Research Articles

Development and Evaluation of Care Quality Indicators for Nursing Homes in China

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ABSTRACT

This study aimed to develop a valid and reliable indicator for evaluating care quality provided to the assisted living Chinese elderly in nursing homes. The development phase included concept development, literature review and a qualitative approach using semi-structured interviews with 20 participants. The evaluation phase consisted of two steps, pretesting and final testing of its measurement properties, including content validity evaluation, inter-rater reliability assessment, and hypothesis testing.

The results revealed three domains within the conceptual structure of nursing home care quality (NHCQ): culturally sensitive care, safe care environment, and self-care management, that covered four care aspects on activity and rest, nutrition and hydration, psychosocial health and wellness, special care and end of life care. The components of the NHCQI-China, I stands for Indicator, were classified by frequency of care action: on admission and regular basis. The items of NHCQI-China comprised: assessment, implementation, and evaluation with two choices as its criteria. The NHCQI-China obtained a Content Validity Index (CVI) of 0.93, the total percentage agreement of 89% verified reliability by inter-rater approach. The construct validity evaluation of the indicator, which used hypothesis testing on the differences in satisfaction scores rated by the elderly and displayed high and low care quality scores, was found to be significant ($t = 5.737$, $p < 0.05$). In conclusion, The newly developed NHCQI-China is able to provide a minimum data set of care quality for nursing homes and can be used to further develop care practice guidelines or care standards. This a tool might be beneficial for managing the care quality of nursing homes in China in the future.

Keywords: care quality indicators; China; development; evaluation; nursing homes

Introduction

China is an aging society with two billion elders that occupied 14.9% the total population of the country in 2014[1]. Nursing homes in China are substantially increasing with significant growth in the elderly population. The cause is a major health care concern as it is leading health care demands and increasing elderly needs.[2] Moreover, life expectancy rose with modern medicine development, and small family size weakened family function with the continued one-child policy over the past 30 years. The acceleration of population movement has also caused changes to the traditional pension model, and institutional pensions have become an increasingly important choice.[3] Nursing homes have become one of the pension institution supplements that play an important role in the Chinese pension system.

Nursing homes have only recently been developed in Chinese society. Generally, the elderly should possess self-care ability to be admitted to a nursing home.[4] Therefore, semi-independent or assisted living elderly have become the majority of the population in nursing homes. Assisted living is designed to provide care for the elderly who are semi-independent and have functional limitation with natural aging living at home. Accompanied by an increase in nursing homes, the quality of care conditions has become a focus of apprehension and attention for families, the government, and the private sector. The care quality of nursing homes is generally influenced by many factors. The main factor is the lack of national criteria for care quality in nursing homes. There are many different aspects concerning the care quality in nursing homes and their facilities in China. These include the facilities and infrastructure, and the number of care assistants and professionally trained staff.[5] Additionally, accidental falls,[5-7] and chronic disease resulting from declining physical functioning influence physical and cognitive abilities.[8]All issues of care quality in nursing homes, therefore, require investigation, and management strategies are needed to establish their care quality.

Strategies exist to deal with the issues of nursing home care quality in China. International standards and provincial standards provide the impetus for determining care quality indicators of the nursing home. International Organization for Standardization (ISO) was established with Plan, Do, Check, Act (PDCA) to deal with the quality of several nursing homes in Wuhan, China. Beijing has service quality standards of pension institutions, and Shanghai has pension agency regulations that are well established.[9-10] International standards of care quality indicators for nursing homes also include: Minimum Data Set (MDS)[11], Residential Assessment Instrument (RAI)[12], Resident Assessment Protocols (RAPs),[13] Observable Indicators of Nursing Home Quality of Care (OIQ-NH),[14] and Observable Indicators of Quality in Assisted Living (OIQ-AL).[15] However, these indicators were developed in the United States of America and other Western countries in which socio-cultural, economic, and practical considerations were contextualized in Western perspective and therefore are not appropriate for use to evaluate care quality of nursing homes in China. No research has been carried out on quality care evaluation for nursing homes in China. Accordingly, developing an instrument to measure care quality for elderly Chinese citizens is needed.

Objectives of the study

To develop a valid and reliable indicator for evaluating care quality provided to the Chinese elderly living in nursing homes in China.

Conceptual framework

The conceptual framework of care quality indicators for nursing homes comprises three parts. Firstly, developing a conceptual structure of nursing home care quality (NHCQ), for which Orem's theory of self-care[16], Leininger's theory of culture care diversity and universality[17], and theories of aging[18-19] were adopted. Secondly, developing a nursing home care quality indicator (NHCQI), for which nursing process[20] and the Donabedian model[21] were applied. Thirdly, evaluating the construct validity of the NHCQI-China, for which the criterion referenced framework was applied. The details are explained as below (Figure 1).

1. Developing conceptual structure of nursing home care quality (NHCQ)

1.1 *Orem's theory of self-care*

Basic conditioning factors (BCFs), therapeutic self-care demand (TSCD), self-care deficit (SCDF), self-care agency (SCA), and nursing system of Orem's theory were used as an organizing framework on developing the conceptual structure of care quality for nursing homes in China. BCFs were used to frame the health state and socioculture orientation of the elderly. TSCD including universal self-care requisites (USCR), developmental self-care requisites (DSCR), and health-deviation self-care requisites (HDSCR) was used to identify the care needs of the elderly in nursing homes. USCR was used to identify three aspects of care needs on activity and rest, nutrition and hydration, psychosocial health and wellness. DSCR was used to frame three attributes of care quality on culturally sensitive care, safe care environment, and self-care management. HDSCR was used to specify the other care needs on special care and end of life care. After identifying the conceptual structure of NHCQI-China, actions based on the self-care deficit (SCDF) and self-care agency (SCA) of the elderly were formulated. Partly compensatory nursing system was used to design actions for responding to the care requisites of the assisted living elderly in nursing homes in China. Five methods comprising doing for, guiding, providing, teaching, and supporting were used for generating concrete care action items of the NHCQI-China.

1.2 *Leininger's theory of culture care diversity and universality*

Leininger's theory was integrated to gain abundant understanding of sociocultural orientation of the population in the nursing home context of China. The theory was applied within the organizing framework of Orem's theory of self-care in order to capture the comprehensive nature of cultural and social structure, including the environmental context of the Chinese elderly in nursing homes. Since sociocultural orientations affect the care demands of aged individuals, identifying care quality attributes especially for the Chinese elder population in nursing home context is needed.

1.3 *Theory of aging*

Wear and tear theory focusing on degeneration processes was integrated to gain a full understanding of the health state of the population. The integration of a theory of aging into the organizing framework of Orem's theory of self-care helped in specifying relevant care quality attributes for the assisted living population living with degenerative processes.

2. Developing nursing home care quality indicator (NHCQI)

2.1 *Nursing process*

Nursing processes of assessment, implementation, and evaluation were applied in order to construct indicators reflecting care quality processes. The care processes were used in item generation by transforming the conceptual structure of nursing home care quality into care action items of the NHCQI-China.

2.2 Donabedian model

The process and outcomes of the Donabedian model were used in this study.[22] The Donabedian model is a conceptual model that provides a framework for examining and evaluating quality of health care. The process measure includes assessment, implementation, and evaluation items of care action that direct service delivery. Outcomes measure reflected process of care action, and the satisfaction of elderly living in the nursing home reflected the level of care quality provided by the care process.

3. Criterion referenced framework

A criterion referenced framework[23] was applied. Criterion-referenced measures are specifically useful in the clinical area when the focus is with the measurement of process and outcome variables. The conceptual framework is shown in Figure 1.

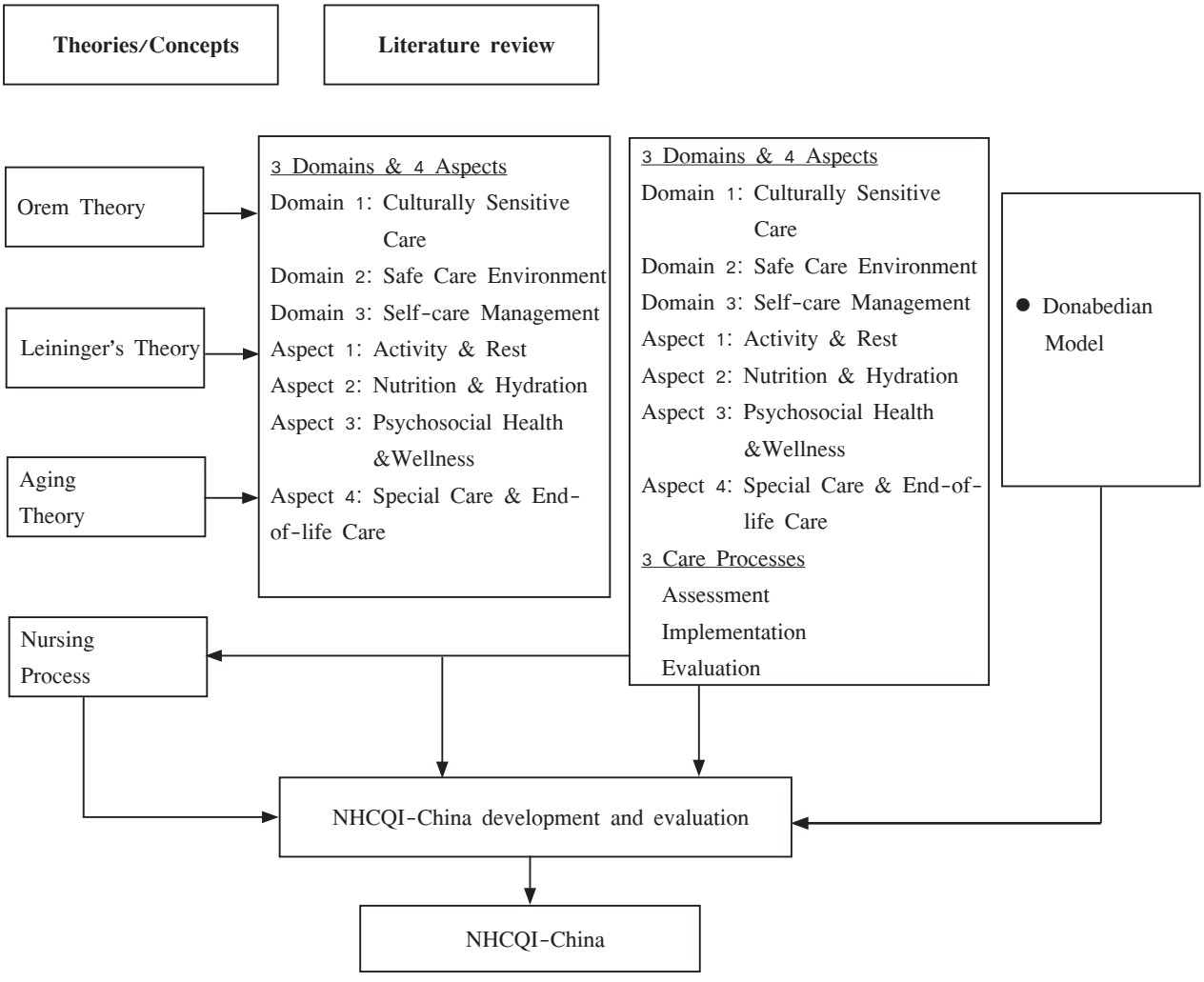


Figure 1 Conceptual Framework of the NHCQI-China

Materials and Methods

This is an instrument development research study using a combination of qualitative and quantitative approaches. Two phases, the development, and the evaluation of Nursing Home Care Quality Indicators of China (NHCQI-China), were conducted. Using concept developing processes based on a hybrid model[22], the first two steps of the developing phase, domain identification of nursing home care quality and item generation of nursing home care quality within Chinese context were performed. The evaluating phase of the NHCQI-China consisted of two steps, pretesting and final testing of its care quality indicators.

Ethical considerations

Prior to data collection, the study was approved by the Ethical Committee of the Faculty of Nursing, Prince of Songkla University, Thailand. Later the researcher contacted Yunnan Provincial Bureau of Civil Affairs, and Yunnan Provincial Committee on Aging, China, to obtain permission and cooperation for the study. Consent informs, privacy confidentiality, and right to withdraw were guaranteed. Consent forms were included in each phase of the study.

Setting and Participants

In the care quality indicator development phase, for the first step, twenty participants were purposively selected from four stakeholder groups of nursing homes in Kunming city, Yunnan province. The participants were recruited from five nursing homes: five assisted living elders, the inclusion criteria were 1) being aged 60 years or older, 2) semi-independent elders after ADL Scale measurement, 3) elders with no dementia, or psychiatric disorders, 4) being able to understand and speak Chinese; five administrative staff members, the inclusion criterion was controlled the care quality of each nursing home; five care assistants, the inclusion criterion was had provided care in nursing homes for at least one year. Five government officers also represented different supervision and management of nursing homes (i.e., one officer from Yunnan Provincial Civil Bureau, one officer from Yunnan Provincial Committee on Aging, one officer from Kunming Bureau of Civil Affairs, one officer from Panlong district Bureau of Civil Affairs, and one officer from Yunnan Provincial Health Administration, that represented persons who managed and supervised nursing homes at a provincial level).

The second step was item generation of NHCQI-China. Bilingual language experts involved in the back-translation process of the item generation of NHCQI-China, three experts (three native Chinese graduated students, all of whom are bilingual in English and Chinese languages), performed back-translation of the tentative draft-Chinese version and as examiners of the first draft of the NHCQI-China.

The phase of evaluation consisted of content validity evaluation, feasibility assessment, inter-rater reliability, and final testing. In the pre-testing step, the content validity examination was approved by seven persons from multiple stakeholder groups (i.e., the first four were people in government organizations, the two others from private organizations; the other was a nursing teacher with a doctoral degree working at a university). Feasibility assessment, three stakeholders who were familiar with the current state of nursing home care quality in Kunming were purposely selected (i.e., one was director of the Nursing Department in Kunming Welfare Institution; one was the director of Nursing Department in PanLong Social Welfare Service Center; and one was the director of Nursing Department in Baishou Elderly Apartment). Inter-rater reliability included three participants who were familiar with the current state of nursing home care quality in Kunming and purposefully invited to work with the researcher (i.e., one expert in

geriatric medicine, two in gerontological nursing).

In the final testing, for the first step of the satisfaction questionnaire of elderly in nursing home development, three participants were invited to evaluate content validity of the satisfaction questionnaire of elderly in nursing homes (one was Assistant Professor of Research Center for Care System of Thai Elderly in Faculty of Nursing, Prince of Songkla University, Thailand; one was the Director of Nursing Department at Kunming Welfare Institution and the other was officer of government administrator in Yunnan Provincial Committee on Aging). In the final testing step of hypothesis testing, sixty assisted living elderly residents who lived in ten nursing homes, (inclusion criteria were: 1) being aged 60 years or older, 2) semi-independent elders after ADL Scale measurement, 3) elders with no dementia, or psychiatric disorders, and 4) being able to understand and speak Chinese), were recruited by using proportional and systematic sampling techniques to obtain subjects from a range of nursing homes using the following procedures:

1. The semi-independent elderly from eight government-run nursing homes and two private-run nursing homes were selected to be representative of nursing homes in Kunming city, China.

2. Based on inter-rater reliability, two extreme high/low care quality groups from the 10 nursing homes in the previous step were chosen. One group of 30 elders was selected from nursing homes with high care quality scores and the other group of 30 elderly was selected from nursing homes with low care quality scores.

3. Based on proportional sampling, this study used 1: 20 for sampling, each nursing home was given a sampling number, for example, one nursing home had 90 semi-independent elderly, the proportion sample was 5 based on proportional sampling technique, then 90/5=18, the sampling interval was 18[24]. After subjects from a range of nursing homes were recruited, the nursing homes with over 50% were classified as high score nursing homes.

Instruments

The following instruments were used: 1) a set of semi-structured questions, 2) Draft 1 of NHCQI-China, 3) Content validity evaluation form, 4) Draft 3 of NHCQI-China, 5) Nursing home care quality assessment form with dichotomous scale (acceptable, unacceptable), and 6) the Satisfaction Questionnaire of Elderly in Nursing Homes.

1. A set of semi-structured questions was developed by the researcher based on the conceptual structure of care quality within the nursing home context. Semi-structured question guides of four groups were used throughout the interview process. The instrument was used in semi-structured interviews in the first step of the development phase.

2. Draft 1 of NHCQI-China, which was generated after item generation of NHCQI-China step, was used as an instrument for pre-examination by three Chinese experts. Then draft 2 NHCQI-China was developed and used for pre-testing.

3. The content validity evaluation form was used to examine draft 2 NHCQI-China. It was used to prepare the data collection package composed of the invitation letter, the introduction of this project, and information on the item development. Each package was sent to an individual expert who was asked to review the instrument and provide comments on each item. The experts were additionally asked to rate each item of the indicator in the first draft of NHCQI-China that ranged from 1 to 4 (1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant). The content validity index (CVI) was calculated and draft 3 was formulated.

4. Draft 3 of NHCQI-China, which was revised after content validity evaluation by seven experts, was used in the feasibility assessment. Participant's suggestion were used to guide the

revision of item criteria, within this process, draft 4 was developed.

5. The nursing home care quality assessment form with dichotomous scale (acceptable, unacceptable) was designed by the researcher to determine the estimated consistency of draft 4 NHCQI-China quality, three participants evaluated draft 5 of the Chinese version simultaneously. Reliability was determined by the degree of agreement among raters. The percentages of agreement were calculated to determine the consistency of the raters' estimates. The instrument was used in inter-rater reliability evaluation. After this process, draft 5 was developed.

6. The Satisfaction Questionnaire of Elderly in Nursing Homes was used to evaluate the construct validity of the NHCQI-China. The Satisfaction Questionnaire of elderly in nursing home was developed by the researcher using three steps. Firstly, each item was implemented in four aspects of care actions within NHCQI-China and taken to form the satisfaction questionnaire. Several items were deleted, revised and made more concise in order to avoid redundancy and be more understandable. Secondly, in order to evaluate its content validity, contact with three experts, was made to request examination. After the experts returned the content validity assessment, the results were revised based on comments and suggestions, i.e., the scale descriptor was suggested to include 3 levels of satisfaction (dissatisfaction=0, satisfaction = 1, and very satisfied = 2). Finally, considering the Chinese taboo on emphasizing death and dying, items on end of life care were integrated with special care items. The Satisfaction Questionnaire of Elderly in Nursing Homes had 3-rater scales (very satisfied = 2, satisfaction = 1, dissatisfaction = 0). This instrument was used in final testing of the evaluation phase of NHCQI-China.

Procedure and Data Analysis

The procedure of this study was organized into two phases. The first phase was NHCQI-China development. The second phase was the evaluation of the newly developed instrument. The NHCQI-China developmental process followed the procedures outlined in Figure 2.

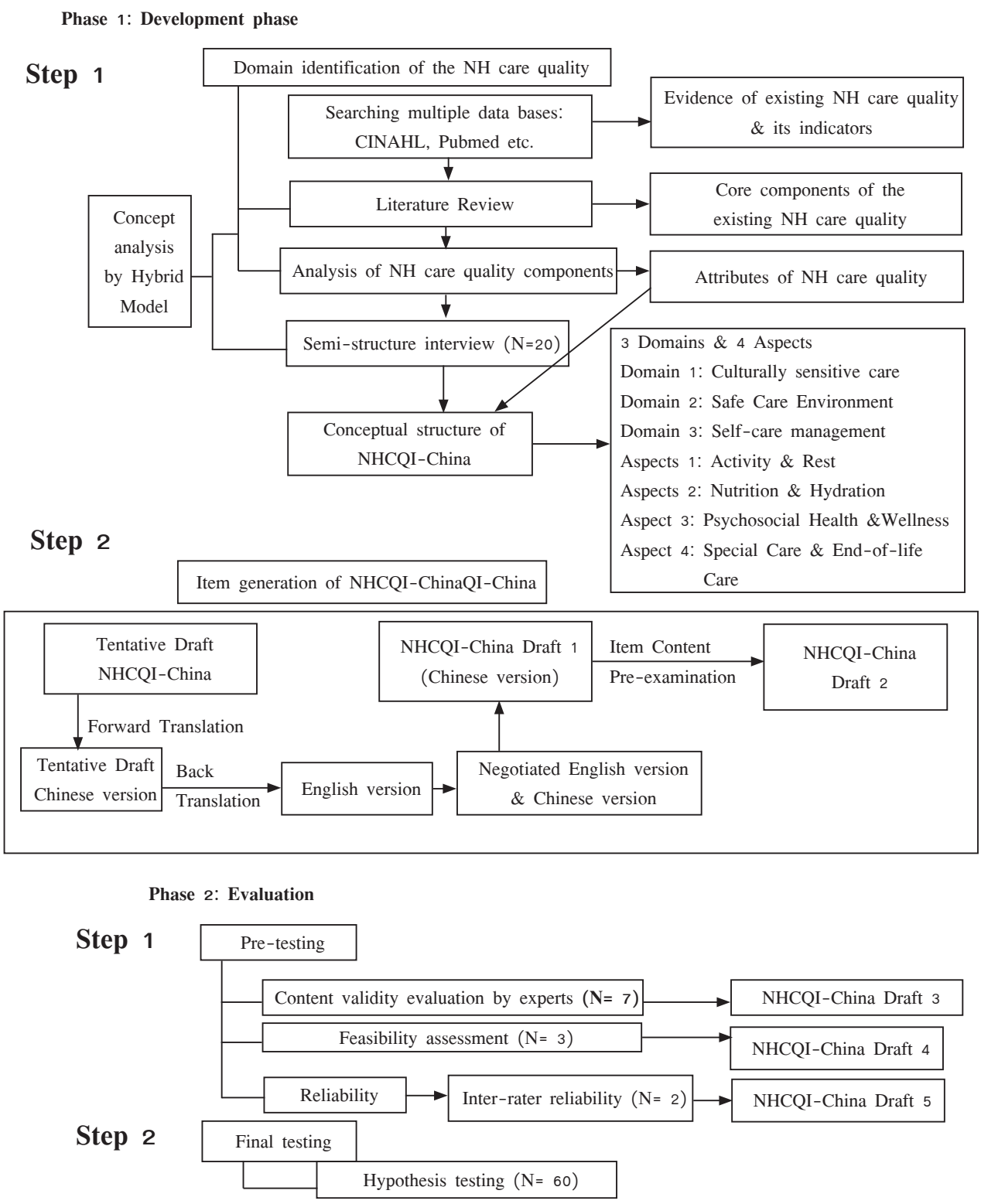


Figure 2 The research process of the study on "Development and Evaluation of Care Quality Indicators for Nursing Homes in China, NHCQI-China

Phase 1: Development phase. There were two steps in this phase: firstly, domain identification, and item generation. Domain identification aimed to explore the concept structure and specify the domains of care quality in nursing homes. The pre-specified domains of NHCQI-China were performed with the method of concept analysis from literature review using hybrid model[22]. Qualitative approach using semi-structured interviews with 20 participants were purposively selected from four stakeholder groups. Examples of the interview questions were: "How do the staff help you (elderly group)?" "What is important care in nursing homes? Why?" Data from the interviews were analyzed using content analysis. The content of tape recordings was transcribed and the main ideas were identified, categorized and arranged into the conceptual structure of NHCQI-China. Secondly, items of NHCQI-China were generated using three procedures: item creation, item translation, and item content pre-examination of the newly generated items. Item creation: after the conceptual structure of care quality of nursing homes in China was developed, the item pool of NHCQI-China was drafted through a matrix, i.e., culturally sensitive care, safe care environment, and self-care management. A blue print of the item matrix on care objectives and four aspects of care (as mentioned in the conceptual framework, i.e., activity and rest, nutrition and hydration, psychosocial health and wellness, special care and end-of-life-care), was generated. Then, an item pool of care quality indicators of each care objective was generated and formed the tentative draft of NHCQI-China (English version). Item translation. This procedure was conducted in order to enhance interpretability and cultural congruency[25]of the first draft of NHCQI-China.The tentative draft of NHCQI-China in English was translated into Chinese language (tentative draft 1) by the researcher who is a Chinese professional nurse and bilingual in English and Chinese language (See Figure 2). Three native Chinese graduated students, all of whom are bilingual in English and Chinese languages, carried out the back-translation of the tentative draft-Chinese version. A face-to-face negotiation between the researcher who was the forward-translator and each of the three back-translators was made until a negotiated back-translated English version was agreed upon and further translated to the NHCQI-China draft 1 (Chinese language). Item content pre-examination was examined by three Chinese experts, who were asked to review the first draft and respond to the appropriateness, comprehensiveness and relevancy of each item.Through this step, NHCQI-China draft 1 and draft 2 were generated, NHCQI-China draft 2 comprised 158 items.

Phase 2: Evaluation phase. The purpose of this phase was to perform pretesting and final testing of the care quality indicators for nursing homes (NHCQI-China) in China. The four steps were content validity evaluation, feasibility assessment, inter-rater reliability, and final testing. Content validity step involved 7 experts representing multiple sectors. The response scores from experts were calculated for Content Validity Index *(*CVI*).* There were 158 items retained in the NHCQI-China draft 3. In feasibility assessment, based on the NHCQI-China draft 3, the researcher was unable to retrieve sufficiently informative data. Feasibility assessment was added to ensure the index was more practical. The NHCQI-China draft 3 with 158 care action items including choices of care operating plans (on admission, on regular basis: daily, weekly, and monthly) was reviewed by three stakeholders for appropriateness, comprehensiveness and relevancy of each item. Based on the stakeholders' suggestion, the two operating plans on scheduled and on time available were deleted. Finally, 36 items were deleted. Two operating plans 'on admission' and 'on regularity' (daily, weekly, and monthly) were

maintained and the NHCQI-China with 122 items (draft 4) was formed.

In inter-rater reliability evaluation, the raters and researcher took the nursing home care quality assessment form with draft 4 of NHCQI-China to evaluate eight government-run nursing homes and two private-run nursing homes. On each visit, the raters walked-through each nursing home facility rating care quality independently at the same site and the same time. After the observation, each rater rated scores independently. The percentage of agreement was used in this step. The NHCQI-China item scores from two raters were compared to determine the consistency of the raters' estimate. The total percentage agreement of 89% verified that NHCQI-China demonstrates reliability. There were 101 items over 90%, 23 items over 80%, 11 items over 70%, and only 2 items over 50%. Those items with reliability higher than 0.80 (80%) were retained, while those less than the acceptable value were deleted. After this step, the NHCQI-China with 116 items was formed. In final testing, the hypothesis testing approach was used to evaluate the construct validity of the NHCQI-China. The hypothesis proposed, "The level of care quality provided by a living facility will be positively associated with "the satisfaction of elderly living in the nursing home". Satisfaction questionnaire of the elderly was used for hypothesis testing. The satisfaction questionnaire of elderly in nursing home was developed by the researcher. Finally, the 22-item questionnaire on care service satisfaction of elderly was used in hypothesis testing of the construct validity of the NHCQI-China, using a 3-rater scales (very satisfied=2, satisfaction=1, dissatisfaction=0) to compare the satisfaction scores in different levels of care quality. T-test was used to compare distribution of satisfaction of scores in care service received from nursing homes in high and low care quality levels. As a result, the construct validity of the NHCQI-China was accepted when satisfaction scores of the elderly were associated with the care quality levels.

Results

Results revealed three domains of culturally sensitive care, safe care environment, and self-care management that covered four care aspects on activity and rest, nutrition and hydration, psychosocial health and wellness, special care and end of life care. Care processes on assessment, implementation, and evaluation were used to organize the care quality attributes into care actions specifically for the assisted living Chinese elderly in nursing homes. In addition, two operating plans 'on admission' and 'on regularly (daily, weekly, and monthly) with 116 items were formed (Appendix).

The NHCQI-China was reviewed for its content validity by seven experts (CVI = 0.93). After feasibility assessment by these stakeholders, 122-items were maintained (Table 1). Furthermore, the total percentage agreement of 89% from inter-rater reliability verified that NHCQI-China demonstrated reliability, and 116-items were maintained after this step. Construct validity of the NHCQI-China was tested by hypothesis testing through the 22-item questionnaire on care service satisfaction, which was used as an instrument in final testing for the construct validity of the NHCQI-China. Findings reported that there was significant difference in satisfaction among the two groups of elderly with high and low scores of care quality ($t=5.737$, $p < 0.05$) (Table 2). This finding demonstrated acceptable construct validity.

Table 1 Examples of care actions based on care processes classified by operating plans

Care operating plans	Care processes		
	Assessment	Implementation	Evaluation
On admission	- ADL assessment (A&R) - Ask on food preference and taboo (N&H) - Discuss with family to identify the cognitive problems: delirium, dementia (PHW) -Assess self- management on prescribed medications (SC)	- Assist with dressing, grooming, bathing, toileting, eating, mobility, transferring, personal hygiene as needed (A&R)	
On regular basis:	- Assess drinking pattern (A&R)	- Encourage on drinking more water (N&H) - Assist in adaptation to routine (PHW) - Make medication records and notes on adverse drug reactions (SC)	- Record on food intake/eating problems (N&H)
Daily Weekly	- Ask about assistive devices using (A&R)	- Guide to have appropriated food (N&H)	- Monitoring record on common positive thinking pattern and development (PHW)
Monthly	- Assess ability on solving problems on rest/sleep in activity and rest (A&R)		

Note: A&R: Activity and Rest, N&H: Nutrition and Hydration, PHW: Psychosocial Health & Wellness SC & EOL: Special Care & End-of-life care

Table 2 Mean, standard deviation, and t-value of care service satisfaction of elderly in different groups

Groups	n	Satisfaction score		
		Mean	SD	t
High NHCQI-China	41	20.43	8.48	5.737*
Low NHCQI-China	20	13.05	4.85	

*$p < 0.05$

Discussion

This study result indicated the NHCQI-China was a newly developed indicator that was quantifiable to evaluate the care quality of nursing homes. The conceptual structure of nursing home care quality in China comprised three domains: 1. culturally sensitive care, 2. safe care environment, and 3. self-care management, covering four care aspects on activity and rest, nutrition and hydration, psychosocial health and wellness, special care and end of life care. Based on elderly characteristics, a degenerative nature in multiple aspects with multicultural backgrounds, and having a primary language different from modern Chinese, the elderly had limitation in adapting to the new environment of nursing homes. This was in spite of nursing homes being places of residence where most care giving staff were trained to provide routine care for all elderly persons. Facilitating the specific care quality attributes of the Chinese elderly for all aged residents in nursing home care facilities was important. Therefore, a conceptual structure was necessary for the care quality of nursing homes in China. Orem's theory of self-care[18]states self-care is necessary for human beings. The elderly do not only need their own caregivers to make them independent, they also need self-care management. Elderly self-care in ADL is an assessment standard of nursing home care quality[21]. This finding was congruent with self-care management among elderly nursing home residents in Taiwan[26].

In addition, wear and tear theory of aging proposed the human body deteriorates and stochastic theories explained decline in the elderly physical function. Based on the degenerative nature of the elderly, they needed culturally sensitive care to meet their unique cultural background. Leininger's theory of diversity and universality[17] was applied within the organizing framework of Orem's theory in order to capture the comprehensive nature of cultural and social structure, including the environmental context of the Chinese elderly in nursing homes. Assisting the elderly to maintain a balance between activity and rest is a reasonable concern of nursing based on their physical functional decline and other disorders common in elderly. In addition, activity and rest is a basic need as a universal and health deviation care requisite[17]. Therefore, activity and rest is a necessary care aspect for elderly in nursing homes. In addition, nutrition and hydration are basic needs as universal and health deviation care requisites. Thus, nutrition and hydration are care aspects for forming care quality attributes in nursing homes. Psychosocial health & wellness was mentioned in twelve publications in literature review. From interview, the elderly faced emotional, psychological, and social problems. In addition, the maintenance of a balance between solitude and social interaction was necessary for assisted living elderly in nursing homes. Special care is also another necessary care aspect for assisted living elderly in nursing homes as chronic diseases are a major factor influencing elderly health in China[26]. Special care related to seeking and securing appropriate medical assistance, and providing special forms of health care based on deviations in health is needed[19]. End of life care was a necessary care need of the elderly in nursing homes[20,21]. Orem's theory of self-care offered a framework for hospice nursing care, terminal care was provided in some nursing homes from interview. All elders are considered to face their terminal life in nursing homes, thus, end of life care became one care aspect for forming the attributes of care quality.

In summary, three domains of culturally sensitive care, safe care environment, and self-care management that covered four care aspects on activity and rest, nutrition and hydration, psychosocial health and wellness, special care and end of life care were significant attributes of nursing homes care quality items of NHCQI-China that

comprised three types of care actions: assessment, implementation, and evaluation with two choices of criteria: acceptable and unacceptable. These three care processes were important for item generation by transforming the conceptual structure of care quality for nursing homes in China to formulate the care action items of the NHCQI-China.Validity of the NHCQI-China was acquired by adopting a hybrid model[25] in which multiple procedures were conducted throughout the development phase. The conceptual structure of care quality of nursing homes was explored using exhaustive review on existing care quality indicators of nursing homes, related theories and research evidence. Using a committee approach, multiple groups of experts and stakeholders were recruited to approve the specified domains and enhance the cultural specific attributes of the NHCQI-China. Bilingual language experts were involved in the back-translation process of the item generation of NHCQI-China. Three experts performed as examiners of the first draft of the NHCQI-China. Eventually, the content validity examination was approved by seven stakeholders from various backgrounds. As a result, the construct validity of the NHCQI-China was achieved by confirming the premise on relationships between the residents' satisfaction of care service with care quality scores of nursing homes, while reliability of the NHCQI-China was achieved through use of precise and concise indicating items. The conceptual structure of NHCQ-China developed in the early phase made the indicating items clearly understandable. Ultimately, the newly developed NHCQI-China seemed to be valid and reliable for evaluating the care quality of nursing homes in China.

Conclusion & recommendation

This study contributes to the development of new indicator for care quality evaluation in nursing homes of China. The conceptual structure of care quality for nursing homes in China and the newly developed indicators have potential utility in practice and research related to the long term care institutions/facilities: The conceptual structure of NHCQI-China revealed in this study can be used as a foundation for developing new tools/indicators. Understanding of the comprehensive attributes of care quality indicators in nursing homes would facilitate other researchers in designing care quality measures for nursing homes in other areas with a different cultural context. The tool could also be used for further research in developing care practice guidelines or standards of care in nursing homes in China.

Participation in article writing

The first author designed and conducted the study; the 2nd and 3rd authors helped supervise, and shape the research. All authors discussed the results and contributed to the final manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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