important role.[2,4] Health care providers' capacity for health education is defined as "integrating professionalism, teaching and empowerment in the co-creation of knowledge and skills to achieve behavior change".[5] In the world, the World Nursing Council and many countries have set standards for health education competency of nurses.[2,6-8]

In Vietnam, the Ministry of Health has promulgated the "Vietnam Nursing Competency Standard", which stipulates the criteria for the health education competency of nurses, currently, in the world and in the country, there are a number of studies on the questionnaire to assess the health education competency of nurses.[9] In 2019, María Pueyo (Spain) built a questionnaire to assess the health education competency of nurses in three areas of awareness, skills, and attitudes. Using a four-step approach: Conceptual analysis and structure of health education competency; Building a portfolio bank to measure health education competency; Build questionnaires; Evaluate internal validity, consistency and stability.[10] Research results showed that from the bank, 88 initial portfolios in 3 areas of knowledge, skills, attitudes, and questionnaires with 58 categories have been tested and put into use. However, there is currently no comprehensive questionnaire to measure the health education competency of nurses in Vietnam. Stemming from the above fact, we carry out the research with the objective to develop and evaluate the validity and reliability of a questionnaire to measure the health education competency among nurses in Vietnam.

METHODS

Participants and design

The study used cross-sectional design with combining qualitative and quantitative methods. The study consists of two phases including Phase I developed the questionnaire, Phase II evaluated the validity and reliability of the questionnaire.[11-12]

Phase I: The participants were 6 nursing professionals with post-graduate degrees, with at least 5 years of seniority at the hospital;[10,13] And 9 experts who have been working in the nursing field with post-graduate degrees, with at least 5 years of working experience.[14] The evaluation was built with 53 items, divided into 3 categories. Experts score in each items from 1 to 4 on the Likert scale of "not suitable" - 1 point; "less suitable" - 2 points; "suitable" - 3 points; "very suitable" - 4 points. The scoring method are counted with the expert opinion on each category. The 1 and 2 point rating expert is counted as disagree, the 3, 4 point rating is counted as the agree. According to author Lynn, the item has an acceptable content value with index I - CVI > 0.78.[15]

Phase II: The participants were nurses directly taking care of patients working at the hospital's clinical departments at the time of the study. The sample size was based on the number of categories on the initial questionnaire, the required number of samples were 150 participants (3 test samples for 1 list).[10-11,13]

The questionnaire was tested for structural value by the EFA. Before performing the test, the

researcher tested the adequacy of sample size by KMO test with required index (>0.6) and Bartlett test (p<0.001). With a sample size of 150 participants, the study took the items with correlation value > 0.45.[10,13]

The exploratory factor analysis (EFA) was tested with the initial questionnaire for structural value. The EFA select the categories and elements that meet the criteria for the questionnaire.[10-11,13-15] The correlation was tested between the fields of the questionnaire by calculating the correlation coefficient between the variables of Knowledge domain score, skill domain score, attitude domain score.[10-11,13] The group validity test was used to evaluate the variation of capacity according to groups of participants.[7,10,12]

The internal consistency reliability was tested using Cronbach's alpha coefficient.[10-11] The stability reliability was tested by interviewing for the second time with 20% randomly selected respondents out of a total of 150 participants who participated in the first time. The Intraclass Correlation Coefficient (ICC) was tested to evaluate the differences between two interviews.[10-11]

Data collection and analysis

The study was conducted from January to June 2022 at 108 Military Central Hospital. The data was cleaned and entered into SPSS software. Descriptive statistics including mean, percentage, were used to describe the variables of the study. The EFA was used to estimate the structure of the questionnaire. Cronbach's alpha was used to estimate the reliability of the factors. Statistical significance was assumed at the 0.05 level.

Ethical considerations

The study was authorized by the 108 Central Military Hospital and approved by the Ethical Council of Nam Dinh University of Nursing. The participants were provided with full information about the study and the right to withdraw from the study at any time.

RESULTS

1. The study participants

Table 1- Characteristics of study participants (N=150)

Characteristics	Participants	N (150)	%
Sex	Male	39	26.0
	Female	111	74.0
Age	21 to 25 years old	69	46.0
	26 to 30 years old	58	38.7
	31 to 35 years old	11	7.30
	35 years old and above	12	8.00
Academic level	Post-Graduate	2	1.30
	University	68	45.30
	College	76	50.70
	Intermediate	4	2.70
Working years	Less than 2 years of work	57	38.0
	2 years of work or more	93	62.0

The results indicated that most of the participants were female, younger nurses, more than 2 years of working experience.

2. Measurement development

Table 2 - Result of EFA of Knowledge, Attitude and Skill area

Content	F1	F2	F3
Knowledge			
Domain 1: Health and education knowledge			
K1: Perceive the concept of health	0.80		
K2: Aware of lifestyle factors affecting health	0.71		
K3: Aware of environmental factors affecting health	0.82		
K4: Understand about culture, society, and practices related to health education	0.80		
K5: Knowledge of the health education process	0.78		
K6: Knowledge of using health education support facilities	0.73		
K7: Knowledge of forms of health education organization	0.78		
K9: Aware of individual roles and responsibilities	0.75		
K10: Aware of the patient's roles and responsibilities	0.77		
Domain 2: Ability to apply Knowledge in practice			
K11: Apply knowledge to guide patients to take care of themselves		0.58	
K12: Apply knowledge to instruct patients to use drugs		0.64	
K13: Apply knowledge to guide patients to coordinate the implementation of the technique		0.82	
K15: Apply nutrition guidelines		0.82	
K16: Apply knowledge to guide disease prevention		0.73	
K17: Apply information to guide regimes and regulations		0.72	
Skill			
Domain 1: Identify needs, develop a plan			
S1: Exploit the habits and lifestyle of the patient	0.53		
S2: Exploit the available knowledge and experience of the patient	0.56		
S3: Correctly identify the patient's health education needs	0.68		
S5: Identify problems patients need health education, select priority issues	0.62		

S6: Determine the place, time, and means for health education	0.68		
S7: Plan health education in accordance with existing conditions and the patient's condition	0.61		
S8: Prepare appropriate materials for health education	0.67		
Domain 2: **Implementation, evaluation**			
S10: Implement health education by appropriate method		0.64	
S11: Communicate clearly and understandably		0.69	
S12: Gestures and manners appropriate for health education		0.68	
S14: Use tables, pictures, leaflets, models		0.64	
S15: Use computers and projectors		0.81	
S16: Use official information on social networks		0.73	
S17: Assess the patient's receptivity		0.60	
S18: Adjust health education contents in line with goals		0.59	
Domain 3: Effective communication and teamwork			
S21: Identify obstacles and difficulties of patients			0.71
S22: Communicate with the patient in clear, understandable language			0.86
S23: Listen to the patient's opinion			0.84
S24: Observe the patient's attitude in health education			0.59
S25: Adjust the way you communicate with the patient			0.80
S26: Collaborate effectively with colleagues in health education			0.70
S27: Manage a working group in health education activities			0.59
Attitude			
Actively take the initiative, perform the role of ensuring the patient's interests			
A1: Actively and proactively perform the task of health education	0.93		
A2: Health education is an important task of nurses	0.92		
A3: Health education should be prioritized in care activities	0.92		
A4: It is the patient's right to receive health education	0.84		
A5: Respond positively to the patient's comments	0.87		
A6: Show empathy and share the patient's difficulties	0.93		
A7: The role of coordination in health education is very important	0.92		
A8: Motivate patients to change their health awareness and behaviors	0.91		

The EFA of knowledge areas. The results indicated that the KMO test was 0.90 and the Bartlett test was statistical significance (p<0.001). Analysis of the number of factors selected based on the eigen value greater than 1, 3 selected items with eigenvalues > 1, respectively, were (1.0, 1.8 and 8.0) explained variation with 50.9%, 62.61% and 69.7%, respectively. Among the 16 items included in the domain analysis, domain 3 has only the item K14, excluding this category because it did not affect the structure and content of the questionnaire. The results indicated that there were 2 domain selected and named by the research team of domain 1- health knowledge and health education (9 items), domain 2 - ability in applying knowledge and information in health education practice (6 items). Table 3 shows 15 items selected in the knowledge area.

The EFA of skill area. The results of KMO and Bartlett test were 0.91 (p<0.001). The number of elements selected based on the eigen value greater than 1. The three selected items, respectively, had eigenvalues l of (1.1; 12.9 and 1.3) explaining the variation of 69.62%, 58.72% and 64.48%, respectively. Among the 27 items included in the component analysis, there were 5 items (S4; S13; S19; S20; S28) with correlation value less than 0.45 or correlation at the same time on many items. The researcher considered removing these 5 items because it did not affect the structure and content of the questionnaire. The results of the rotation analysis indicated that there were 3 items selected and named respectively to suit the research structure of domain 1 – need assessment, planning (7 items), domain 2 - implementation of the plan, outcome evaluation (8 items), domain 3 - effective communication, teamwork (7 categories). Table 4 indicates 22 items selected in the skill area.

The EFA of attitude area. The results indicated that KMO and Bartlett test were 0.91 (p<0.001). Analyze the number of factors selected based on the eigen value greater than 1; 1 selected item had an eigenvalue l of (6.56) which explains the variation of 82.07%. In 8 items included in the domain analysis, all items had correlation values above 0.45. The analysis results indicated that there was 1 element selected and named accordingly by the research team of actively taking the initiative, performing the role of ensuring the interests of the patient (8 items). Table 5 indicated eight items selected in the attitude area.

Table 3 - Correlation between the areas of the questionnaire

Area	Pearson's coefficient, *p*		
	Knowledge	Skill	Attitude
Knowledge	1		
Skill	0.82[**]	1	
Attitude	0.65[**]	0.75[**]	1

** *p*< 0,01

The results in Table 3 indicated that the average scores of the areas of knowledge, skills and attitudes were correlated with Pearson's coefficient from 0.65 to 0.96 (>0.4). The questionnaire had a strong correlation between over 3 areas.

3. Measurement validation

Table 4 - Result of group validity test

Group	Knowledge score		Skill score		Attitude score	
	Mean (SD)	t, p	Mean (SD)	t, p	Mean (SD)	t, p
Trained in health education						
Yes	62.30 (4.20)	7.4*	90.40 (5.90)	5.7*	33.9 (2.8)	3.7**
No	55.80 (6.50)		82.50 (10.80)		31.3 (5.5)	
Working years						
Less than 2 years	59.60 (5.20)	-6.1*	82.4 (9.2)	-5.1*	30.9 (5.1)	-4.1*
From 2 years or more	61.70 (5.70)		89.8 (8.1)		33.9 (3.5)	

* p<0.01,   ** p< 0.05

The results in table 4 indicated that the nursing group trained in health education had a higher score of knowledge, skills, attitude, and total score than the untrained group (p < 0.05). The nursing group with long-term working experience had a higher score of knowledge, skills and attitude than the new group of nurses (p<0.01).

Table 5 - Reliability measurement results between domains and items of the questionnaire

Field, element	Cronbach's α
Knowledge	0.93
1. Domain 1: Health and education knowledge	0.93
2. Domain 2: Ability to apply knowledge in practice	0.84
Skills	0.95
1. Domain 1: Identify needs, develop a plan	0.87
2. Domain 2: Implementation, evaluation	0.93
3. Domain 3: Effective communication and teamwork	0.95
Attitude	0.95
Actively take the initiative, perform the role of ensuring the patient's interests	0.95
Total	**0.95**

The intrinsic reliability was tested using Cronbach's alpha coefficient. The results of Cronbach's alpha value of each domain and of the area of the questionnaire presented in table 5 indicated that the value ranges was from 0.84 to over 0.95.

DISCUSSION

The process of developing and evaluating the validity and reliability strictly follows through 2 phases with 5 steps, similar to the steps of building and testing the questionnaire in the research of María Pueyo, Li- Ying LIN, Huei-Lih Hwang.[10-11,14-15] The questionnaire's items were developed on the concept of competence of the WHO, the structure of the competency framework for health education according to Virpi Kemppainen.[2,16] The areas and domains of items had similarities with the research of María Pueyo.[10] Some items were included by the research team in accordance with the Vietnamese nursing competency standards, reality of health education of women and cultural characteristics in Vietnam.[9,17-19]

The initial questionnaire was consulted by 9 experts with experience in various fields (clinical, teaching, management). The experts had high consensus for 51 items with I-CVI scores above 0.78 were selected for the initial questionnaire. This may be due to the selection of original initial content specialists who are experienced in providing health education services to patients.

150 nurses participated in the survey, tested the questionnaire at different ages and positions, ensured enough sample size to analyze validity and reliability.[13,20] The questionnaire was evaluated for structural validity using the EFA. After factor analysis, 45 items in 3 areas of knowledge (2 domains - 15 items), skills (3 domains - 22 items), attitude (1 domain - 8 items) met the selection criteria. The questionnaire was congruent with María Pueyo's Questionnaire with 58 categories in 3 areas of knowledge (23 items), skills (26 items), attitude (9 items).[10] The questionnaire was built with fewer items. The reasons the differences may become from selected items that they are consistent with the Vietnamese nursing competency standards and the health education practice of nurses in Vietnam.

Evaluating the variation of competency according to the groups of participants, the nurse group trained in health education had higher scores than the untrained group, the nurse group with long working experience had higher scores than the new nurse group. This result is similar to the research results of María Pueyo, Tran Quang Huy.[10,12] This indicated that the questionnaire provided the evaluation results consistent with previous studies.

Evaluation of the intrinsic reliability using Cronbach's alpha coefficient had a value from 0.84 to 0.95, demonstrating the internal consistency of the items and domains of the questionnaire as well.[13,21-22] The re-test of reliability through the ICC coefficient between two responses with values from 0.97 to 0.99 meets the requirements for re-test of reliability (>0.7). The high correlation of the questionnaire's results may be due to the relatively short 2-week interval between the two assessments, and the respondents still remember the information from the first interview.

The study had some limitations. Due to limited resources, the 150-sample test evaluation sample size is low-level, possibly not large enough to generalize the results. The research conducted the study by selecting nurses to participate in the investigation of the questionnaire at different ages and positions. There is no gold standard questionnaire to measure health education competence of nurses in Vietnam, therefore, in exploratory factor analysis, the study did not used confirmatory factor analysis, however, the research was conducted using group assessment to examine the degree of relevance with some previously published studies.

CONCLUSION

The questionnaire measuring health education competency of nurses in Vietnam is a valid and reliable questionnaire. The questionnaire includes 45 items across 3 domains of knowledge (2 domains - 15 items), skills (3 domains - 22 items), attitudes (1 doamin - 8 items) and feasible to apply in practice and future research to measure health education competence among nurses in Vietnam.

Conflict of Interest statement: No conflict of interest has been declared by the authors.

REFERENCES

1. Training Institute of Preventive Medicine and Public Health - Hanoi Medical University (2012), "Concept of health education and health promotion communication, in Education and health promotion", *House medical publishing.*
2. World Health Organizaton (2012), "Health education: theoretcal concepts, efectve strategies and core competencies: a foundaton document to guide capacity development of health educators", World Health Organizaton, Regional Office for the Eastern Mediterranean.
3. Hesam Seyedin and al (2015), "Patient education process in teaching hospitals of Tehran University of Medical Sciences*", Medical Journal of The Islamic Republic of Iran*. 29 (220).
4. Ministry of Health of Vietnam (2017), "Guidelines for health communication 2017".
5. Kristjansdottir, O. B., Vågan, A., Svavarsdóttir, M. H., Børve, H. B., Hvinden, K., Duprez, V., ... & Stenberg, U. (2021). "Training interventions for healthcare providers offering group-based patient education. A scoping review". *Patient Education and Counseling*, 104(5), 1030-1048.
6. College of Nurses of Ontario, "Entry-to-Practice Competencies for Registered Nurses*".*
7. Massachusetts Department of Higher Education Nursing Initiative (2016), "Massachusetts Nurse of the Future Nursing Core Competencies".
8. The Nursing Council of Hong Kong (2012), "Core-Competencies for Registered Nurses *(General)".*
9. Ministry of Health of Vietnam (2010), Decision No. 1352/QD-BYT dated April 24, 2010 on "Vietnam nursing competency standards".
10. Dean Whitehead María Pueyo-Garrigue Miren Idoia Pardavila-Belio, Nuria Esandi, Ana Canga-Armayor, Paula Elosua, Navidad Canga-Armayor (2021), " Nurses' Knowledge,

skills and personal attributes for competent health education practice: An instrument development and psychometric validation study*"*, *J Adv Nurs*. 77, 715–728.

11. Huei-Lih Hwang PhD, Mei-Ling Kuo MS and Chin-Tang Tu PhD (2017), "Health education and competency scale: Development and testing*"*, *Journal of Clinical Nursing* 27(3-4).

12. Tran Quang Huy (2020), "Nursing training based on competency, perspective from training institutions", Report of Nursing Science Conference 2020, Nam Dinh University of Nursing

13. Michael T. Kalkbrenner (2021), "A Practical Guide to Instrument Development and Score Validation in the Social Sciences*"*, *The MEASURE Approach, Practical Assessment, Research & Evaluation*, 26 (1).

14. Li-Ying LIN and Ruey-Hsia WANG (2017), "Patient Education Competence Scale for Registered Nurses in Taiwan: Scale development and psychometric validation*"*, *Japan Journal of Nursing Science*. 14,117–125.

15. Muhamad Saiful Bahri Yusof (2019), "ABC of Content Validation and Content Validity Index Calculation*"*, *Education in Medicine Journal*. 11(2), 49–54.

16. Virpi Kemppainen and al (2012), "Nurses' roles in health promotion practice: integrative review*"*, *Health Promotion International* 28 (4).

17. Ministry of Health of Vietnam (2016), Decision No. 6858/QD-BYT dated November 18, 2016 of the Ministry of Health on promulgating the set of quality criteria for Vietnamese hospitals, editor.

18. Nguyen Thi Thuy (2019), "Assessment of knowledge, attitudes and practices on health education and guidance activities for inpatients at some clinical departments", Hanoi Medical University Hospital, Master's thesis in nursing, Hanoi Medical University.

19. Center for Human Resource Development and Medical Practice Support - Vietnam General Medical Association (2019), "Basic medical pedagogical training manual."

20. Anne -Louise Bergh and al (2015), "Nurses' Patient Education Questionnaire–development and validation process.*"*, *Journal of Research in Nursing*. 20,181-200.

21. Torsten B. Neilands Godfred O. Boateng, Edward A. Frongillo, Hugo R. Melgar-Quiñonez and Sera L. Young (2018), "Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer*"*, *Frontiers in public health.* 6 (149).

22. The Singapore Nursing Board's (2018), "Core Competencies for Registered Nurse".