Development and Psychometric Testing of the Cambodian Nursing Care Quality Scale

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Abstract: The evaluation of nursing care quality as a patient outcome is critical to improving practice, and requires appropriate instruments that have been validated and are reliable. Although a number of such instruments have been developed in the west, there are few in Asia and none in Cambodia where nursing quality needs vast improvement. The aim of this study was to develop the Cambodian Nursing Care Quality Scale and assess its validity and reliability.

The design of this study was instrument development and psychometric testing. This methodological study had seven steps in instrument development, including content validity assessment by 5 experts. It was then tested with 240 registered nurses in 12 hospitals from five geographic areas of Cambodia who had undergone a multistage random sampling procedure. The analysis involved exploratory factor analysis and internal consistency testing. The instrument was developed as a questionnaire which had six factors: patient outcomes; physical environment; ethics-oriented activities; nurses' characteristics; nurses' task activities; and progress of the nursing process. Only 35 items were kept after exploratory factor analysis.

The instrument had an acceptable level of construct validity and good internal consistency, indicating its usefulness to measure nursing care quality in Cambodia. It needs further testing with different samples. Nursing and health leaders need to find ways of improving nursing care and developing nursing quality, and instruments used for measuring nursing care quality must be reliable and valid.

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Introduction

This study was based on the need to measure nursing care quality (NCQ) as an essential for the development and the improvement of the nursing care. Nursing care quality ought to be measured from the perspectives of registered nurses (RNs), as they contribute significantly to assessing, planning, and evaluating patient needs, delivering treatments and medications, and advocating for patients to assure

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their comfort.[1] Principally, there are two methods of developing an instrument: to build a new one or to adopt the existing one. This study is a part of a capstone dissertation project which aimed to develop an instrument to measure NCQ in the Cambodian context.

Nursing care quality (NCQ) is complex, multi-faceted and multi-dimensional, "and attempts to assess, monitor, evaluate and improve nursing care quality have evolved over years" and in many settings.[2] This includes ensuring that such instruments fit the cultural context of practice. In this study, the operational definition of NCQ as developed by the researchers, refers to the degree to which an activity fulfills requirements perceived by individual professional nurses, based on the nursing standards of practice they provide with an expectation to meet patients' needs.

In order to evaluate Cambodian nurses' perceptions of the NCQ, we needed to have a standardized, valid, and reliable instrument. However, there was suitable Cambodian or culturally relevant instrument based on the perceptions of RNs that we could use for this purpose. The development of this was very important, hence this study.

Literature Review

There are many studies concerned with measuring NCQ but these have been mainly conducted in the USA[3,4]; in European countries[5,6,7,8]; in Asia countries of China[9,10]; Thailand[11]; South Korea[12]; Sri Lanka[13]; and in the Middle East.[14,15] However, no study has been undertaken in Cambodia, the setting for this study. All these studies reflect western cultures rather than Cambodian cultures.

In Cambodia, 14,000 nurses currently deliver patient care, and their daily evaluation of that care is done without assessing the level of NCQ. Ninety per cent of Cambodian RNs currently have an associate degree in nursing; 1% have a bachelor degree in nursing sciences; whilst 4% are nurse aides.[16] There are a number of challenging factors that influence NCQ in Cambodia, such as a shortage of RNs, few nurses holding a bachelor degree, increasing numbers of RNs leaving nursing to join other professions, and lack of in-service training, all of which impact on NCQ.[17] Further, 100% of RNs are assigned to practice across a 24-hour-shift, which is highly unsatisfactory in terms of patient and nurse health and safety, and quality care. For example, an RN rostered on duty today might work a 24 hour shift, then have tomorrow off, then work two days for 8 hours per day. In the experience of the first author, many Cambodian nurses work between 60 to 70 hours per week, a highly unsatisfactory state of affairs. It was therefore deemed critical to have a means of assessing the quality of their care if professional standards are to be raised and patient outcomes achieved.

Nursing Care Quality Theory

The theoretical underpinning of the instrument developed here, the Cambodian Nursing Care Quality Scale (CNCQS), was based on the structure-process-outcome (SPO) model of Donabedian. This framework has guided three decades of study in the elements needed to evaluate and compare medical care quality. The emphasis on evaluating the quality of care has shifted from structures (administrative & equipment) to processes (practice) to outcomes (good or bad results).[18] Structures, or practice settings, are usually thought to affect processes, which in turn produce desirable or undesirable outcomes. The process is the relationship between care activities and patients, whilst outcomes refer to the patient's condition. This framework was useful to investigate care activities and patient outcomes. NCQ is based on patients' demands and concerns the different activities of nursing care, including patient outcomes, nurses' characteristics, physical environment, task requirements, a progress of the nursing process, and ethical activity.

Nursing Care Quality Scales

A literature review found that there were two groups of existing NCQ instruments.[2] In the first group, researchers assessed NCQ by a single item, for example, nurses' reports of quality of care on their hospital unit as excellent, good, fair, and poor.[19,11,20] The second group of instruments were questionnaires to assess NCQ, and involved 5-point Likert type scales. For example, the Good Perioperative Nursing Care Scale (GPNCS) was used to describe nurses' perceptions of perioperative care quality, but the researchers did not report the values of construct validity.[5] In another study The Perception of Quality Nursing Care Scale was used to explore NCQ as perceived by nurses in medical and surgical departments in a Chinese tertiary general hospital.[21] In addition, NCQ was assessed by the Assessment of Quality Scale-Acute Care Version, however, the construct validity was not reported.[22]

In summary, there were at least three reasons why a new instrument had to be developed, even though there were existing instruments: first, we argue that a single item cannot reflect the reliability and validity of NCQ; second, other instruments lacked construct validity; and third, most instruments were developed in western countries, with western cultures as their points of reference. Therefore, given these realities, it was vitally important to develop an instrument which reflected the conditions of health and nursing care in Cambodia, an instrument based on the views of hospital clinical nurses, most involved in the NCQ across the health care settings.

Study Aim

To develop the Cambodian Nursing Care Quality Scale (CNCQS) and assess its validity and reliability.

Methods

Study design: This methodological research had two phases: phase one, the development of the CNCQS, and phase two, psychometric testing.[23]

Sample and settings: There were 240 participants invited to this study through a multi-stage random sampling process as described more fully below in Step 6 of the study. Sampling involved five geographic areas in Cambodia that had a total of 32 tertiary government hospitals.

Ethical considerations: Research ethics approval was obtained from the Cambodian National Ethics Committee for Health Research (Approval no. 319 NECHR) and relevant permissions were given by the hospital directors. All participants received explanations of the study purposes and methods and their rights, and could refuse to participate in or could withdraw from the study at any time. This included a guarantee that their responses and identities would be kept confidential. Participants' return of the completed questionnaire implied informed consent had been given.

Data Collection and Data Analysis

Developing the instrument had seven steps: 1) clarifying and determining the concept, 2) generating an item pool, 3) determining the format for measurement, 4) review of the initial item pool by experts, 5) conducting preliminary item tryouts, 6) conducting psychometric property testing, and 7) developing scoring and interpreting the test score.[24]

Step 1: Clarifying the concept: see operational definition of concept in above Introduction.

Step 2: Generating an item pool: Through content analysis existing measurements were extracted from a review of the literature (100 items extracted) together with Cambodian nursing documentation (75 items extracted), a total of 175 items. This analysis made replicable and valid inferences by interpreting and coding textual material, and systematic evaluation of texts based on the operational definition. It was found that some items were redundant, and others did not reflect NCQ, so these were deleted. Finally 45-items representing NCQ for the Cambodian context were developed as an initial item pool. These items were

checked and edited by an American Nurses Association member who came to help in developing the standard of nursing practice for Cambodia.

Step 3: Determining the format for measurement. The CNCQS was written in the form of a questionnaire and we used a 5-item Likert scale of 1 = strongly disagree to 5 = strongly agree for each item.

Step 4: Review of item pool: The 45 items were reviewed and validated by 5 experts who were nursing directors with experience in quality improvement, nursing management and clinical practice. Firstly, we used the translation-back translation method applied by two professional translators from Ministry of Health. Then these experts judged the items, rating them on a scale of 1 = not relevant to 4 = very relevant. They recommended that the CNCQS have 43-items.

Step 5: Preliminary item tryouts: This involved a pilot test for readability, comprehensiveness, administrative feasibility and scoring of the measures, and to identify logistical management issues. Testing took place at three hospitals selected by a lottery method, two from the provinces (Battambang and Takeo) and one in Phnom Penh city (Khmer-Soviet Friendship Hospital). This was undertaken with a convenience sample of 30 participants who had an associate degree in nursing or a bachelor degree, and at least one year RN experience. The RNs were asked to assess readability, level of difficulty, clarity of meaning, and relevancy of NCQ. Twenty nine questionnaires were returned. Based on their feedback we revised some of the items. The total Cronbach alpha was 0.89, ranging from 0.87 to 0.90.

Step 6: Psychometric testing. This involved a multi-stage sampling process:

1. Purposive sampling to select five geographic areas of Cambodia with a total of 32 tertiary government hospitals;
2. Simple sampling without replacement for 12 hospitals out of 32 by a lottery method;
3. Purposive sampling at each hospital having an ICU, surgical, internal medicine, pediatric, and maternity and gynecology units, and in which RNs had been involved in NCQ. This was suggested by hospital directors;
4. Calculating five respondents per item plus 10% to allow for dropouts. Thus a total of 240 participants were required; and lastly
5. Sampling without replacement whereby the head nurses used purposive sampling and sent an official invitation letter to individual nurses. The questionnaire was sent to 20 potential participants in each hospital from the five units above mentioned.

Step 7: Scoring and interpretation of test score. In this step, the level of NCQ was created on the basis of the NCQ total scores. This score was considered indicative of the level of NCQ; the higher the score, the higher the NCQ. The validity and reliability of the CNCQS instrument were evaluated. Statistical analysis was carried out using SPSS 23 software (SPSS, IBM, 2016). Content validity index (CVI) was tested. An exploratory factor analysis (EFA), principal component analysis was performed on the inter-correlations among CNCQS items. An eigenvalue was used as the extracting criterion. The items scoring ≥0.3 were kept, and Cronbach's alpha coefficient assessed internal consistency.

Results

A high response rate of 94% was achieved with 240 questionnaires being distributed and 225 returned. The majority of respondents were female (60%) and the average age was 35.74 years (SD= 10.34). Average years of work experience as RN was 13.39 (SD=11.78), while the average years as an RN on the current working unit was 10.39 SD=10.42). The majority had an associate degree in nursing (75%), 25% had a bachelor degree or equivalent, 94% worked full-time, and 99% worked a 24-hour-shift during their regular duty. The average number of patients to a nurse was 15.17 (SD=8.01).

Psychometric Properties of CNCQS

Content validity: Content validity index (I-CVI and S-CVI/Ave)

There are 43 items in the scale; the total agreement was 43, the Item-level Content Validity Index (I-CVI) was 1, scale-level content validity index average (S-CVI/Ave) was 1, and scale-level content validity index universal average (S-CVI/UA) was 1. Therefore, the CNCQS has very good content validity, since a I-CVI greater than 0.80 indicates good content validity (**Table 1**).[23]

Table 1 Description of 35-item Cambodian Nursing Care Quality Scale (CNCQS) after EFA (n=225)

Dimensions	Eigen-values	Total variance explained	Number of items	Cronbach's alpha after EFA	Item-total correlation ranges
1. Patient outcomes	6.91	25.56	9	.93	.36 - .49
2. Physical environment	3.47	11.28	3	.92	.54 - .67
3. Ethics-oriented activities	1.81	5.90	9	.92	.52 - .61
4. Nurses' characteristics	1.50	4.90	5	.93	.35 - .54
5. Nurses' task requirement	1.28	4.18	6	.93	.44 - .59
6. Progress of nursing process	1.24	4.04	3	.93	.54 - .58
Overall CNCQS	16.21	52.48	35	.926	.45 - .58

Construct validity: Exploratory factor analysis. Item analysis using the merged data showed that the total skewness was -0.70, and ranged from -0.02 to -1.25. The total kurtosis was 1.54, and ranged from -0.14 to 4.01. According to Kline, an absolute value of skewness >3.0 illustrates "extreme" skewness,[25] while an absolute value of kurtosis >10.0 indicates a problem. The scale characteristics were negative skewness of normal distribution, which was closer to zero (-0.70) and positive kurtosis was illustrated as a relatedly peaked distribution (1.54). Thus, the CNCQS had a normal distribution.

Internal consistency: the item-total correlation coefficients showed that there were some items lower than the standard criteria (0.30), so eight items were removed and 35 items remained. The item-total correlation ranged from 0.35 to 0.67, which was ≥ 0.30 as suggested by Nunnally (**Table 1**).[26]

Exploratory factor analysis (EFA): The Kaiser-Meyer-Olkin (KMO) testing result was 0.89, which indicates that the sample size was adequate for EFA, and Bartlett's testing result was significant (χ^2 = 3526.56, p = .000), which demonstrated all items were significantly correlated. The Principal Component Analysis (PCA) extraction the varimax rotation method was used for EFA. Since the sample size was 225, the cutoff point of factor loading was set at .30, as suggested by a previous study.[27] The result of EFA extracted six factors (35 items) with eigenvalues that ranged from 1.23 to 11.12, and the total variance explained as 54.48 (**Tables 2 - 7**).

Moderate intercorrelations were found in the CNCQS subscales (**Table 8**). The 35 items reflect six factors: (1) patient outcomes (9 items); (2) physical environment (3 items); (3) ethics-oriented activities (7 items); (4) nurses' characteristics (7 items); (5) nurses' task requirement (6 items); and (6) progress of nursing process (3 items). Item 26 and 25 moved from ethic-oriented and patient outcomes respectively to nurses' characteristics. Item 11 moved from physical environment to nurses' task requirement; another item was moved to the progress of the nursing process; and item 24 moved to nurses' task activities (Table 9).

Table 2 Factor, Factor loading, Eigenvalue, and % of Variance of Patient Outcomes Dimension (n=225)

Description of items	Factor Loading
Patient outcomes	
Patients are satisfied with nurses' teaching	.80
Patients are happy with the information being taught	.71
Patients have comfortable conditions	.64
Patients receive safety care	.63
Patients are dissatisfied with waiting time	.59
Patients received high quality care	.54
Patients are satisfied with the nursing care	.52
Patients are satisfied with discharge planning	.50
Patients are satisfied with symptom management (pain, nausea)	.37
Eigenvalues = 6.91; total-variance explained = 25.56	

Table 3 Factor, Factor loading, Eigenvalue, and % of Variance of Physical Environment Dimension (n=225)

Dimensions and Description of items	Factor Loading
Physical environment	
Rooms have good ventilation	.72
Rooms are clean	.68
Rooms are quiet	.63
Eigenvalues = 3.47; total-variance explained = 11.28	

Table 4 Factor, Factor loading, Eigenvalue, and % of Variance of Ethical-oriented activity Dimension (n=225)

Dimensions and Description of items	Factor Loading
Ethics-oriented activity	
Nurses are responsible for maintain their own competence	.68
Nurses continue to develop their own competencies	.63
Nurses provide fair nursing care	.60
Nurses participate in resolving moral issues	.58
Nurses are responsible for nursing professional development	.49
Nurses observe patients' sign and symptom carefully	.43
Nurses are determined for the appropriate delegation of tasks	.42
Eigenvalues = 1.81; total-variance explained = 5.90	

Table 5 Factor, Factor loading, Eigenvalue, and % of Variance of Nurses' Characteristics Dimension (n=225)

Dimensions and Description of items	Factor Loading
Nurses' characteristics	
Nurses are able to relieve patient worry about illness	.59
Patients receive help as needed	.55
Nurses are able to reduce patients' anxiety	.49
Nurses protect safety and patients' rights	.48
Nurses are kind to patients	.47
Nurses are polite and pleasant to patients	.43
Nurses protect patients from physical injury	.31
Eigenvalues = 1.50; total-variance explained = 4.90	

Table 6 Factor, Factor loading, Eigenvalue, and % of Variance of Patient Outcomes Dimension (n=225)

Dimensions and Description of items	Factor Loading
Nurses' task requirement	
Nurses' knowledge is Up-to-date	.53
Nurses explain information to patients clearly	.51
Nurses provide patients with knowledge of disease/ condition and care requirements	.43
Nurses have enough time for patients as needed	.39
Nurses practices with caring behavior	.35
Pain is treated appropriately	.31
Eigenvalues = 1.28; total-variance explained = 4.18	

Table 7 Factor, Factor loading, Eigenvalue, and % of Variance of Progress of Nursing Process Dimension (n=225)

Dimensions and Description of items	Factor Loading
Progress of nursing process	
Nurses provide good basic nursing care	.41
Holistic client care is provided	.41
Nurses develop nursing care plans for patients	.34
Eigenvalues = 1.24; total-variance explained = 4.04	

Table 8 Spearman Rank Correlation Coefficient Between Factors in CNCQS (n = 225)

Factors	I	II	III	IV	V	VI
I Nurses' characteristics	1					
II Patient outcomes	.55**	1				
III Progress of nursing process	.57**	.61**	1			
IV Physical environment	.45**	.51**	.54**	1		
V Ethic-oriented activity	.61**	.53**	.57**	.49**	1	
VI Nurses' task requirement	.62**	.69**	.60**	.52**	.49**	1

** Correlation is significant at the level 0.01.

Table 9 Principal Component Analysis with Varimax Orthogonal Rotation for CNCQS and 6-factor Solution, (n = 225)

Items	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI
42. Nurses are responsible for maintain their own competence	.31	.23			.68	
31. Nurses continue to develop their own competencies	.25	.12			.63	
39. Nurses provide fair nursing care	.15	.22			.60	
40. Nurses participate in resolving moral issues	.22	.39			.58	
27. Nurses observe patients' sign and symptom carefully	.07	.31			.43	
26. Nurses are polite and pleasant to patients	.20	.22			.43*	
41. Nurses are determined about the appropriate delegation of tasks	.11	.09			.42	
19. Nurses are able to relieve patient worry about illness	.59	.31			.35	
35. Patients receive help as needed	.55					

Table 9 Principal Component Analysis with Varimax Orthogonal Rotation for CNCQS and 6-factor Solution, (n = 225) (Cont.)

Items	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI
18. Nurses are able to reduce patients' anxiety	.49	.22			-.09	
38. Nurses protect safety and patients' rights	.48			.32		.21
25. Nurses are kind to patients	.33	.47*				
11. Pain is treated appropriately	.08	.20		.31*		
23. Patients are satisfied with discharge planning	.26	.50	-.35		.21	.36
20. Patients are satisfied with nurses' teaching	.29	.80			.33	
21. Patients are happy with the information being taught		.71				
9. Patients have comfortable conditions	.30	.64				
8. Patients receive safety care	.35	.63				
22. Patients are dissatisfied with waiting time	.11	.59				
36. Patients received high quality care	.33	.54				
6. Patients are satisfied with the nursing care		.52		.27		
29. Rooms have good ventilation	.09	.25		.72		
28. Rooms are clean				.68		
30. Rooms are quiet	.22	.30		.63	.09	
32. Nurses' knowledge is Up-to-date	.23	.21				.53
15. Nurses explain information to patients clearly	.08	.12	-.22			.51
16. Nurses provide patients with knowledge of disease/ condition and care requirements			-.11		.31	.43
17. Nurses have enough time for patients as needed				-.19	.22	.39
37. Nurses practices with caring behavior	.11			.22	.19	.35
14. Nurses provide good basic nursing care	.11	.22	.41		.19	
33. Holistic client care is provided			.41	.32		
34. Nurses develop nursing care plans for patients	.09		.34			
24. Patients are satisfied with symptom management (pain, nausea)	.09	.37	.22		.22	.14
7. Nurses protect patients from physical injury	.31					.11

[a]Marks the items placed in the 'wrong' factor.

Discussion

An instrument measuring NCQ, to be used in any country, should have its roots in that country's culture and from the health environment in which it is to be used. It is also of major importance that nursing staff be able to give their views of the NCQ. Studies including all relevant categories on quality make it possible to measure RNs' opinions of NCQ.

The CNCQS is a new instrument developed for measuring NCQ in Cambodia. Despite a number of existing NCQ instruments in other countries, the development of CNCQS has been performed from a different starting-point. First, a literature review was conducted from existing instruments to pool items, which related to NCQ. Second, a review of nursing documentation was performed. Thus, the items included in the instrument have been generated from

the two sources. It is also possible to relate this study to the SPO model because those pulling items were under each construct of this model.[18] Opinions about NCQ can be measured among nurse staff with this instrument. Finally, the instrument is designed to measure NCQ, and will point out the need for specific improvement in the NCQ within Cambodian healthcare facilities. That the CNCQS instrument is designed to measure NCQ in Cambodia is an important first step in a developing country where advanced nursing techniques and nursing research are yet to make their mark.[2] However, further psychometric testing of the CNCQS instrument, and possible refinement, are needed. Instruments to measure the NCQ must be reliable and valid in several aspects, and acceptable to the cultural context.

The results of this study were higher than those found in a previous study by Leinoen et al., for example, the Cronbach's alpha ranged from 0.50 – 0.84 and the correlation was 0.27 – 0.71.[5] Therefore, the CNCQS validity and reliability is good.

The six subscales were not thought to be highly correlated through EFA, thus a PCA with varimax rotation of EFA was conducted to develop construct validity.[28] The sample met the ideal rule of 5–10 times as many respondents as items for factor analysis. The KMO (.89) for measuring sampling adequacy met the ideal value (> .80) and the determinant (< .001) was small and close to zero, indicating the data were legitimately factored.

Internal consistency reliability was used to provide a general estimate of how well all items in the CNCQS consistently measure the same phenomenon. The results were consistent throughout the pilot study (alphas for the total scale and each subscale ranged from .87 to .90). A scale with alpha coefficient > .80 is considered important for a well-established and widely used instrument.[29]

Interpretations of the new factors were named according to items with higher loadings and item meaning, and are reflective of the original SPO model.[18] The result of this was that there were six factors, as described below:

Factor 1: *Nurses' characteristics* (7 items): RNs perspectives that they are able to relieve, protect, and help patients; and be polite and kind. These activities are of most importance to patients in hospitals. RNs are rostered around the clock in most countries, but in Cambodia they can work 24 hours shifts; and under such pressure, they need to express good characteristics, for example, helping patients to understand their health status. A previous study found that nurses' characteristics were criticized by patients.[5]

Factor 2. *Patient outcomes* (9 items): RNs' perceptions about patient safety, comfort, satisfaction, and receiving high quality care. Nursing variables contribute to patient outcomes such as presence or absence of pressure ulcers, nosocomial infections, and patient falls, in addition to patient satisfaction with nursing care, pain management, educational information, and overall care.[30]

Factor 3. *Progress of nursing process* (3 items): The need of RNs to evaluate patient problems, and prepare, implement and evaluate nursing care plans. This process is a guiding framework RNs use for patient care in many countries, but a previous study in a developing country reported some barriers: RNs could not use nursing process effectively, and did not understand it as it was not taught well in nursing school.[31]

Factor 4. *Physical environment* (3 items): Refers to a hospital room as having good ventilation, and is clean and quiet. If hospital rooms/environment is clean, nosocomial infection is reduced or prevented. It is has been found that nosocomial infection varied from 9 to 38% if the room was not clean, and among infected patients, there was a 39% death rate.[32]

Factor 5. *Ethics-oriented activity* (9 items): refers to RNs' perceptions regarding the resolving of moral issues, responsibility to the profession, competence, and provide fair nursing care to patients. Good caring requires competence to personalize that care, based on physical, mental, social, and spiritual needs.[33]

Factor 6. *Nurses' task requirement* (6 items): RNs' perspectives on updated knowledge, caring behaviors, timing, and proper treatment. This factor is essential to give direct nursing care. However, in Cambodia nurses perceive there is a lack of time to care for their patients. The time required for administrative work means time away from patients, and this means for example, not enough time to control pain effectively. This is similar to a study reporting that nurses spend only 25% of their time with patients.[34]

Limitations

This study's sample was extracted mostly from government hospitals, which restricts generalizability of the result. Future research must include larger numbers of participants, and those from non-government hospitals. Due consideration of experts was given to individual differences in reading and comprehension, with possible omission of the more technical questions, and coverage of all items was ensured. Another potential limitation was that around 75% of participants had an associate degree in nursing, and they may have different perceptions about, or possess, certain skills in the delivery of quality nursing care than those of RNs with a bachelor degree.

Conclusion

The final version of self-administered questionnaire, the CNCQS, comprised six factors or dimensions. It achieved acceptable levels of construct validity. The internal consistency of the instrument is good. This indicates that it may be possible to use instruments in clinical practice for measuring the NCQ. The next step is to use the instrument to evaluate and compare the perceptions of individual professional nurses in both private and public healthcare facilities in Cambodia.

Implications for nursing practice, education and research

The challenge for the health sector in any country, including Cambodia, is to ensure that the practice of nurses is of a high standard. Improving standards requires reliable means to assess baseline practice outcomes, and the challenge continues for nurse managers and nurses alike to prove the impact of the nursing practice on patient outcomes. As the largest component of the health workforce, nurses play a critical role in patient safety and quality.[35] The results of this study provide nurse leaders, managers, and policymakers with the evidence to improve NCQ in government hospitals in Cambodia, and it can be adapted after further testing for other settings. RNs can also use the CNCQS to assess their own practice and that of their colleagues. Furthermore, it is possible to adapt it for use in other countries, where similar situations may be found.

When using an instrument such as the CNCQS nurse educators, mentors, and students can understand better nursing assessment, evaluation and recording of relevant information related to NCQ. Doing this will familiarize novice nurses to be aware of NCQ in hospitals, and their educators and mentors need such tools to assess the quality of student practice, and that of themselves.

Finally, there are challenges ahead for researchers to ensure that patients have input into assessing NCQ. The CNCQS is new and has been developed to measure NCQ in Cambodia; but the replication of this study to assess variations in NCQ across hospitals is needed. There were sleeve items, which were lower than standard criteria, so these items should be revised and retested to improve construct validity. Furthermore, this instrument should be further tested for content and construct reliability, and reliability, concurrently with other objectives instruments to measure NCQ.

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References

1. Cline DD, Rosenberg MC, Kovner CT, Brewer C. Early career RNs' perceptions of quality care in the hospital setting. QHR [Internet]. 2011 [cited 2014 Aug 11]; 21: 673-682. Available from 10.1111/jan.12503.
2. Koy V, Yunibhand J, Angsuroch Y. The quantitative measurement of nursing care quality: a systematic review of available instruments. International Nursing Review [Internet]. 2016 [cited 2017 Jan 15]; 63: 490-8. Available from https://www. ncbi.nlm.nih.gov/ pubmed/2729314.
3. Burhans LM, Alligood MR. Quality nursing care in the words of nurses. JOAN [Internet]. 2010 [cited 2015 Sept 10]; 66: 1689-97. Available from https://www. ncbi. nlm.nih.gov/pubmed/20557383.
4. Lindgren M, Andersson IS. The Karen instruments for measuring quality of nursing care: construct validity and internal consistency. IJQHC [Internet]. 2011 [cited 2015 Nov 8]; 23: 292-01. Available from https://www.ncbi. nlm.nih.gov/ pubmed/21242159.
5. Leinonen T, Leino-Kilpi H, Ståhlberg MR, Lertola K. Comparing patient and nurse perceptions of perioperative care quality. ANursRes [Internet]. 2003 [cited 2016 Jun 12]; 16: 29-37. Available from https://www.ncbi.nlm. nih.gov/ pubmed/12624860.
6. Van Bogaert P, Kowalski C, Weeks SM, Clarke SP. The relationship between nurse practice environment, nurse work characteristics, burnout and job outcome and quality of nursing care: a cross-sectional survey. IJNS [Internet]. 2013 [cited 2015 Dec 9]; 50: 1667-77. Available from https://www.ncbi.nlm.nih.gov/ pubmed/23777786.
7. Aiken LH, Sermeus W, Van den Heede K, Sloane DM, Busse R, McKee M, Bruyneel L, Rafferty AM, Griffiths P, Moreno-Casbas MT, Tishelman C. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. BMJ [Internet]. 2012 [cited 2015 Feb 27]; 20: 344:e1717. Available from http://www. bmj.com/content/ 344/bmj.e1717.short.
8. Lindqvist R, Smeds Alenius L, Griffiths P, Runesdotter S, Tishelman C. Structural characteristics of hospitals and nurse-reported care quality, work environment, burnout and leaving intentions. JONM [Internet]. 2015 [cited 2017 Jan 15]; 23: 263-74. Available from http://onlinelibrary. wiley. com/doi/10.1111 /jonm.12123/full.
9. Lu M, Ruan H, Xing W, Hu Y. Nurse burnout in China: a questionnaire survey on staffing, job satisfaction, and quality of care. JONM [Internet]. 2015 [cited 2016 Dec 18]; 23: 440-7. Available from https://www.ncbi.nlm. nih.gov/pubmed /24024567.
10. You LM, Aiken LH, Sloane DM, Liu K, He GP, Hu Y, Jiang XL, Li XH, Li XM, Liu HP, Shang SM. Hospital nursing, care quality, and patient satisfaction: cross-sectional surveys of nurses and patients in hospitals in China and Europe. IJNS [Internet]. 2013 [cited 2015 Dec 9]; 50: 154-61. Available from https://www.ncbi. nlm.nih.gov/ pubmed/22658468.
11. Nantsupawat A, Srisuphan W, Kunaviktikul W, Wichaikhum OA, Aungsuroch Y, Aiken LH. Impact of nurse work environment and staffing on hospital nurse and quality of care in Thailand. JONS [Internet]. 2011 [cited 2015 Mar 21]; 43: 426-32. Available from https://www.ncbi. nlm.nih.gov/pubmed/22018093.
12. Lee B. Identifying outcomes from the nursing outcomes classification as indicators of quality of care in Korea: A modified delphi study. IJNS [Internet]. 2007 [cited 2017 Jan/Mar]; 44: 1021-8. Available from https://www. ncbi.nlm.nih. gov/pubmed/16712852.
13. Senarat U, Gunawardena NS. Development of an instrument to measure patient perception of the quality of nursing care and related hospital services at the National Hospital of Sri Lanka. ANursRes [Internet]. 2011 [cited 2016 Jun 10]; 5: 71-80. Available from http://www.kan.or.kr/new/ kor/sub3/filedata_anr/ 201102/71.pdf.
14. Mrayyan MT. Jordanian nurses' job satisfaction, patients' satisfaction and quality of nursing care. INR [Internet]. 2006 [cited 2015 Dec 10; 53: 224-30. Available from https:// www.ncbi.nlm.nih.gov/pubmed/16879186.
15. Pazargadi M, Tafreshi MZ, Abedsaeedi Z, Majd HA, Lankshear AJ. Proposing indicators for the development of nursing care quality in Iran. INR [Internet]. 2008 [cited 2017 Jan/Mar]; 55: 399-06. Available from http:// onlinelibrary.wiley.com/doi/10.1111/j.1466-7657. 2008.00642.

16. Ministry of Health (MoH). Personnel Department: Government Health Staff Statistics, Cambodia. 2016; (Unpublished manuscript).
17. Bureau of Nursing and Midwifery. Nursing Workforce, Cambodia. 2017; (Unpublished).
18. Donabedian A. Evaluating the quality of medical care. The MMFQ [Internet]. 1966 [cited 2017 Jun 27]; 44(3): 166-206. Available from 10.2307/3348969.
19. Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. JAMA [Internet]. 2002 [cited 2017 Jan 18]; 288: 1987-93. Available from 10.1001/jama. 288. 16.1987.
20. Sochalski J. Is more better?: the relationship between nurse staffing and the quality of nursing care in hospitals. Medical care [Internet]. 2004 [cited 2016 Jun 12]; 42:II-67. Available from https://www.ncbi.nlm.nih.gov/pubmed/14734944.
21. Zhao SH, Akkadechanunt T, Xue XL. Quality nursing care as perceived by nurses and patients in a Chinese hospital. JOCN [Internet]. 2009 [cited 2016 Jun 22]; 18: 1722-8. Available from 10.1111/j.1365-2702.2008.02315.
22. Lynn MR, McMillen BJ, Sidani S. Including the provider in the assessment of quality care: Development and testing of the nurses' assessment of quality scale-acute care version. JNCQ [Internet]. 2007 [cited 2014 Jan 1]; 22: 328-36. Available from 0.1097/01.NCQ.0000290414.42640.
23. Polit DF, Beck CT. Essentials of nursing research: Appraising evidence for nursing practice. Lippincott Williams & Wilkins. [Internet]. 2010 [cited 2017 Jan 18]. Available from https://www.ncbi.nlm.nih.gov/nlmcatalog/101586119.
24. DeVellis RF. Scale development: Theory and applications. Sage publications [Internet]. 2016 [cited 2016 Dec 18]. Available from https://us.sagepub.com/en-us/nam/author/robert-f-devellis.
25. Kline RB. Principles and Practice of Structural Equation Modeling, 3rd ed. Guilford Press. New York [Internet]. 2011 [cited 2017 Feb 17]. Available from https://www.amazon.com/Principles-Practice-Structural-Equation-Methodology/dp/1606238760.
26. Nunnally JC, Bernstein IH. Psychometric Theory. 3rd ed. New York: McGraw-Hill, Inc; 1994.
27. Hair JF, Anderson RE, Babin BJ, Black WC. Multivariate Data Analysis: A Global Perspective. 6th ed. New Jersey: Pearson 2010.
28. Strickland OL. Using factor analysis for validity assessment: practical considerations. JNM [Internet]. 2003 [cited 2012 Jun 13]. Available from https://www.ncbi.nlm.nih.gov/pubmed/15633776.
29. Higgins PA, Straub AJ. Understanding the error of our ways: Mapping the concepts of validity and reliability. Nursing Outlook [Internet]. 2006 [cited 2015 Dec 18]; 54: 23-9. Available from https://www.ncbi.nlm.nih.gov/: pubmed/16487776.
30. Burston S, Chaboyer W, Gillespie B. Nurse-sensitive indicators suitable to reflect nursing care quality: a review and discussion of issues. JCN [Internet]. 2014 [cited 2016 April 6]; 49: 1785-1795. Available from 10.1111/jocn.12337.
31. Agyeman-Yeboah J, Korsah KA, Okrah J. Factors that influence the clinical utilization of the nursing process at a hospital in Accra, Ghana. BMC Nursing [Internet]. 2017; 16: 1-7. Available from 10.1186/s12912-017-0228-0.
32. Oliveira AC, Kovner CT, Silva RS. Nosocomial infection in an intensive care unit in a Brazilian university hospital. Revista Latino-Americana de Enfermagem [Internet]. 2010 [cited 2017 July 15]; 18(2): 233-9. Available from 10.1590/: S0104-11692010000200014.
33. Lachman VD. Applying the ethics of care to your nursing practice. MedSurg Nurs [Internet]. 2012 [cited 2015 April 18]; 21(2): 112-120.
34. Armstrong SJ, Rispel LC, Penn-Kekana L. The activities of hospital nursing unit managers and quality of patient care in South African hospitals: a paradox? GHA [Internet]. 2015 [cited 2017 Feb 19]; 8: 1-9. Available from http://www.global healthaction.net.
35. Cho E, Lee NJ, Kim EY, Kim S, Lee K, Park KO, Sung YH. Nurse staffing level and overtime associated with patient safety, quality of care, and care left undone in hospitals: a cross-sectional study. IJNS [Internet]. 2016 [cited 2017 July 9]; 60: 263-71. Available from 10.1016/j.ijnurstu.2016.05.009.

Development and Psychometric Testing of the Cambodian Nursing Care Quality Scale

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บทคัดย่อ: การประเมินคุณภาพการพยาบาลเป็นผลลัพธ์ทางการพยาบาลผู้ป่วยที่มีความสำคัญต่อการปรับปรุงการปฏิบัติการพยาบาลและต้องใช้เครื่องมือที่เหมาะสมซึ่งได้รับการตรวจสอบความตรงและมีความเที่ยง แม้ว่าในประเทศแถบตะวันตกจะมีการพัฒนาเครื่องมือดังกล่าวจำนวนมาก แต่พบไม่มากในประเทศแถบเอเชียและยังไม่พบในประเทศกัมพูชาที่มีความต้องการปรับปรุงคุณภาพการพยาบาลอย่างมาก การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อพัฒนามาตรวัดคุณภาพการพยาบาลของกัมพูชาและประเมินความตรงและความเที่ยงของเครื่องมือ

รูปแบบของการศึกษาครั้งนี้คือการพัฒนาเครื่องมือและการทดสอบคุณสมบัติทางจิตวิทยาของแบบสอบถาม การศึกษาเชิงกระบวนการนี้มีขั้นตอนในการพัฒนาเครื่องมือ 7 ขั้นตอน ประกอบด้วย การประเมินความตรงเชิงเนื้อหาโดยผู้เชี่ยวชาญ 5 ท่าน จากนั้นได้ทำการทดสอบกับผู้ประกอบวิชาชีพการพยาบาลจำนวน 240 คนใน 12 โรงพยาบาลจาก 5 ภูมิภาคของประเทศกัมพูชาและได้รับการสุ่มตัวอย่างแบบหลายขั้นตอน วิเคราะห์ข้อมูลด้วยการวิเคราะห์องค์ประกอบเชิงสำรวจและการทดสอบความสอดคล้องภายใน เครื่องมือนี้ได้รับการพัฒนาเป็นแบบสอบถามประกอบด้วย 6 ปัจจัย ได้แก่ ผลลัพธ์ทางการพยาบาล สภาพแวดล้อมทางกายภาพ กิจกรรมเชิงจริยธรรม คุณลักษณะของพยาบาล กิจกรรมงานของพยาบาล และความก้าวหน้าของกระบวนการพยาบาล หลังจากการวิเคราะห์องค์ประกอบเชิงสำรวจแบบสอบถาม เหลือจำนวน 35 ข้อ

เครื่องมือนี้มีค่าความตรงตามโครงสร้างและมีความสอดคล้องภายในอยู่ในเกณฑ์ที่ยอมรับได้ ซึ่งเป็นประโยชน์ในการวัดคุณภาพการพยาบาลในประเทศกัมพูชา แบบสอบถามนี้ต้องการทดสอบเพิ่มเติมกับกลุ่มตัวอย่างอื่น ผู้นำด้านการพยาบาลและสุขภาพจำเป็นต้องหาแนวทางในการปรับปรุงการพยาบาลและการพัฒนาคุณภาพการพยาบาล และการใช้เครื่องมือในการวัดคุณภาพการพยาบาลต้องมีความตรงและความเที่ยง

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