Report Information from ProQuest

29 September 2023 08:14

TABLE OF CONTENTS

SEARCH STRATEGY

Set No.	Searched for	Databases	Results
S1	Asian Nursing Research	Ebook Central, Public Health Database, Publicly Available Content Database	58472*

* Duplicates are removed from your search, but included in your result count.

A New Objective Health Numeracy Test for Patients with Type 2 Diabetes: Development and Evaluation of Psychometric Properties

Eun-Hyun, Lee [1] ; Young Whee Lee [2] ; Kwan-Woo, Lee [3] ; Hong, Seongbin [4] ; Kim, So Hun [4] [1] Graduate School of Public Health, Ajou University, Suwon, Republic of Korea [2] Department of Nursing, Inha University, Incheon, Republic of Korea [3] Department of Endocrinology and Metabolism, School of Medicine, Ajou University, Suwon, Republic of Korea [4] Department of Internal Medicine, School of Medicine, Inha University, Incheon, Republic of Korea

ABSTRACT (ENGLISH)

Purpose

Patients with diabetes frequently need to perform certain numeric tasks such as interpreting blood glucose levels. However, there is no psychometrically sound instrument for objectively measuring diabetes-specific health numeracy. This study aimed to develop a new objective diabetes health numeracy test (DHNT) and evaluate its psychometric properties in adult patients with type 2 diabetes.

Methods

An instrument development study was conducted. Initial items were evaluated by six experts for content validity. After a pilot test, a convenience sample of 257 participants with type 2 diabetes was recruited at 2 university hospitals from May to September 2018. The structural, convergent, and criteria validity, and internal consistency of the DHNT with binary item responses were evaluated. Data were analyzed using exploratory factor analysis, Rasch analysis, tetrachoric correlation, Spearman's correlation, and the Kuder–Richardson-20 formula.

Results

Exploratory factor analysis yielded a single-factor solution comprising seven items. Rasch analysis confirmed that no item did not fit with the single factor and identified that the item difficulty parameters had moderate values. The convergent and criterion validity of the instrument were demonstrated, with diabetes knowledge and subjective diabetes numeracy, respectively, as was its acceptable internal consistency, by a Kuder–Richardson-20 coefficient of .81.

Conclusion

The DHNT demonstrated satisfactory psychometric properties. The instrument with moderate levels of item difficulty may have a lower cognitive burden. The developed instrument can be applied in practice to tailor the education of diabetes self-management as per the levels of health numeracy of specific patients.

FULL TEXT

Introduction

Diabetes is one of the greatest health problems faced worldwide. About 463 million adults aged from 20 to 79 years have diabetes, and this is estimated to increase to 700 million by 2045 [1]. Most (90–95%) patients have type 2 diabetes [2], and self-management is regarded as a key strategy for their diabetes care [3]. Patients with diabetes need to continuously perform tasks associated with self-management.

The performing of diabetes self-management tasks frequently involves numeric tasks, such as taking medications at the right time, performing an appropriate amount of exercise, computing calories from nutrition labels, interpreting blood glucose levels, calculating insulin doses, and quantifying the risk of getting a disease. These quantitative

abilities are reliant on health numeracy [4,5], which is an important concept in practice because patients with lower diabetes-related numeracy have been consistently found to have worse knowledge, self-efficacy, and self-management, and make worse medical decisions [6,7].

Health literacy is the way that people access, understand, appraise, and apply health information to make decisions concerning health care, disease prevention, and health promotion [8]. Health numeracy is considered to form part of health literacy, and has been defined as “the ability to perform basic reading and numerical tasks required to function in the health care environment” [9]. This perspective was subsequently criticized as inappropriate because health numeracy may provide unique explanations for health outcomes beyond those provided by health literacy [10, 11]. Health numeracy has also been simply defined within a narrow scope as the ability to understand and use numbers in daily life [11,12]. However, health numeracy is predominantly defined in a broader perspective, such as going beyond basic arithmetic skills and encompassing the ability to understand, interpret, and apply quantitative, graphical, biostatistical, and probabilistic health information [10,13]. Regarding diabetes, Teft [5] emphasized that health numeracy needs to be broadly defined beyond the simple meaning of a basic understanding of numbers.

The ability to measure diabetes health numeracy is important in both clinical and research applications, but considerable issues remain to be addressed. Based on the transition from the perspective of the term of health numeracy, Nelson et al. [14] proposed the need for instruments reflecting health numeracy from a broader scope. Golbeck et al. [10] similarly suggested that the contents of the instruments need to be expanded based on a comprehensive perspective of the health numeracy. The second issue is choosing between subjective and objective instruments. In a subjective instrument, individuals self-report their perceived levels of health numeracy, such as using Likert scales. In contrast, an objective instrument assesses the ability to process numeric information by asking respondents to answer specific questions, such as about the time to take the next medication. A subjective instrument requires less cognitive effort in responding to questions, whereas an objective instrument assesses health numeracy more accurately [15]. The third issue is related to the lack of psychometric properties. In accordance with a systematic review of measurement properties [16], three objective instruments have been developed for assessing health numeracy for patients with diabetes: diabetes numeracy test-43 (DNT-43) [4], its short-form DNT-15 [17], and brief numeracy [18]. As the results of the systematic review [16], these instruments had no, unclear, or only limited evidence for most of their psychometric properties, implying the need for a new objective instrument measuring health numeracy for patients with diabetes. In addition, a new instrument should be of the disease-specific type because such an instrument is more accurate in the context of clinical practice than using a generic type of an instrument, which is preferable for general healthy people [14,16].

Aim of the study

This study aimed to develop a new objective health numeracy instrument, called the Diabetes Health Numeracy Test (DHNT) and evaluate its psychometric properties in adult patients with type 2 diabetes.

Methods Phase 1: item generation and content validity

In this study, diabetes health numeracy was conceptualized as the abilities to understand, interpret, and apply health information that requires quantitative skills when performing the tasks for diabetes self-management and treatment based on literature review [10,13,14,19]. Therefore, the three elements considered for item generation were (a) the abilities to understand, interpret, and apply quantitative health information [13,14]; (b) basic, computational, analytical, and statistical aspects of numeric skills [10]; and (c) the tasks required for diabetes treatment and self-management, such as exercise, diet, blood glucose monitoring, taking medications, and foot care [19]. The present study focused on developing an instrument measuring core health numeracy applicable to the majority of adult patients with type 2 diabetes. A national survey found that only 6.8% of patients aged >30 years with type 2 diabetes were treated with insulin injections [20], and so the insulin-injection–related attribute of health numeracy was not included in the present study.

Items were generated using a grid-matrix table combining the aforementioned three elements. The top rows of the matrix contained the abilities to understand, interpret, and apply quantitative health information, whereas the left column contained the tasks for diabetes treatment and self-management. It was then determined which quantitative

numeric skills fell under the specific matrix cells crossing rows and columns based on a literature review on diabetes numeracy and discussions with two experts. If an empty cell crossing a row and column was filled with a quantitative numeric skill, the content of the cell was described as an item. This procedure yielded 11 items. Item responses were composited as five-choice answers, including “don't know,” and each item was scored as 1 if the answer was correct or 0 if the answer was incorrect or “don't know.”

Content validity was evaluated using an item-level content validity index (I-CVI) [21]. A panel of six experts was formed that comprised two diabetes education nurses, one expert on health literacy, two experts on measurement instruments, and one nutritionist. These experts were asked to rate how relevant the initially derived 11 items were to health numeracy in diabetes conditions on the following 4-point scale: 1 = “not relevant,” 2 = “somewhat relevant,” 3 = “quite relevant,” and 4 = “very relevant”. The I-CVI was calculated as the proportion of experts who answered that the item was either 3 or 4. If the I-CVI value of an item was >.78 [21], the item was considered to reflect diabetes health numeracy. In addition, the panel was asked open questions that inquired about the comprehensiveness and comprehensibility of the items, such as the use of jargon, reading level, and phrasing ambiguity.

All items satisfied I-CVI = 1.00 with the exception of one item on calculating the time of taking the next medication, for which I-CVI was .50. That item was deleted because it did not satisfy the threshold of .78. In the open questions, the expert panel suggested that two items about “percentage of patients” and two items about “nutrition labels” were asking about similar attributes of health numeracy. One of each item was therefore deleted, and so finally eight items were retained.

Phase 2: pilot test

A pilot test of the content-validated items was conducted with 10 participants who had type 2 diabetes. After the participants had answered the items, a trained research assistant asked questions about whether they had found any sentences or phrases to be difficult to understand. The assistant recorded these difficulties in a logbook.

The participants of the pilot study were aged 55.50 ± 18.15 years, and 80% (*n* = 8) of them were women. All of them were married and half of them (*n* = 5) had an education level of high school or a bachelor's degree. Half of them took oral hypoglycemic agents, and their blood glucose level (HbA1c, %) was 7.78 ± 2.11. Four participants reported that they experienced difficulties when answering the items, and one of them described that it felt like taking an examination. The participants considered that the most difficult item was related to nutrition labels, including serving size information, calorie information, percentage of daily intake, nutrition information, and a footnote about recommended daily values. Although the participants experienced these difficulties, the researchers decided to include the item about nutrition labels because they are seen everywhere in daily life. Two participants stated that they experienced no specific difficulty in answering the items.

Phase 3: field testing of psychometric properties

A psychometric evaluation of the DHNT was conducted for structural validity, convergent validity, criterion validity, and internal consistency.

•**1)**Sample and data collection

A convenience sample of 257 participants was recruited at outpatient clinics at 2 university hospitals from May to September 2018. The inclusion criteria for the participants were being diagnosed with type 2 diabetes, aged at least 19 years, and articulate in the Korean language. Participants with gestational diabetes were excluded. Two trained research assistants invited potential participants at outpatient clinics after providing them with a brief description of the purpose of the study. If the participants expressed interest in participating in this study, they were taken to a small private room and provided with more information about the study, such as the voluntary nature of participation and the right to refuse or withdraw from the study at any time. The participants were then asked to sign an informed consent form and to complete a package of questionnaires. The sample size in this study fulfilled the requirements for exploratory factor analysis (EFA), with 7–10 times as many participants as the number of items, and at least 100 participants for the Rasch analysis [22,23].

•2)Instruments

The Brief Diabetes Knowledge Test-2 (DKT2) [24] and Numerate Health Literacy, a subscale of the Diabetes Health Literacy Scale (DHLS) [25], were administered to assess the convergent validity and criterion validity of the DHNT, respectively.

Brief DKT2: The DKT2 was developed by the Michigan Diabetes Research and Training Center [24]. Its questionnaire comprises two sections that can be used independently: the first 14 items are applied to adults with diabetes, and the remaining 9 items are relevant to those taking insulin. The present study only used the first section because only adults who did not take insulin were included. Each multichoice item has three or four possible answers, and the responses were scored as 1 point for a correct answer and 0 point for an incorrect answer. The correct answers were summed, with higher scores indicating greater knowledge. The internal consistency of the 14 items was satisfied among a sample of patients with diabetes in the original study, with a Kuder–Richardson-20 (KR-20) coefficient of .77. The English version was translated into Korean using a forward and backward translation technique. Two bilinguals independently translated the original English version into Korean using semantic equivalence. The Korean version (reached consensus by two health professionals) was independently translated back into English by another two bilinguals. Two researchers of this study checked the back-translated versions against the original version. A discrepancy between the translated and original versions was confirmed by the developer of the DKT2. The Korean version of the 14 items exhibited satisfied internal consistency (KR-20 = .70) in this study.

Subjective numeracy: The DHLS was developed to measure diabetes-specific health literacy using a self-reported instrument [25]. The DHLS comprises 14 items scored on a 5-point Likert scale in 3 subscales: informational (7 items), numerate (4 items), and communicative (3 items) health literacy. The DHLS exhibits good psychometric properties for four validity metrics (content validity, structural validity, convergent validity, and criterion validity) and two reliability metrics (internal consistency and test–retest reliability). The numerate health literacy subscale, which subjectively measures diabetes health numeracy, exhibited satisfactory internal consistency (Cronbach's alpha = .85) in the present study. The objective DHNT-based instrument was estimated to be moderately correlated with the subjective diabetes health numeracy as measured using the subjective numeracy subscale [26].

•3)Data analysis

Data were analyzed using SPSS for Windows (version 25, IBM Corp., Armonk, NY, USA) and WINSTEPS (Winsteps, Chicago, IL, USA). Correct and incorrect responses to the items were computed using descriptive statistics. For item correlations with binary (dichotomous) responses, a tetrachoric correlations matrix was constructed using TETRA-COM, which provided estimates that were more accurate than those obtained using the commonly used product–moment correlation matrix [27].

To explore underlying factor structure, EFA using unweighted least squares with orthogonal rotation was performed using SPSS, in which the tetrachoric correlation matrix was used as the input for the factor analysis [28]. Before the EFA, Bartlett's test of sphericity and the Kaiser–Meyer–Olkin test were performed to check the factorability of the data [29]. The following criteria were used to determine the number of factors to retain: an eigenvalue greater than 1, a scree plot (one less than the factor number of the inflection point), and at least 50% of the variance explained by the identified factor(s) [30]. Factor loadings with values >.45 were considered meaningful [31].

The structural validity of the DHNT was also assessed using a dichotomous Rasch model (one-parameter item-response-theory model), a series of tests consisting of the item polarity, item fit statistics, and item characteristic curve. Item polarity was examined using the point-measure correlation. The criterion for the correlation coefficient is

generally within the range of .3–.8 [32]. Item fit statistics refer to the extent to which items contribute to the same construct and were tested using infit and outfit mean-square fit statistics. Both infit and outfit statistics have an expected value of 1 and an acceptable range of fits from 0.5 to 1.5 [33]. In other words, infit or outfit statistics with values >1.5 (indicating a lack of fit between the items and the model) or 34]. These features were depicted in the item characteristic curve, which visualizes how item difficulty is distributed, with the vertical axis indicating the probability of correct answers and the horizontal axis indicating the respondent's ability, with the item difficulty increasing toward the right along the horizontal axis.

Convergent validity and criterion validity were computed using Spearman's correlation. Internal consistency reliability was tested using the KR-20 formula, with a coefficient ≥ .70 indicating acceptable reliability [30].

•4) Ethical considerations

This study was approved by the institutional review boards of the two university hospitals at which the participants were recruited (Approval no. AJIRB-MED-SUR-15-332 and INHAUH 20180530-05-030). All participants were provided with information about the study, signed an informed consent form, and received remuneration for participating in the study.

Results Sample

The 257 participants were aged 59.79 ± 12.16 years, and 45.9% were women. Almost three quarters of them reported having completed high school. Most (70.8%) of the participants were taking an oral hypoglycemic agent (Table 1).

Descriptive statistics of items and the tetrachoric correlation matrix

Table 2 indicates that item 6 received the largest proportion of correct answers (71.6%). The tetrachoric correlation matrix indicated that all items had higher coefficients with other items (r_t = .38–.71) with the exception of item 8 (nutrition labels). The coefficients for item 8 were below the criteria of 0.3 for all other items (r_t = .08–.29), and so this item was eliminated due to the small amount of shared common variance [35].

Structural validity

Bartlett's test of sphericity was significant (χ^2 = 1077.16, *p* 29]. Factor analysis extracted a single-factor solution (eigenvalues >1) that accounted for 56.6% of the total variance. The scree plot also exhibited one factor. All items of the DHNT loaded meaningfully at a criterion of >.45 on the factor (Table 2).

From the Rasch analysis (Table 3), the point-measure correlation values for all seven items were positive and within the range of .44–.61, indicating that the items were working in the same direction to measure the single factor. The infit and outfit mean-square values of all items were within the acceptable range of 0.5–1.5. All of the items fit the Rasch model, and so they were all retained. The item difficulty parameters indicated that item 3 was the most difficult and items 5 and 6 were the least difficult (Table 3 and Figure 1). Item difficulty can be interpreted as follows: very easy (lower than −2.0), easy (−0.2 to −0.5), moderate (−0.5 to +0.5), difficult (+0.5 to +2), and very difficult (higher than +2) [36,37]. This meant that the difficulty levels of all items other than item 3 were demonstrated to be moderate for the patients with type 2 diabetes in this study. However, the curves for items 5 and 6 could not be distinguished, reflecting the same item difficulty in a single factor.

Convergent/criterion validity and internal consistency

The DHNT was moderately correlated with diabetes knowledge (r_s = .40, *p* r_s = .47, *p* **Discussion**

This study developed the DHNT comprising seven items to measure health numeracy for patients with type 2 diabetes. The most basic and important process in the development of such an instrument is determining the broadness of the construct covered, based on an identified definition [22]. Existing instruments for measuring

diabetes health numeracy have been criticized for mainly covering a basic understanding of quantitative calculations [16]. In contrast, the DHNT was developed in this study with a more comprehensive definition considering the combination of three elements: abilities (understanding, interpreting, and applying quantitative health information), quantitative numeric skills (basic, computational, analytical, and statistical aspects), and tasks (for diabetes treatment and self-management). This comprehensive approach made it more likely that the developed DHNT can more accurately measure diabetes health numeracy.

Structural validity informs how items are combined into a scale or subscale [38]. According to Lee et al. [16], the DNT-15 (scored as binary outcomes of correct or incorrect) is the only instrument whose structural validity has been evaluated in patients with diabetes, and EFA revealed a single-factor solution [4]. Similarly, EFA performed in the present study yielded a single factor for the DHNT. However, a methodologically strong point of the EFA in this study was the use of tetrachoric correlations. For the structural test of a set of binary items, EFA using tetrachoric correlations is a more appropriate procedure (producing less-biased eigenvalues and factor loadings) than the commonly used product–moment correlations [27,39]. The single factor of the DHNT was also confirmed by the absence of any items that did not fit the Rasch model in this study. However, a future study needs to adjust items 5 and 6 to that they have distinct item difficulties. To the best of our knowledge, the DHNT is the first instrument that has been evaluated using both classical test theory (e.g., EFA) and item-response-theory (e.g., Rasch model) for determining its structural validity in measuring diabetes health numeracy.

Convergent validity is tested based on the association between a focal measure (the DHNT in this study) and a comparator instrument with which conceptual convergence is expected [40]. As expected, the DHNT exhibited a moderate correlation with diabetes knowledge in the present study, which is consistent with the findings of previous studies [4,41].

The presence of criterion validity implies that a focal measure is consistent with a criterion measuring the same construct [40]. In the present study, the DHNT was moderately correlated with a criterion instrument measuring a subjective diabetes numeracy, as expected. The psychometrics study of Luo et al. [42] measured the generic types of objective and subjective numeracy instruments using the Short Test of Functional health Literacy in Adults−math test [43] and Self-Numeracy Scale-8 [44] in patients with type 2 diabetes, which revealed a weak correlation. In other words, the correlation was stronger when diabetes-specific health numeracy instruments were used than when using generic instruments. This difference in correlation strength may support that a condition-specific instrument is more accurate than a generic instrument in assessments of the health numeracy of people who have a particular medical condition [45].

The empirical process of psychometric evaluation performed in this study resulted in the elimination of item 8 about a nutrition label. Some (15.6%) of the participants had correctly answered the item, which had been expected, given that the participants in the pilot test had reported the terms printed on nutrition labels to be more difficult to understand than the numbers on them; that is, considerable levels of both health numeracy and literacy are needed to interpret current nutrition labels. In a similar vein, Rothman et al. [11] emphasized that nutrition labels should be as easy to read and interpret as possible. Those authors suggested that a written explanation should be provided of confusable terms (e.g., the serving size and the number of servings per container) and that extraneous information should be removed (e.g., the percentage of daily intake and the footnote about daily intakes). Therefore, health policy–makers should make efforts to improve the format of nutrition labels to make them easier for consumers to comprehend. Further psychometrics studies should then be applied to the reformatted labels.

Strengths and limitations

The main strength of the DHNT is the potential for its use in practice. The most frequently used instrument for

measuring diabetes health numeracy is DNT-43 and its short version, which comprise 43 items and 15 items, respectively [4,17]. The DHNT comprises markedly fewer items than in both of these instruments, which makes it likely to be easier to apply in practice and have a lower burden on the respondents when completing it.

The second strength of the DHNT is that it reflects the rapidly changing medical environment. Health numeracy instruments for chronic diseases (including diabetes) typically contain an item related to calculating the next time to take an oral medication, such as “Take a tablet by mouth every 6 h. If you take one tablet at 8 a.m., when do you take your next tablet?” [18,46]. Technology developments mean that the date and time for taking pills are now printed on the cover of each packet containing a dose of pills when medications are prescribed in the Republic of Korea. This means that patients no longer need to calculate the next time to take medications. The DHNT is consistent with the present medical-care environment in not including such a question; however, the item will need to be rephrased when the instrument is used in a situation or country where such technology is not used.

Objective instruments for measuring health numeracy can induce a burden in respondents that results in them struggling to answer the items [15]. Schapira et al. [13] therefore emphasized the importance of including items with an appropriate level of difficulty. The third strength of the DHNT is that most of its items have a moderate level of difficulty, thereby reducing the response burden and the potential for embarrassment of the respondents.

The responsiveness of an instrument refers to its ability to detect changes over time, and so measuring this requires studies with a longitudinal design [22]. The responsiveness of the DHNT was not tested in the present study, and so it is recommended for future longitudinal studies assess its responsiveness with an intervention to improve numeracy.

The test–retest reliability refers to the temporal stability of an instrument over time [22]. This property was also not assessed in the present study, again indicating the need for future studies to verify the stability of the DHNT.

Implications for practice and further research

Self-management is considered a cornerstone of care for patients with diabetes, and education has been emphasized as an important intervention for ensuring practical self-management [47]. Thus, health professionals need to make efforts to provide patients with information on self-management tasks or behaviors and ask them to implement them in their daily lives. The use of DHNT may help health professionals to tailor such education to the levels of health numeracy of individual patients, which should make the education more effective.

The DHNT measures the core contents of health numeracy in adult patients with type 2 diabetes, and so numeracy issues related to insulin injection—which are applicable to relatively few of these patients—were not included in the instrument. Therefore, it is recommended for future studies to develop a numeracy module comprising items specific to type 2 patients treated with insulin injection. The included items could encompass calculation of the insulin dose and the interpretation of the sliding scale for insulin dosages. Such a developed module could then be used in conjunction with the DHNT for patients who receive treatment with insulin injection.

Conclusion

The DHNT is a diabetes-specific health numeracy instrument comprising seven items. It exhibits good measurement properties, in terms of content validity, structural validity, convergent validity, criterion validity, and internal consistency. The items of the DHNT have a moderate level of difficulty, and the shortness of the instrument may make it highly feasible to use in both clinical research and practice. The DHNT can be applied in practice to tailor the education of diabetes self-management depending on the levels of health numeracy of individual patients. Future work could include examining the measurement properties of versions of the DHNT that have been translated into different languages.

Funding statement

This research was supported by the Basic Science Research Program of the National Research Foundation of

Korea (NRF) funded by the Ministry of Education (No. 2015R1D1A1A01056573).

Conflict of interest

The authors have no conflict of interest to declare.

Appendix A Supplementary data

The following is the Supplementary data to this article:**Multimedia component 1**Multimedia component 1

Appendix A Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.anr.2020.01.006.

Characteristic	n (%)	Mean ± SD
Gender		
Men	139 (54.1)	
Women	118 (45.9)	
Age (yrs)		59.79 ± 12.16
<30	5 (1.9)	
30–39	11 (4.2)	
40–49	32 (12.5)	
50–59	66 (25.7)	
60–69	93 (36.2)	
70–79	41 (16.0)	
≥80	9 (3.5)	
Marital status		
Married/living together	201 (78.2)	
Divorced/widow(er)	32 (12.4)	
Unmarried	20 (7.8)	
Other	3 (1.2)	

Data missing	1 (.04)	
Education		
Elementary school	24 (9.3)	
Middle school	40 (15.6)	
High school	112 (43.6)	
College &above	78 (30.3)	
Other	3 (1.2)	
Monthly house income (10,000 KRW)		
<200	87 (33.9)	
200–299	43 (16.7)	
300–399	47 (18.3)	
≥400	74 (28.8)	
Data missing	6 (2.3)	
Disease duration (yrs)		10.83 ± 7.21
Treatment regimen		
Oral hypoglycemic agent	182 (70.8)	
Insulin injection	19 (7.4)	
Oral hypoglycemic agent &insulin injection	52 (20.2)	
No medication	4 (1.6)	
HbA1c (%)		7.62 ± 1.38

Abbreviated item description		Combination of elements for item descriptions			Correct response	Incorrect response
Task for self-management and treatment	Ability	Numeric skill	n (%)	n (%)	1.	Calorie consumption
Exercise	Application	Computational	163 (63.4)	94 (36.6)	2.	Weight loss
Exercise	Interpretation	Analytic	177 (68.9)	80 (31.1)	3.	Fasting time
Blood glucose monitoring	Application	Computational	146 (56.8)	111 (43.2)	4.	Table of diagnostic criteria
Diagnosis	Interpretation	Analytic (table)	181 (70.4)	76 (29.6)	5.	Fasting glucose levels[a]
Blood glucose monitoring	Understand	Basic	183 (71.2)	73 (28.4)	6.	Percentage of patients
Disease	Understand	Computational	184 (71.6)	73 (28.4)	7.	Graph of prevalence rates[b]
Disease	Interpretation	Statistical (graph)	168 (63.4)	87 (33.9)	8.	Nutrition labels

Abbreviated item description		EFA	Rasch analysis			
Factor loading	Item difficulty	Infit MNSQ	Outfit MNSQ	PTMEA CORR	1.	Calorie consumption
.72	0.30	1.06	1.12	.50	2.	Weight loss
.83	−0.15	0.85	0.79	.61	3.	Fasting time
.72	0.83	1.06	1.15	.50	4.	Table of diagnostic criteria
.72	−0.29	1.02	1.03	.51	5.	Fasting glucose levels
.65	−0.39	1.15	1.23	.44	6.	Percentage of patients
.83	−0.39	0.84	0.78	.60	7.	Graph of prevalence rates

DETAILS

Subject: Glucose; Outpatient care facilities; Diabetes; Validity; Literature reviews; Health education; Insulin; Quantitative psychology; Systematic review; Health literacy; Skills; Nutrition; Medical research

Identifier / keyword:	consumer health information; diabetes; psychometrics
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	66-72
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.anr.2020.01.006
ProQuest document ID:	2490469216
Document URL:	https://www.proquest.com/scholarly-journals/new-objective-health-numeracy-test-patients-with/docview/2490469216/s e-2?accountid=211160
Copyright:	
Last updated:	2021-02-24
Database:	Publicly Available Content Database

Factors Influencing Satisfaction with Patient-Controlled Analgesia Among Postoperative Patients Using a Generalized Ordinal Logistic Regression Model

Baek, Wonhee [1] ; Jang, Yeonsoo [2] ; Park, Chang Gi [3] ; Moon, Mir [1] [1] College of Nursing, Yonsei University, Seoul, Republic of Korea; Acute Pain Service Team, Severance Hospital, Seoul, Republic of Korea [2] College of Nursing, Yonsei University, Seoul, Republic of Korea; Mo-Im Kim Nursing Research Institute, Seoul, Republic of Korea [3] College of Nursing, University of Illinois at Chicago, Chicago, IL, USA

ABSTRACT (ENGLISH)

SummaryPurpose

The purpose of this study was to identify the factors affecting the satisfaction with patient-controlled analgesia (PCA) of patients using a generalized ordinal logistic regression model and to evaluate the difference in results of the ordinal regression from those of binary regression.

Methods

The study design involved secondary analysis of electronic medical records from a single tertiary care hospital in Seoul, Korea. It included 2,409 patients treated with PCA for postoperative pain management after open or laparoscopic abdominal surgery. Binary logistic regression and generalized ordinal logistic regression were used to identify factors affecting satisfaction.

Results

Binary logistic regression analysis showed that there was insufficient information for analysis. Generalized ordinal logistic regression revealed that sex, age, pain, PCA usage, and side-effects were common factors affecting PCA satisfaction. However, the effect of some factors affecting PCA satisfaction differed with the level of satisfaction. In open surgery patients, the effect of pain at 6 hours after surgery was significantly greater in the group with lower satisfaction. While, in the laparoscopic surgery patients, the effect of pain at 6–24 hours after surgery was significantly greater in the group with lower satisfaction.

Conclusion

Generalized logistic regression may be an appropriate statistical method for analyzing ordinal data. Degree of postoperative pain and assessment interval are the most important factors associated with PCA satisfaction. Because the factors affecting PCA satisfaction were different for the two types of abdominal surgeries, customizing PCA to individual patients may potentially improve pain management and consequently increase PCA satisfaction.

FULL TEXT

Introduction

Pain is considered to be the fifth vital sign, and failure to adequately control postoperative pain can lead to various complications in surgery patients. Uncontrolled pain decreases the quality of sleep [1], impairs bodily functions, and increases fatigue and depression [2,3]. In addition, uncontrolled pain can interfere with postoperative recovery [4] and can reduce reported satisfaction with postoperative pain management [5].

Patient-controlled analgesia (PCA) refers to any method that allows a person experiencing pain to self-administer

analgesics using a device (typically an infusion pump) that can be activated when the patient feels pain [6]. PCA is reported to be effective for acute postoperative pain management [6]. PCA is used to control pain after most surgical procedures where acute pain is expected. Effective pain management through PCA usage improves patient satisfaction and postoperative recovery [4,7]. It is important to assess patient satisfaction when monitoring the quality of pain management [8,9]. Therefore, PCA satisfaction may serve as an outcome indicator of pain management methods. Nevertheless, there are several cases where PCA cannot be used because of potential side-effects [10]. Moreover, the side-effects of analgesics may be among the factors that lower patient satisfaction with pain management. The previous studies reported that age, sex, and severity of pain affected the patient satisfaction with pain treatment [5,11–13].

The majority of previous studies on patient satisfaction with pain management have collected and analyzed data in multiple unordered or ordered categories such as “very unsatisfactory,” “dissatisfied,” “normal,” “satisfactory,” and “very satisfied”. An ordinal categorical scale is an easy and convenient method to rank outcome variables such as attitude, behavior, and disease severity [14–16]. In numerous previous studies, ordinal data have been converted into binary data because the number of cells was small [11,17]. However, when data are categorized using an ordinal scale with five to seven levels, determining cutoff points is a major problem. In addition, when an ordinal scale for satisfaction variables is converted to an interval scale [7,18], often multiple linear regression analyses cannot be performed because the dependent variable is not normally distributed [11]. Even when ordinal logistic regression is used, the associations between the predictors and outcome variable may not be constant across the ordered categories. Consequently, the intervals used for the levels (levels 1, 2, and 3) of a scale may not necessarily be equivalent, and the order number of the levels may not be representative of the actual relationship among the levels (outcome in level 3 may not be thrice the outcome in level 1). Moreover, additional parallel line test has to be satisfied. However, parallel line test has many limitations, and it is difficult to accept [14,19]. Therefore, alternative tests must be considered.

Very few studies have analyzed ordinal data for treatment methods using ordinal logistic regression [20] because of the difficulty of completing this type of analysis. However, Williams' generalized ordered logit model (*gologit2*) can overcome the limitations of ordinal data analysis because parallel testing is less restrictive, and the model results are concise and easy to interpret. *Gologit2* can also evaluate the magnitude of the impact of factors at each level (order) [19], and researchers can determine how the relationship between the factors and outcome changes at each level. Therefore, the tool can provide information that may be useful for decision-making in a clinical setting.

Ordinal logistic regression appears to be a useful method to assess factors influencing PCA satisfaction in patients. This study aimed to investigate factors affecting PCA satisfaction after open and laparoscopic abdominal surgery, using a generalized regression model. In addition, the difference in results of the binary regression analysis from those of the ordinal regression analysis was evaluated. Finally, the researchers assessed the magnitude of the effect of each factor at each level of satisfaction.

Methods Study participants

The study participants were patients that used intravenous PCA for pain management after undergoing abdominal surgery at a single tertiary care hospital in Seoul, Korea, from March 2014 to August 2015. The Institutional Review Board of Yonsei University Health System, Severance Hospital (Approval no. 4-2016-1150) approved the study, and the requirement of written informed consent was waived. The study utilized the medical records of 2,409 patients. The inclusion criteria for the participants were as follows: communicative adult, aged 19 to 80 years who used PCA after laparoscopic or open surgery, and patients that underwent general anesthesia. Patients who needed postoperative respiratory care or intensive care were excluded. The patient selection flow chart is shown in the study profile (Supplementary file 1).

PCA protocol

All patients used the same model of the disposable PCA pump (Accufuser plus® P2015M or Accufuser plus® P5015L, Woo Young Medical, Chungbuk, Korea). The pump was programmed to deliver 2 ml/hr as the background infusion and 0.5 ml per demand, with a 15-min lockout during a 48 hour period. Alternatively, it could deliver 5 ml/hr

as the background infusion and 0.5 ml per demand, with a 15-min lockout during a 48 hour period. The PCA regimen typically consisted of fentanyl (2–20 mcg/ml) plus normal saline (total volume of 100 ml or 250 ml). At the discretion of the attending anesthesiologists, 90–120 mg of ketorolac, 20–160 mg of nefopam, or 1000–6000 mg of denogan was added as an adjuvant to the PCA regimen depending on the patient's condition. Prophylactic antiemetics (5-HT_3 antagonists) were administered immediately after surgery. The PCA nurse specialists, who were part of the acute pain service team, monitored patients at the -6, -24, -48 hour intervals after surgery.

Measurements Demographic and clinical characteristics

Demographic characteristics were assessed such as sex, age, and smoking history and clinical characteristics such as medical diagnosis, surgical site, surgical type, American Society of Anesthesiologists physical status class, duration of anesthesia, duration of surgery, and additional analgesics.

Pain

Pain was measured using the numerical rating scale, with values ranging from zero (no pain) to 10 (most severe pain), at -6 hours, -24 hours, and -48 hours after surgery. Essentially, a higher score indicated a greater degree of pain [21]. The degree of pain in the postanesthesia care unit (PACU) was measured using the Wong–Baker pain scale, for which patients identify a cartoon facial expression and provide a written description of their level of pain. Again, a higher score on the Wong–Baker pain scale indicated a greater degree of pain [21].

PCA usage

Total PCA usage was defined as the percentage of total dose (prescribed by an anesthesiologist) that was used by the end of the infusion. For example, when an anesthesiologist prescribed a total of 100 ml of medication, total PCA usage was 60% if only 60 ml was injected because of side-effects.

Adverse effects

Adverse effects were recorded, and they included nausea, vomiting, dizziness, headache, sedation, pruritus, urinary retention, and hypotension [22]. Participants responded with “yes” or “no”, depending on the presence of symptoms. In addition, based on the electronic medical records, the researchers confirmed the presence of adverse effects.

Patient satisfaction

Satisfaction with use of PCA for pain management was measured at the end of PCA infusion. A scale with scores ranging from 1 to 5 (1 = not satisfied at all; 5 = very satisfied) was used for the measurement.

Statistical analyses

The 2,409 patients were classified based on the type of surgery reported in their records: open or laparoscopic abdominal surgery. Laparoscopic surgery patients included patients that underwent robotic surgery. The Stata program (version 13, StataCorp., College Station, TX, USA) was used to analyze patient demographics and to identify the factors affecting PCA satisfaction. To compare the demographic characteristics, degree of pain, adverse effects, and total PCA usage in open and laparoscopic surgery groups, an independent *t* test and Chi-square test were used. The Chi-square test, Fisher's exact test, and analysis of variance were used to find variables that affected satisfaction.

First, a typical satisfaction analysis was conducted. The researchers tried to use the linear regression model to identify the factors affecting satisfaction, but the data did not satisfy the normality test. Therefore, the satisfaction level 1 and 2 groups were classified as the dissatisfaction group, and the satisfaction level 3, 4, and 5 groups were classified as the satisfaction group. Next, binary logistic regression was performed to identify factors affecting satisfaction.

Generalized ordinal logistic regression was the second method used to identify factors affecting satisfaction. Before using this method, the parallel test was performed, and we confirmed that the requirements of the parallel test were not met. Therefore, *gologit*2 with the partial proportional odds model was used because it did not satisfy the parallel test. The *gologit2* is a user-written Stata program [19] that estimates generalized logistic regression models for ordinal-dependent variables. This model is a less restrictive method than ordinal logistic regression and overcomes the limitations of the parallel test by fitting the data into the partial proportional odds model. In this study, there were five levels of satisfaction; therefore, four logit models were used. The logit effects of all variables were presented

across four models, and comparisons were made for probabilities of being in a higher category versus being at or below that category. Each group of categories was compared based on the satisfaction level as follows: step 1: 2, 3, 4, and 5 versus 1; step 2: 3, 4, and 5 versus 1 and 2; step 3: 4 and 5 versus 1, 2, and 3; and step 4: 5 versus 1, 2, 3, and 4. Hence, positive coefficients indicated that higher values of the explanatory variable increase the likelihood of the respondent being at a higher satisfaction level than at the current or lower satisfaction levels, whereas negative coefficients indicated that higher values of the explanatory variable increase the likelihood of the respondent being at the current or lower satisfaction levels than at a higher satisfaction level. The magnitude of the coefficient implied the magnitude of the effect of the explanatory variable. Depending on the comparison step, how the effect size of the explanatory variable changed could be confirmed. The level of significance or α was set at 0.05 for all statistical tests.

Results

The demographic characteristics of patients have been presented in [Table 1]. This study included 970 women (40.3%) and 1,439 men (59.7%). The medical records indicated that 949 (39.4%) patients had open abdominal surgery, and 1,460 (60.6%) had laparoscopic surgery. Among these, 872 (36.2%) had lower gastrointestinal, 861 (35.7%) had upper gastrointestinal, and 491 (20.4%) had biliary and pancreatic surgeries. The most common indication for surgery was cancer.

Pain score, adverse effects, and PCA usage

[Table 1] presents the maximum pain score for each time period (in the PACU, -6 hours, -24 hours, and -48 hours postoperatively). The maximum pain score at all time points was significantly higher after open abdominal surgery than after laparoscopic surgery. Nausea/vomiting and dizziness significantly differed between the open surgery and laparoscopic surgery groups. Total PCA usage (%) was significantly higher in open surgery patients compared with that in laparoscopic surgery patients.

Factors affecting PCA satisfaction: binary logistic regression

To identify the factors affecting PCA satisfaction, age, sex, PCA usage, additional analgesics, pain, and side-effects were used as related variables, and binary logistic regression analysis was performed by dividing the patients into the PCA satisfaction group and dissatisfaction group ([Table 2]). In open surgery patients, as age increased, there was a higher probability of satisfaction [odds ratio (OR): 1.25, 95% confidence interval (CI): 1.01–1.53], and when PCA usage increased, the probability of satisfaction was higher (OR: 1.05, 95% CI: 1.03–1.07). When pain at 6 hours (OR: 0.71, 95% CI: 0.57–0.87) and 6–24 hours (OR: 0.79, 95% CI: 0.65–0.96) after surgery increased, the probability of satisfaction was lower. If there was dizziness, the probability of satisfaction was higher than when there was no dizziness (OR: 3.23, 95% CI: 1.08–9.62). In laparoscopic surgery patients, when PCA usage increased, the probability of satisfaction was higher (OR: 1.03, 95% CI: 1.02–1.04). When pain at 6 hours (OR: 0.82, 95% CI: 0.69–0.97) and 6–24 hours (OR: 0.81, 95% CI: 0.67–0.97) after surgery increased, the probability of satisfaction was lower. If there was headache, the probability of satisfaction was lower than when there was no headache (OR: 0.27, 95% CI: 0.09–0.79).

Comparison of variables by levels of satisfaction

In open surgery patients, there were significant differences in sex, age, pain score for each time period (in the PACU, -6 hours, -24 hours, and -48 hours postoperatively), additional analgesics, nausea and vomiting, dizziness, and PCA usage by levels of satisfaction ([Table 3]). In laparoscopic surgery patients, there were significant differences in sex, age, pain score for each time period (in the PACU, -6 hours, -24 hours, and -48 hours postoperatively), additional analgesics, nausea and vomiting, dizziness, headache, and PCA usage by levels of satisfaction ([Table 3]). There were no significant differences in smoking history, American Society of Anesthesiologists physical status class, duration of anesthesia, duration of surgery, sedation, pruritus, urinary retention, and hypotension ([Supplementary file 2]).

Factors affecting PCA satisfaction by level of satisfaction: generalized ordinal logistic regression, open *abdominal surgery*

The factors affecting PCA satisfaction in open surgery patients have been presented in [Table 4]. In all steps, male

participants were more likely to be at a higher satisfaction level than at the current satisfaction level at all steps. In other words, men were significantly and positively associated with satisfaction (coefficient = 0.30, p = .025). However, the total drug usage was not invariant across the three steps, and separate interpretations were required. Total drug usage was positively associated with satisfaction, and the coefficients were different for each cutoff point: 0.06, 0.04, 0.02, and 0.02. The total drug usage was associated with the likelihood of the respondent being at a higher satisfaction level. Effects of the total drug usage weakened when the satisfaction level moved from low to high; further, the largest effect was identified at step 1 (satisfaction level from 2 to 5 vs. 1). In steps 1 (coefficient = 0.31, p = .037) and 2 (coefficient = 0.24, p = .017), age was positively associated with satisfaction. In step 4, side-effects of nausea and vomiting were negatively associated with satisfaction (coefficient = −0.47, p = .005). In all steps, pain was negatively associated with satisfaction. Notably, the coefficients for pain reported at 6 hours after surgery were different for each cutoff point: −0.88, −0.45, −0.17, and −0.15. Pain present 6 hours after surgery was associated with the likelihood of the respondent being at a lower satisfaction level. The effects of 6 hours pain strengthened when the satisfaction level moved from high to low; further, the largest effect was identified in the first comparison of step 1. Therefore, the maximum level of pain reported at -6 hours after surgery affected satisfaction more in the low-satisfaction group, and step 1 had about six fold greater influence of pain level than step 4.

Factors affecting PCA satisfaction by level of satisfaction: generalized ordinal logistic regression, laparoscopic surgery

The factors affecting PCA satisfaction in laparoscopic surgery patients have been presented in Table 5. In all steps, age was positively associated with satisfaction (coefficient = 0.13, p = .003). The side-effects of nausea and vomiting (coefficient = −0.57, p p = .001), and headache (coefficient = −0.71, p = .027) were negatively associated with satisfaction. In steps 1, 2, and 3, total PCA usage was positively associated with satisfaction, and the coefficients were different for each cutoff point: 0.07, 0.03, and 0.01. In all steps, pain was negatively associated with satisfaction. Notably, the coefficients for pain reported between -24 hours after surgery were different for each cutoff point: −0.37, −0.26, −0.23, and −0.14.

Discussion

The purpose of this study was to identify the factors affecting the satisfaction with PCA of patients who underwent open and laparoscopic abdominal surgery using a generalized ordinal logistic regression model and to evaluate the difference in results of the ordinal regression from those of binary regression. The key findings of this study have been detailed below. First, the factors affecting PCA satisfaction identified by generalized ordinal regression and binary logistic regression were different. Second, using generalized ordinal logistic regression, the factors affecting satisfaction differed with the level of satisfaction, and the factors were different for laparoscopic and open surgery patients.

When the factors affecting satisfaction were analyzed using generalized ordinal logistic regression, the factors associated with greater PCA satisfaction were less pain experienced during all time intervals, fewer side-effects, higher PCA drug usage, and patients who were older and male. These results are consistent with the results of previous studies on the satisfaction of pain management [5, 12, 13, 16, 17]. Svensson et al [5] reported that 50-year-old men who experienced severe pain had a 10% probability of being dissatisfied, whereas 50-year-old women who experienced severe pain had a greater than 40% probability of being dissatisfied. In this study, nausea and vomiting were side-effects that followed both open and laparoscopic surgeries, and these were negatively associated with PCA satisfaction. This finding is similar to previously reported results that fear of side-effects decreases the probability of being satisfied [17]. It has been reported that postoperative nausea and vomiting delay discharge and recovery as well as decrease the quality of life [23, 24]. In particular, nausea and vomiting have been reported as serious side-effects that lead to patients refusing pain management [22]. Therefore, to increase patient satisfaction with postoperative pain management, healthcare providers should emphasize proper dosage control and management of the side-effects of narcotic analgesics.

Unlike generalized ordinal logistic regression, binary logistic regression analysis revealed fewer factors influencing

satisfaction (in open surgery patients: age, PCA usage, pain score at -6 hours and -24 hours postoperatively, and dizziness; in laparoscopic surgery patients: PCA usage, pain score at -6 hours and -24 hours postoperatively, and headache). Especially, in the open surgery patients, dizziness was associated with an approximately three-fold increase in the probability of satisfaction (OR: 3.23, 95% CI: 1.08–9.62). These results differed from those of previous studies as well as from the results obtained from generalized logistic regression in this study. In addition, it is well known that postoperative nausea and vomiting are the most reported adverse effects, and they affect satisfaction [25]. However, there were no significant effects of nausea and vomiting in the results of binary logistic regression in this study. Logistic regression analysis gave erroneous results for patient satisfaction. However, the results of ordinal regression analysis were representative of real-world observations and provided more detailed characteristics of PCA satisfaction. It seems that there was loss of information when five levels of satisfaction were compressed into only two levels: “satisfaction” and “dissatisfaction”. This was done without using an appropriate cutoff point and disregarding the effect of factors on satisfaction at each level. In nursing research, ordinal data should be analyzed with appropriate statistical methods to understand real-world phenomenon.

In this study, we were able reduce the loss of information by using a generalized logistic regression model and concluded that the factors affecting satisfaction with PCA were different for the two types of surgeries (open or laparoscopic). In patients who underwent open surgery, when the statistical results of steps 1 and 2 were analyzed, we observed that at only low satisfaction levels, older patients showed greater satisfaction with PCA. Additionally, when the statistical results of step 4 were analyzed, at only high satisfaction levels, nausea and vomiting affected satisfaction. The group with high satisfaction reported low pain in this study. In other words, in a highly satisfied group, in which pain was relatively well controlled, age did not affect the degree of satisfaction, and nausea and vomiting were the factors that influenced satisfaction. In contrast, in laparoscopic surgery patients, age, nausea and vomiting, headache, and dizziness affected the satisfaction in all steps. The magnitude of influence was the same at all satisfaction levels, possibly because pain is generally well-controlled after laparoscopic surgery [26]. Factors other than pain appear to affect satisfaction in all satisfaction groups after laparoscopic surgery, particularly the high incidence of postoperative nausea and vomiting [27]. PCA-related side-effects may aggravate nausea and vomiting after laparoscopic surgery and decrease patient satisfaction with PCA.

Using a generalized logistic regression model in this study, it was found that the impact of pain was different at different levels of satisfaction. The magnitude of the influence of pain on satisfaction was higher in the group with lower satisfaction than in the group with higher satisfaction. In particular, the pain level reported at 6 hours after open abdominal surgery affected PCA satisfaction more in the group with low satisfaction. This result appears to be consistent with previous studies that found postoperative pain following open surgery to be greatest at 6 hours after surgery [28]. Therefore, pain management in the first 6 hours after surgery is important for patients undergoing open surgery.

Unlike open surgery, in laparoscopic surgery patients, the magnitude of the influence of pain -24 hours after surgery on PCA satisfaction was greater in the group with lower satisfaction than in the group with higher satisfaction. Patients who undergo laparoscopic abdominal surgery tend to return to ambulation earlier than patients who have open surgery [29], and it appears that the inverse association of degree of pain during -24 hours after laparoscopic surgery with PCA satisfaction was related to ambulation in our study. In previous studies, patients experienced the greatest degree of postoperative pain when moving from the bed or during exercise [18]. In laparoscopic surgery patients, intensive pain assessment and management may be necessary even if the patient does not indicate pain on ambulation.

Implications for clinical practice

This study has two main implications for patient satisfaction with PCA using generalized logistic regression model. First, postoperative pain management was the most significant factor influencing reported satisfaction with PCA. Second, the factors affecting PCA satisfaction and the magnitude of influence of these factors were different at different levels of PCA satisfaction.

Overall, the most important factor for improving patient satisfaction with PCA was degree of reported pain, whereas

other factors influenced satisfaction in the group where pain was well-controlled. Because younger patients and women had lower satisfaction with PCA in this study, special considerations for younger female patients may be advisable when developing improved pain management protocols. Nonpharmacological pain interventions are effective [30], and pain management protocols for open abdominal surgery patients should include not only pharmacological management but also nonpharmacological pain interventions. In addition, nursing staff should prioritize pain management in open surgery patients. Conservative treatments such as acupressure have been proven to be effective in preventing nausea and vomiting [31]. Therefore, patients with well-controlled pain after laparoscopic surgery might report greater satisfaction with PCA, if nursing care is combined with conservative treatment and prophylactic use of antiemetic drugs.

Ordinal data are often used in the analysis of satisfaction and disease staging [11,15], but ordinal logistic regression has rarely been used because of the difficulty of conducting such analyses. However, a generalized logistic regression model can be used to identify other influencing factors at each level and to assess the magnitude of their influence. In this study, the researchers found that it is important to control pain for -6 hours postoperatively in open abdominal surgery patients and to control pain at -24 hours postoperatively in laparoscopic surgery patients. Therefore, open surgery patients should receive frequent pain assessment and preventive pain medications [32]. They should also be advised to frequently use PCA up to 6 hours after surgery. On the other hand, laparoscopic surgery patients should be given additional preventive analgesics prior to ambulation, and nurses should educate the patients about PCA usage before ambulation. Patient satisfaction with postoperative pain management may increase by identifying the magnitude of their effect as well as the factors impacting satisfaction with PCA, and applying the findings to pain management policy.

Limitations

This study has certain limitations. First, even though the analyses are stratified based on the type of abdominal surgery (open and laparoscopic), other surgery-related variables such as surgery type and surgeon were different and not considered. Second, although only the patients who received PCA by intravenous administration were included, the regimens were not necessarily the same for all patients. Consequently, the degree of pain management may have been different even for patients who underwent the same type of surgery. In addition, the researchers did not control for pain management methods used during surgery. Third, although nonpharmacological pain interventions that could affect patient satisfaction might have been provided after surgery, they were not included among the variables used in our regression analyses. Finally, this study did not control for cancer-related patient characteristics even though they might affect the experience of pain. These limitations may be addressed in further studies to confirm the results of PCA satisfaction in this population.

Conclusion

This study analyzed PCA satisfaction using both a generalized ordinal logistic regression model and binary logistic regression model. Comparing the two methods, it was found that ordinal data should be analyzed in an ordinal logistic regression to draw conclusions without loss of information. In the generalized ordinal logistic model, it was possible to analyze the factors affecting satisfaction with PCA and the magnitude of these factors at each level. Therefore, the results of this study may be used to improvement satisfaction with PCA by customizing nursing services to patient characteristics and surgical procedures. Pain is the most important factor in patient-reported satisfaction with PCA, but patient satisfaction with postoperative pain management is complex and does not depend solely on pain intensity [33]. Patient satisfaction with postoperative PCA may be improved by adjusting various environmental factors such as amount and intensity of ambulation, side effects, and PCA usage.

Conflict of interest

The authors declare that they have no conflicts of interest.

Appendix A Supplementary data

The following are the Supplementary data to this article:**Multimedia component 1**Multimedia component 1
Multimedia component 2 Multimedia component 2**Multimedia component 3**Multimedia component 3

Appendix A Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.anr.2020.03.001.

Variable	Open (n = 949)	Laparoscopic (n = 1,460)	Total (N = 2,409)	t or x^2 (p)
n (%) or M ± SD	n (%) or M ± SD	n (%) or M ± SD	Sex	
Women	371 (39.1)	599 (41.0)	970 (40.3)	0.89 (.350)
Men	578 (60.9)	861 (59.0)	1,439 (59.7)	
Age (yrs)	56.62 ± 12.80	57.02 ± 11.91	56.86 ± 12.67	-0.78 (.434)
19–30	40 (4.2)	23 (1.6)	63 (2.6)	
31–40	70 (7.4)	117 (8.0)	187 (7.8)	
41–50	165 (17.4)	268 (18.3)	433 (18.0)	
51–60	280 (29.5)	470 (32.2)	750 (31.1)	
61–70	261 (27.5)	365 (25.0)	626 (26.0)	
71–80	133 (14.0)	217 (14.9)	350 (14.5)	
Medical diagnosis, n (%)				
Lower GI, 872 (36.2)	249 (100.0)	623 (100.0)	872 (100.0)	
Cancer	184 (73.9)	581 (93.2)	765 (87.7)	
Obstruction	28 (11.2)	8 (1.3)	36 (4.1)	
Others[a]	37 (14.9)	34 (5.5)	71 (8.2)	
Upper GI, 861 (35.7)	197 (100.0)	664 (100.0)	861 (100.0)	
Cancer	187 (94.9)	633 (95.3)	820 (95.2)	
Mass	6 (3.1)	27 (4.1)	33 (3.8)	
Others[b]	4 (2.0)	4 (0.6)	8 (1.0)	

Biliary and pancreatic, 491 (20.4)	330 (100.0)	161 (100.0)	491 (100.0)	
Cancer	284 (86.1)	73 (45.3)	357 (72.7)	
Mass	26 (7.9)	28 (17.4)	54 (11.0)	
Gallbladder disease	14 (4.2)	45 (28.0)	59 (12.0)	
Others[c]	6 (1.8)	15 (9.3)	21 (4.3)	
Kidney transplantation, 135 (5.6)	135 (100.0)	0 (100.0)	135 (100.0)	
Others[d], 50 (2.1)	38 (100.0)	12 (100.0)	50 (100.0)	
Pain score				
PACU pain score	5.80 ± 2.31	5.10 ± 2.14	5.37 ± 2.24	7.47 (<.001)
-6 h pain score	6.54 ± 2.29	5.79 ± 2.34	6.09 ± 2.35	7.74 (<.001)
-24 h pain score	4.53 ± 2.09	3.97 ± 1.93	4.19 ± 2.01	6.61 (<.001)
-48 h pain score	3.34 ± 1.86	2.91 ± 1.61	3.08 ± 1.72	5.88 (<.001)
Nausea and vomiting				
Yes	264 (27.8)	525 (36.0)	789 (32.8)	17.30 (<.001)
No	685 (72.2)	935 (64.0)	1,620 (67.2)	
Dizziness				
Yes	125 (13.2)	307 (21.0)	432 (17.9)	24.12 (<.001)
No	824 (86.8)	1,153 (79.0)	1,977 (82.1)	
Headache				
Yes	20 (2.1)	35 (2.4)	55 (2.3)	0.22 (.642)
No	929 (97.9)	1,425 (97.6)	2,354 (97.7)	
PCA usage (%)	97.72 ± 11.77	94.91 ± 16.53	96.02 ± 14.90	4.86 (<.001)

Open surgery						
Variable	β	SE	p	OR	95% CI	
Sex (ref: women)	0.37	0.29	.204	1.45	0.82	2.56
Age	0.22	0.11	.038	1.25	1.01	1.53
PCA usage (%)	0.04	0.01	<.001	1.05	1.03	1.07
Additional analgesics (ref: no)	−1.47	1.06	.165	0.23	0.03	1.83
PACU pain score	−0.02	0.07	.736	0.98	0.86	1.11
-6 h pain score	−0.35	0.11	.001	0.71	0.57	0.87
-24 h pain score	−0.24	0.10	.019	0.79	0.65	0.96
-48 h pain score	−0.07	0.09	.438	0.93	0.78	1.12
N/V (ref: no)	0.39	0.35	.263	1.48	0.75	2.93
Dizziness (ref: no)	1.17	0.56	.035	3.23	1.08	9.62
Headache (ref: no)	−0.83	0.77	.281	0.44	0.10	1.97
	Dissatisfaction group (n = 67), Satisfaction group (n = 882)					

Variable		PCA satisfaction (open abdominal surgery)						F or x^2 (p)
1 (n = 26)	2 (n = 41)	3 (n = 215)	4 (n = 206)	5 (n = 461)	Total (n = 949)	n (%) or M ± SD	n (%) or M ± SD	n (%) or M ± SD
n (%) or M ± SD	n (%) or M ± SD	n (%) or M ± SD	Sex	Women	16 (61.5)	19 (46.3)	93 (43.3)	95 (46.1)

148 (32.1)	371 (39.1)	21.69 (<.001)	Men	10 (38.5)	22 (53.7)	122 (56.7)	111 (53.9)	313 (67.9)
578 (60.9)		Age (yrs)		49.88 ± 12.93	54.41 ± 13.53	57.97 ± 12.46	55.64 ± 12.87	57.00 ± 12.74
56.62 ± 12.80	3.13 (.014)	Postoperative pain score	PACU	6.81 ± 2.59	6.80 ± 2.36	6.12 ± 2.34	5.82 ± 2.29	5.50 ± 2.24
5.80 ± 2.31	6.29 (<.001)	-6 h	9.10 ± 0.98	7.68 ± 1.97	7.19 ± 1.86	6.83 ± 1.99	5.87 ± 2.44	6.54 ± 2.29
28.54 (<.001)	-24 h	6.92 ± 2.10	5.63 ± 2.29	5.31 ± 1.88	4.60 ± 1.83	3.91 ± 2.03	4.53 ± 2.09	33.70 (<.001)
-48 h	5.50 ± 2.14	3.95 ± 2.17	3.87 ± 1.80	3.57 ± 1.67	2.82 ± 1.73	3.34 ± 1.86	26.61 (<.001)	[a]Additional analgesics
Yes	26 (100.0)	40 (97.6)	204 (94.9)	188 (91.3)	393 (85.3)	851 (89.7)	(<.001)	No
0 (0.0)	1 (2.4)	11 (5.1)	18 (8.7)	68 (14.7)	98 (10.3)		Nausea and vomiting	Yes
8 (30.8)	12 (29.3)	70 (32.6)	77 (37.4)	97 (21.0)	264 (27.8)	22.48 (<.001)	No	18 (69.2)
29 (70.7)	145 (67.4)	129 (62.6)	364 (79.0)	685 (72.2)		Dizziness	Yes	1 (3.9)
4 (9.8)	33 (15.4)	38 (18.5)	49 (10.6)	125 (13.2)	10.90 (.028)	No	25 (96.1)	37 (90.2)
182 (84.6)	168 (81.5)	412 (89.4)	824 (86.8)		[a]Headache	Yes	1 (3.9)	2 (4.9)
5 (2.3)	4 (1.9)	8 (1.7)	20 (2.1)	(.409)	No	25 (96.1)	39 (95.1)	210 (97.7)

202 (98.1)	453 (98.3)	929 (97.9)		PCA usage (%)		86.65 ± 32.16	95.85 ± 18.02	97.53 ± 12.12

Step	Variable	Coef.	SE	z	p > |z|	95% CI	
Step 1:	Sex (ref: women)	0.30	0.14	2.24	.025	0.04	0.57
2, 3, 4, 5	Age	0.31	0.15	2.09	.037	0.02	0.59
vs. 1	Total usage (%)	0.06	0.01	4.66	<.001	0.04	0.09
	AD (ref: no)	−0.49	0.25	−1.94	.052	−0.98	0.00
	PACU pain score	0.00	0.03	0.09	.929	−0.06	0.06
	-6 h pain score	−0.88	0.18	−4.89	<.001	−1.24	−0.53
	-24 h pain score	−0.17	0.05	−3.6	<.001	−0.27	−0.08
	-48 h pain score	−0.12	0.05	−2.38	.017	−0.21	−0.02
	N/V (ref: no)	0.80	0.54	1.47	.142	−0.27	1.87
	Dizziness (ref: no)	0.11	0.19	0.59	.558	−0.26	0.49
	Headache (ref: no)	−0.14	0.43	−0.33	.738	−0.99	0.70
Step 2:	Sex (ref: women)	0.30	0.14	2.24	.025	0.04	0.57
3, 4, 5	Age	0.24	0.10	2.39	.017	0.04	0.44
vs. 1, 2	Total usage (%)	0.04	0.01	3.94	<.001	0.02	0.06
	AD (ref: no)	−0.49	0.25	−1.94	.052	−0.98	0.00
	PACU pain score	0.00	0.03	0.09	.929	−0.06	0.06
	-6 h pain score	−0.45	0.09	−4.85	<.001	−0.63	−0.27
	-24 h pain score	−0.17	0.05	−3.6	<.001	−0.27	−0.08

	-48 h pain score	−0.12	0.05	−2.38	.017	−0.21	−0.02
	N/V (ref: no)	0.45	0.32	1.41	.159	−0.18	1.08
	Dizziness (ref: no)	0.11	0.19	0.59	.558	−0.26	0.49
	Headache (ref: no)	−0.14	0.43	−0.33	.738	−0.99	0.70
Step 3:	Sex (ref: women)	0.30	0.14	2.24	.025	0.04	0.57
4, 5	Age	−0.04	0.06	−0.62	.532	−0.15	0.08
vs. 1, 2, 3	Total usage (%)	0.02	0.01	2.32	.02	0.00	0.03
	AD (ref: no)	−0.49	0.25	−1.94	.052	−0.98	0.00
	PACU pain score	0.00	0.03	0.09	.929	−0.06	0.06
	-6 h pain score	−0.17	0.04	−3.81	<.001	−0.26	−0.08
	-24 h pain score	−0.17	0.05	−3.6	<.001	−0.27	−0.08
	-48 h pain score	−0.12	0.05	−2.38	.017	−0.21	−0.02
	N/V (ref: no)	−0.04	0.18	−0.24	.813	−0.38	0.30
	Dizziness (ref: no)	0.11	0.19	0.59	.558	−0.26	0.49
	Headache (ref: no)	−0.14	0.43	−0.33	.738	−0.99	0.70
Step 4:	Sex (ref: women)	0.30	0.14	2.24	.025	0.04	0.57
5	Age	0.02	0.05	0.34	.735	−0.09	0.13
vs. 1, 2, 3, 4	Total usage (%)	0.02	0.01	2.65	.008	0.01	0.04
	AD (ref: no)	−0.49	0.25	−1.94	.052	−0.98	0.00
	PACU pain score	0.00	0.03	0.09	.929	−0.06	0.06
	-6 h pain score	−0.15	0.04	−3.82	<.001	−0.23	−0.07
	-24 h pain score	−0.17	0.05	−3.6	<.001	−0.27	−0.08
	-48 h pain score	−0.12	0.05	−2.38	.017	−0.21	−0.02

	N/V (ref: no)	−0.47	0.17	−2.8	.005	−0.79	−0.14
	Dizziness (ref: no)	0.11	0.19	0.59	.558	−0.26	0.49
	Headache (ref: no)	−0.14	0.43	−0.33	.738	−0.99	0.70

Step	Variable	Coef.	SE	z	p > |z|	95% CI	
Step 1:	Sex (ref: women)	−1.09	0.56	−1.94	.053	−2.19	0.01
2, 3, 4, 5	Age	0.13	0.04	2.96	.003	0.04	0.22
vs. 1	Total usage (%)	0.07	0.01	6.46	<.001	0.05	0.08
	AD (ref: no)	−0.29	0.18	−1.60	.109	−0.65	0.07
	PACU pain score	−0.36	0.11	−3.21	.001	−0.57	−0.14
	-6 h pain score	−0.18	0.03	−5.72	<.001	−0.24	−0.12
	-24 hr pain score	−0.37	0.12	−3.02	.003	−0.61	−0.13
	-48 hr pain score	−0.09	0.04	−2.08	.038	−0.17	−0.01
	N/V (ref: no)	−0.57	0.12	−4.83	<.001	−0.80	−0.34
	Dizziness (ref: no)	−0.44	0.13	−3.38	.001	−0.70	−0.18
	Headache (ref: no)	−0.71	0.32	−2.21	.027	−1.34	−0.08
Step 2:	Sex (ref: women)	−0.15	0.29	−0.53	.596	−0.72	0.41
3, 4, 5	Age	0.13	0.04	2.96	.003	0.04	0.22
vs. 1, 2	Total usage (%)	0.03	0.01	4.96	<.001	0.02	0.04
	AD (ref: no)	−0.29	0.18	−1.60	.109	−0.65	0.07
	PACU pain score	−0.02	0.06	−0.40	.691	−0.14	0.09
	-6 h pain score	−0.18	0.03	−5.72	<.001	−0.24	−0.12

	-24 h pain score	−0.26	0.08	−3.50	<.001	−0.41	−0.12
	-48 h pain score	−0.09	0.04	−2.08	.038	−0.17	−0.01
	N/V (ref: no)	−0.57	0.12	−4.83	<.001	−0.80	−0.34
	Dizziness (ref: no)	−0.44	0.13	−3.38	.001	−0.70	−0.18
	Headache (ref: no)	−0.71	0.32	−2.21	.027	−1.34	−0.08
Step 3:	Sex (ref: women)	−0.22	0.14	−1.58	.114	−0.49	0.05
4, 5	Age	0.13	0.04	2.96	.003	0.04	0.22
vs. 1, 2, 3	Total usage (%)	0.01	0.00	3.52	<.001	0.01	0.02
	AD (ref: no)	−0.29	0.18	−1.60	.109	−0.65	0.07
	PACU pain score	0.01	0.03	0.22	.827	−0.06	0.07
	-6 h pain score	−0.18	0.03	−5.72	<.001	−0.24	−0.12
	-24 h pain score	−0.23	0.05	−5.05	<.001	−0.32	−0.14
	-48 h pain score	−0.09	0.04	−2.08	.038	−0.17	−0.01
	N/V (ref: no)	−0.57	0.12	−4.83	<.001	−0.80	−0.34
	Dizziness (ref: no)	−0.44	0.13	−3.38	.001	−0.70	−0.18
	Headache (ref: no)	−0.71	0.32	−2.21	.027	−1.34	−0.08
Step 4:	Sex (ref: women)	0.03	0.12	0.29	.776	−0.20	0.27
5	Age	0.13	0.04	2.96	.003	0.04	0.22
vs. 1, 2, 3, 4	Total usage (%)	0.01	0.00	1.53	.126	0.00	0.01
	AD (ref: no)	−0.29	0.18	−1.60	.109	−0.65	0.07
	PACU pain score	0.01	0.03	0.41	.682	−0.05	0.07
	-6 h pain score	−0.18	0.03	−5.72	<.001	−0.24	−0.12
	-24 h pain score	−0.14	0.04	−3.38	.001	−0.22	−0.06

	-48 h pain score	−0.09	0.04	−2.08	.038	−0.17	−0.01
	N/V (ref: no)	−0.57	0.12	−4.83	<.001	−0.80	−0.34
	Dizziness (ref: no)	−0.44	0.13	−3.38	.001	−0.70	−0.18
	Headache (ref: no)	−0.71	0.32	−2.21	.027	−1.34	−0.08

DETAILS

Subject:	Laparoscopy; Medical records; Variables; Anesthesia; Abdominal surgery; Pain management; Abdomen; Regression analysis; Demographics; Medical personnel; Patient satisfaction; Analgesics; Medical research
Identifier / keyword:	analgesia, patient-controlled; logistic models; patient satisfaction; postoperative period
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	73-81
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article

The Chinese Version of the Work Control Scale for Nurses: Modifying the Translation and Psychometric Testing

Fule Wen [1] ; Wang, Lin [1] ; Fang, Zhiyin [2] ; Zhu, Jinjin [1] ; Zhang, Yaqing [1] 1 School of Nursing, Shanghai Jiao Tong University, Shanghai, China 2 Real World Evidence, Shanghai Meisi Med-Tech Co. Ltd., Shanghai, China

ABSTRACT (ENGLISH)

Purpose

The aim of the study was to modify and test the psychometric properties of the Chinese version of the work control scale (C-WCS).

Methods

The translated scale was administered to 840 nurses in Shanghai. Validity was assessed in terms of content validity and construct validity using exploratory factor analysis and confirmatory factor analysis. Internal consistency and test–retest reliability were estimated using Cronbach α and the intraclass correlation coefficient.

Results

Psychometric analyses of the C-WCS indicate high reliability and good content and construct validity.

Conclusion

The C-WCS has good psychometric properties and can be used as a valid tool for measuring work control among nurses in China. The C-WCS will help to further explore the correlations between perceived work control and organizational quality indicators such as nurses' satisfaction, job stress, well-being, or intention to stay. It can also be used in nursing outcome studies of work control strategies.

FULL TEXT

DETAILS

Subject:	Research; Sample size; Validity; Quantitative psychology; Advanced manufacturing technologies; Questionnaires; Response rates; Hospitals; Researchers; Data collection; Nursing; Translations; Nurses; Medical research
Business indexing term:	Subject: Advanced manufacturing technologies
Location:	China
Identifier / keyword:	nurses; psychometrics; internal-external control; validation study; workplace
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	122-128
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Jour nal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.anr.2020.04.006
ProQuest document ID:	2490469116
Document URL:	https://www.proquest.com/scholarly-journals/chinese-version-work-control-scale-nurses/docview/2490469116/se-2?accountid=211160

Cross-Cultural Validation of the Intensive Care Experience Questionnaire in Korean Critical Care Survivors

Kang, Jiyeon [1] ; Young Shin Cho [2] [1] College of Nursing, Dong-A University, Busan, Republic of Korea [2] Department of Surgical Intensive Care Unit, Kosin University Gospel Hospital, Busan, Republic of Korea

ABSTRACT (ENGLISH)

Purpose

The purpose of this study was to culturally adapt the Intensive Care Experience Questionnaire (ICEQ) for Korean patients and evaluate its validity and reliability.

Methods

This cross-sectional study comprised two phases. The first phase involved the cultural adaptation of the ICEQ. In the second phase, the psychometric properties of the adapted measure were evaluated. Cultural adaptation was conducted in accordance with the World Health Organization's process. The adapted questionnaire was administered to 200 Korean patients who had received treatment in an intensive care unit within the past six months. Model fit was assessed through confirmatory factor analysis, and convergent validity and discriminant validity of the items were assessed. Known-groups validity was evaluated using the t test and Cohen's effect size. Cronbach's α was used to examine internal consistency reliability.

Results

The Korean version of the ICEQ (K-ICEQ) consists of 26 items and four subscales: Frightening Experiences, Awareness of Surroundings, Satisfaction with Care, and Recall of Experiences. The model fit indices, convergent validity, and discriminant validity of the K-ICEQ were all satisfactory. According to the results of the test of known-groups validity, intensive care unit (ICU) experience varied according to gender, planned ICU admission, mechanical ventilation, and restraints application. Cronbach's α of the K-ICEQ subscales ranged from .74 to .93.

Conclusion

The validity and reliability of the K-ICEQ reflecting the characteristics of Korean ICU patients were satisfactory. The K-ICEQ can be used to evaluate the experience of Korean ICU patients and contribute to the development of interventions to improve the ICU experience.

FULL TEXT

Introduction

Owing to the aging of the population and the developments in medical technology, the number of patients admitted

to an intensive care unit (ICU) has been increasing [1]. In Korea, about 300,000 patients are admitted to ICUs every year [2]; 25% of national medical expenses are used by ICU patients [3]. As ICU survival rates in Korea have increased up to 90% [3], in addition to the increase in the number of ICU patients, interest in the intensive care experience of critical care survivors has received increased clinical and research attention [4,5].

In addition to the medical condition, ICU patients struggle with being in an unfamiliar space surrounded by medical equipment and monitors and separated from their family and friends [6]. They often feel overwhelmed with anxiety and fear of death [7], and delirium and sedation may impair their cognitive function [8]. Such an ICU experience is mostly negative, which is often expressed as “being imprisoned,” a “strange journey,” or “unreal” [6,7]. A negative ICU experience can affect the critical care survivor's life after discharge. A meta-synthesis of qualitative studies revealed that survivors suffered from reduced memory and concentration and distressing memories of the ICU experience [4]. The negative ICU experience also can lead to psychiatric conditions such as depression, anxiety, and posttraumatic stress disorder (PTSD) after discharge [9,10].

Several measurement tools have been developed to assess the impact of negative ICU experience on patient outcomes. One of them is the Intensive Care Experience Questionnaire (ICEQ), which assesses patients' overall ICU experiences, including perceptions, feelings, satisfaction, and memories [11]. The ICEQ was developed in the UK in 2004 and demonstrated acceptable reliability and support for concurrent and predictive validity [11]. The ICEQ has been used in other studies in the UK [12,13], as well as in Australia [14], Jordan [15], and Turkey [16,17]. It was also used in prospective studies on ICU survivors' long-term outcomes such as anxiety, depression, PTSD, and quality of life after discharge [13,14,18]. Other tools assessing ICU experience, the Intensive Care Unit Memory Tool [19] and the Intensive Care Unit Environmental Stressor Scale [20], measure only a fraction of the experience, such as ICU memories or perception of environmental stresses. In comparison, the ICEQ consists of four subscales covering various aspects of the ICU experience.

Although the ICEQ has been used in a variety of studies related to ICU patient experience, no prior studies have been reported with Korean patients. To use a measure in a different country, especially when there are differences in language and culture, validation of the tool considering the sociocultural and linguistic context is needed [21]. The severity of ICU patients in Korea is high, but there is a shortage of medical personnel including nurses [3]. Because most nurses are in charge of three or more patients, it is difficult to provide individualized care in Korean ICUs [2]. Unlike European countries or the United States, in most Asian countries' ICUs, including Korea's, patients stay in an open space except in special cases such as isolation for infection control [22]. Influenced by traditional Confucian culture, Koreans are reluctant to show their bodies to others and are afraid to be isolated from their families [23]. The current state of intensive care and the unique aspects of the patient experience in the open ICU space need to be reflected in the Korean adaptation of the ICEQ through expert panel reviews and cognitive interviews [21]. This study translated and culturally adapted the ICEQ to a Korean context (the K-ICEQ) and evaluated its psychometric properties.

Methods Study design

This study included two phases. In the first phase, the ICEQ was translated into Korean and adapted to Korean culture. In the second phase, the validity and reliability of the K-ICEQ were evaluated through a cross-sectional survey.

Phase 1: Cross-cultural adaptation

Researchers acquired permission from the original author of the ICEQ and followed the World Health Organization's process of instrument translation and adaptation [21]. This process included forward translation, expert panel back-translation, pretesting, and cognitive interviewing

Forward translation and back translation

First, two people whose native language is Korean and who were also fluent in English translated the ICEQ. Translator 1 was an intensive care unit nurse who majored in English literature and translated the ICEQ reflecting her clinical viewpoint (T1). Translator 2 was a professional translator and translated the scale from a purely linguistic point of view with no clinical background (T2). The two translators independently performed forward translation, and

the authors of the present study created “T12” by integrating the results of T1 and T2. Next, T12 was back translated. Two professional translators (BT1 and BT2) translated T12 written in Korean into English.

Expert panel review

A committee of experts was organized to confirm the appropriateness of the translation and item structure of T12. The Expert Committee consisted of ten members: five ICU survivors, two ICU nurses not involved in the translation process, one nursing methodologist, and two linguists.

First, the researchers interviewed the five ICU survivors as a means of validating the items within the sociocultural context of Korea. Their ages ranged from 48 to 64 years old; three were men. The reasons for their ICU admissions were pneumonia, acute respiratory distress syndrome, liver transplantation, Guillain-Barre syndrome, and myasthenia gravis. Four of them underwent mechanical ventilation treatment. The ICU length of stay ranged from 6 to 50 days. All interviews were conducted one-on-one by one of the researchers after obtaining informed consent. The main interview questions were “Tell me about your experience of being on the ICU” and “Do you have anything to add to the ICEQ items?” Analysis of the contents of the interview resulted in the addition of four new items: “I was embarrassed,” “I felt trapped,” “I was treated impersonally,” and “I was suffering because of the other patients.”

The remaining five experts examined the original and translated measures (T1, T2, T12, BT1, and BT2) for the relevance and translation process of each item. They also evaluated the four additional items. Throughout the five meetings, the panel repeatedly reviewed and revised items. The panel recognized that two items, “I have no recollection of being in intensive care” and “Most of my memories are blurred,” had almost the same meaning when translated into Korean. They also agreed that two other items, “I wish I had known more about what was happening to me” and “I knew what happened to me,” were difficult to distinguish in Korean. The panel proposed to exclude two items to avoid redundancy: “I have no recollection of being in intensive care” and “I wish I had known more about what was happening to me.” Through these expert panel reviews, four items were added and two items were deleted, resulting in a preliminary Korean version of the intensive care experience questionnaire (K-ICEQ) consisting of four subscales and 26 items.

Content validity

Another expert group consisting of two nursing professors, one ICU head nurse, and two nurses with 9 years of ICU experience assessed the content validity of the K-ICEQ. The results of their analysis indicated the scale items were highly congruent with or relevant to the construct. The item-content validity index values were high at 0.90–1.00, and no additional content validity test was conducted.

Pretesting and cognitive interviewing

To supplement the cultural appropriateness and understandability of the K-ICEQ, pretests and cognitively interviews were conducted with 20 ICU survivors who consented to participate. The group included 15 men and 5 women. Their ages ranged from 21 to 80 years old, and the ICU length of stay ranged from 1 to 24 days. During the cognitive interview, the participants were guided to read the K-ICEQ items aloud slowly. The researchers then asked their understanding of each item, their answers, and the reasons for their choice. Participants also expressed their opinion about item readability and comprehensibility. Five of them were able to complete the questionnaire within 5 minutes, 13 of them within 5 to 10 minutes, and two took more than 10 minutes. In the course of the aforementioned process, no items were found to be difficult to understand or have unnecessary words or phrases.

Phase 2: Evaluation of the K-ICEQ Setting and samples

A questionnaire survey was conducted at three university hospitals in a city in Korea to evaluate the psychometric properties of the K-ICEQ. All three hospitals were tertiary hospitals affiliated with universities with 957–1,194 beds and 50–107 ICU beds. Each hospital had four to eight ICUs, including surgical, medical, neurosurgical, emergency, trauma, and mixed ICUs. All of these ICUs were rated at the highest grade in the National Health Insurance Service ICU evaluations.

The inclusion criteria were the same as for the original ICEQ: adults over 18 years of age who were admitted to the ICU for 24 hours or more. Patients who had been discharged from the ICU for more than 6 months were excluded to avoid the possibility of errors in memory. When assessing construct validity by factor analysis, a minimum of 150

participants is required to ensure that the factor structure is likely to remain stable across samples [24]. Data were collected from 202 ICU survivors; however, two questionnaires had missing data resulting in 200 useable questionnaires for the analysis. Of these, 139 (69.5%) were patients in general wards and the remaining 61 (30.5%) were outpatients.

Ethical considerations

The study received approval from the Institutional Review Board of Kosin University Gospel Hospital (Approval no. KUGH2018-11-013-001). Participants were informed of the purpose and procedure of the study and then provided their consent to participate by signing a consent form.

Instrument

The K-ICEQ is a 26-item self-report instrument with four subscales. “Recall of Experiences” has 4 items (numbered 1–4), “Satisfaction with Care” has 5 items (5–9), “Frightening Experiences” has 9 items (10, 19–26), and “Awareness of Surroundings” has 8 items (11–18). Each item is measured on a 5-point Likert scale. Eleven items (1–11) are responded to regarding agreement (1 = strongly agree to 5 = strongly disagree). Items # 6, 10, and 11 are reversed items. The remaining 15 items (12–26) are responded to with regard to frequency (1 = never to 5 = always). The higher the score on “Recall of Experiences,” the better they remember their ICU experience (score range: 4–20). The higher the score on “Satisfaction with Care,” the more satisfied they were with the ICU environment and care (5–25). The higher the “Awareness of Surroundings” score, the more aware they were of themselves, others, place, time, and treatment situation (score range: 8–40). Lastly, the higher the “Frightening Experiences” score, the more frightened and terrible they felt during their ICU stay (score range: 9–45). Scores are calculated for each subscale, not for their sum of them, according to the original tool scoring method.

Data collection

This study publicly recruited study participants in the ICUs and outpatient clinics from January 5 through February 28, 2019. For ICU patients, announcements of participant recruitment were posted on ICU bulletin boards. Once ICU patients indicated their intention to participate, the survey was conducted in the patient room after they were transferred to general units. Announcements were also posted on each outpatient clinic's bulletin board. When the patients indicated their intentions, the survey was conducted in the clinic meeting rooms. All surveys were self-reported and took about 10 minutes.

Data analysis

The data were analyzed using IBM SPSS Amos WIN 24.0 program (IBM Corp., Armonk, NY, USA). The researchers analyzed participants' general characteristics using descriptive statistics and performed item analysis with descriptive statistics, Pearson's correlation coefficients, item total correlations (ITC), and interitem correlations (IIC). Construct validity was evaluated by confirmatory factor analysis to determine whether the tool actually measured the theoretical construct for the target group [25]. The researchers evaluated the model fit using the χ^2 statistic and chi square minimum/degrees of freedom (CMIN/DF). Because the χ^2 value is influenced by the sample size, we also analyzed other indices independent of sample size. The Tucker-Lewis index (TLI) and the comparative fit index (CFI) were calculated as incremental fit indices and the root mean square error of approximation (RMSEA) as the absolute fit index. The reference values for each fitness index were $p > .05$ for χ^2, CMIN/DF ≤ 3.0, GFI ≥ .90, TLI ≥ .90, CFI ≥ .90, and RMSEA ≤ .08 [26]. Convergent validity was assessed based on standardized factor loadings, critical ratios, average variance extracted, and construct reliability values. Discriminant validity was confirmed by the criterion that the interfactor correlation coefficient ±2 × standard error value should not contain 1 [26].

To assess the known-groups validity, independent t test were conducted on groups based on gender, planned ICU admission, mechanical ventilation, and restraints application, which were reported to influence intensive care experience in previous studies [7,15,17]. We calculated the Cohen's effect size (d) of the differences between the groups. Cronbach's α was used to evaluate internal consistency reliability.

Results Sample characteristics

The mean age of the participants was 62.04 ± 12.81 years; 59.5% were men. Most participants were married

(90.5%) and living with someone (79.0%). The mean ICU length of stay was 4.42 ± 0.55 days. Other characteristics of the participants are shown in [Table 1]. The mean scores for the subscales were as follows: “Recall of Experiences” was 3.21 ± 0.86, “Satisfaction with Care” was 3.81 ± 0.74, “Frightening Experiences” was 2.16 ± 0.82, and “Awareness of Surroundings” was 4.14 ± 0.76.

Item analysis

The results of the item analysis are shown in [Table 2]. The mean scores of the 26 items ranged from 1.46 to 4.44 and the standard deviations ranged between 0.83 and 1.42. In the course of item analysis, items with ITC values less than .30 and items with IIC values greater than .80 can be considered for elimination [24]. The ITC value of all items was .30 or more. The IIC values of items 12 through 16 were greater than .80. However, we did not delete the items because they did not duplicate any other items and each item had inherent attributes.

The skewness of the items ranged from −1.44 to +2.03 and the kurtosis ranged from −1.48 to +3.14. The only item outside the reference value of ±1.96 in skewness and kurtosis [26] was item 21 (“I saw strange things”). Because the item was about unusual symptoms, the variation in response among patients was expected to be large. Therefore, high skewness or kurtosis was not a reason to delete the item.

Construct validity

The K-ICEQ model fit indices were χ^2 = 779.41 (p 2 = 534.94 (p 2, which are sensitive to the sample size, reached the recommended level [26] ([Table 3], [Figure 1]).

The standardized factor loadings (λ) were .31–.95 as a result of evaluating convergent validity. Most λ values were higher than the recommended value of or close to .5 [26]. However, the λ value of item 26, “I was suffering because of the other patients,” was as low as .31. This item was added from the interviews with the ICU survivors on the expert panel. We did not remove the item because it reflected the Korean experience; the patient may witness pain, delirium, intubation, and even death of other patients in an open ICU space. The significance of the factor loading (critical ratios) was 3.64–25.33 and all items were over 1.965. Average variance extracted values ranged were .24–.68, but construct reliability values ranged from .70 to .94, with all subscales being more than the reference value of .70 [26]. As a result of evaluating the discriminant validity using the interfactor correlation coefficient and standard error, all the factors ranged between .11 and .83, therefore meeting the criterion that they should not include 1.0 [26] ([Table 3]).

Known-groups validity

[Figure 2] shows the results of known-groups validity analysis. Women had significantly higher “Frightening Experiences” than men did (t = −2.05, d = .29). Compared with the planned ICU admission group, the unplanned group had significantly lower “Recall of Experiences” (t = 3.25, d = .47), “Satisfaction with Care” (t = 2.18, d = .32), and “Awareness of Surroundings” (t = 3.02, d = .47). “Recall of Experiences” (t = −3.01, d = .46) and “Awareness of Surroundings” (t = −4.97, d = .79) were significantly lower in the group with mechanical ventilation treatment. Their “Frightening Experiences” were significantly higher than that of the no mechanical ventilation group (t = 4.25, d = .64). “Recall of Experiences” (t = −3.79, d = .57) and “Awareness of Surroundings” (t = −5.00, d = .72) were significantly lower in the group with restraints; their “Frightening Experiences” was significantly higher than that of the no restraints group (t = 3.46, d = .50).

Reliability

The Cronbach's α values were .76 for “Recall of Experiences,” .74 for “Satisfaction with Care,” .80 for “Frightening Experiences,” and .93 for “Awareness of Surroundings” ([Table 2]).

Discussion

The purpose of the present study was to adapt the ICEQ for use with the Korean population (namely, the K-ICEQ) and evaluate its psychometric properties. In the process of adapting the measure, 2 items were deleted, and 4 new items were added to suit the Korean context.

The researchers considered the ICU environment and cultural context of Korea by reflecting the experience of Korean ICU survivors in the items that were added. The items were about impersonal treatment, feeling trapped, embarrassment, and suffering because of other patients. The ICU nurse-to-patient ratio in Korea is 3.3, higher than

that of 1–1.8 in Western countries [2,22]. The high workload of ICU nurses is one of the barriers to patient-centered care [27]. The poor working environment of ICU nurses in Korea might prevent the provision of individualized care, which could have a negative impact on the intensive care experience. According to a Korean qualitative study [5], ICU patients often experience impersonal situations surrounded by state-of-the-art equipment and machines. Their communication may sometimes be restricted owing to intubation or they may feel stuck and trapped by restraints and central and arterial lines (e.g., catheters) [5]. In addition, they may be very embarrassed and find the situation unbearable when they must urinate or move their bowels in bed [5,28]. In the light of Korean Confucian culture that values honor and family [23], ICU patients may regard this situation as a frightening experience. The additional item (#26) concerns the difficulties caused by other patients in the ICU. This reflects the unique characteristics of the ICU in Korea, which is mostly open space. Patients often witness the pain, delirium, and even death of other patients in the ICU. Yang [28] described this experience as “the depth of misery through other patients.” The four additional items can also be applied to ICU patients in other countries. However, the original ICEQ did not include these items. The researchers believe that these items were added to the K-ICEQ as an integrated result of nursing work environment, ICU situation, and Korean cultural context.

Two items, “I have no recollection of being in intensive care” and “I wish I had known more about what was happening to me,” were deleted in the process of the expert panel review; the reason being the differences in English and Korean linguistic expressions. In particular, there is no passive expression in Korean and the subjunctive mood expression differs a lot from English [29]. The two deleted items translated into Korean are similar to “Most of my memories are blurred” and “I knew what was happening to me.”

Item analysis showed that the IIC of five of the items on the “Awareness of Surroundings” subscale was higher than 0.80. This was similar to what was reported when developing the original ICEQ [11]. All five items ask about awareness of place, self, and others during their ICU hospitalization. Rattray et al [11] explained that the correlations between these items were high because of the similarity of recognition in various situations according to the individual's cognitive level. In the present study, the intention of the original developers of the ICEQ was maintained and therefore these items were not deleted.

Based on the evaluation of the fitness indices, the modified final model of the K-ICEQ was found to be an appropriate and parsimonious tool to measure the ICU experience of Korean patients. The evaluation of convergent validity and discriminant validity indicated that the individual items consistently measured the ICU experience and at the same time maintained independence between the four subscales [26]. Although there were some changes in the items compared with the original ICEQ, the reliability was satisfactory with Cronbach's α of the K-ICEQ subscales ranging from .74–.93.

The results of the known-groups validity test showed differences in ICU experiences according to gender, plan of ICU admission, mechanical ventilation treatment, and application of restraints in the ICU. These results are consistent with previous studies reporting ICU experiences in Australia [14], Turkey [16,17], and the UK [12,13]. The mean score for the ICU experience of the participants in the present study was similar to that of ICU survivors in Australia [14]. Compared with studies on patients in Turkey [16,17], the mean scores of the “Recall of Experiences,” “Awareness of Surroundings,” and “Satisfaction with Care” subscales were higher in the present study; the mean of the “Frightening Experiences” subscale was lower. This is because, first, the ICU length of stay in our study and the Australian study [14] was 3–4 days, which was shorter than seven days in the Turkish study. Second, women accounted for 61% of the Turkish study [16], higher than 35.2% and 40.5% of the Australian [14] and present study, respectively. These findings suggest that the intensive care experience might be different depending on the sociocultural context and the characteristics of the ICU patients. Follow-up studies are needed to compare the differences in ICU experiences across various countries and patient characteristics.

Understanding the patient's experience is essential for imroving patient outcomes through patient-centered care. The researchers derived items from the experiences of critical care survivors; the added four items of the K-ICEQ reflect Korean culture, as well as the physical environment and nursing work environment of Korean ICUs. Accordingly, the K-ICEQ measures the experience of Korean ICU patients and can contribute to the development

and evaluation of interventions to improve the ICU experience. Because most K-ICEQ items are related to nursing, the K-ICEQ can be used as one of the reliable and valid measures for assessing nursing-sensitive indicators that reflect the structure, process, and outcomes of nursing care. It can also be used to assess the effect of the ICU patient experience on various outcomes in ICU survivors, such as anxiety, depression, PTSD, postintensive care syndrome, quality of life, and survival. The K-ICEQ measurement is useful in providing a direction for improving the intensive care experience in Korea, such as improving the environmental intervention and appropriate nurse staffing. The present study has the following limitations. First, because the questionnaires were given to patients who were discharged from the ICU, the accuracy of the recall of their experience may have been affected. Our participants were 30.5% outpatients. It is possible that their memory of their intensive care experience was less clear than that in inpatients. In addition, survivors who did not want to participate in the study may have had a more unpleasant experience or may not have a memory of the ICU. As such, it is possible that the negative ICU experience of patients might have been underestimated. This should be considered in interpreting and understanding the results of the present study. Second, we have not been able to evaluate the concurrent or criterion validity of the K-ICEQ because measures such as the Intensive Care Unit Memory Tool and Intensive Care Unit Environmental Stressor Scale have not been adapted for use with Koreans. Future research will be needed to make cultural adaptations to various measures related to the ICU experience and to compare and analyze related factors and outcomes of patients' experiences. Third, the test-retest reliability was not evaluated because study participants did not stay in the ward for a sufficient number of days after leaving the ICU. Therefore, further research is needed to evaluate the stability of the K-ICEQ over time.

Conclusion

This study adapted the ICEQ into a Korean version (K-ICEQ) and evaluated its validity and reliability. In the process of adaptation of the measure, the researchers tried to maintain the attributes of the original ICEQ while considering the Korean linguistic characteristics and sociocultural context of Korea. Two items were deleted from the ICEQ and four items were added, resulting in a 26-item K-ICEQ with four subscales. Support was found for the construct validity, convergent validity, discriminant validity, known-groups validity, and internal consistency reliability of the scale. The K-ICEQ has utility as a measure of Korean patients' ICU experiences. Future research is needed on the influencing factors and long-term outcomes of the ICU experience, as well as identifying ways to improve the ICU experience and develop interventions for person-centered nursing care.

Declaration of Competing Interest

The authors declare there are no conflicts of interest with respect to the research, authorship, and publication of this article.

Acknowledgments

This work was supported by the National Research Foundation (NRF) of Korea grant funded by the Korea government (Ministry of Science and Information and Communication Technologies: MSIT) (No NRF-2019R1A2C1011300).

Characteristics	Group	n (%) or Mean ± SD	K-ICEQ			
Recall	Satisfaction	Frightening	Awareness	Mean ± SD	Mean ± SD	Mean ± SD
Mean ± SD	Age (yrs)		62.04 ± 12.81			

	<40	10 (5.0)	3.35 ± 0.89	3.70 ± 0.46	2.61 ± 1.00	4.17 ± 0.46
40 ~ 59	68 (34.0)	3.19 ± 0.86	3.73 ± 0.78	2.28 ± 0.79	4.06 ± 0.77	≥60
122 (61.0)	3.21 ± 0.86	3.87 ± 0.73	2.05 ± 0.80	4.23 ± 0.77	Gender	Men
119 (59.5)	3.24 ± 0.86	3.82 ± 0.77	2.06 ± 0.81	4.12 ± 0.78	Women	81 (40.5)
3.17 ± 0.85	3.80 ± 0.69	2.30 ± 0.82	4.25 ± 0.72	Marital	Married	181 (90.5)
3.20 ± 0.86	3.82 ± 0.74	2.13 ± 0.89	4.18 ± 0.77	status	Single	19 (9.5)
3.34 ± 0.87	3.74 ± 0.75	2.40 ± 0.89	4.06 ± 0.65	Living with	Family	158 (79.0)
3.20 ± 0.88	3.80 ± 0.74	2.12 ± 0.80	4.18 ± 0.74	Alone	42 (21.0)	3.25 ± 0.79
3.86 ± 0.76	2.28 ± 0.88	4.13 ± 0.82	ICU type	Surgical	105 (52.5)	3.24 ± 0.83
4.08 ± 0.57	2.00 ± 0.66	4.40 ± 0.63	Medical	73 (36.5)	3.23 ± 0.92	3.53 ± 0.84
2.33 ± 0.98	3.98 ± 0.81	Others[a]	22 (11.0)	3.03 ± 0.75	3.51 ± 0.68	2.19 ± 0.81
3.74 ± 0.78	Planned	Yes	124 (62.0)	3.36 ± 0.84	3.90 ± 0.74	2.09 ± 0.83
4.31 ± 0.62	ICU admission	No	76 (38.0)	2.97 ± 0.83	3.67 ± 0.71	2.21 ± 0.79
3.95 ± 0.89	ICU LOS		4.42 ± 0.55			
	1	69 (34.5)	3.36 ± 0.86	4.05 ± 0.65	1.76 ± 0.53	4.42 ± 0.55
2 ~ 3	70 (35.0)	3.30 ± 0.85	3.73 ± 0.80	2.20 ± 0.80	4.27 ± 0.71	4 ~ 7
36 (18.0)	3.11 ± 0.73	3.72 ± 0.70	2.44 ± 0.84	4.05 ± 0.78	≥8	25 (12.5)
2.72 ± 0.89	3.52 ± 0.69	2.48 ± 0.65	3.41 ± 0.83	Surgery	Yes	140 (70.0)
3.20 ± 0.86	3.86 ± 0.73	2.23 ± 0.87	4.18 ± 0.71	No	60 (30.0)	3.25 ± 0.86
3.70 ± 0.75	1.98 ± 0.66	4.17 ± 0.86	Mechanical ventilation	Yes	68 (34.0)	2.96 ± 0.84
3.74 ± 0.81	2.50 ± 0.86	3.80 ± 0.79	No	132 (66.0)	3.35 ± 0.84	3.85 ± 0.70
1.98 ± 0.74	4.38 ± 0.66	Restraints	Yes	71 (35.5)	2.91 ± 0.80	3.79 ± 0.83

2.42 ± 0.86	3.83 ± 0.81	No	129 (64.5)	3.38 ± 0.84	3.83 ± 0.69	2.01 ± 0.76
4.36 ± 0.65	Diagnosis	Digestive	71 (35.5)	3.25 ± 0.94	3.90 ± 0.70	2.22 ± 0.83
4.21 ± 0.78	Cardiovascular	60 (30.0)	3.16 ± 0.75	3.81 ± 0.82	2.20 ± 0.89	4.20 ± 0.64
Respiratory	29 (14.5)	3.43 ± 0.91	4.00 ± 0.61	1.92 ± 0.68	4.24 ± 0.77	Trauma
14 (7.0)	2.91 ± 0.89	3.48 ± 0.79	2.36 ± 0.87	3.70 ± 0.81	Neurological	13 (6.5)
3.00 ± 0.72	3.55 ± 0.73	2.15 ± 0.84	3.71 ± 0.82	Sepsis	6 (3.0)	3.37 ± 0.98
3.43 ± 0.81	2.21 ± 0.77	4.56 ± 0.90	Others[b]	7 (3.5)	3.25 ± 0.59	3.77 ± 0.45
1.83 ± 0.45	4.78 ± 0.25	Comorbidities	Yes	126 (63.0)	3.25 ± 0.88	3.77 ± 0.79
2.17 ± 0.81	4.26 ± 0.70	No	74 (37.0)	3.14 ± 0.83	3.89 ± 0.65	2.13 ± 0.84
4.03 ± 0.83	Total			3.21 ± 0.86	3.81 ± 0.74	2.16 ± 0.82

Item	Mean ± SD	Skewness	Kurtosis	ITC (r)	Alpha if item deleted	Cronbach's α
Recall of Experiences						.76
1Most of my memories of intensive care are blurred.	3.31 ± 1.42	−0.11	−1.48	.67	.64	
2I wish I remembered more about it	3.45 ± 1.24	−0.33	−1.06	.66	.65	
3I seemed to sleep too much	3.11 ± 1.07	0.20	−1.01	.44	.76	
4I never knew whether it was day or night	2.96 ± 1.31	0.21	−1.24	.49	.74	
Satisfaction with Care						.74

5My care could have been better	3.87 ± 1.06	−0.72	−0.38	.57	.67	
6I thought my care was as good as it could have been	3.80 ± 0.87	−0.00	−1.02	.55	.69	
7I was constantly disturbed	3.98 ± 1.09	−0.76	−0.58	.47	.71	
8It was always too noisy	3.42 ± 1.11	0.01	−1.12	.41	.74	
9I was treated impersonally[a]	4.27 ± 0.99	−1.28	0.48	.56	.68	
Frightening Experiences						.80
10I thought I would die	2.23 ± 1.27	0.59	−1.10	.40	.80	
19.I seemed to have bad dreams	1.93 ± 1.28	1.01	−0.46	.66	.76	
20I felt scared	1.92 ± 1.28	1.00	−0.46	.67	.76	
21I saw strange things	1.46 ± 0.95	2.03	3.14	.40	.79	
22I felt helpless	2.35 ± 1.24	0.27	−1.20	.49	.78	
23I seemed to be in pain	2.93 ± 1.31	−0.03	−1.10	.46	.79	
24I was embarrassed[a]	1.80 ± 1.23	1.22	0.05	.52	.78	
25I felt trapped[a]	2.39 ± 1.39	0.40	−1.26	.50	.78	
26I was suffering because of the other patients[a]	2.07 ± 1.23	0.62	−1.11	.37	.80	
Awareness of Surroundings						.93

11I was able to let people know what I wanted.	4.04 ± 0.90	−0.72	−0.01	.60	.94	
12I recognized my relatives.	4.44 ± 0.83	−1.27	0.55	.81	.92	
13I was aware of someone near to me.	4.38 ± 0.90	−1.40	1.37	.85	.92	
14knew where I was.	4.38 ± 0.90	−1.44	1.54	.86	.92	
15I knew what was happening to me.	4.28 ± 0.93	−1.10	0.32	.87	.92	
16I remember my relatives being with me.	4.29 ± 0.95	−1.13	0.29	.84	.92	
17I felt safe.	4.06 ± 1.02	−0.72	−0.58	.70	.93	
18I felt I was in control.	4.26 ± 0.84	−0.83	−0.24	.62	.93	

Factors	Item	λ	C.R.	p	Factors			AVE	CR
1 (r)	2 (r)	3 (r)	Recall of Experiences	1	0.86	6.93	<.001	1	
	.37	.70	2	0.83	6.90	<.001			
		3	0.46	5.01	<.001				
	4	0.50	–	–					
Satisfaction with Care	5	0.58	5.19	<.001	.20	1		.35	.72
6	0.51	5.85	<.001						7
0.65	5.49	<.001						8	0.46

–	–						9	0.78	5.83
<.001						Frightening Experiences	10	0.49	3.77
<.001	−.16	−.73	1	.24	.72	19	0.81	4.24	<.001
					20	0.79	4.22	<.001	
				21	0.51	3.81	<.001		
			22	0.52	3.84	<.001			
		23	0.45	3.64	<.001				
	24	0.49	4.37	<.001					
25	0.55	3.91	<.001						26
0.31	–	–						Awareness of Surroundings	11
0.56	9.03	<.001	.56	.44	−.42	.68	.94	12	0.86
18.83	<.001						13	0.88	20.43
<.001						14	0.93	–	–
					15	0.95	25.33	<.001	
				16	0.87	19.75	<.001		
			17	0.66	11.45	<.001			
		18	0.57	9.12	<.001				

DETAILS

Subject:	Patients; Validity; Culture; Memory; Quantitative psychology; Questionnaires; Adaptation; Hospitals; Guillain-Barre syndrome; Interpreters; Intensive care; Interviews; Nurses; Critical care; Post traumatic stress disorder; Medical research; Anxiety
Location:	United Kingdom--UK
Identifier / keyword:	cross-cultural comparison; factor analysis, statistical; intensive care units; life change events; validation study
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	89-96
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.anr.2020.03.002
ProQuest document ID:	2490469081
Document URL:	https://www.proquest.c om/scholarly-journals/cross-cultural-validation-intensive-care/docview/2490469081/se-2?accountid=211160

Development and Evaluation of an SBAR-based Fall Simulation Program for Nursing Students

Jeong, Jeong Hee [1] ; Eun Jeong Kim [2] [1] Department of Nursing, Daedong College, Busan, Republic of Korea [2] Department of Nursing, Dong-A University, Busan, Republic of Korea

ABSTRACT (ENGLISH)

SUMMARYPurpose

The purpose of this study was to develop an Situation-Background-Assessment-Recommendation (SBAR) fall simulation program for Korean nursing students and to evaluate its effectiveness.

Methods

This study used a single-blind randomized control pretest–posttest design. The 54 nursing students in their third semester at a college in Korea were selected through convenience sampling (SBAR group 26, handoff group 28). The SBAR-based program was provided to the experimental group, while the general handoff-based program was given to the control group. The program was designed for a total of three sessions each and no more than 120 minutes each. Measurement variables included the knowledge, skill, attitude, communication ability, and its clarity related to falls. The data were analyzed with x2 test, t test, and repeated measures of ANOVA using the SPSS 18.0 program.

Results

The SBAR group showed the improved fall-related skill and communication clarity compared with the handoff group. There was a significant difference in the fall-related knowledge only in a time-dependent manner before and after intervention, while there was no statistically significant difference in the attitude and communication ability related to falls.

Conclusions

SBAR-based simulation program revealed positive results in terms of patient safety of nursing college students compared with the general handoff-based method. Therefore, the SBAR-based simulation program is expected to be used as an educational intervention for nursing students not only to improve abilities in reporting and communication but to prevent or handle patient safety accidents efficiently.

FULL TEXT

Introduction Background

Patient safety is a top priority area in the quality of medical care, minimizing the possibility of medical malpractice and preventable errors to a patient [[1]]. In particular, falls are one of the patient safety goals required by the Joint

Commission International. However, it is the most frequently reported incident among all safety accidents and is the leading cause of accidental or unintentional injury deaths [2]. Therefore, it is important that appropriate nursing interventions are provided to identify and reduce a patient's underlying fall risk factors and to prevent secondary injury to a patient who has fallen. Nurses are a group that can sensitively recognize and manage problems related to patient safety [3], and nursing personnel are the main targets to enhance essential patient safety competences such as knowledge, skills, and attitudes to protect patients from harm or injury [4].

As the medical environment becomes more complex and collaboration with team is needed, good communication skills of medical professional have been considered extremely important for patient safety [1]. In particular, nurses are usually in charge of connecting communication with others such as patients, coworkers, or doctors under various clinical situations [5]. Effective communication skill of nurses is particularly important to ensure patient safety and quality of care [1,2], and the communication in nursing is a vital element emphasized by international organizations for the patient safety [1,6,7].

However, the communication problem between the medical professionals are severe [8,9], so much that more than 60% of sentinel events were reported to be due to miscommunication [10]. In addition, nursing students are unable to communicate information clearly because of their ability to apply theoretical knowledge to nursing practice and lack of communication experience between medical professionals [11]. Despite sufficient clinical clues and data, there is a tendency for insufficient communication, such as simple reporting of the patient's condition [12]. Therefore, studying communication in their undergraduates education is necessary to be able to effectively communicate information regarding patient health after confirming clinical clues and changes in patient status [1,12].

The Situation-Background-Assessment-Recommendation (SBAR) is a structured communication tool designed to reduce errors caused by communication and to improve patient safety, including situation, background, assessment, and recommendations [10]. Communication using SBAR can improve nurses' communication clarity and improve nurse satisfaction, as well as the quality of care and patient safety [13,14]. In Korea, interest in SBAR is increasing, requiring the agency to require regulations for accurate communication between medical professionals [15].

As previously mentioned, a number of research studies have been conducted to alleviate communication problems because communication in a health-care setting is an imperative competence for patient safety. To date, a few studies have examined effects of SBAR-applied education: specifically, improvement effect of communication clarity, clinical performance and self-efficacy on nurses [5] and improvement effect of teamwork and patient safety on health professionals in hospital [8], enhancement effect of communication ability on nursing university students [11], and positive changes in patient safety indicators on staff in rehabilitation ward with high fall rates [16]. However, there is little research evidence documenting specific changes in competences of patient safety and communication through the SBAR-based simulation program on nursing university students. Therefore, this study developed and investigated the effects of an SBAR-based program for nursing students on the topic of falls – the most common patient safety accident – to provide a training strategy for efficient communication and patient safety competence in future clinical settings.

Purpose of study

This study aimed to develop the SBAR-based fall program (SBAR fall program) for nursing students and to examine the effects on their fall knowledge, skills, attitude, communication ability, and communication clarity.

Study hypothesis

The hypotheses established to achieve the purpose of this study were as follows:

1. After intervention, the experimental group (SBAR group) receiving the SBAR fall program will have the improved knowledge of falls compared with the control group (handoff group), which will not have so.

2. After intervention, the fall-related skills in the SBAR group will be improved compared with the handoff group.

3. After intervention, the fall-related attitude in the SBAR group will be improved compared with the handoff group.

4. After intervention, the communication ability in the SBAR group will be improved compared with the handoff group.

5. After intervention, the communication clarity in the SBAR group will be improved compared with the handoff group.

Methods Study design

This study used a single-blind randomized control pretest–posttest design.

Participants

The research participants are those who experienced clinicals for one year as a third-year nursing student in one college in Korea. The applicants who signed on the agreement of research participation voluntarily among the 231 third-year students were selected through the recruitment announcement after addressing further details of the research. The calculation of the number of participants needed to conduct research was performed using the G*Power 3.1.3 program [17]. For repeated measures of ANOVA, with significance level α = .05, power (1-β) = .90, number of measurements = 2, number of groups = 2, correlation among repeated measures = .50, and medium effect size f = .25, the total sample size was 46 (23 in each group). Considering a drop-off rate of 25.0%, 30 participants were needed for each group. The basis of calculating the effect size is based on the effect size (d) 0.85 in the meta-analysis study investigating the changes in knowledge and attitude after applying simulation to nursing students [18] and the effect size (d) 0.7 in the communication improvement program for the nursing student [19]. The number of participants was selected based on f = .25, which is the median size. Before running the program, 30 people were recruited for each group, and the simulation operation consisted of two teams, each of which consisted of 15 teams of experimental and control groups. During the intervention period, four in the SBAR group and two in the handoff group who did not participate more than one time due to personal affairs were treated as dropouts. The data from 26 participants in the SBAR group and 28 in the handoff group were analyzed in the final analyses.

Instruments General characteristics

These comprised a total of 8 items, including gender, age, academic performance, experiences of patient safety education, experiences of fall education, experiences of patient safety campaign, experiences of falls campaign, and fall experiences during practice.

Fall-related patient safety competence Knowledge about falls

This study used the tool developed by Kim [20] for nurses. This tool comprised a total of 14 items, including the rate of falls, damage due to falls, internal factors of falls, and external factors of falls. It was evaluated on a total score of 14 points (1 point if correct, 0 point if incorrect). The KR20 value in Kim's research [20] was .76, and the KR20 value in our research was .64.

Skill about falls

Based on the post-fall assessment protocol provided by the Agency for Healthcare Research and Quality [21], it comprised a total of 10 items, including assessment of a neurological damage (change of consciousness, headache, memory loss, vomiting, and so on), request for help, trauma assessment, mobility assessment, and report (fall incidence and patient status). Each item is on a 5-point Likert scale, and Cronbach's α in our research was .83.

Attitude about falls

This study used the tool developed by Kim [20] for nurses. This tool comprised a total of 13 items, including interest in falls and nursing, opinions about falls in hospital (the cause and responsibility of the fall, extent of the damage, impact of the hospital environment, and guilt of the fall), and is on a 5-point Likert scale. Cronbach's α in Kim's research [20] was .72, and Cronbach's α in our research was .74.

Communication Communication ability

This study used the General Interpersonal Communication Competence scale (GICC-15) which was developed by Hur [22] by adding 7 types of concepts based on interpersonal communication competence developed by Rubin et al. [23] This tool comprised a total of 15 items (self-disclosure, empathy, social relaxation, assertiveness, concentration, interaction management, expressiveness, supportiveness, immediacy, efficiency, social appropriateness, conversational coherence, goal detection, responsiveness, and noise control) on a 5-point Likert scale. Cronbach's α in Hur's [22] research was .72, and Cronbach's α in our research was .80.

Communication clarity

Structured communication from the study by Dunsford [24] was modified to fit this program. Before use, the validity of the tool was evaluated by professors in fundamentals of nursing, adult health nursing, and simulation. This tool comprised 9 items including introducing the nurse, explaining why the nurse called the doctor, describing the patient's fall and risk factors, explaining the patient's body condition, care after falls, and nurse's suggestion according to judgment result. One external expert watched the recorded video of the simulation and rated on a 3-point scale (0 point for inadequate, 1 point for adequate, and 2 points for superb). Cronbach's α for this measure was .78.

Procedure and implementation Development of fall simulation program and outline Development of program

The program for the SBAR group was developed based on “A shared structure for effective team communication. An implementation toolkit,” which is an education session for medical professionals [25]. This guideline comprised 3 to 1.0~2.0 hrs sessions. Each session is categorized into education session 1 (didactic session; communication in health care and the SBAR tool), education session 2 (practice session; experiential-based learning with the adapted SBAR tool), and education session 3 (SBAR team focus group discussion). The general handoff-based method provided to the handoff group was structured based on “Use of the handoff of care form” suggested by Zard from St Joseph's Medical Center [26]. This guideline includes patient care, treatment and service, recent condition, and recent or anticipated changes.

The programs of the SBAR group and handoff group were designed to conduct once in every 2 days for 120 minutes, 3 sessions in total. The specific contents and methods of management were partially modified to reflect the characteristics of nursing students. Because students prioritize learning in a limited environment of school, researchers attempted to enhance the program by first providing general knowledge about the learning topic, then increasing the experience to practical applications (team practice, role play, standard patient usage), and providing debriefing time. Details of the program and structure are listed in Appendix 1.

Fall scenarios, subsequent fall risk factors, and inspection of injury reflected contents from the “3N: Post-fall Assessment, Clinical Review” protocol by the Agency for Healthcare Research and Quality [21]. This was structured so that the situation of the accident and the patient condition after the fall can be immediately identified and reported quickly and accurately to a related medical professional. Scenarios for evaluation were based on actual incidents, but the patient condition, fall experience, underlying diseases, and existence of injury at the time of discovery were simplified and presented considering the 10 minutes evaluation time. More specifically, the scenarios include the patient's condition and main symptoms at the time of admission, the case history, the situation at the time of discovery, the damage and pain area, and the risk of falling, as assessment factors (Appendix 2).

To increase the completeness of the program, the researchers received validity evaluations from two professors in related disciplines (fundamentals of nursing, adult health nursing) and one clinical practice expert. Based on feedback for the post-fall care and communication segments, the program contents were reviewed and modified.

Standard patient

As a standardized patient (SP), two veteran actors who have more than 10 years of experience in a theater stage were casted to reliably simulate particular clinical scenarios. The SP played a patient who has a fall when getting out of a hospital bed. The preliminary meeting was held two times before intervention. Before these meetings, they received rigorous training, in advance, to portray patient scenarios successfully. In the meetings, they prepared to maintain a consistent performance, confirming a role of SP, circumstances of laboratory and scenarios, rehearsal of script, flow of actors, and so on.

Fall simulation program details Experimental group: SBAR-based fall simulation program

In the SBAR fall program ([Appendix 1]) applied to the SBAR group, the first stage of first session lasted 45 minutes. This class was conducted starting with introducing instructors, students, program objectives, and operations, and a lecture-type class on SBAR was given for nursing student to understand regarding falls and to inform clearly the situation of falls and patient's condition to physicians or senior nurses. The handouts and audio-visual materials were utilized in order to help students fully recognize lessons. In the second stage, the form of role play was practiced with contents converted into SBAR forms from main information of the scenarios by team (2 persons/1 team) for 60 minutes. Finally, in the third stage, the students had a time for brief summary of the importance and methodology of SBAR communication techniques and discussed what they learned and felt from using the SBAR in this process for 15 minutes. Then, learning contents for the next lesson were provided in the end of the class.

In the second session, students were given the opportunity to apply SBAR skill more actively in practice and develop their sense of reality through the SBAR-based simulation trained in the first session. The first stage of second session lasted 20 minutes, and it was a time for students to remind and review difficult or additional questions about previous lessons. In addition, SPs and practice room were introduced to perform simulation using newly designed technique. The second stage was an 80-minunute role play for SPs. In this stage, all team members take a role of a nurse working in the same ward, and the instructor acted as a doctor.

The laboratories for simulation and general practice were set in the same form, two for each, for the efficiency of the program progress. Teams were divided in half and performed the programs simultaneously. One group was made of two teams, with each playing a role of patients and nurses, respectively. They shifted their roles for practice. Then, there was a time for debriefing in the third stage.

Finally, in the third session, the evaluation was performed to verify educational status or achievement of student based on what they learned in prior training up to now. The scenarios used for assessment were simplified into no visible trauma founded at the time of discovery by removing the contents about the fall experience and some of the underlying diseases during hospitalization. Before doing assessment, for 15 minutes in the first stage, the evaluation method and modified scenario were presented, and the students reviewed the highlights in previous session. In the second stage, the simulation practice evaluation on SP participated in last session was undertaken by the instructor. At this time, as in the second session, two laboratories for each simulation and general practice were used. The instructor, a researcher of this study, played a role of doctor and checked if the students as a nurse dealt with the circumstances well by asking question about the fall situation and the patient's condition (vital signs, injury, and consciousness). The simulation by teams lasted 10 minutes, and the whole processes were recorded for further assessment. The third stage was formed for student to exchange views and opinions about their experiences during the whole program by debriefing.

Control group: The general handoff-based fall simulation program

The general handoff-based fall simulation program was applied to the handoff group ([Appendix 1]). The program operation method was the same as that of the SBAR group. However, there was only difference in transferring meaningful information obtained from scenarios or simulation situation through the general handover method.

Implementation

The general handoff-based fall simulation program for the handoff group was performed once every two days in total of 3 sessions in January 2018. The SBAR-based program was conducted once every two days, 3 sessions in total, in February 2018. Before the intervention, the researcher randomly assigned the participants into the SBAR group and handoff group using the table of random sampling numbers for group assignments. The managers of the program (professor) were two researchers of this study, and two nurses who have more than 3 years of clinical experiences were placed to help students. In addition, to exclude any effect the researcher had on the students, predata and postdata collection was performed by other two research assistants. In the communication clarity assessment, only postinvestigation after the intervention was undertaken because the participants are students who did not have the experiences of communicating with the medical practitioners in the actual clinic and have not yet studied the simulation course. The communication clarity was assessed based on the visual materials that recorded the evaluation process for both the SBAR group and handoff group. To improve the evaluation reliability, one external expert who was not involved in the study evaluated this consistently.

Ethics

Before data collection, research approval was granted by the department chair and IRB of the corresponding college (Approval no. PNU IRB/2017_123_HR). Research participants were students who responded to a recruitment poster and indicated they understood the purpose and methods of the research by voluntarily completing the consent form. All participants who participated were provided with a small compensation.

Statistical analysis

The collected data were analyzed using the SPSS win version 18.0 program (IBM Corp., Armonk, NY, USA).

- **1)** General characteristics of the participants were calculated using frequency, percentage, mean, and standard deviation.

- **2)** General characteristics and tests of between-group homogeneity of the dependent variables were analyzed with x^2 test and t test.

- **3)** Communication ability and fall-related patient safety competence of pretest–posttest or between groups were analyzed using repeated measures ANOVA. The variance homogeneity of the dependent variables was confirmed by the Mauchly's test of sphericity. These variables did not fulfill the sphericity assumption, and then the Greenhouse–Geisser correction was used.

- **4)** The comparison of the changes in communication clarity between groups was analyzed by t test.

Results General characteristics and homogeneity tests

As it can be seen in Table 1, there was no statistically significant difference between the SBAR group and handoff group with regard to the general characteristics of the participants. In addition, no significant difference was revealed in the fall-related knowledge, skills, attitudes, communication skills, the dependent variables in this study, and between the SBAR group and handoff group.

Hypothesis test

Hypothesis 1

'The SBAR group will have the improved fall-related knowledge after intervention compared with the handoff group' was rejected. Because there was a statistically significant difference in the fall-related knowledge over time before and after intervention (F = 42.62, *p* p = .266) and in interaction between group and time (F = 0.01, *p* = .994).

Hypothesis 2

‘The SBAR group will have the improved fall-related skills compared with the handoff group after intervention’ is supported as there was a statistically significant difference (F = 11.71, *p* = .001) in the fall-related skills over time before and after intervention between two groups.

Hypothesis 3

‘The SBAR group will have the improved fall-related attitude compared with the handoff group after intervention’ was rejected by the result that no statistically significant difference (F = 0.45, *p* = .833) was observed in fall-related attitude over time before and after intervention between two groups.

Hypothesis 4

‘The SBAR group will have the improved communication ability compared with the handoff group after intervention’ was rejected because there was no statistically significant difference (F = 0.75, *p* = .391) in communication ability over time before and after intervention between two groups.

Hypothesis 5

‘The SBAR group will have the improved communication clarity after intervention compared with the handoff group’ was supported because there was a statistically significant difference (t = −11.28, *p* Table 2).

Comparison of subfactors in communication clarity

The test scores for the communication clarity marked by an expert was translated into a maximum of 10 points per question, and then the two groups were compared ([Table 3]). The results showed that the SBAR group was a statistically significant difference compared with the handoff group in the communications on the reason for contacting the doctor, explanation of the risk factors of the fall, and the nurse's suggestion according to the judgment result. However, no statistically significant differences were found between two groups in the explanation of the patient's consciousness status, trauma, and nursing treatment.

Discussion

Current nursing education focuses on therapeutic communication with patients and general human communication. It is mainly composed of theory-based lectures, and there is a limit in acquiring the theory and skills required to guarantee patient safety in the clinical field. As a result, new nurses who have not learned communication among medical staff complain of considerable difficulty in communicating with medical staff in the clinic [11]. The SBAR tool developed in this study is distinct from previous research studies in that various education methods such as lectures, case study, practice, and simulation were implemented for nursing students to totally understand the importance of patient safety competence and communication on the point of patient safety and thus improve the capability of patient safety and communication applied to clinical settings. In addition, the program was made for the teams playing a nurse to assess the SP, cope with the situation, and report it to a researcher who acted as a doctor, allowing students to simultaneously experience nurse–nurse, nurse–patient, and nurse–doctor communications. As a result, the SBAR group, given the SBAR fall program, showed the improved fall-related skills and communication clarity compared with the handoff group, implying that the program intervention was the effective method for training in the undergraduate nursing education settings.

In the results of fall-related knowledge before and after the intervention, there were no significant differences among the groups even though the knowledge after the intervention was improved compared with before the intervention. There is difference between the SBAR group and handoff group, but this is thought to be the result that all groups had been given a fall simulation program. The increase in knowledge about falls supports the finding from a previous study on the systematic review of the simulation training effects on nursing students [27] that found that knowledge increased in 75% of participants after simulation training. As simulation has been reported to be more effective in gaining knowledge than other training methods through reviewing learned knowledge and practically applying it [27],

expanding simulation training for nursing students may increase the knowledge of the learners and maximize the effect of training.

The increase in skills about falls in the SBAR group is difficult to directly compare with previous findings because there is no research that examined changes in the behavioral area through SBAR simulation programs. However, these results are similar to results by Kim et al. [5] that an SBAR program increased nurses' performance skills. The repeated use of SBAR, which is a structured communication tool, generates a schema [28, 29]. The schema refers to structured knowledge about general process of performing an action, results of perception, and social situation [28]. In other words, when a patient fall suddenly occurs, the nurse structuralizes what to observe, what information to collect, and which order the contents should be delivered to alert a doctor by repeatedly using SBAR; this structuralized information can be said to enable the nurse to make quick judgments and behaviors in an urgent situation. The use of a standardized communication tool, rather than the general handoff-based communication tool, facilitates skillful performance by the nursing student and ultimately improves patient safety competence.

Attitude toward falls shows some difference from a previous study in which SBAR application improved the attitude of the nurses about safety [16]. This is interpreted to be the result of recent nursing education emphasizing patient safety and students being repeatedly trained about this from the start of the nursing school. Among safety issues, falls are recognized by the students as a nursing problem with high frequency of occurrence. Therefore, both the SBAR group and handoff group reported the attitude to actively respond to falls and self-evaluated that they were active in post-fall care after the simulation training.

The results for communication ability differ from previous results that found an SBAR application increased communication ability [11, 16]. Identifying changes in general communication ability following a short-term intervention was difficult given that the tool used in this study measures comprehensive communication ability which includes intents such as self-disclosure, empathy, social relaxation, assertiveness, concentration, interaction management, expressiveness, immediacy, and efficiency. There is a need to adequately and consistently provide education and training for the improvement of communication abilities. Thus, a follow-up study examining the changes in the general communication ability following long-term SBAR-based simulation training is needed.

Meanwhile, the improvement of communication clarity in the SBAR group is in line with the results from previous research which found an increase after SBAR education [5]. Increasing the nurses' communication clarity using SBAR is helpful to improve patient safety [13, 14] and brings about substantive improvements in quality of care and cooperation between the medical team [8]. There is a need to emphasize that unclear communication can threaten patient safety and decrease quality of care. The use of SBAR, which is a standardized communication tool, is recommended.

This study compared subfactors of communication clarity and was able to extract significant results. In the communication items ‘Explain why nurse called doctor’ which corresponds to ‘S (situation)’; ‘Describe the patient's falls risk factors' which corresponds to ‘B (background)’; and ‘Nurse’s suggestion according to judgment result’ that corresponds to ‘R (recommendation)’, there was a significantly large increase in the SBAR group than that in the handoff group, demonstrating that simulation training using SBAR can bring about positive effects in communication skills. However, there was no difference in communication on the patient's consciousness status, trauma assessment, and nursing care after falling in ‘A physical assessment and coping’ of ‘A (assessment)’. This step requires not just providing assessment and collection of data about the situation but also offering a meaningful interpretation of the assessment and delivering the self-evaluated clinical judgments [30]. Short-term education may be insufficient to accurately assess the patient's condition and to improve the ability to accurately interpret and deliver meaningful content. It is extremely important to ask a doctor for the necessary actions on the basis of clinical

judgment to ensure patient safety. It has been reported that nurses tend to be reluctant to inform doctors of patient's status if their clinical situation is uncertain or their judgments are wrong [31]. There is a need to emphasize physical assessment skills training through various learning methods including simulation in the undergraduate stage to solve this problem. Skills training should be strengthened to increase comprehensive thinking, critical thinking, and clinical inference for the meaningful identification of relationships within the data.

This study is meaningful in that it provides effective guidance on the contents and methods of communication through the simulation program in the situation where the simulation program based on patient safety and communication for nursing students is lacking. When considering the application of this simulation programs to nursing curriculums, it is needed to adjust the process time. If this program was operated in a total of 2 sessions including first session and performed in teams of four for students to take various roles of nurses, patients, doctors, and so on, it can be easily applicable to more extended students by simplifying the overall process.

However, there are a few limitations in interpreting the results of this research. First, this study was conducted on nursing students in one college, so there is a limitation on generalizing the research results. Second, this study evaluated competences of patient safety and communication immediately after short-term intervention, but it is necessary to evaluate whether the educational effect can be maintained because these competences are the difficult areas to be completed by short-term education. Third, it can be hard to completely rule out the risk of performance bias occurred from single blindness. To minimize this, the researcher planned the program operation method of the SBAR group and the handoff group only with the difference between the SBAR and the handoff-based method and tried to ensure that the quality of education did not differ even when applying the intervention. Based on the results of this study, we would like to make the following suggestions. Given that the present study has not confirmed the impact of short-term intervention on the improvement of communication and the sustainability of education effect, we propose that further research on changes in competences of patient safety and communication and patient safety indicator in the clinical setting should be undertaken through long-term intervention and follow-up observation.

Conclusion

Following a post-fall care simulation program (SBAR-based for the experimental group; general handoff-based for the control group) for nursing students, there was significantly greater increase in communication clarity and fall-related skills in the SBAR group than that in the handoff group. The results showed that the SBAR-based simulation program had positive results in terms of patient safety of nursing college students compared with the general handoff-based method. Therefore, this study has demonstrated that SBAR fall program can be used as a promising training intervention for increasing nursing students' reporting and communication abilities, as well as improving the prevention of and response to patient safety accidents.

Conflicts of interest

The authors declared no conflict of interest.

Appendix A Supplementary data

The following is the supplementary data to this article:**Multimedia component**Multimedia component

Appendix A Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.anr.2020.04.004.

Variables	Range	SBAR group (n = 26)	Handoff group (n = 28)	χ^2 or t	p
n (%) or M±SD	n (%) or M±SD	Gender			
Men		0 (0.0)	1 (3.6)	0.95	.519
Women		26 (100.0)	27 (96.4)		
Age (yrs)	21-40	23.08 ± 3.98	23.21 ± 3.98	0.13	.900
Academic performance (average rating)					
>3.0		2 (7.7)	0 (0.0)	2.86	.053
3.0-3.4		8 (30.8)	7 (25.0)		
3.5-3.9		11 (42.3)	13 (46.4)		
≤4.0		5 (19.2)	8 (28.6)		
Experiences of patient safety education					
Yes		13 (50.0)	11 (39.3)	0.63	.159
No		13 (50.0)	17 (60.7)		
Frequency of patient safety education	0-5	2.69 ± 1.84	2.18 ± 1.33	−0.79	.440
Experiences of fall education					
Yes		10 (38.5)	13 (46.4)	0.35	.183
No		16 (61.5)	15 (53.6)		
Frequency of fall education	0-5	2.70 ± 1.57	2.38 ± 1.56	−0.48	.636
Experiences of patient safety campaign					
Yes		22 (84.6)	27 (96.4)	2.24	.132
No		4 (15.4)	1 (3.6)		
Experiences of falls campaign					

Yes		23 (88.5)	27 (96.4)	1.25	.230
No		3 (11.5)	1 (3.6)		
Fall experiences during practice					
Yes		4 (15.4)	8 (28.6)	1.36	.135
No		22 (84.6)	20 (71.4)		
Patient safety competence (falls)					
Knowledge	0-14	8.00 ± 2.06	7.64 ± 1.91	−0.66	.511
Skill	10-50	28.54 ± 4.23	29.07 ± 0.21	0.41	.683
Attitude	13-65	47.81 ± 4.39	47.64 ± 3.95	−0.15	.885
Communication ability	15-75	56.73 ± 4.80	57.07 ± 6.37	0.22	.826

Variables	Time	SBAR group (n = 26)	Handoff group (n = 28)	Sources	F or t	p
M±SD	M±SD	Patient safety competence (falls)				
Knowledge	Pre	8.00 ± 2.06	7.64 ± 1.91	Group	1.27	.266
Post	10.42 ± 1.63	10.07 ± 1.51	Time	42.62	<.001	
		G*T	0.01	.994	Skill	Pre
28.54 ± 4.23	29.07 ± 5.21	Group	6.58	.013	Post	43.04 ± 3.62
37.50 ± 5.88	Time	166.96	<.001			
G*T	11.71	.001	Attitude	Pre	47.81 ± 4.39	47.64 ± 3.95

Group	0.19	.667	Post	49.35 ± 2.97	48.82 ± 5.38	Time
2.56	.116				G*T	0.45
.833	Communication					
Ability	Pre	56.73 ± 4.80	57.07 ± 6.37	Group	0.24	.628
Post	59.00 ± 6.78	57.50 ± 5.27	Time	1.60	.211	
		G*T	0.75	.391	Clarity	Post

Subfactor	SBAR group (n = 26)	Handoff group (n = 28)	t (p)
M±SD	M±SD	Introducing a nurse	9.62 ± 1.36
9.29 ± 2.62	0.57 (.569)	Explaining why nurse called doctor	10.00 ± 0.00
6.43 ± 2.30	8.22 (<.001)	Describing the patient's falls risk factors	5.19 ± 0.68
0.00 ± 0.00	38.97 (<.001)	Explaining patient's body condition and care after falls	4.13 ± 1.05
2.77 ± 1.29	4.26 (<.001)	Vital sign	8.85 ± 2.15
3.57 ± 3.00	7.47 (<.001)	Conscious state and injury	2.69 ± 0.68
2.32 ± 0.66	2.04 (.046)	Nursing care	2.31 ± 2.54
2.86 ± 2.52	−0.80 (.429)	Nurse's suggestion according to judgment result	8.08 ± 2.48

DETAILS

Subject:	Simulation; Falls; Patient safety; Nursing education; Teams; Knowledge; Intervention; Interpersonal communication; Hospitals; International organizations; Likert scale; University students; Attitudes; Nurses; Skills; Medical research
Identifier / keyword:	accidental falls; communication; patient safety; simulation training; students
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	114-121
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.anr.2020.04.004
ProQuest document ID:	2490469072
Document URL:	https://www.proquest.com/scholarly-journals/development-evaluation-sbar-based-fall-simulation/docview/2490469072/se-2?accountid=211160
Copyright:	

Last updated:	2021-03-19
Database:	Publicly Available Content Database

The Core Knowledge and Skills of Nursing Competency Regarding Mealtime Assistance for Hemiplegic Patients in China

Chen, Huifang [1] ; Nakatani, Hisae [2] ; Liu, Ting [3] ; Zhao, Haiwei [4] ; Xie, Di [5] [1] School of Nursing, Shandong First Medical University& Shandong Academy of Medical Sciences, Taian, China [2] Graduate School of Biomedical &Health Sciences, Hiroshima University, Hiroshima, Japan [3] Community-based Care Unit, Hiroshima Red Cross Hospital &Atomic-bomb Survivors Hospital, Hiroshima, Japan [4] Neurology, Taishan Sanatorium of Shandong Province, Taian, China [5] School of Sports Medicine and Rehabilitation, Shandong First Medical University& Shandong Academy of Medical Sciences, Taian, China

ABSTRACT (ENGLISH)

Purpose

Hemiplegic patients often experience malnutrition and feeding risks due to disabilities and inadequate nursing support; nursing roles regarding mealtime assistance remain unclear in China. Therefore, this study aimed to clarify the core knowledge and skills of nursing competency regarding mealtime assistance for hemiplegic patients in China.

Methods

A cross-sectional survey of self-administered questionnaire to 640 nurses (response rate: 57.7%) from two tertiary teaching hospitals and two sanatoriums was conducted. Survey content included 25 items regarding the mealtime assistance competency plus 6 items on demographic characteristics. The factor structure of the 25 items was explored and verified by exploratory and confirmatory factor analysis. Its reliability was confirmed by Cronbach's alpha.

Results

Three factors including 22 items with a cumulative rate of 60.9% were identified: “Assistance knowledge and skills for acute period”, “Knowledge about assistance and guidance for recovery period,” and “Professional basic knowledge regarding hemiplegia.” Its reliability was ensured with Cronbach's alpha ranging from .86 to .96. In addition, evidence for its construct validity was obtained, as structural equation modeling revealed a good fit to the data within the allowable range based on various fit indices.

Conclusion

This study clarified the core knowledge and skills regarding mealtime assistance competency for hemiplegic patients, with “Assistance for acute period” most concerned, followed by “assistance and guidance for recovery period,” and “Professional basic knowledge,” and the latter two need more attention. Obtained results can provide useful evidence for competent nursing practice to improve the quality of mealtime assistance for hemiplegic patients in China.

FULL TEXT

Introduction

Based on the reports of World Health Organization, cerebrovascular diseases (CBVDs) are the second leading cause of death in middle-income countries, including China [1]. In China, CBVD is ranked third among the common causes of death in urban residents and second for rural residents [2]. Stroke, the most common CBVD, has become the leading cause of death in China [3], the burden from stroke in China has increased over the past three decades [4]. That is also the leading cause of sustained neurological disability in the world, with 50% of the patients suffering from hemiparesis [5]. The patients with hemiparesis often suffer from sensory-motor deficits, pain, and decreased passive joint motion, and these impairments have a profound effect on patients' activities of daily living [6]. Besides, the recovery of hemiplegic patients is a lengthy process from the acute phase to the chronic phase, during which the risk of aspiration due to swallowing difficulty often leads to malnutrition because of inadequate intake. Thus, hemiplegic patients in acute or chronic phases may benefit from effective mealtime assistance for independence support, nutrition improvement, and aspiration prevention. Qualified and competent nurses are expected to provide high-quality mealtime assistance to hemiplegic patients.

As stated in a Chinese textbook on the fundamentals of nursing, mealtime assistance is a common nursing task. However, nurses typically carry out skilled professional tasks for patients, who are only involved in 25.6% of the bedside nursing care, while 64.7% of such tasks are performed by family members or health-care assistants [7]. This assistants, also called Family-paid caregivers, rather than hospital nursing staff, are involved in most of the bedside nursing care with oral feeding comprising a major proportion of the tasks. However, they are supervised directly by a privately owned agency rather than the hospital, and they seldom receive any formal training [8]. And the care, knowledge, and skills of families and caregivers are mainly derived from nurses [9]. Accordingly, families and caregivers play a major role in mealtime assistance with the quality of mealtime assistance unguaranteed, with special reference to hemiplegic patients. Therefore, competent nursing support is expected to improve the quality of mealtime assistance provided to hemiplegic patients. However, nurses' perceptions of their roles in mealtime assistance remain unclear [10]. It is inferred that the study for clarifying the nursing roles regarding competent nursing support for mealtime assistance to hemiplegic patients would be very important.

Along with the rapid population aging [11] and the increasing complexity of nursing services such as client-centered and holistic patient care [12], nurses' professional competency is gaining increasing attention. As the importance of ensuring nurses' competency has been emphasized at a global level [13], nursing competency regarding mealtime assistance for promoting inpatients' nutritional state and clinical outcomes becomes increasingly more important, especially for those with feeding and swallowing dysfunctions, such as hemiplegic patients. However, nursing curriculum in China tends not to reflect the changing demands in the hospital nursing environment, Chinese nurses were reported to have insufficient knowledge related to mealtime assistance owing to inadequate learning experience [14]. Regulated nursing practice with close monitor of professional competency for improving the quality of mealtime assistance is essential in medical facilities. With limited resources such as nurse shortage [15] and intense tension between patients and health-care workers in China, only few opportunities for improving nurses' competency can be offered by medical facilities. Under such circumstances, analyzing nursing abilities regarding mealtime assistance for hemiplegic patients appears to be important.

Competency is defined as the blend of abilities, skills, and knowledge needed to perform a specific task [16]. Nursing competency is usually referred to master a range of relevant knowledge and skills including clinical, interpersonal and technical, which is necessary conditions before performing in real clinical environment [17]. In this study, nursing competency regarding mealtime assistance for hemiplegic patients refers to master relevant knowledge and skills necessary for performing mealtime assistance safely and effectively. Considering the contradiction between the need for high-quality nursing care of hemiplegic patients and the missing nursing role and clinically irregular care status regarding mealtime assistance, it is necessary to explore nursing competency regarding mealtime assistance for hemiplegic patients. Thus, the present study aimed to clarify the core knowledge and skills of nursing competency regarding mealtime assistance for hemiplegic patients. The results obtained in this study will provide

useful evidence for competent nursing practice to improve the quality of mealtime assistance for hemiplegic patients in China. Although previous studies have explored the definition and structure of nursing competency, no previous research has been found focusing on mealtime assistance competency.

Methods Study design

Content exploratory research of nursing competency regarding mealtime assistance for hemiplegic patients used a methodological study design. It included two steps: (1) questionnaire development, based on the 25 items obtained in a previous study [18]; (2) clarify the core knowledge and skills of nursing competency regarding mealtime assistance for hemiplegic patients by analyzing and verifying its probable factor structure. Therefore, this study, the second step, was a cross-sectional survey design with a quantitative approach.

Participants and settings

This study was conducted using convenience sampling. Considering that hemiplegic patients experience acute onset and long-term rehabilitation in the chronic phase, nurses working in both acute and chronic phase hospitals were considered. Therefore, the study was conducted in two tertiary teaching hospitals and two major sanatoriums in Taian, China, from July to September 2017. Participating nurses were recruited with the assistance of senior nursing managers, who also facilitated the distribution and collection of the questionnaires. To reduce selection bias, senior nursing managers were asked to include all nurses that met the eligibility criteria. The inclusion criteria were: (1) registered nurses with qualified certificate; (2) nurses with at least one working year; (3) nurses with nursing experience in mealtime assistance to hemiplegic patients; (4) nurses in departments other than critical care units such as emergency department, intensive care unit, where oral feeding is rarely provided. The following were excluded: (1) those who do not meet the inclusion criteria; (2) those who were not willing to participate in the study.

Questionnaire development

The questionnaire development included the following three steps.

Step 1

The first step in instrument development phase was to clarify cognition, training, and education in mealtime assistance for hospitalized patients. This step was completed in 2014. The data was collected from nurses (China 107; Japan 184) in two teaching general hospitals with more than 500 beds, by using self-administrated questionnaire developed originally. Finally, the following problems in providing mealtime assistance for hospitalized patients in China were identified: insufficient knowledge of nursing roles, insufficient consideration of psychological aspects, and lack of related theoretical and practical education [14].

Step 2

The second step was to explore nursing perceptions regarding these problems, possible reasons, necessary nursing supports regarding nursing competencies for mealtime assistance in the case of hospitalized hemiplegic patients. This step was completed in 2016. The data were gathered from 5 nursing faculty members and 10 senior nurses in China using semi-structural interviews [18]. The validity of the three problems was confirmed (86.7% or higher); lack of nutritional support for patients during hospitalization was identified as an additional problem [18]. And 25 items on mealtime assistance competency focusing on knowledge and skills were extracted from the support measures of participants, and the review of literature and nursing textbooks [18].

Step 3

The third step was to conduct a pretest by using the 25 items on nursing competency concerning mealtime assistance for hemiplegic patients, with 6 additional items on demographic characteristics included. As for the method of assessing nursing competency, some studies have assessed nursing competency using self-evaluation, and the importance of reflective practice, such as developing confidence by accumulating experience in patient care, has also been reported [19]. Thus, we used the self-evaluation method and had nurses rate their degree of self-confidence for the 25 nursing competency items on a 5-point Likert-type scale: “unconfident” (1 point), “a little unconfident” (2 points), “hard to say” (3 points), “a little confident” (4 points), and “confident” (5 points). However, before this step, the questionnaire were sent to three nurse faculties and ten clinical nurses who were asked about their suggestions on the items that they have difficulty understanding or responding to. In accordance to the

suggestions, some modifications for clarity were made. Then pretest was conducted in 15 clinical registered nurses from a surveyed hospital. The Cronbach's alpha was .90 for the 25 items, .93 for the 13 items of knowledge and .88 for the 12 items of skills.

Ethical considerations

The study was approved by the ethics committee of Hiroshima University, Japan (Approval no. E−826). The purpose and procedure of the study were fully explained both verbally and in writing to the director of each hospital. Research cooperation was obtained via written consent from these directors, including the selection of senior nursing managers for the distribution and collection of the questionnaires. All participants were informed of the study purpose, their participation was voluntary, and withdrawal was allowed any time without penalization or loss of benefits. Agreement to participate was assumed based on returning the completed questionnaire. Other standard ethical guidelines (e.g., protecting the anonymity of the participants and the confidentiality of the data) were also followed.

Sample size

The study was conducted in two tertiary teaching hospitals and two sanatoriums. The literature suggests that the sample size should be at least 5-10 participants per item for validity and reliability studies [20]. In this study, considering that there are 25 items on mealtime assistance competency, the sample size should be 125-250. In addition, as there may be differences in the responses of nurses from the four medical facilities, the goal was to reach 500 nurses. Owing to the tense and busy working attributes of nurses, the response rate of valid questionnaires cannot be ensured. Therefore, attrition rate was estimated to be 50%, about 1,000 questionnaires should be distributed to ensure the sample size.

Data collection

The questionnaires, along with sealable envelopes, were provided to a senior nursing manager of the Nursing Department Office at each of the surveyed hospitals. The senior nursing managers distributed the questionnaires to nurses. We placed a questionnaire collection box at the entrance to each Nursing Department Office. Upon completion, the participants placed the questionnaires into the collection box. The questionnaires were retrieved after two weeks.

Data analysis

The high quality of the data was assured by using double data entry and checks. SPSS 21.0 (IBM Corp., Armonk, NY, USA) for Windows was used for data analysis. The significance level was set at p 21]. Regarding reliability, we calculated Cronbach's alpha for each factor and all items together. Based on the assumptions of the results of exploratory factor analysis, confirmatory factor analysis with the path diagram and maximum likelihood method was conducted to confirm the structure validity of the obtained factor structure model by using the statistical program AMOS 21.0 (IBM Corp., Armonk, NY, USA). The goodness-of-fit index (GFI), adjusted GFI (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) were used as conformity indices [22]. Model chi-square was also used as a GFI, with lower values generally indicating better model fit; thus, statistically nonsignificant chi-square test values indicate a good model fit (p > .05) [23]. A good model fit is indicated by a GFI of .90 or higher, an AGFI close to 1, a CFI of .90 or higher [22], and low RMSEA values (between 0 and .06) [24].

Results Demographic data

A total of 1109 questionnaires were distributed, 640 (57.7%) were returned. As shown in Table 1, the majority of the 640 respondents were female (584, 91.7%); the mean age was 28.80 ± 6.41 years, 63.1% of participants were in their 20s, and 28.5% in their 30s. Respondents were generally well educated: 70.9% had completed undergraduate education or higher, and 28.2% had completed postsecondary education. However, 79.6% were in the primary level of nursing. Moreover, almost half of them (49.4%) had worked for less than 5 years, and the mean working period was 7.15 ± 6.68 years. Regarding the workplace, 54.1% participants worked in departments where hemiplegic patients were cared for, including stroke departments, neurology, neurosurgery, rehabilitation centers, and geriatrics.

Factor structure of mealtime assistance competency

The score distribution of the 25 items is shown in Table 2. Mean self-confidence ratings on the 25 items of mealtime

assistance competency ranged from 3.34 to 4.08 on a scale of 1 to 5, with standard deviations ranging from 0.71 to 0.95. Based on factor extraction principles and item inclusion/deletion criteria, seven rounds of exploratory factor analysis using the weightless least squares method and promax rotation were carried out until all the items loaded on a particular factor. Finally, three factors with 22 items were identified, with a cumulative ratio of 60.9%. Those items with factor loadings of less than .4 and cross-loading with several factors were deleted. Accordingly, following three items were deleted: “Knowledge about preventing risks likely to occur,” “Help the patient to eat safely,” and “Help the patient to eat more efficiently.”

Each factor was given a name to reflect its theme based on the meaning of the items that loaded on the factor (Table 3). The first factor consisted of 12 items such as “Assess feeding and swallowing function of hemiplegic patients,” “Create a good eating environment,” “Provide aid based on patient's independence degree,” “Observe the dietary intake situation and condition of hemiplegic patient,” “Evaluate the intake situation after meals,” and so on. Items related to assessment and preparation before meals, aid and observation during meals, and evaluation and oral care after meals showed high factor loadings on this factor. Items related to various assistance of the diet process for hemiplegic patients in the acute phase showed high factor loadings on this factor. Therefore, the factor was named “Assistance knowledge and skills for acute period.”

The second factor consisted of 6 items such as “Knowledge about guidance on dietary habits,” “Knowledge about aid based on the degree of hemiplegia,” “Knowledge about guiding families to perform mealtime assistance,” and so on. Those items referring to rehabilitation assistance and guidance in nutrition, assistance method, functional training, and families’ care showed high factor loadings. Thus, the factor was named “Knowledge about assistance and guidance for recovery period.”

The third factor consisted of 4 items such as “Knowledge about epidemiology of hemiplegia” “Knowledge about important factors causing hemiplegia,” and so on. Items regarding necessary professional basic knowledge concerning epidemiology, pathophysiology, and so on. for the care of hemiplegic patients showed high factor loadings. Thus, the factor was named “Professional basic knowledge regarding hemiplegia”.

The correlation coefficient between the factors ranged from .66 to .75, indicating a moderate positive correlation.

Reliability

Internal consistency was good, as determined by a Cronbach's alpha of .96 for the 22 items as a whole, and .86-.94 for the factors.

Overall fit of the factor structure model

Based on the assumption of the obtained factor structure model in the exploratory factor analysis, confirmatory factor analysis based on structural equation modeling was performed to confirm the structure validity of the three factor structure. Regarding the overall fit of the model (Figure 1), although the chi-square value was significant (*p* p

Discussion

In accordance with the need for competent nursing support to ensure the quality of mealtime assistance for hemiplegic patients, this study set out to clarify the core knowledge and skills of mealtime assistance competency by analyzing and verifying its factor structure. The core knowledge and skills of the mealtime assistance competency were identified; three factors with 22 items were extracted. They were: “Assistance knowledge and skills for acute period”, “Knowledge about assistance and guidance for recovery period,” and “Professional basic knowledge regarding hemiplegia”.

Nurses showed high self-confidence scores on knowledge and skills necessary in mealtime assistance competency for hemiplegic patients. This might be related to their higher education experience and their working experience providing mealtime assistance to hemiplegic patients. Besides, most of them came from departments with hemiplegic patients such as stroke departments, neurology, and rehabilitation centers, where nurses have more chances to provide care to hemiplegic patients. However, given the lack of similar research, the findings from this study cannot be compared with other Chinese studies.

The first factor, “Assistance knowledge and skills for acute period” with twelve items loaded, accounted for 53.3% of variance. Those items mainly involved the necessary knowledge and skills related to preparation, assessment,

providing assistance, and evaluation during the eating process. And these aids are provided based on patients' physical and psychological condition, such as intake and nutritional status, psychological state, and related residual function and independence degree. It reflects the idea of providing care based on an understanding of the condition of hemiplegic patients, which is consistent with previous research [25,26]. This content seems to be the most important due to the most variance and items included, probably because it focused on the assistance for hemiplegic patients at acute stage. Assistance during acute period is high risk practice but closely related to treatment and clinical results, therefore it may be considered more important by Chinese nurses who usually rely on doctor's orders or give priority to treatment [7]. Interestingly three of the highest factor loadings were from items directly related to intake and nutritional status. Nurses are expected to have abilities in nutritional care, which was often known as the work of nutritionists or others; insufficient nutritional support for patients during hospitalization such as the limitation on the provision of nutritional meals was also reported [18]. And the provision of meals or mealtime assistance depends on families and caregivers [7,8], who rarely have formal training, and whose care knowledge comes primarily from nurses [8,9]. In a stressful clinical nursing work environment, Chinese nurses do not have much time to give life care, including mealtime assistance. Nurses lack life care experience and related learning experiences [14], so that they cannot give good guidance to family members or caregivers. This missing role of nurses and role ambiguity can greatly affect patients' diet and nutritional status. The aforementioned role issues has also been pointed out to be one of barriers that impact the quality of mealtime assistance in many countries including China [27,28]. Thus, the development of a standard on nurse role and scope of work concerning mealtime assistance is suggested to be necessary, especially for patients with hemiplegia.

The second factor, “Knowledge about assistance and guidance for recovery period”, accounted for 4.7% of variance. It consisted of six items focusing on assistance and guidance in nutrition, assistance method, functional training, and families’ care based on the characteristics of recovery period of hemiplegic patients. In accordance with the variance, the ability of providing support for recovery period seems to be not so important. This may be because Chinese nurses attach great importance to the nursing technology directly related to the treatment of the disease [7], often ignoring the knowledge that is conducive to preventing the disease and promoting health recovery. In other studies, teaching–coaching was consistently rated as important and necessary [25,26], probably because the level of guidance can directly affect the quality of mealtime assistance, no matter it is provided by nurses or caregivers or families. Rehabilitation of patients with hemiplegia is a long process, and the content of the assistance and guidance is also different according to the recovery status of patients. Evidence-based rehabilitation support becomes important for hemiplegic patients, which can help improving the quality of mealtime assistance, promote rehabilitation, and improve clinical outcomes. Therefore, a rehabilitation support standard that incorporates evidence-based nursing is suggested to be established as a reference for competent nurses to provide high-quality mealtime assistance.

The third factor, “Professional basic knowledge regarding hemiplegia”, accounted for only 2.9% of variance. It contained four items emphasizing a master of professional basic knowledge such as epidemiological characteristics, factors, and complications of hemiplegia. The mastery of professional basic knowledge seems to be not so important based on the least variance. It may be because professional knowledge is considered more important than professional basic knowledge, which is often related to Chinese nurses relying on doctors' prescriptions and performing treatment-oriented work [7]. However, professional basic knowledge can help understand the principles of mealtime assistance. With the changes in the medical environment, the complexity of diseases, and the diversification of medical services, it is also necessary to constantly update the above knowledge and learn to apply it flexibly. Nevertheless, the component of nursing competency concerning professional development identified in previous studies [25,26,29] was not included in the results of this study. The development of competency requires a good learning environment and self-directed learning ability. Actually, as reported in previous studies, there is lack of relevant nursing education and learning experiences among nurses in China [14,18]. This suggests that it is necessary to create learning environments that respect the independence of nurses and promote their self-directed learning to improve nursing care quality and enhance nurses’ mealtime assistance abilities.

Three items were deleted during factor analysis. Compared the 3 items with the 22 items left, there were some overlap. For example, deleted item 13 and 15 asked about the ability to perform mealtime assistance safely, which had very similar meaning with item 4 “Observe the dietary intake situation and condition of hemiplegic patients” and item 14 “Knowledge about first aid in emergency”. Besides, item 13 were deleted as being somewhat less important (loading less than 0.4). And item 2 showed almost the same loading of more than 0.4 in the first and second factor. This item asked about the ability of performing mealtime assistance efficiently without an evaluation standard, which makes the distinction between factors less obvious. This ability needs to be evaluated based on some detailed goals such as time limiting.

Regarding the analysis of model fit, chi-square was found to be significant, which indicates that the three factor structure model did not fit the data well [23]. However, as demonstrated in previous studies [30], chi-square as a goodness-of-fit measure with large samples is almost always statistically significant even in well-fitting models. Thus, the use of chi-square could be limited by the amount of data, and its value may not adequately reflect the goodness of model fit in this study. On the contrary, GFI, AGFI, and CFI are not affected by the sample size. In our study, GFI was .92, and AGFI was .90; a model in which AGFI is markedly lower than GFI is considered to be not good; however, the difference in this case was very small; thus, a good model fit was supported. Moreover, CFI showed a value close to 1, which was sufficient, and RMSEA was .06.Therefore, the overall fit of the model was considered good within the allowable range. Although the statistical results have confirmed the structural validity of the factor model to a certain extent, this research was not designed according to scale development, so it lacks a systematic analysis process of content validity. From this speculation, the related knowledge and skill items obtained need further review in the future study.

This study clarified the core knowledge and skills regarding mealtime assistance competency, which can be used as a reference standard of competent nursing practice to evaluate the ability of applying relevant knowledge and skills, to improve the quality of nursing care and mealtime assistance for hemiplegic patients. The improvement of nursing quality and clinical results may gradually promote the improvements in nursing education, such as the revision of teaching materials and the development of practical teaching. In this way, nursing decision makers may pay more attention to the nursing needs of people who need mealtime assistance, thereby promoting the advancement of related policies, such as clarifying the role of nurses and the scope of work. Based on the results of this study, we will further explore the effectiveness of nursing interventions on oral feeding for hemiplegic patients.

Limitations

There are some limitations in our study. First, the survey of nurses was only carried out at four medical facilities in Taian, China. Further studies are recommended to use larger and more multifarious samples. Secondly, in this study, many missing responses led to low response rate, which may affect the validity of the research results. In future research, more effort will be required in the design, distribution, and recycling of questionnaires. Third, although the significant difference in the responses from the nurses in acute and chronic hospitals have not been found, future research needs to fully consider the impact of working environment. Finally, the nursing competency items targeted in this study were developed through qualitative and quantitative research with nursing faculty staff and nurses, which ensures their validity and reliability. However, important elements of nursing competency such as attitude were not included in this study, which may also affect nurses’ ratings of self-confidence. To reduce bias in further studies, attitude should be included in nursing competency.

Conclusion

This study, as the preliminary research focusing on mealtime assistance competency, clarified core knowledge and skills with 22 items of nursing competency regarding mealtime assistance for hemiplegic patients. Among them, “Assistance knowledge and skills for acute period” was considered to be the most important, followed by “Knowledge about assistance and guidance for recovery period” and “Professional basic knowledge regarding hemiplegia”. The results provided an evidence of competent nursing practice regarding mealtime assistance for hemiplegic patients in China. It can be used as a reference for feedback to nurses for self awareness of the level of mastering and applying relevant knowledge and skills; to nurse managers for nursing practice assessment and

defining relevant nurse roles and scope; and to clinical mentors for assessing the relevant learning needs of staff nurses, with the need of paying more attention to the support of recovery period and professional basic knowledge.

Funding statement

No external funding was obtained for the study.

Conflict of interest

There is no conflict of interest.

Acknowledgments

The authors are especially grateful to nurse administrators in 4 medical facilities for their cooperation and coordination in data collection and thank the nurses who participated in this study.

Characteristics	n	%
Gender		
Men	53	8.3
Women	584	91.7
Age (yrs)		
M±SD (range)	28.80 ± 6.41 (18-56)	
≤19	5	0.8
20-29	404	63.1
30-39	182	28.5
40-49	38	5.9
≥50	11	1.7
Nursing education level		
Secondary education	6	0.9
Postsecondary education	180	28.2
Undergraduate education	444	69.5
Master's education	9	1.4
Job title		

Nurse	509	79.6
Supervisor nurse	120	18.8
Deputy chief nurse	9	1.4
Chief nurse	1	0.2
Department		
Stroke department	15	2.4
Neurology	123	19.4
Neurosurgery	67	10.6
Geriatrics	68	10.7
Rehabilitation center	70	11.0
Other	292	45.9
Working period as nurse (yrs)		
M±SD (range)	7.15 ± 6.68 (1-40)	
<5	316	49.4
5-9	176	27.5
10-19	100	15.6
≥20	48	7.5

Items	M	SD
1. Knowledge about epidemiology of hemiplegia	3.34	0.95
2. Help the patient to eat more efficiently	3.86	0.78
3. Create a good eating environment	3.95	0.71

4. Observe the dietary intake situation and condition of hemiplegic patients	3.93	0.76
5. Evaluate the intake situation after meals	3.94	0.76
6. Knowledge about guiding families to perform mealtime assistance	3.88	0.79
7. Assess psychological state of hemiplegic patients	3.77	0.78
8. Help the patient to eat happily	3.94	0.74
9. Provide aid that considers patient's individuality (eating habits, etc.)	3.78	0.78
10. Knowledge about important factors causing hemiplegia	3.64	0.87
11. Knowledge about physical and psychological characteristics of hemiplegic patients	3.64	0.87
12. Knowledge about complications likely to occur in hemiplegic patients	3.83	0.79
13. Knowledge about preventing risks likely to occur	3.79	0.76
14. Knowledge about first aid in emergency	3.79	0.79
15. Help the patient to eat safely	3.92	0.72
16. Provide safe and effective oral care	4.08	0.77
17. Knowledge about using self-help devices	3.83	0.76
18. Provide aid based on patient's independence degree	3.86	0.75
19. Knowledge about aid based on the degree of hemiplegia	3.69	0.82
20. Knowledge about aid based on the recovery phase of hemiplegic patients	3.68	0.80
21. Knowledge about rehabilitation guidance such as functional training, etc.	3.69	0.84
22. Assess eating and swallowing function of hemiplegic patients	3.72	0.86
23. Knowledge about guidance on dietary habits	3.84	0.81
24. Knowledge about guidance on dietary nutrition suitable for hemiplegic patients	3.77	0.80
25. Assess nutritional status of hemiplegic patients	3.78	0.78

Factors (% of variance)	Items	Loading	Cumulative variance (%)	Cronbach's alpha
Factor 1: Assistance knowledge and skills for acute period (53.3)	5. Evaluate the intake situation after meals	.82	53.3	.94
25. Assess nutritional status of hemiplegic patients	.79	4. Observe the dietary intake situation and condition of hemiplegic patients	.76	3. Create a good eating environment
.74	7. Assess psychological state of hemiplegic patients	.71	16. Provide safe and effective oral care	.71
22. Assess eating and swallowing function of hemiplegic patients	.66	18. Provide aid based on patient's independence degree	.62	17. Knowledge about using self-help devices

.56	9. Provide aid that considers patient's individuality (eating habits, etc.)	.55	8. Help the patient to eat happily	.54
14. Knowledge about first aid in emergency	.45	Factor 2: Knowledge about assistance and guidance for recovery period (4.7)	23. Knowledge about guidance on dietary habits	.77
58.0	.92	19. Knowledge about aid based on the degree of hemiplegia	.76	24. Knowledge about guidance on dietary nutrition suitable for hemiplegic patients
.75	20. Knowledge about aid based on the recovery phase of hemiplegic patients	.74	6. Knowledge about guiding families to perform mealtime assistance	.68

21. Knowledge about rehabilitation guidance such as functional training, etc.	.50	Factor 3: Professional basic knowledge regarding hemiplegia (2.9)	1. Knowledge about epidemiology of hemiplegia	.78
60.9	.86	10. Knowledge about important factors causing hemiplegia	.71	11. Knowledge about physical and psychological characteristics of hemiplegic patients

DETAILS

Subject:	Patients; Self evaluation; Knowledge; Nursing care; Questionnaires; Hospitals; Health facilities; Caregivers; Psychological aspects; Nurses; Roles; Hospitalization; Medical research
Location:	China; Japan
Identifier / keyword:	China; hemiplegia; meals; nurses
Publication title:	Asian Nursing Research; Seoul
Volume:	14

Issue:	2
Pages:	129-135
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.101 6/j.anr.2020.04.005
ProQuest document ID:	2490469008
Document URL:	https://www.proquest.com/scholarly-journals/core-knowledge-skills-nursing-competency/docview/2490469008/se-2?accountid=211160

Last updated:	2021-02-24
Database:	Publicly Available Content Database

Development of Knowledge and Attitudes Survey on Pain Management for Korean Long-term Care Professionals

Kwon, So-Hi [1] ; Kim, Hyunsim [2] ; Park, Seurk [3] ; Jeon, Wooseok [4] [1] College of Nursing, Kyungpook National University, Research Institute of Nursing Science, Daegu, Republic of Korea [2] College of Nursing, Kyungwoon University, Gumi, Republic of Korea [3] College of Nursing, Kyungpook National University, Daegu, Republic of Korea [4] Cardiovascular Center, Busan Saint Mary's Medical Center, Busan, Republic of Korea

ABSTRACT (ENGLISH)

Purpose

Inappropriate knowledge and attitude toward pain management of professionals has been pointed to be major obstacles to effective pain management in long-term care setting. The purpose of this study was to develop the knowledge and attitudes survey on pain management for Korean long-term care (LTC) professionals (KASP-K).

Methods

To develop the KASP-K, the knowledge and attitudes survey regarding pain developed by Ferrell and McCaffery in 2014 was amended after a review of broad literature and the latest pain management standards. A rigorous validation process of the KASP-K was performed by testing the content validity, item difficulty and discrimination index, construct validity, test–retest reliability, and internal consistency.

Results

The KASP-K consisted of 22 items and showed a content validity index of >0.7. The average difficulty of the KASP-K was 0.56 and the discrimination index was >0.2. The construct validity of the KASP-K was verified because of the differences in the sum scores depending on pain education (t = 2.30, p = .024). The test–retest reliability was r = .79 (p < .001) and the Cronbach's alpha was 0.73.

Conclusion

This preliminary evaluation of the KASP-K demonstrated acceptable validity and reliability. The KASP-K will be able to provide scientific and empirical data regarding the knowledge of and attitude toward pain management by LTC professionals.

FULL TEXT

Introduction

As Korean society is aging rapidly, socioeconomic burdens including demand for long-term care (LTC) are increasing. To cope with the rapid increase of LTC needs, the Korean government introduced LTC insurance in 2008. Since then, the number of LTC hospitals has almost tripled from 591 in 2007 to 1,502 in 2017 [1,2]. This number is 7.6 times more than the OECD average and twice that of the top 10 OECD countries [3]. This increase in LTC hospital beds has led to an increase in the number of in-patients, up to about 332,000 who are mostly elderly [1].

The prevalence of chronic pain among long-term care residents is 45–80% [4,5]. More than 70% of all elderly Koreans in LTC hospitals have chronic diseases such as dementia, stroke, and cancer [6] that frequently involve pain [7]. Unresolved pain can have profound physical and psychosocial consequences for older people such as decreased quality of life, depression, anxiety, poor sleep, and loss of appetite [4,8]. Therefore, effective pain management in LTC hospitals is a critical issue in Korea. Barriers to pain management have been identified for patients, medical and non-medical staffs, and system sides [9]. In the LTC setting, providers' knowledge about and attitudes toward pain management are especially important because under-reporting issues are more common than acute care setting due to the impaired cognition and suboptimal attitudes of the elderly people [10]. Korean elders often consider pain an inevitable part of life, which is a journey from birth to aging, illness, and death because of the influence of Buddhism [11]. In addition, concerns about drug addiction and overuse make them reluctant to report

pain and to use pain medication, like most of Asians [12,13]. Pain management should be addressed at the level of health and human [14]. Therefore, the professionals at LTC hospital should be enthusiastic about evaluating pain and well prepared for good pain management practice.

Knowledge and attitude of professionals are often link to the overall success in addressing the assessment and management of pain for elderly and improving knowledge and attitude of professionals can make a difference in pain management in LTC setting [15]. The knowledge and attitudes survey regarding pain (NKAS) has often been used to assess these attributes in nurses in a variety of settings: emergency, pediatric, and oncology [16–18]. In addition, the NKAS has been used in several countries, such as Australia, Iran, and Norway [17–19].

There has been a widely used an instrument, which was developed by Watt-Watson [20], translated into Korean by Hyun [21], and modified by Nam [22] to assess knowledge and attitudes on pain management in Korea. The instrument was used in several previous studies that focused on cancer pain management in acute settings [23,24]. It might be insufficient in the case of patients with various types of pain because noncancer pain prevalence is higher than cancer pain prevalence in LTC hospitals in Korea [6]. However, there is no validated tool to measure the knowledge of and attitude toward pain management of professionals in LTC hospitals in Korea. This is because pain management at LTC hospitals has yet to draw attention compared with cancer pain management at acute care hospitals in Korea. Therefore, it is necessary to develop a tool to measure knowledge and attitude on pain management as a headstone of education and research for improving pain management practice of LTC professionals. The purpose of the present study is to develop a valid and reliable questionnaire to assess the knowledge and attitudes of LTC professionals regarding pain management in Korea.

Methods Study design

A validation study of the knowledge and attitudes survey on pain management for Korean long-term care professionals (KASP-K) was performed following the process of developing preliminary items through broad literature reviews and translation and back translation. The developed preliminary items were tested with rigorous validation processes. To develop and test a new instrument, factor analysis would be recommended but it was not conducted in this study for the following two reasons. First, it was reported that factor analysis applied to dichotomous variables is problematic and may lead to artificial results [25]. In accordance with this, factor analysis for the KASP-K would not be recommended because it consisted of dichotomous variables which took two values, correct or incorrect. Second, the first developers of the NKAS indicated that it was not designed for factor analysis [19,26].

Therefore, content validity (CV), item difficulty, discrimination based on the item response theory (IRT), and construct validity were examined to establish the validity of the KASP-K, as was test–retest and internal consistency reliability.

Ethical considerations

The study meets the ethical principles for responsible management of research on human subjects. The research protocol was approved by the institutional review boards of Kyungpook National University in South Korea (Approval no. 2017-0102).

Measures

The NKAS was originally constructed in 1987 as a tool to measure knowledge and attitudes toward pain in nurses and other healthcare professionals and updated to reflect the latest pain management standards, including the World Health Organization (WHO), the American Pain Society, and the National Comprehensive Cancer Network Pain Guidelines [26]. A total of 41 items is a self-administrated questionnaire and consists of 22 True/False items, 15 multiple choice items, and 4 case studies. The reliability of the original instrument was tested on 60 nurses. Test-retest reliability was r > .80, and the internal consistency reliability Cronbach's alpha coefficient was calculated to be over .70 [26].

Translation and back translation process

The NKAS was translated from English to Korean by one of the authors who had majored in both English education and nursing science and had obtained a TESOL Master's degree in the United States. In accordance with the

WHO's translation and adaptation of instruments guidelines [27], the forward translator should be knowledgeable of the English-speaking culture, but her mother tongue should be the primary language of the target culture. The translator was satisfied with the forward translator criteria of the WHO. The translation was accomplished conceptual equivalent of a word or phrase instead of a word-for-word translation. Review and modification of the Korean version were conducted by two of the authors with education experience in both the United States and Korea. One of them has a lot of experience in pain management and the other gained a TESOL Master's degree in the United States. The created Korean version was sent to a language education institute and was then back-translated into English by a bilingual translator whose first language was English, and second language was Korean. In addition, the bilingual translator had no prior knowledge of the questionnaire, and thus independence between the forward translator and the back translator was maintained. Comparison and evaluation of the similarity and differences in the sentence structure and the semantics were undertaken via discussions with the authors and translators and then the final version of the KASP-K was completed.

Development of the KASP-K's preliminary items

To develop the KASP-K, the NKAS was amended to reflect elderly patients' pain management in an LTC hospital in Korea after getting a permission of the Pain Resource Center over email (C. Radell, personal communication, September 13, 2017). Preliminary items of the KASP-K were created based on a review of broad literature and the latest pain management standards including the WHO [28], American Pain Society [29], and National Comprehensive Cancer Network guidelines [30], and inquiring into cultural sensitivity of items of NKAS [26]. To reflect Korean pain management practice, cancer management guidelines published by the Korean Ministry for Health and Welfare and National Cancer Center (2016) [31], and questionnaires used in previous studies were also reviewed. The KASP-K was modified by considering the characteristics of pain among the elderly population and LTC hospital environments in Korea. First, some age-specific items that focused on pain in children or young adults were either deleted or modified. All case study items were deleted and were then changed into scenarios with elderly patients based on the tool to evaluate nursing home staff's knowledge and attitudes about pain [32]. Moreover, some items were changed to consider the LTC hospital setting in Korea. A few items related to the postoperation were deleted or changed from acute pain to chronic pain. In addition, modifications were made in consideration of environmental differences between the United States and Korea. For example, in item #36, the drug name was changed because ibuprofen is called “ibuprofen” rather than “Motrin” in Korea. In item #38, revisions were made to reflect Korean culture; there were not yet certain cultural influences in Korea owing to the diversity of the population, unlike in the United States (Table 3).

Finally, some questions that were not part of the original NKAS were added after comprehensive literature review. In detail, item #22 was added to emphasize the differences between adult and elderly patients in terms of pain management. The four items #24–#27 were added so that the instrument focused on patients with dementia [33] to clarify the knowledge and attitudes in dementia patients’ pain management. In item #28, a question regarding the warning against the combined use of benzodiazepine and opioids was added based on the pain management guidelines in the LTC setting [34]. Therefore, 48 preliminary items of the KASP-K were developed and tested in total (Table 3).

Data analysis

The data analysis was performed using the SPSS Statistics 18.0 (IBM Corp., Armonk, NY, USA) and Excel 2013 (Microsoft, Redmond, WA, USA). Descriptive statistics were used to characterize the sample, and various analyses were used to demonstrate the rigorous validation of the KASP-K. The rigorous validation process is described in detail in the following section.

- **1)** To obtain CV, one of the authors with a lot of research experience using the Delphi technique developed the instrument for evaluating the CV of each item and then analyzed the results thoroughly. Eleven experts recommended by the Korean Society for Hospice and Palliative Care agreed to participate in the study. The KASP-K and consent documentation were sent over email. The 11 experts were asked to sign the consent form and then

rate the CV of each item as follows: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant and 4 = highly relevant. Only items that scored a three or four were defined as relevant, and the content validity index (CVI) was calculated using the following formula:

CVI=numberofexpertswhoevaluatedtheitemwith3or4Totalofexperts

In addition, the experts were asked to provide suggestions for the collection of the KASP-K items. Data were collected from September 20th to October 20th, 2017.

- **2)** Item difficulty and discrimination and internal consistency were calculated. Based on the liem response theory, item difficulty and discrimination indexes of each item composing the KASP-K were calculated using the following formulas [35].

Difficulty index =Rightanswersinbestgroup+Rightanswersinworstgroupnbestgroup+nworstgroupDiscrimination index =Rightanswersinbestgroup−Rightanswersinworstgroupn(bestorworstgroup)

Item difficulty and discrimination were calculated with the uses of the top 33% and the bottom 33% of the results. The number of right answers given by the 27 best participants and the 27 worst ones were used. The analysis of the difficulty index can be defined as very easy (difficulty index >.80), easy (difficulty index from .61 to .80), medium (difficulty index from .41 to .60), difficult (difficulty index from .21 to .40), and very difficult (difficulty index 35].

- **3)** Eighty-one professional staffs from an LTC hospital participated in the construct validity testing. The participants were asked to answer the KASP-K questions, and we gathered general information. Data were collected from October 22nd, 2018 to October 26th, 2018. The number of correct answers (sum score) by each professional staff member was calculated to test the construct validity. The difference between the professional staff members with (n = 50) and without (n = 31) experience of pain education was analyzed via an independent t-test.

- **4)** To determine the KASP-K's test–retest reliability, 30 nurses were participated meeting the minimum number of participants for the parameter statistics [36]. They were recruited from four local hospitals in cooperation with the department of nursing by means of a convenience sampling method. The researchers explained the purpose of the study and asked the participants to sign the consent form in advance. Demographic information such as age, sex, marital status, religion, type of hospital, and experience of pain education was obtained. The KASP-K was distributed twice, two weeks apart. Participants were instructed to identify themselves in the consent form so that the questionnaires could be matched. They were told that no learning and searching was allowed between the pretests and post-tests to avoid changes owing to learning effects. Data were collected from October 26th, 2017 to November 13rd, 2017.

- **5)** For internal consistency reliability, the Cronbach's alpha of the KASP-K was calculated to demonstrate how well the KASP-K reliably measured the same construct. The values of alpha for an item deleted and the total coefficient of each item were calculated.

Results Demographic information of all participants

A panel of 11 experts including a nursing professor, three palliative care doctors, and seven advanced practice nurses in hospice palliative care participated to evaluate CV. Four of the seven advanced practice nurses worked in a hospice in-patient setting and the other three were in LTC hospitals.

Eighty-one professional staff members (6 men and 75 women) from an LTC hospital in Korea were recruited to demonstrate the construct validity, item difficulty, and discrimination index of the KASP-K. The participants were two physicians, nine nurse supervisors, 51 registered nurses, and 19 certified nursing assistants. Fifty of the participants

had experienced a variety of pain education courses but 31 had not. The details are reported in Table 1.

Thirty nurses consisting of 11 from a large teaching hospital, 14 from hospice wards, and five from various LTC hospitals participated in the test–retest reliability examination. The mean age of the subjects was 32.72 ± 9.33 years. Ten (33.3%) participants reported that they had no pain education experience. Among the subjects who had pain education experience, there were four (13.3%) participants who had received some form of pain education on one occasion and 16 (53.4%) who had received it more than twice. The duration of pain education was 7.63 ± 9.16 hours on average (Table 2).

Content validity

Forty-eight items of the KASP-K were selected in the initial stages to be tested for CV by 11 expert panels. To obtain the CV of the KASP-K, 11 experts were asked to check the CV of all items and suggest comments for the development of the KASP-K. The CVI values equal to or greater than .70 were considered acceptable. One item which was “Elderly patients are at greater risk of opioid side effects rather than adults.” was deleted because of low CVI which was .64. Besides, one item with high CVI (=.91) related to opioid-induced respiratory depression after surgery was deleted by accepting panels’ suggestion that it is not relevant to LTC settings in Korea. In consequence, 46 items remained after the CV test. In total, 46 items were analyzed in accordance with four categories: pain assessment, attitudes, pain management, and case study items. First, the ten items were classified as pain assessment items and the CVI ranged from .73 to 1.00. Second, the seven items were classified as attitudes items and the CVI was shown above .73. Third, the 25 items were categorized as pain management items and the CVI ranged from .73 to 1.00. Last, the four items were categorized as case study items and the CVI was shown above .91 (Table 3).

Item difficulty and discrimination

The analysis of the difficulty index revealed that the average difficulty of the KASP-K was .56, indicating medium levels. The results of the discrimination index showed that 21 items showed above .20 meaning fair, good, and very good items, whereas 25 items showed from .19 to negative which indicated very low discrimination coefficients. Item discrimination index means the probability that subjects with high ability meet the answer is higher than the probability that subjects with low ability meet the answer [37]. However, items with very low discrimination coefficients should be deleted because of not demonstrating effectiveness [35]. The analysis of item discrimination indexes was examined by four categories. First, in pain assessment items, discrimination of five items (#1, 11, 24, 25, and 37) were shown from .22 to .56 and adopted. However, five items (#3, 9, 23, 26, and 27) were shown below .19 and deleted. Second, in attitudes items, three items were adopted while four items were deleted. However, the item #14 was adopted even though it showed .19 meaning low discrimination indexes. The reason to select the item #14 was that using placeboes was a serious problem of pain management in an LTC hospital in Korea. Cho and Kwon [38] mentioned that 80.2% of nurses in an LTC hospital used placebos to elderly patients who reported pain often. Third, in pain management items, 10 items were adopted while 15 items were deleted. Finally, in case study items, four items were all included and shown from .30 to .33, meaning good discrimination indexes. Details were shown in Table 3. Therefore, the KASP-K consisted of total 22 items and was examined reliability.

Construct validity

The participants from the LTC hospital were divided into two groups depending on their experience of pain education: with (n = 50) and without (n = 31). The former showed an average of 13.76 ± 3.73 and the latter showed an average of 11.72 ± 4.15. The results from applying an independent t-test showed statistically significant differences between the two groups (t = 2.30, p = .024) (Table 1). Therefore, the construct validity was verified because the group with pain education had a higher average score than the group without.

Test–retest reliability

To examine the KASP-K's stability, test–retest reliability was determined on a sample of 30 participants. The mean total score of the 22 items was 15.67 ± 3.20 in the first test and 15.50 ± 2.58 in the second retest. Results of the test–retest reliability were r = .79, *p* Internal consistency reliability

The final 22 items of the KASP-K was calculated a Cronbach's alpha to demonstrate the reliability. The Cronbach's alpha of .73 was found, which is appropriate for newly developed research measures [39]. The value of item-total correlation and the value of alpha if item dropped of final 22 items ranged from .10 to .46, and .71 to .74, respectively (Table 3).

Discussion

The KASP-K may contribute on assessing Korean LTC professionals' knowledge and attitudes regarding pain management in Korea. The development of the KASP-K involved a rigorous validation process. First of all, the KASP-K was based on a broad literature review and then the CV was also established through the 11 expert panels. The experts participated not only in rating CVI of all items but also suggested possible improvements. As a result, the understanding of the items was adjusted, and their readability improved. All 22 items finally chosen for this study had a CVI of .70–1.00, which indicates strong CV.

To a strong validity of the KASP-K, not only CV but also item difficulty and discrimination based on the IRT were examined through 81 professional staffs in a LTC hospital in Korea. The item difficulty level ranged from .28 to .78, with an average of .56 meaning that the KASP-K can evenly reflect from low to high knowledge scores. In addition, the item discrimination index is possible to distinguish between a person with a high knowledge and a person with a low knowledge, and the discrimination degree should be .2 or more [40]. Therefore, it is strictly deleted in accordance with the criterion that the discrimination rate is lower than .2 or negative value. However, one item related to placebo use did not delete to highlight the serious problem of placebo use in pain management in Korea. Placebo use is common in Korea, with 80% of nurses reporting that they are using placebo for patients repeatedly complaining pain [38].

Moreover, construct validity was verified by following the rigorous process. Kim and Jung [41] obtained the construct validity of the Alzheimer's' Disease Knowledge Scale-Korean version by comparing two groups of students with and without dementia education. In a similar fashion, we compared two groups with and without experience of pain education to determine the construct validity of the KASP-K.

Ensuring reliability also applied a rigorous process by calculating test–retest reliability and internal reliability through Cronbach's alpha. The KASP-K was distributed with a two-week interval, which resulted in minimizing memory effect. In addition, to avoid maturation due to learning, all participants were told that no learning and searching were allowed. The comparison was expressed by a correlation coefficient and the coefficient of the KASP-K was .80. The result was similar to the correlation coefficient of the NKAS (r > .80). In addition, the KASP-K's Cronbach's alpha was .73, which indicated an appropriate instrument [39]. Therefore, the KASP-K is thought to be stable and the same results can be obtained on repeated administration.

In addition to the aforementioned reasons, there are several others that support that the KASP-K is a useful instrument. The KASP-K is not a disease-specific instrument and can be used to assess various types of pain in LTC hospitals. Generally, brain vascular disease, dementia, and cancer are the most prevalent, in that order, in LTC hospitals in Korea. The KASP-K covers all types of pain and makes it possible to assess LTC professionals' knowledge and attitudes. Also, it is noteworthy that the KASP-K was developed to reflect the current situation in Korea. In the KASP-K, the names of some drugs were changed from the American versions to those common in Korea. The KASP-K also changed scenarios to the Korean situation and ages to match the LTC context based on

the scenarios [32]. Therefore, the KASP-K can be a valuable instrument to measure knowledge and attitudes regarding pain management among Korean LTC professionals.

The study has some limitations that need to be mentioned. The participants were recruited in a southern area of Korea and the sample size was small. Moreover, the participants for verifying test–retest reliability were recruited by applying a convenience sampling method. In addition, a special methodologist was not involved in the analysis of CVI. Therefore, we should consider these limitations when conducting future studies.

Conclusion

In conclusion, the development of the KASP-K involved a rigorous validation process based on a broad literature review including reflection on new pain management guidelines. The KASP-K was found to have good validity and reliability and may contribute to improved pain management in LTC hospitals in Korea. By using the KASP-K, knowledge and attitude deficits among LTC professionals can be identified. Moreover, educational programs can be developed to enhance their competence. Further studies will clarify whether increased competency in pain management will result in the improvement of LTC professionals' performance.

Funding statement

This research was supported by the Kyungpook National University Bokhyeon Research Fund, 2017.

Conflict of interest

No conflict of interest has been declared by the authors.

Characteristics	Categories	n (%)	KASP-K score	
Mean ± SD	t (p)	Gender	Men	6 (7.4)
		Women	75 (92.6)	
	Age (yrs)	20–30	13 (16.0)	
	31–40	15 (18.5)		
41–50	16 (19.8)			51–60
27 (33.3)			>60	10 (12.4)
		Job position	Physician	2 (2.5)
		Nurse supervisor	9 (11.1)	
	Registered nurse	51 (62.9)		

Certified nursing assistant	19 (23.5)			Working experience (yrs)
<5	44 (54.3)			5–9
32 (39.5)			10–14	2 (2.5)
		≥15	3 (3.7)	
	Marital status	Married	59 (72.8)	
	Unmarried	20 (24.7)		
Other	2 (2.5)			Religion
Protestant	31 (38.3)			Buddhist
21 (25.9)			None	26 (32.1)
		Other	3 (3.7)	
	Experience of pain education	Nonexperienced	31 (38.3)	11.72 ± 4.15
	Experienced	50 (61.7)	13.76 ± 3.73	2.30 (.024)
Type of education (n = 50)	In-service	31 (62.0)		
Korean nurse board – providing continuing education	1 (2.0)			Conference program
2 (4.0)			Other	16 (32.0)

		Contents of education[a]	Pain pathophysiology	20 (21.1)
		Pain assessment	39 (41.1)	
	Pain intervention	36 (37.8)		

Variables	Category	n (%)	Mean ± SD	Range
Age (yrs)			32.72 ± 9.33	23–58
Type of hospital	Large teaching hospital	11 (36.7)		
Acute care hospital	14 (46.7)			LTC hospital
5 (16.6)			Job position	Head nurse
2 (6.7)			Charge nurse	1 (3.3)
		Registered nurse	27 (90.0)	
	Degree	Diploma	7 (23.3)	
	Bachelor's	19 (63.4)		
Master's	4 (13.3)			Working experience (months)
		93.77 ± 69.26	18–271	Experience of pain education
None	10 (33.3)			Once

4 (13.3)			twice or more	16 (53.4)
		Duration of pain education (hours)		

Answer	Items	CVI (n = 11)	IRT (n = 81)		ITC (n = 81)	Alpha if item dropped (n = 81)
Item difficulty index	Discrimi-nation index	Pain assessment items				
F	1. Vital signs are always reliable indicators of the intensity of a patient's pain.	.82	.37	.52	.39	.71
T	[a]3. Patients may sleep in spite of severe pain.	.82	.11	−.07	-	-
F	[a]9. Elderly patients cannot tolerate opioids for pain relief.	.73	.93	.07	-	-
F	11. Elderly patients with the decreased cognitive function cannot reliably report pain so clinicians should rely solely on the parent's assessment of the patient's pain intensity.	.82	.63	.37	.33	.73
F	[a]23. Elderly patients are less sensitive to pain than adults.	.73	.69	.19	-	-
F	24. Patients with dementia were accurately able to self-report their pain.	.91	.72	.41	.38	.71

T	25. Pain assessment tools used with cognitively intact patients could also be used in patients with dementia.	.82	.52	.22	.10	.74
T	[a]26. When making an accurate assessment of pain in patients with dementia, it is important to consider other behavior indicators of pain such as facial expressions, body movements, and postures.	1.00	.91	.04	-	-
T	[a]27. Pain in patients with dementia should be managed in the different way as in cognitively intact patients.	.91	.83	−.04	-	-
C	37. The most accurate judge of the intensity of the patient's pain is a. The treating physician b. The patient's primary nurse c. The patient d. The pharmacist e. The patient's spouse or family	1.00	.65	.56	.46	.71
Attitudes items						
F	[a]2. Patients who can be distracted from pain usually do not have severe pain	.91	.57	.04	-	-
F	10. Patients should be encouraged to endure as much pain as possible before using an opioid.	.73	.78	.30	.45	.71
T	[a]12. Patient's spiritual beliefs may lead them to think pain and suffering are necessary.	.82	.35	.04	-	-
F	14. Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real.	1.00	.43	.19	.23	.73
F	22. Elderly patients are more likely to be addicted to opioid analgesics than adults.	.82	.54	.26	.19	.73

A	[a]35. The most likely reason a patient with pain would request increased doses of pain medication is a. The patient is experiencing increased pain. b. The patient is experiencing increased anxiety or depression. c. The patient is requesting more staff attention. d. The patient's requests are related to addiction.	1.00	.72	.04	-	-
C	[a]38. Which of the following describes the best approach for cultural considerations in caring for patients in pain: a. There are not yet cultural influences in Korea due to the diversity of population. b. Cultural influences can be determined by an individual's ethnicity (e.g., Asians are stoic, Italians are expressive, etc). c. Patients should be individually assessed to determine cultural influences. d. Cultural influences can be determined by an individual's socioeconomic status (e.g., blue collar workers report more pain than white collar workers).	.91	.78	.07	-	-
Pain management items						
F	[a]4. Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases	.82	.31	.04	-	-
T	[a]5. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months.	.91	.15	.15	-	-
T	6. Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent.	.91	.76	.26	.10	.73
F	[a]7. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours.	.91	.43	.19	-	-
F	8. Opioids should not be used in patients with a history of substance abuse.	.73	.72	.33	.28	.72

T	[a]13. After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response.	1.00	.96	.00	-	-
T	[a]15. Vicodin (hydrocodone 5 mg + acetaminophen 300 mg) PO is approximately equal to 5 – 10 mg of morphine PO.	1.00	.39	.19	-	-
F	16. If the source of the patient's pain is unknown, opioids should not be used during the chronic pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain.	.91	.31	.41	.38	.71
F	17. Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose.	.82	.65	.33	.18	.73
T	[a]18. Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regiment.	.91	.52	−.30	-	-
T	[a]19. Narcotic/opioid addiction is defined as a chronic neurobiologic disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving.	.91	.78	−.07	-	-
T	20. The term ‘equianalgesia’ means approximately equal analgesia and is used when referring to the doses of various analgesics that provide approximately the same amount of pain relief.	1.00	.61	.26	.22	.73
T	21. Sedation assessment is recommended during opioid pain management because excessive sedation precedes opioid-induced respiratory depression.	1.00	.56	.22	.19	.73
T	[a]28. Combined used of opioid medicines with benzodiazepines or other drugs that depress the central nervous system (CNS) has resulted in serious side effects, including slowed or difficult breathing and deaths.	1.00	.91	.04	-	-

D	[a]29. The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain is a. intravenous b. intramuscular c. subcutaneous d. oral e. rectal	1.00	.50	.11	-	-
A	[a]30. The recommended route of administration of opioid analgesics for patients with brief, severe pain of sudden onset is a. intravenous b. intramuscular c. subcutaneous d. oral e. rectal	.82	.70	.15	-	-
B	[a]31. Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer patients? a. codeine b. morphine c. meperidine d. Tramadol	1.00	.87	.19	-	-
B	32. A 30 mg dose of oral morphine is approximately equivalent to: a. Morphine 5 mg IV b. Morphine 10 mg IV c. Morphine 30 mg IV d. Morphine 60 mg IV	1.00	.52	.30	.43	.71
A	33. Analgesics for continuous pain should initially be given a. around the clock on a fixed schedule b. only when the patient asks for the medication c. only when the nurse determines that the patient has moderate or greater discomfort	1.00	.61	.63	.43	.71
A	[a]34. A patient with persistent cancer pain has been receiving daily opioid analgesics for 2 months. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has been receiving 250 mg/hour intravenously. The likelihood of the patient developing clinically significant respiratory depression in the absence of new comorbidity is a. less than1% b. 1-10% c. 11-20% d. 21-40% e. >41%	.82	.15	.07	-	-
D	[a]36. Which of the following is the most appropriate for treatment of cancer pain? a. Ibuprofen (Ibuprofen) b. Hydromorphone (Dilaudid) c. Gabapentin (Neurontin) d. All of the above	.91	.15	.07	-	-

B	[a]39. How likely is it that patients who develop pain already have an alcohol and/or drug abuse problem? a. <1% b. 5 – 15% c. 25 – 50% d. 75 – 100%	.73	.39	.04	-	-
A	40. The time to peak effect for morphine given IV is a. 15 min. b. 45 min. c. 1 hour d. 2 hours	1.00	.67	.30	.15	.73
C	41. The time to peak effect for morphine given orally is a. 5 min. b. 30 min c. 1–2 hours d. 3 hours	1.00	.48	.22	.20	.73
A	[a]42. Following abrupt discontinuation of an opioid, physical dependence is manifested by the following: a. sweating, yawning, diarrhea and agitation with patients when the opioid is abruptly discontinued b. Impaired control over drug use, compulsive use, and craving c. The need for higher doses to achieve the same effect. d. a and b	.91	.13	.11	-	-
Case study items						
7	43-A. Kim is a 78-year-old woman whose only medical problems are osteoarthritis and some memory loss. She received 5 mg of oxycodone IR 3 hours ago. As you enter her room, she smiles at you and continues talking and joking with her daughter. Your assessment reveals the following information: alert and unsedated; BP = 120/80; HR = 80; R = 18. She rates her pain as 7 and describes it as achy, throbbing and unchanged in the last 3 hours. Circle the number that best represents your assessment of Kim's pain to be marked on her record. 0 1 2 3 4 5 6 7 8 9 10 No pain/discomfort Worst Pain/discomfort	1.00	.28	.33	.29	.72

B	43 B. Kim's current orders for analgesia are oxycodone IR 5 mg PO q 3-4 hour PRN pain and ibuprofen 400 mg PO TID PRN pain. Of the following, check what is best for the nurse to administer at this time: a. no analgesic at this time; continue to assess b. 5 mg oxycodone IR now c. 5 mg oxycodone IR in one hour d. ibuprofen 400 mg now	1.00	.31	.33	.27	.72
7	44-A. Park is a 78-year-old woman whose only medical problems are osteoarthritis and some memory loss. She received 5 mg of oxycodone IR 3 hours ago. As you enter her room, she lies quietly in bed, grimaces, and guards her hip as she turns in bed. Your assessment reveals the following information: alert and unsedated; BP = 120/80; HR = 80; R = 18. She rates her pain as 7 and describes it as achy, throbbing and unchanged in the last 3 hours. Circle the number that best represents your assessment of Park's pain to be marked on her record. 0 1 2 3 4 5 6 7 8 9 10 No pain/discomfort Worst Pain/discomfort	1.00	.52	.30	.29	.72
B	44 B. Park's current orders for analgesia are oxycodone IR 5 mg PO q 3-4 hour PRN pain and ibuprofen 400 mg PO TID PRN pain. Of the following, check what is best for the nurse to administer at this time: a. no analgesic at this time; continue to assess b. 5 mg oxycodone IR now c. 5 mg oxycodone IR in one hour d. ibuprofen 400 mg now	.91	.59	.30	.33	.72

DETAILS

Subject:	Cancer; Validity; Pain management; Long term health care; Culture; Knowledge; Dementia; Questionnaires; Chronic illnesses; Hospitals; Nonsteroidal anti-inflammatory drugs; Older people; Attitudes; Bilingualism; Nurses; Education; Medical research
Location:	United States--US

Company / organization:	Name: National Comprehensive Cancer Network; NAICS: 813920; Name: Organization for Economic Cooperation &Development; NAICS: 928120; Name: American Pain Society; NAICS: 813920
Identifier / keyword:	attitude; knowledge; long-term care; pain management; validation study
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	105-113
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.anr.2020.04.002
ProQuest document ID:	2490469005
Document URL:	https://www.proquest.com/scholarly-journals/development-knowledge-attitudes-survey-on-pain/docview/2490469005/se-2?accountid=211160
Copyright:	
Last updated:	2021-02-24

Analyzing Nursing Leadership at an Academic Historical Event: A Descriptive Study Based on Social Networks

Marqués-Sánchez, Pilar [1] ; Cummings, Greta [2] ; Martínez-Fernández, María Cristina [1] ; María Lara Martínez-Gimeno [3] ; López, María [4] ; Serrano-Fuentes, Néstor [5 1] SALBIS Research Group, Faculty of Health Sciences, University of Leon, León, Spain [2] The Faculty of Nursing, University of Alberta, Edmonton, Alberta, Canada; Connecting Leadership, Education, and Research (CLEAR) Outcomes Research Program, University of Alberta, Edmonton, Alberta, Canada [3] SALBIS Research Group, Faculty of Health Sciences, University of Leon, León, Spain; Foundation San Juan de Dios, San Rafael-Nebrija Health Sciences Center, University of Antonio Nebrija, Madrid, Spain [4] Faculty of Nursing, University of Valladolid, Valladolid, Spain [5] SALBIS Research Group, Faculty of Health Sciences, University of Leon, León, Spain; School of Health Sciences, University of Southampton, Southampton, United Kingdom

ABSTRACT (ENGLISH)

Purpose

To analyze the leadership network structure among nursing leaders in Spain identified through the *Grupo40Enfermeras y Universidad* event.

Methods

A descriptive cross-sectional study using social network analysis was used. Study sample consisted of 210 individuals, of whom 119 received nominations as referents. Structural analysis of the network was conducted using centrality and cohesion.

Results

A network structure was generated in which different leadership strategies were identified through InDegree, Eigenvector, and Betweenness Centrality. Five leaders were identified as bridges to other individuals using Betweenness. The whole network presented little cohesion although two highly cohesive cores were detected by K-core measurements.

Conclusion

A strategy is needed to support nursing leaders with high degree of Betweenness to serve as bridges to connect other nursing leaders.

FULL TEXT

Introduction

Currently, nursing in Spain is a university-based profession with several specialities that have been achieved over the past 40 years. However, its social recognition as a profession is not enough.

The 27th October 2017, the Commemorative Meeting of the 40th anniversary of the transformation of nursing studies into university studies was held in Madrid. This event motivated a group of seven people united by friendship and nursing interests to create the *Grupo40Enfermeras y Universidad* to commemorate the date of entry of nursing into

the university, in 1977. The group aimed to remember how achievements were made in the past and how the future might be approached. It produced various documents to build on the historical memory of Spanish Nursing (www.grupo40enfermeras.org). This has been considered especially useful because it has created a “movement” while bringing together senior leaders and professionals from new generations.

New health and management demands challenge current health systems [1]. Considering a nursing perspective, the increase in patient numbers, the need for a generational change of leaders, the improvement of nurses' satisfaction and motivation, fostering mutual respect between different disciplines, staff recruitment, and the creation of healthy work environments are some of these priorities [2]. The development of innovative nursing leadership strategies at a global level and understanding “leadership” as the ability to guide others toward desired outcomes [3] might be crucial to tackle some of these issues [2].

Nursing history acknowledges examples of nursing leadership while demonstrating the relevance of exploring this competency at the present. Also, gaining a historical overview of the roles and impact of nurses is essential to construct a professional nursing identity and represent the basis for understanding and developing the future nursing leadership [4,5]. For example, at the individual level, Florence Nightingale led through the social impact of her academic, political, and managerial work [6]. At the institutional level, organizations such as the American Nurses Association [7], the National Organization for Public Health Nursing, the National League of Nursing Education, and on an international level, the International Council of Nurses [8] have promoted nursing leadership with the capacity to influence health planning and policies. For example, the American Nurses Association has developed its Strategic Plan 2017–2020, which includes objectives aimed at promoting the profession and improving the population's health [7]. In Spain, the Spanish Association of Nursing Teachers (Spanish initials: AEED), founded in 1979, has played a significant role in promoting the scientific and professional development of nursing, mainly from the field of education [9].

In general, nursing leadership can be described in terms of actions involving relationships and contacts aimed at achieving common goals. For example, strengthen relationships with workmates of the same clinical unit to increase motivation and improve the work atmosphere [10]. In this regard, an analytical description of the scenarios formed by contacts can be obtained by applying the social network analysis (SNA) method. The SNA comprises analytical methods that examine the ties between various social entities and the impact of these ties [11]. A social network contains a set of points, some of which are joined by lines. The points represent individuals or groups, and the lines indicate that the individuals interact between them, generating a social structure [12]. The contact exists not only between individual members but also between their goals and objectives because the latter are achieved through relational connections and behaviors [13–15]. These connections transmit inherent resources to the structure of ties between individuals [16]. These inherent resources, or social capital, highlight the idea that people with “good” social connections can use other types of capital such as financial resources, knowledge, or skills to achieve their goals, better than other people who do not have such “good” connections [17]. Ties can be analyzed in two types of networks: sociocentric networks and ego networks. Sociocentric networks identify the relations between actors belonging to a previously defined group [18]. Ego networks examine an individual's connections in the network, analyzing the structure that is developed between the individual and his or her contacts [19].

Previous studies have described how the SNA methodology is relevant in healthcare settings, specifically to promote communication, collaboration, and dissemination of new practices in work teams, which would have an impact on patient care [20]. In addition, SNA has been applied to nursing leadership before, demonstrating the impact of nursing networks in the care of patients with dementia [21], the influence of communication networks on job satisfaction [22], the ability of identifying issues that can affect patient safety outcomes, such as medication [23], the mediating leadership of nurses in support and motivation networks in different clinical units [24], the influence and connectivity of nurses through informal networks in rural communities [25], and the impact of nurse leader networks on organizational communication [26,27].

A visible example of nursing leadership in Spain occurred when nursing education became a university degree program. To commemorate this historic moment and create a forum for reflection on the future of the profession,

some of the leaders involved organized an event called *Grupo40Enfermeras y Universidad* [Group40Nurses and University] [28]. These leaders aimed to encourage and motivate new nurses (in formal or informal leadership roles), demanding a nursing presence in power structures and access to relevant decision-making processes. Given this, the purpose of this study was to analyze the leadership structure of nursing leaders in Spain, identified through the "Group40Nurses and University" event. The specific objectives were to (i) identify the leadership of nominated leaders (referents) in terms of their structural position in the event network, (ii) describe the ego network of the most frequently nominated leaders, and (iii) examine the structural cohesion of the network.

Methods Study design

A descriptive cross-sectional study using historical event data and social network analysis was used.

The "Group40Nurses and University" event was held in Madrid on the 27th of October, 2017. The event aimed to commemorate the 40th anniversary of the introduction of nursing at the university sector in Spain. A core group of nursing leaders who had been involved in achieving this milestone 40 years ago organized the event.

Setting and sample

The study population comprised of 212 nurses. Two of them were excluded because they were not nurses, resulting in a final sample of 210 individuals. All the Spanish nurses were invited to vote their leaders for this event. The final sample included professionals who nominated nursing leaders as well as the nurses who were nominated (referents). Of the 210 nurses, 119 were nominated as referents. The five most relevant leaders in the network were selected based on their capacity for Betweenness (Table 1).

Ethical consideration

This study was approved by Group40 Enfermeras y Universidad. The research team contacted the Group40 organization to request permission to analyze the data published on the website. It was explained what SNA was and stressed that only the data that were publicly available on the website would be used. Besides, it was specified that authorization from Group40 would be subject to the prior reading of the final manuscript and knowledge of the means selected for its publication. The organization uploaded a first graph about the event onto the website to inform the participants about the study and facilitate potential questions.

Data collection

The event's official website (https://www.enfermeria21.com/grupo40enfermeras/el-grupo/) was used to nominate the referents. The website contained a tab stating the following: *Nominate your reference nurse, upload a photo of her/him and describe why you consider him/her a referent.* The event website defined "referent" as follows: *A referent is a nursing professional who has made a significant contribution to the profession.* A scientific committee examined the nominations and included only those who provided data and information on the professional career of nominated nurses. Nominations were accepted over 8 months.

The names of the professionals submitting nominations were displayed to the public on the website, as well as the names of the leaders nominated with a summary of their careers. The data obtained were used to construct a *nxn* matrix with 210 rows and 210 columns. The matrix was read as follows:

••For rows, "A nominates B";

••For columns, "A is nominated by B".

Data analysis

The SNA was applied to the matrix of *nxn* data, using measures of centrality at the individual level and cohesion at the group level. An actor's centrality is the extent to which the individual occupies a central position in the network [29]. Individual leadership was analyzed using the following measures of centrality: InDegree, Betweenness, and Eigenvector, with normalized measures [29]. Briefly explain of the measures used: InDegree centrality is defined as the number of people who ask the actor for advice [29] and Betweenness centrality is defined as the Extent to which an actor serves as a potential "go-between" for other pairs of actors in the network by occupying an intermediary position on the shortest paths connecting other actors [29]. Eigenvector centrality corresponds to the measure of

actor centrality that takes into account the centrality of the actors to whom the focal actor is connected. Thus, an actor whose three friends have many connections will have higher Eigenvector centrality than an actor whose three friends have few connections [30]. Finally, K-core being defined as a subgraph in which each node is adjacent to at least a minimum number, K, of the other nodes in the subgraph [11].

To identify correlations between InDegree, Eigenvector, and Betweenness, a normality test to determine whether the variables presented a normal distribution was conducted. Spearman correlation coefficients were determined for Eigenvector, Betweenness, and InDegree with normalized values to determine existing relations between the variables.

Furthermore, to obtain a more detailed description of the network of actors that present a higher degree of leadership using Betweenness centrality [31], the ego networks of the five main leaders were analyzed. Cohesion refers to the existence of many ties between similar others [32]. Network cohesion was analyzed by studying K-core subgraphs [11]. This metric was selected to identify large cohesive groups that might explain the social influence of leaders at the local level.

SNA variables were calculated using UCINET 6.627 software [33]. Graphs were created using the UCINET tool, NetDraw. In this regard, the use of network visualization might facilitate the identification of patterns in ties between individuals and provide insights into the ego's position in the network and effective means of communicating findings to others [34].

Results Results for leadership

The target population consisted of 210 nurses, of whom 119 were nominated as referents. Correlation results indicated that Betweenness correlated significantly with InDegree (*p* p = .45) indicated a moderately positive relationship, whereby the higher the InDegree, the greater the Betweenness. Eigenvector did not correlate with the other two variables, and in both cases, *p* was higher than .05 (Table 2).

On the other hand, measures were performed to describe the statistics and correlations of Betweenness, InDegree, and Eigenvector. The general mean and standard deviation for InDegree was 0.46 ± 0.69, for Eigenvector 1.15 ± 9.69, and for Betweenness 0.01 ± 0.00. The lowest mean corresponded to Betweenness metric, given that few actors achieved this position in the network. This finding indicates that individuals with a high degree of Betweenness were leading actors with a substantial capacity to serve as a bridge between other actors in the network (Table 1). Public information was collected from these five leaders, showing that they have been developed as nurses in both clinical and academic roles.

To better understand structural leadership, a visualization of the ego network for each of the five leaders (Figure 1) was created, showing the structural differences between them. In particular, Figure 1 shows that the leader node Mompart MP presented a higher number of contacts and capacity for Betweenness.

Results for cohesion

Figure 2 shows the “Group40Nurses and University” event network. Women are represented in light blue, and men in dark color. Nominations can be seen in the graph with the arrows lines linking nodes. The network presents an almost elliptic shape, with areas where the line of the ellipse appears broken because some groups of actors were not connected. In general, the network evidenced low density and little cohesion, except two subgroups with more nodes and connections showing greater cohesion than the rest of the network. Centrality metric was used using the UCINET tool “NetDraw” to visualize more these two subgroups within the whole network and to conduct a more detailed study of these two subgroups (Figure 2).

Two K-cores emerged (Figure 3). The K-core on the right shows a very cohesive central group with individuals in an advantageous structural position, who serves as a link between the network center and other individuals of the

periphery. If these individuals disappear from the network, the social capital transmitted through their connections would be lost. In the K-core on the left side, an individual connects other individuals. This person is essential because he/she forms the only link between the two subgroups. Red color indicates the maximum K-core, which contains many of the leaders identified in this study concerning their degree of Betweenness.

These findings show a different approach to interpreting the construction of leadership in comparison with other traditional methods. The results show the behavior of a global network, the relational behavior of central individuals in the network, and describe the network of the leading actors. This knowledge is useful for nursing organizations to consider the relevance of networks to empower nursing.

Discussion

In Spain, a need for nurse leadership has been detected. Health organizations, Nursing Professional Councils, and professional associations are not sufficiently interconnected. Thus, professionals with leadership competencies and professionals who can adapt to the new demands are required [35]. Therefore, in research on nurse leadership, it is necessary to apply dynamic, social and relational paradigms capable of explaining the structure of leadership at different levels: individual and collective or global. Thus, it will be able to answer questions such as: Are there different types of leadership, depending on the structural pattern they have? Are there subnets capable of promoting collaborative relationships focused on professional empowerment? How are the networks of the people who have led us? SNA offers an approach to the development of nurse leadership [36].

The analysis of leadership networks helps to identify interpersonal ties that exert influence at the local and collective levels, shaping social change and systems. The SNA was used in this research to analyze leadership at the historic “Group40Nurses and University” event. Thus, (i) individual leadership using InDegree, Betweenness, and Eigenvector centrality metrics, (ii) the main leaders' network using their ego networks, and (iii) network cohesion through the K-core metric were analyzed.

The results showed that there were nurses with a high degree of centrality and a central position in the network (InDegree, Betweenness, and Eigenvector), which could predict leadership competencies in these nurses. These results are consistent with those reported by another study [32], who applied the same three metrics and concluded that leaders exert influence at three levels: through direct ties surrounding leaders, through direct and indirect ties in which they are embedded and through interorganizational linkages. Similarly, Marqués et al [24] showed that InDegree and Eigenvector values identified nursing leadership and was positively related to individual performance in the workplace. On the other hand, within this research, Betweenness identified the individuals whose leadership served to connect different nursing groups and profiles. This decision was based on previous studies that have used the Betweenness metric to explore leadership in organizations. De Brún and McAuliffe [31] applied Betweenness to measure leadership among senior hospital managers and reported that actors with a high degree of Betweenness connected more efficiently than the rest of the actors in the network. Nevertheless, this is the first time that SNA has been used to analyze nursing leadership cohesion at a scientific event. The results have given rise to two strongly cohesive groups with no possibility of fracture. Network analysis can be used in academic research and by professional associations to identify strong subgroups of nurses. The importance of weak ties could also be added because they allow new nonredundant information, necessary to generate innovation. Nevertheless, this research has not shown that distant relationships (in terms of geography or the frequency of contacts) could be useful to consider new projects.

Furthermore, the five leaders with the highest degree of Betweenness were selected and analyzed their ego networks to obtain more detailed information about their relational behavior. The results showed that the most prominent nursing leader with the highest degree of Betweenness presented a denser ego network than others,

which could facilitate the transmission of social capital. Nurses that serve as a bridge might become key players with the capacity to mobilize and coordinate social activity [37]. The different ego networks can be “mirrors” for future nurses that want to lead the profession. Each of these nurses could consider what type of ego network might be similar concerning how they establish relationships. Nurse leaders consistently communicate and develop relationships within across professions to promote and maintain information exchange [38]. Measures of cohesion are useful to analyze leadership processes and dynamics because they permit an analysis of the strongest structures of interpersonal ties. It has been widely explored, most notably through cliques and density [11], two measures that were not used in this study. A clique analysis would reveal several small cohesive subgroups in the global network [11]. This information is beyond the scope of this research, which aimed to analyze the presence of leaders in larger cohesive subgroups. Also, the density metric was not used. Density or proportion of possible lines provides information on connections at the global network level, but not at the local level [11].

The literature [39] proposed an alternative approach to network cohesion based on the minimum degree in combination with a study of local density, which is useful to analyze network characteristics and compare networks. Thus, K-cores at the “Group40Nurses and University” event were analyzed. K-cores have received less research attention in general but provide essential information to gain a better understanding of leadership. To determine if the identified leaders were part of a single core or not, it was necessary to study large cohesive regions. The results of this study yielded a graph with two K-cores, one smaller than the other. The explanation for the existence of two highly cohesive cores may be that these two groups share similar interests that are different from the other network members. The five leaders identified were all members of the larger K-core, suggesting a high concentration of relational resources on the part of the leaders and poorly disseminated leadership, a potentially harmful aspect for the whole network. Other studies [40] examined the concentration of intragroup relational resources and found that if a subgroup possesses the most of the group's social capital, this could negatively affect the effectiveness of the whole network. On the other hand, low intragroup cohesiveness has been significantly related to higher perceptions of intergroup conflict [41]. A balance between intragroup and intergroup connections may be the best option.

By applying SNA methods to existing data, five nursing leaders were identified in Spain who share their experience in the field of health and higher education. It is important to emphasize that these five leaders live in different locations and geographically far from each other. This may explain they could exert a scattered influence on geographically distant individuals to access nonredundant information, link unconnected individuals, and tackle nursing challenges. The findings show a strategic way to build new nursing leadership networks. Individuals who are identified as central and influential actors could act as key conduits, both for the dissemination and collection of information [42].

Although this event is a small representation of the thousands of nurses in Spain, its value is a touch of attention to the mobilization of nursing leadership because it has been promoted by a group of historical Spanish nursing leaders. The SNA shows that Spanish nursing has different leaders who are embedded in small subgroups that support them, dispersed and with lack of connections between them.

This work with leadership networks analyzed in Spain has helped to rethink this weaving process using SNA-based methods. The SNA is a method that allows us to build leadership and also detect leadership roles, among which bridges must be built. The daily support of a collective leadership network requires that members can meet and form active groups [36]. Year of Nursing, 2020, will be an excellent time to consider networks as precursors of leadership. Initiatives, such as the Nightingale Challenge, aim to train nurse leaders. The directors of these strategies should consider the SNA as a framework for building sustainable leadership.

This study presents some limitations that should be addressed in future research. First, data such as the workplace

or seniority should have been collected; this would have allowed the analysis of networks related to similarity aspects. Second, it would have been useful to collect more data from networks, for example, from networks of friendship or collaboration in work or research. Third, it would have been relevant to incorporate some qualitative methods, such as observation and in-depth interviews to complement the quantitative data.

Nursing leaders need to understand how network structures derive from formal and informal contacts function. Further research is required to explore how individuals and subgroups are embedded in larger groups, in larger networks or organizations and also to determine how formal and informal networks interact [40]. Finally, it would be necessary to elucidate the characteristics of leaders presenting a high degree of Betweenness because of their capacity to serve as bridges and conduits for cross-boundary relationships, such as those between senior and junior nurses, nurse researchers, teachers and assistants, and nurses working in political institutions, healthcare organizations universities, and other heterogeneous groups. Future research should examine social capital among nursing leaders based on their interactions. In this sense, qualitative research could complement the traditional quantitative approach of SNA.

Conclusions

In light of the above, the main conclusions of the present study are as follows:

1. Social network analysis offers a new perspective on nursing leadership which could be applied to daily practice, identifying future leaders based on their ability to build relationships.

2. Social network analysis allows identifying different types of relationship-based nurse leadership: InDegree Leadership (many actors come to the leader), Eigenvector leadership (the leader influences other nurses even if they do not contact directly), and Betweenness Leadership (leader who act as a bridge).

3. SNA offers the opportunity to explore the ego networks of the leaders identified within the whole network.

4. SNA captures the most cohesive groups among nurses, because they share affinities and a common engagement.

5. The structure of the “Group40Nurse and University” network underlines the need to identify more leaders who serve as bridges. This finding suggests that it is necessary to think of a network-based strategy for local and global leadership.

6. The SNA methodology, which analyzes the structure of social networks, is useful for designing strategies for transgenerational leadership in nursing. Future strategies should include senior and influential individuals in new generations of nurses.

Sources of funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Conflict of interest

There is no conflict of interest for the authors.

Actor	Betweenness	NBetweenness	InDegree	NrmInDeg	Eigenvector	NEigenvector

Mompart MP	165.00	0.38	12.00	5.74	0	0
MartÃ-nez JR	105.00	0.24	1.00	0.48	0	0
MegÃ-as F	103.00	0.24	7.00	3.35	0	0
Alberdi RM	66.00	0.15	5.00	2.39	0	0
Santo Tomás M	54.00	0.12	3.00	1.44	0	0

Correlation	Variables	Characteristics	NBetweenness	NEigenvector
Spearman's rho	NEigenvector	Correlation Coefficient	.07	
p-value	.34		N	210
	NrmInDeg	Correlation Coefficient	.45	
p-value	<.001	.17	N	210

DETAILS

Subject:	Leadership; Social network analysis; Social networks; Nursing administration; Professional development; Medical research
Business indexing term:	Subject: Leadership Social networks Professional development
Location:	Spain
Identifier / keyword:	interpersonal relations; leadership; nurse's role; nursing; social networking
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	82-88
Publication year:	2020
Publication date:	May 2020

Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.anr.2020.03.003
ProQuest document ID:	2490468947
Document URL:	https://www.proquest.com/scholarly-journals/analyzing-nursing-leadership-at-academic/docview/2490468947/se-2?accountid=211160

Last updated:	2021-02-24
Database:	Publicly Available Content Database

Improvement Plan of Nurse Staffing Standards in Korea

Shin, Sujin; Jong Duck Park; Shin, Juh Hyun

ABSTRACT (ENGLISH)

Purpose

This study compares the expected nurse-to-patient ratio, penalties for violating these regulations, and the laws

enacted in the medical and nursing fields in Korea and advanced countries like Germany, Australia, the United States, and Japan.

Methods

This study deployed an integrative review method and used search terms such as “nursing law,” “nurse ratio,” “nurse,” “nurse staffing,” “health,” and “staffing” to find articles published in English, Korean, German, or Japanese through Cumulative Index to Nursing and Allied Health Literature Plus with Full Text, the Westlaw (International Materials-Jurisdiction) site, US government and state sites (federal parliament, National Conference of State Legislatures), and Google Scholar.

Results

Compared with medical laws in other advanced countries, Korean laws are quite crude and its nurse-to-patient ratio does not reflect patients' status. Korea also lacks strict penalties for nurse staffing ratio violations.

Conclusion

Korea requires a strong regulatory apparatus for nurse staffing in health-care organizations to improve the quality of its health-care services and patient safety.

FULL TEXT

Introduction

Researchers report the stable professional nursing staff at health-care organizations is one of the essential requirements to provide ideal patient outcomes, reducing falls, infections, medication errors, mortality, and pressure ulcers, through meta-analysis and systematic literature reviews for decades [1–3]. Extant research highlighted that the lower the nurse staffing levels with higher turnover rates, the higher the nurses' dissatisfaction and intention to leave [3–7]. The rigorous research reported that insufficient nurse staffing contributed to 24% of adverse outcomes such as patients' mortality rates, cognitive impairment, and permanent loss of function; nurse staffing levels and overtime relate to patient safety, quality of care, and inadequate care; and about 84% of medication errors affecting patients would diminish with increasing numbers of licensed nurses [8]. The composition of nurse staffing levels also relates to hospitals' mortality rate, which increases as the number of patients per nurse increases [9–14]. In addition, when nurse staffing levels and the ratio of nurses to patients is higher, days of hospitalization decrease [14, 15] along with readmission rates [7, 16, 17]. The levels of nursing staff also affect nurse outcomes leading to burnout, job dissatisfaction, and attrition intention. Because nurses' exhaustion is higher when their staff levels are lower [5–7], the adequate nurse staffing concept is changing from minimum to safe expected staffing to ensure patient safety and quality of nursing care.

Based on the study results, most advanced countries have proposed specific nurse staffing standards through the enactment of nursing laws. However, in Korea, the quota of nurses allocated to health-care organizations was established in 1962 [18] as 2 per 5 inpatients (30 outpatients converted to 1 inpatient), then deleted in 1973 [19] and reestablished in 1983 [20].

Some research still supports research results on the positive effects of nursing law enactment, including patients' perspectives (mortality rates) and nurses' perspectives (increased satisfaction with decreased turnover) [21–23]. Furthermore, cost-effective results followed by the enactment of nursing laws also supported the cost benefits of having more registered nurses (RNs) compared with expenses related to training nurses and caring for patients [23–25]. According to the International Council of Nurses, more than 80 countries have enacted and implemented nursing laws, and state-by-state nursing legislation is being enacted even in countries already having nursing laws [26]. The International Nursing Council also supported the enactment of nursing laws in Korea [27]. Despite worldwide research on the important role of professional nurses in patients' safety, the standard quota of nurses to patients remains the same as mandated in the 1962 enactment in Korea. The quota of nurses was based on an annual average of inpatient care per day, according to the classification of health-care institutions (considering 12 outpatients as one inpatient).

Currently, the most powerful traction for regulating nursing staff in Korea is Differentiated Inpatient Nursing Fees (*Ganho kwanri chadeungjae*) according to the nurse staffing levels in the general ward and intensive care unit (ICU).

This measure was introduced in November 1999 for hospitalization in the general ward to address the problem of poor-quality nursing services such as delegating tasks of the nursing service to the caregiver or guardian in health-care settings that did not have adequate nurse staffing [28]. Integrated nursing care (*Ganho kanbyoung tonghap service*) was implemented to improve patients' safety by providing comprehensive coverage of nursing care by RNs rather than by caregivers who are not professionals, thereby relieving caregivers' physical, psychological, and financial burden [29]. Integrated nursing care services is a system that stops patient care performed by the caregiver or family members in general wards in Korea and provides all nursing services by nursing professionals in the wards where the caregiver does not reside. The National Health Insurance Corporation has paid the cost of integrated nursing care services since 2015 [30]. This system has begun to alleviate the burden of care for patients and their families and to improve patient safety [31].

Owing to implementation of Differentiated Inpatient Nursing Fees (*Ganho kwanri chadeungjae*) in 2007 and integrated nursing care *(Ganho kanbyoung tonghap service)* in 2013, the nurse-to-patient staffing ratio slightly improved, based on the Enforcement Regulation of the Medical Service Act: Paragraph 4, Article 1 in Korea. Specifically, concern emerged about the validity of the nurse staffing standards specified in Korea's Medical Service Act because 1,631 (65.8%) Korean hospital-level organizations have violated the mandated staffing quota standards, and about 13.2% nursing facilities had insufficient numbers of nursing staff [31].

It is quite timely to review the actual number of patients for each work shift per nurse by referring to advanced countries' cases that emphasize the importance of patient-to-nurse staffing criteria. This study compared and analyzed the expected nurse-to-patient ratio, penalties for violating such regulations, and the state of laws enacted in health care in Korea and the advanced countries of Germany, Australia, the United States, and Japan.

Methods Research design

In this study, we conducted an integrated literature research to examine the current state of nurse staffing and explored possible policy improvements in Korea.

Literature search method Search materials

This study used the following search engines: Cumulative Index to Nursing and Allied Health Literature Plus with Full Text, Westlaw (International Materials-Jurisdiction), US government and individual state sites (federal Congress, National Conference of State Legislatures), and Google Scholar.

Search terms

This study used “nursing law,” “nurse ratio,” “nurse,” “nurse staffing,” “health,” and “staffing” as search terms.

Literature selection criteria

Only English, Korean, German, and Japanese literature published since 2015 was included.

Results Nurse-to-patient ratio

The nurse-to-patient ratio is summarized by nation in Table 1. The nurse-to-patient ratio was specified by the Medical Service Act in Korea and Japan, whereas it was described in the United States and Australia by the Nursing Act and in Germany by the Nursing Strengthening Act.

Republic of Korea

Since 1962, Korea has specified health-care professional staffing standards according to types of health-care organizations, in line with Article 36 of its Medical Service Act. As shown in Table 1, the current quota of nurses in tertiary referral hospitals, general hospitals, and dental clinics was obtained by dividing the daily average number of hospitalized patients based on annual numbers by 2.5, whereas Eastern medicine hospitals and nursing homes apply looser standards (5 and 6 patients, respectively). Apart from the Medical Service Act criteria, the Korean government tries to improve nurse staffing levels by paying hospitals Differentiated Inpatient Nursing Fees based on nurse staffing. In general wards, nurse staffing levels are differentiated by type [32], a method that adds or subtracts fees as per grade. Upper level general hospitals have 6 grades, and general hospitals and hospital-level institutions have 7 grades. However, the standard level of nurse staffing without reduction of admission fees ranged from 4.0:1 or more for higher level general hospitals to 4.5:1 and 6.0:1 for general hospitals and hospital-level institutions, that is, one nurse is in charge of about 20 patients, obtained by multiplying 4.0 by 4.8 (multiply by 4.8 to calculate the

number of occupied beds attended by one nurse per duty, considering the total number of nurses taking three shifts and 1.6 times the number of the workforce available for off-duty and vacations), for tertiary referral hospitals and about 22 and 29 patients, obtained by multiplying 4.5 and 6.0 by 4.8, for general hospitals and hospital-level institutions, respectively. This is unreasonably substandard compared with foreign standards.

The United States

In the United States, federal and state laws establish laws for nurse staffing. Federal law rests on Code 42 of Federal Regulations [33] along with the Nurse Staffing Standards for Patient Safety and Quality Care Act of 2017. Advocating professional nurses' contribution to positive patient outcomes, the Nursing Act states that assistive personnel cannot replace professional registered nurse staffing. The Nurse Staffing Act, the public health act that includes the number of patients rather than the percentage of direct nursing staff, publishes information about nurse staffing, and health-care records of actual nurse staffing have been brought into the US House of Representatives. The nursing laws of four states—California, New York, Massachusetts, and New Jersey—define patient-to-nurse ratios. Characteristically, Massachusetts has defined the ratio of patients rather than the number of direct care nurses in ICUs, whereas California, New York, and New Jersey defined the ratio of patients rather than direct nursing nurses in the nursing unit. The state of Ohio has also proposed a bill regarding the minimum patient-to-direct care nurse ratio. Representatively, California's 2392 Act [33] suggested minimum nurse staffing considering patient severity such as a 1:1 ratio for trauma emergencies and the operating room and a 1:2 ratio for the ICU, neonatal ICUs (NICUs), and delivery, circulatory, respiratory, and anesthesia units. In addition, it is mandatory to form and operate a nurse staffing committee comprising more than 50% of direct care nurses. The Safe Staffing for Hospital Care Act Bill S. 1634-2013 of New York, Public Act 08-79 in Connecticut, Public Act 095-0401 in Illinois, Health and Safety Code Chapter 257 in Texas, and Ohio's safe nurse staffing law (Ohio Revised Code, sections 3727.50 to 3727.57) make it compulsory to establish nurse staffing plans, reflecting patient severity and nursing unit characteristics. The nursing service plan led by the nurse staffing committee continuously monitors stable nurse staffing and patient quality and supervises overall matters (records, representativeness, quality management, and so on) of each hospital's nursing staff and consistently evaluates nurse-sensitive quality indicators.

Australia

Australia has a reasonable level of nurse staffing laws/guidelines that depend on the type of the nursing unit and the size of the hospital. The Public Health System Nurses' and Midwives' (State) Award gives detailed information on the definition of nurse staffing, work patterns, staffing standards, salaries, benefits, vacations, and regulations related to career and position. Its nurse staffing standard specifies the number and composition of nurse staffing according to the organizations and work shifts.

In Victoria state, staffing rates, excluding charge nurse or triage nurse, range from 1:4 to 1:6 nurse-to-patient ratios for internal/surgical wards and 1:3 for emergency rooms. California, where mandatory nurse staffing is applied, clarifies the boundaries of nurses' duties considering aspects such as severity of illness, available medical devices, complexity of nursing, and self-care ability of patients. Victoria too considers these aspects and determines staffing by setting need-based, flexible standards. Queensland introduced nurse staffing in 2016 and is now conducting a second campaign to increase implementation. As part of this campaign, the degree of implementation of nurse staffing, aggregated by states and regions separately, is posted on the state government's health-related website every month with a very high compliance rate of 98% to 100% [34]. In addition, the nurse staffing for Queensland was estimated to have a 1:4 nurse-to-patient ratio for day and afternoon shifts and a ratio of 1:7 for night shifts in acute adult wards [34].

Germany

German nurse staffing standards specified by federal and state laws have been applying nurse-to-patient ratios from the implementation of the health-care system in 1995, based on staffing of nurses and nursing assistants in nursing homes according to the Nursing Insurance Act (long-term care insurance). Although Nursing Staff Regulation (NSR) *Pflegepersonalregelung* (PPR), the minimum regulation standard for hospital nurse staffing, was applied to all hospitals in Germany between 1993 and 1995, the government eliminated these regulations on January 1, 1997,

without taking further measures to cope with the financial burden of recruiting more than 20,000 nurses. However, the Nursing Managers Association of German university hospitals has supplemented the abolished PPR Nurse Staffing Standard, and it is still used informally to estimate nursing staff and budgeting of nursing departments. In other words, nurses at German university hospitals identify and measure nursing needs every evening for nursing care and basic care—support for activities of daily living (ADLs) support[35]. However, because no standard exists to legally guarantee nurse staffing, each hospital operates its staff flexibly as per patients' severity and the need for nursing care. Hopitals hire less nurses because reduction they prioritize nursing staff and restrict staff hiring by diagnosis-related group (DRG).

Compared with other European countries [4], Germany has a higher burden of nursing work (a nurse-to-patient ratio of 1:13 or higher) and a lower proportion of nursing assistants The problem is that the German DRG, introduced in 2004, accounts for 98% of the total diseases in 2018 and has compiled 1,292 DRGs. The German DRG reflects only 60–70% of caregivers' ADL support among German nursing services, which is an integrated nursing care, resulting in significant daily workload for nurses. To address this nursing shortage, the German House of Representatives passed the Nursing Enhancement law on November 9, 2018, with an emergency program that did not require the Senate's consent. As a result, salaries of additional recruits and individual workers in all hospitals and nursing homes in Germany have been reimbursed by health or long-term care insurance benefits since 2018, and financial arrangements have been specified by law [36].

The guidelines for nurse staffing standards of delivery units and NICUs have been set as federal standards since 2015 as a sublaw norm for the Federal Commission [37]. In NICU Levels 1 and 2, nurses specializing in pediatric ICU should comprise 40% and 30% of the staff, respectively, and it is compulsory to have a nurse specialized in pediatric ICU per work shift. For Level 1 premature child centers, the nurse-to-premature baby ratio is 1:1, and for Level 2, it is 1:2. Unsuccessful hospitals need to notify the Federal Commission of unsatisfactory circumstances along with the reason, requiring the state to hold a separate conversation with unsuccessful hospitals about their nurse staffing status [37]. Berlin and Nordrhein-Westfalen comply with the regulation of the 1:2 nurse-to-patient ratio for ICUs and 1:1 for special care units, and at least 30% of the departmental nurses should be specialized in ICU nursing, according to the minimum nurse staffing recommended by the German ICU and Emergency Medicine Interdisciplinary Academy [38]. The city of Berlin applies a minimum standard of 1:1.35 to 1:1.8 nurse-to-patient ratios for geriatric wards and for patients with acute illness and 1:5.5 to 1:1.62 for day care clinics [38].

In accordance with the federal regulations on the minimum standards of hospital nurse staffing (October 10, 2018), the standard of nurse staffing needs to be 1:2.5 for the day shift (morning and afternoon shifts: 6 am to 10 pm) in the ICU and 1:3.5 for the night shift (10 pm to 6 am), and from January 2021, must have staffing securement in phases: 1:2 nurse-to-patient ratio for day shifts and 1:3 for night shifts [36]. Because this level of staffing is lower than the 1:2 nurse-to-patient ratio in ICUs already applied in the cities of Berlin and Nordrhein-Westfalen, criticism has emerged about its inadequacy owing to the level of nursing services, patient safety, and increased burden for nurses [39].

Taking effect in January 2019, the minimum staffing standard applied to all hospitals in Germany is a 1:10 nurse-to-patient ratio for day shifts (6 am–10 pm) and a 1:20 ratio for night shifts (10 pm–6 am) in elder wards. The required staffing in the trauma ward is a 1:10 nurse-to-patient ratio for day shifts and 1:20 for night shifts, whereas the heart disease wards needs a 1:12 nurse-to-patient ratio for day shifts and 1:24 for night shifts. If the number of patients is less than the threshold for a single nurse, one nurse should be deployed for the patient's safety [36].

Nurses and nursing assistants in nursing homes providing chronic disease care were assigned a nurse-to-patient ratio based on the level of nursing needs after the introduction of the system in 1995. Nurses were deployed depending on the degree of patients' loss of self-reliance on ADLs, and the ratio of nurses to nursing assistants increased to more than 52%, from 50%, in 2017. The nurse-to-patient ratio for the first grade, mild cases, is 1:7.25, 1: 3.9 for the second grade, 1:2.8 for the third grade, and 1:2.2 for the fourth grade, and for the most serious cases (fifth grade), it is 1:1.8. In cases of patients with dementia and mentally disability, the nurse-to-patient ratio for the first grade, mild cases is 1:4.12, 1:2.77 for the second grade, 1:2.16 for the third grade, and 1:1.79 for the fourth grade, and for the fifth grade, the most serious cases, it is 1:1.51. In the case of patients with intellectual disability

and multiple disabilities, nursing requirements are recognized as Grades 3 to 5, with a nurse-to-patient ratio of 1:1.96 for the third grade, 1:1.14 for the fourth grade, and 1:1 for the most serious fifth grade. For unconscious patients requiring intensive care, one nurse is assigned per patient and the ratio of nurse to nurse assistant is at least 70%. For long-term ventilator patients, one nurse per patient is required, with a minimum nurse-to-nurse-assistant ratio of 80%. To maintain the quality of nursing services, the ratio of low-wage workers should not exceed 5%, and the standard of patients per nursing staff has been revised in favor of patients. The standard for additional caregivers, such as safety guardians of patients with dementia and companion roles, has been enhanced from 1:24 to 1:20, and caregivers are not included in the nurse-to-nurse assistant ratio [39].

The Nursing Enhancement Act, enacted on November 9, 2018, specifies 13,000 additional nurses in nursing homes, with finances covered by health insurance benefits. Facilities with up to 40 residents should have an additional 0.5 nurses, facilities with 41 to 80 people should have one nurse, facilities with 81 to 120 people should have 1.5 nurses, and facilities with more than 120 people should have two more nurses, and part-time nurses may also be considered. In the event of compliance with the nurse staffing ratio with nurses not available, despite intensive efforts, it is inevitable to replace nurses with nursing assistants attending nursing school and doing exceptionally well academically, 4 months after the recruitment announcement. This policy was supported by the health insurance service because the goal is to partially cover expenses related to nursing care for elders, especially in relation to nursing care by doctors' prescription [36].

Upon application, nursing homes will receive extra funding to promptly add staff and, in particular, nurses, without complicated administrative procedures. Failure to comply with legal staffing standards will result in suspension of new admissions [36].

Japan

The basis for Japan's nurse staffing standard is its Medical Law Enforcement Regulations that classifies staffing according to bed types (general, nursing, mental illness, infectious disease, tuberculosis), by applying a minimum staffing standard (including registered nurses and practical nurses), with one nursing staff member caring for 3 inpatients [40]. This was amended in 2001, specifying Article 19 of the Enforcement Regulation of the Medical Law based on Article 21, Paragraph 1 of the Medical Act, but in actuality is based on the standard of each nursing department. The Enforcement Regulations of the Medical Law stipulate that the size of the nursing staff should be based on the total number of people in the hospital. For example, for 500 general beds, an average of 450 inpatients, and a daily average of 900 outpatients, the requirement of nurses is calculated as 150 for inpatients (450 divided by 3) and 30 for outpatients (900 divided by 30), for a total of 180. Since 2006, Japan has been able to assess nurse staffing levels from the perspective of patients' nursing care needs by including practical nurse staffing to calculate basic hospitalization fees.

Penalties imposed by nations for violations of nurse staffing regulations

Table 2 shows the punishment and regulations for violations of nurse staffing requirements by nation.

Republic of Korea

Although Article 63 of the Medical Service Act permits issuance of corrective orders and prohibits the use of facilities for a certain period of time, guidelines are only nominal because no specific standards relate to penalties. Korea has replaced legal standards pertaining to nurse staffing regulations with disincentives for nonconformity to nurse staffing levels.

In April 2007, to improve the distribution of the majority of hospitals in Grade 6 hospitals and Grade 4 general hospitals, the grade of nursing institutions and general hospitals was adjusted to Grade 7. Despite the addition of hospitalization fees based on the number of beds-per-nurse ratio calculations, and system improvements, they have made no substantial difference to the majority of Grade 7 hospitals that still have difficulty attaining sufficient nurse staffing. Consequently, the standard was reset, and, based on Paragraph 4, Article 7 of the Enforcement Regulations of the Income Tax Act, health-care organizations in vulnerable areas were exempted from deductions, and the deduction level was eased by 2% in areas other than Seoul and metropolitan cities [41].

However, based on the revised 2018 bill, Grade 7 was applied to unreported general hospitals and Grade 6 to

unreported higher level general hospitals, clinics, and Eastern medical clinics, which shows it is not possible to identify unreported institutions' actual condition. Although Grade 6 is applied to tertiary referral hospitals, admission fees were not reduced. Because Grade 6 has the lowest nurse-to-patient ratio of 4:1 or more, actually it is about 20 patients per nurse, considering three shifts and staff going in and out of the facility. Although it is impossible to provide quality nursing care and ensure patient safety under these circumstances, considering patients' severity in general hospitals, deductions or penalties are not imposed, inevitably resulting in overtime for nurses, threatening patient safety. For general hospitals, Grade 7 is applied, and for Grade 6 facilities, which have no reduction in the admission fee, one nurse is in charge of about 29 patients. In Grade 7 facilities, the lowest grade, nurses are in charge of more patients than those who work in Grade 6 facilities, but the admission fee deduction is a maximum of 5%, which means that the admission fee deduction is less than the cost of employing a nurse. It would, therefore, be beneficial to reduce hospitalization fees without employing nurses for hospital operations.

The United States

Penalties for violating nurse staffing stipulated by the Nursing Act is prescribed in six bills in five states. When staffing matters in the nursing law are breached, in addition to levying fines, strong legal sanctions such as the suspension and cancellation of a hospital's license, restriction of hospitalization, and obligation to publish violated matters on their website are imposed.

Germany

The Nurse staffing – Promotion Program, introduced with the Hospital Rescue Act to support the recruitment of hospital nursing staff from 2015 to 2019, has been extended beyond 2018. The upper limit of the existing supplementary funds paid by insurers has been eliminated, and the hospital's 10% burden was abolished. The resulting additional funds will be used only for new employees' labor costs because, according to the Nursing Enhancement Act, the entire amount will be covered by health insurance and, if not, will be taken back by the insurer [36]. Under the scope of the nursing budget, when the hospital outsources the distribution of meals previously performed by nursing staff to improve the flow of work or relieve nurses' burden, it is supported by the insurer but taken back if unsuitable for the purpose. The minimum nurse staffing standard for hospitals was to be implemented beginning in January 2019, subject to a 3-month grace period until March, and compensation for the cost of medical care to noncompliant organizations was to be reduced beginning in April [36].

In Nordrhein-Westfalen, the hospital itself can close its ICU if it fails to comply with the minimum nurse staffing standards required for patient safety in the ICU. Nursing homes will also have to stop accepting admissions if they fail to comply with the legal standard [39]. Germany developed and expanded its minimum nurse staffing standards based on individual nursing needs to improve and maintain the quality of its nursing services and ensure patient safety, despite the constant shortage of nursing staff. To resolve the nursing workforce shortage, each hospital needs to maintain the financial records of labor costs incurred for recruiting new nursing staff, and these will be fully funded retrospectively from August 2018 by the National Health Insurance as per the Emergency Support Program of the Nursing Enhancement Act.

The nurse-to-patient ratios and nurse-to-nurse assistant ratios implemented in January 2019 will gradually be extended to the entire nursing field by 2021. Organizations that fail to comply with minimum nurse staffing standards will be subject to strict regulations including fines and retrieval of all subsidies. Another implication was to use nurses' expertise for patient safety, and to assuage the serious shortage of nursing staff, nurses should provide nursing while care nurse assistants carry out routine activities according to the care plan, under nurses' instructions and supervision.

Australia

As per the Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Act 2015 of Victoria, the magistrates' court may apply monetary compensation or work restrictions to hospitals that do not meet the nurse staffing regulations [42].

Discussion

We propose the following policy measures for nurse staffing after comparing and analyzing the medical and nursing

laws of Korea. First, it is necessary to revise the current nurse-to-bed ratio to align with the nurse-to-patient ratio, that is, the actual number of patients for each work shift per nurse. Most advanced countries featured in this study present nurse-to-patient ratios based on the number of patients, but Korea requires standardization based on the number of patients because Korea has a dual structure, applying the nurse-to-bed ratio (reflecting the rate of hospitalization) under the Medical Service Act and the Differentiated Inpatient Nursing Fee system and the nurse-to-patient ratio (the actual number of patients each nurse is in charge of) under the integrated nursing care guideline. ICUs or special care units apply different standards for nurse staffing based on the recently introduced Differentiated Hospitalization Fee for ICUs [43]; the nurse staffing standard for the stroke ICU is 1.25:1 or less, based on the number of beds, whereas the actual number of patients per nurse is 6 by multiplying 1.25 by 4.8. In addition, the nurse staffing standard for high-risk pregnant patients in the ICU is 1.5:1 or less, based on the number of beds, and the actual number of patients per nurse is about 7.2. General ICUs were classified as ninth-grade ICUs [44], and the 2008 nurse-to-bed ratio was applied. These figures imply that each nurse should be responsible for about 10 ICU patients.

The Differentiated Hospitalization Fee for the NICU was introduced on October 1, 2007 [45]. In June 2018, it was revised to the sixth grade for tertiary referral hospitals and general hospitals and to the fifth grade for dental, Eastern medicine, and other hospital ICUs [46]. However, when converting to nurse-to-patient ratios, the result was about 2.4, by multiplying 0.5 by 4.8, for the first grade before adjusting for grade (three shifts, 1.6 times securing nurse staffing) and 9.6 for the fifth grade, by multiplying 4.8 by 2.0, before adjusting for grade or about 10 NICU patients per nurse. The minimum standard is 1:2 in the ICU and 1:1 in the pediatric ICU. It is even lower than California, which has the lowest nurse-to-patient ratio of 1:5 in its general ward. Patient safety has been seriously threatened in the ICU, which was specifically designed to monitor critical patients.

Moreover, in the integrated nursing care service (a pilot project started in 2013), providers' nurse staffing is determined by Paragraph 4, Article 1 of the Enforcement Regulation of the Medical Service Act, whereby tertiary referral hospitals should have 1 nurse per 7 beds, general hospitals should have 1 nurse per 12 beds, and other hospitals should have 1 nurse per 14 beds. In 2016, when the integrated nursing care project was expanded, the nurse staffing standards applicable to public hospitals were revised from the number of beds per nurse to the number of patients per nurse (equal to private hospitals), and the new standards of 1:5 and 1:6 were established for nurse staffing in tertiary referral hospitals. In September 2016, a new 1:7 nurse-to-patient ratio was established for general hospitals with high severity (nursing need level), the upward and downward indicators in nurse staffing were deleted, and a 1:16 or less nurse-to-patient ratio for hospitals was established [47]. Only health-care organization satisfying this proposed nurse staffing standards can select a nurse-to-patient ratio of 1:5 or less for tertiary referral hospitals, 1:7/1:8 or less for general hospitals, and 1:10 or less for hospitals based on medical institution type, and in such cases, the nursing assistant level of 1:40 or less for tertiary referral hospitals and 1:30 or 1:40 for general and other hospitals was recommended [48].

Second, it is crucial to adjust the number of patients per nurse to a level that can ensure national health and patient safety. Although the first grade (comprising the general ward and ICU and garnering the highetst nursinc care fees) need to be raised to the level of advance countries, depending on the characteristics of the nursing unit. The application of standard grade, without any reduction, should be realistically adjusted so compulsory nurse overtime is not required. In general wards, the nurse-to-patient ratio, based on the number of patients presented in the integrated nursing care guidelines, may be the practical minimum standard. The nurse staffing of actual integrated nursing service providers by nurse-to-bed ratios revealed that most tertiary referral general hospitals were less than 2.0:1, general hospitals ranged from 2.0 to 2.5:1, and other hospitals were less than 2.5 to 3.0:1 [49]. The actual number of patients each nurse is in charge of, based on nurse-to-patient ratios, showed 1:6 as the highest ratio for highest level general hospitals and 1:10 as the highest ratio for general hospitals [12]. Nevertheless, to improve patient safety and quality of medical care, we suggest raising the nurse staffing standard to 1:4 for highest level general hospitals and 1:6 to 1:7 for general hospitals [12].

The number of hospitals participating in the integrated nursing care service has increased by approximately 35 times

for the number of hospitals, 27 times for wards, and 22 times for beds during the 5 years beginning in 2013. Integrated nursing care service has been expanding despite the shortage of nursing personnel, which is the biggest obstacle. In addition, researchers reported that nurses in integrated nursing care wards have less job stress, higher job satisfaction [50], and lower attrition intentions [51] than nurses in general wards. These results can be interpreted as the effect of compliance with the nurse staffing standards, which have improved the working environment for nurses in Korea. Therefore, it is necessary to improve the working environment by maintaining the appropriate nurse staffing standards, beginning by adjusting the number of patients under each nurse's charge.

To provide relief to local hospitals finding it difficult to secure nurse staffing, in 2018, the Differentiated Inpatient Nursing Fees for local hospital patients were revised [41]. Beginning in April 2018, some nursing institutions were advised to use the additional nursing care fees generated from the amended standard relating to the ratio of the number of beds to the number of patients, to improve the treatment of nurses. The status of improvement by nursing institutions applying the standard is being monitored. As a result, the lower the operation rate of beds, the higher the nursing grade.

Third, penalties and strengthening of the reduction ratio are necessary when nurse staffing does not comply with regulations. Nurse staffing standards specified in the Medical Service Act are presently ineffective owing to a lack of specific punishment standards for noncompliant institutions, and these limitations have been supplemented by the incentive system that has made no real difference. Furthermore, because it is impossible to identify the actual situation for nonreporting or rating hospitals with a certain grade or lower, they are assumed to have the lowest grade, and only a 5% adjustment for grade is made at hospital admission point. Because the 5% reduction is far less than the nurse recruitment cost, a structural problem exists whereby the loss is not enough to drive nurse recruitment. Therefore, reporting on nurse staffing levels should be made mandatory to enable readjustment of the scope of reduction according to grade so that recruitment of nursing staff leads to a structure that can compensate for the loss owing to the reduction.

Fourth, it is imperative to mandate notification of nurse staffing levels and establish a reporting system for nurse staffing. One of the major disadvantages with the existing Differentiated Inpatient Nursing FeesFee system of Korea is that it regards unregistered institutions' nurse staffing levels at the lowest grade: Grade 7. Because the institution's actual status is unknown, it is predicted that the level of unregistered institutions will be substantially lower than the standard applicable to Grade 7. In addition, reliable data should be obtained to evaluate compliance with nurse staffing standards.

At present, it is difficult to measure the ratio of the actual number of patients that nurses care for each day based only on the number of beds and bed-to-operation ratio. Thus, it is necessary to evaluate the validity of nurse staffing based on the actual number of patients per nurse, as in the United States or Japan. It is also necessary to establish a reporting system for nurse staffing along with mandatory notification of nurse staffing levels. The United States introduced the payroll-based journal system in 2016 that enables the public to learn about nurse staffing. Section 6106 of the Affordable Care Act stipulates that nursing facilities for the elderly should report nurses' daily care hours (hours per resident day) on a quarterly basis for elderly patients and post on the Nursing Home Compare website information such as total nursing staff, turnover rate, nursing-sensitive patients' outcomes, and so on [52]. It is imperative for Korea to establish a system to report and notify the current status of nurse staffing in health and medical institutions in real time, allowing them to be benchmarked.

It is urgent to enact a Korean nursing law to stabilize supply and management of nurse staffing. Nursing and law studies are the main disciplines to engage to achieve patient health, well-being, and social justice. People in those disciplines can work concurrently when coordination or power differences erupt between members or organizations [53]. When nursing law originated in the mid-1900s, it described contracts, witnesses, and criminals; gradually, it developed into torts, confidentiality, and labor law and recently has focused on establishing nurses' roles/positions [53]. In particular, it focuses on establishing roles for each field and positions such as entry-level registered nurses, nurse practitioners or advanced practice nurses, manager, researcher, and so on [53]. The law could expand, maintain, or limit nursing clinics, education, and research [53].

The scope of practice, including the independent role of professional advance practice nurses, has expanded through legislation, case law, and regulatory changes [53].

In the United States, 14 states—California, New York, Massachusetts, Connecticut, Illinois, Nevada, Oregon, Rhode Island, Texas, Vermont, Washington, Ohio, New Jersey, and Minnesota—have enacted nursing laws, and legislation is being introduced in a phased manner throughout the country. In total, 18 laws were enacted in these 14 states, and recently, the Safe Staffing for Nurse and Patient Safety Act of 2018, HR 5052 of Ohio and Quality Patient Care Act HF 2650 of Minnesota were proposed to the US House of Representatives and Senate, along with No. 989 from New Jersey to the US Senate. In addition, H.R. 2392 of California has been submitted to a committee, and D.B. S228 of New York and Ohio State's S.B.55 bill have been proposed to the Department of Health.

Conclusion

Proper nurse staffing is an important condition for the retention of nursing staff and patient safety. A review of nurse staffing laws, regulations, and regulatory devices in domestic and foreign countries revealed that Korea has adopted a very relaxed standard compared with the United States, Australia, Germany, and Japan. Korea's institutional devices are insufficient to ensure compliance with its nurse staffing laws. Therefore, we propose that a nurse staffing level should be identified on the basis of notification, and the penalties for health-care organizations that fail to meet the minimum standards should be enforced. Support for compliant institutions through the Staffing Grade Incentive System should also be strengthened, and the nursing fee system can improve by reinforcing disincentives for noncompliant institutions.

Furthermore, we propose institutional improvements to unify nurse staffing standards as the actual number of patients for each work shift per nurse, rather than the ratio of total nurses to the number of patients, reflecting the number of beds or bed-to-operation ratio, and publicizing the level. Currently, the Medical Service Act, staffing grades, and integrated nursing care system adopt different nurse staffing standards, thereby intensifying confusion among the public.

Funding

This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT and Future Planning (2017R1A2B4003282).

Conflict of interest

No conflict of interest.

	Law		Ratio	
Medical law	Nursing law	Ratio of RN:patient	Ratio of RN:bed	Korea
Medical Law Article 38			2.5:1 (inpatient) 12:1 (outpatient)	Japan
			3:1	Germany
		1:10		United States

		California		Nurse Staffing Standards for Patient Safety and Quality Care Act of 2017 (H R.2392)
Trauma emergency/operating room = 1:1				Intensive care unit, neonatal intensive care unit, emergency intensive care unit, labor and delivery unit, coronary care unit, acute respiratory care unit, postanesthesia unit, burn unit = 1:2 Emergency room, pediatric unit, step down unit, telemetry unit, antepartum unit, labor, deliver, and postpartum unit = 1:3
				Medical–surgical unit, intermediate care nursery unit, acute care psychiatric unit, other specialty unit = 1:4
				Rehabilitation and skilled nursing unit = 1:5

				Postpartum, well-baby nursery unit = 1:6
	Massachusetts		Bill H. 4228/M.G.L.A. 111 § 231	Intensive care unit = 1:1 or 1:2
	New Jersey		SENATE, No. 989	Medical/surgical unit = 1:5
				Step down unit, telemetry unit, intermediate care unit = 1:4
				Emergency room = 1:4
				Emergency intensive care unit = 1:2
				Trauma service of an emergency room = 1:1
				Behavioral health or psychiatric unit = 1:5
				Intensive care unit, neonatal unit, burn unit = 1:2
				Anesthesia in an operating room = 1:1
				Postanesthesia patients in a recovery room, postanesthesia care unit = 1:2

				Labor and delivery unit = 1:2
				Rooming-in = 1:4
				Postdelivery mothers-only unit = 1:6
				Pediatric unit, intermediate care nursery unit = 1:4
				Well-baby nursery unit = 1:6
	New York		Safe Staffing for Quality Care Act (Assembly Bill No. 1532)	Operating room, trauma emergency unit, maternal/child care unit for the second or third stage of labor = 1:1
			Maternal/child care unit for the first stage of labor, emergency intensive care unit, postanesthesia unit = 1:2	
			Antepartum unit, emergency room, pediatric unit, step down unit, telemetry unit, unit for newborn and intermediate care nursery unit = 1:3	
			Postpartum rooming-in = 1:3 (to maximum six patients per nurse = 1:6)	
			Noncritical antepartum unit, postpartum mother only unit, medical/surgical unit, acute care psychiatric unit = 1:4	

			Rehabilitation unit, subacute unit = 1:5	
			Well-baby nursery unit = 1:6	
Connecticut		Public Act 08-79, An Act concerning Hospital Staffing		
Illinois		Public Act 095-0401		
Texas		Health and Safety Code Chapter 257, Nurse Staffing		
Ohio		Safe Nurse Staffing Law		
Australia				
Victoria			Medical and surgical = 1:4 to 1:6	
			ER = 1:3 (excluding charge or triage nurse)	
Victoria		The Safe Patient Care (Nurse to Patient and Midwife to Patient Ratios) Bill 2015	Public acute medical and surgical = 1:4	
			ER = 1:3 (excluding charge or triage nurse) one in-charge nurse and two triage nurses Larger regional hospitals = 1:4 on morning shifts, 1:5 on afternoon shifts, 1:8 on night duty shifts, plus an in-charge nurse on all shifts.	
Queenslan d		Hospital and Health Boards Amendment Regulation (No.2) 2016 Part 6A 30B	Acute adult wards = 1:4 on morning shifts and afternoon shifts and 1:7 on night shifts	

	Medical law	Nursing law	Penalty content

Korea	Medical Law 63		The Minister of Health and Welfare or the mayor/governor/head can order correction of a certain period of time to limit or prohibit the use of facilities, equipment, and so on.
Germany	–	–	–
United States			
California		Nurse Staffing Standards for Patient Safety and Quality Care Act of 2017 (HR. 2392)	1Civil money penalty2Enforcement of public release on the violation
Minnesota		Quality Patient Care Act (H.F. 2650)	1Civil money penalty2Enforcement of public release on the violation
Nevada		Prescribes requirements concerning the care of patients in facilities for skilled nursing (BDR 40-417) (AB242)	1Civil money penalty
	SB 362	1Suspension or cancellation of license of health-care organization2Monetary penalty3Corrective action by health division including decreasing patients per unit, limiting additional admissions	New Jersey
	NJ Rev Stat § 26:2H-5f, 5g, 5h	1Monetary penalty	Ohio
	Safe Staffing for Nurse and Patient Safety Act of 2018 (H R. 5052)	1Civil money penalty	Oregon
	ORS § 441.154	1Civil penalties2Suspension or cancellation of license of the health-care organization3Enforcement of public release on the violation	Australia (Victoria state)

DETAILS

Subject:	Patient safety; Ratios; Mortality; Nursing care; Medical research
Location:	Australia; California; United States--US; New York; Massachusetts; Ohio; Germany; Japan; New Jersey
Identifier / keyword:	hospital; legislation; nursing; nursing staff
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	57-65
Publication year:	2020
Publication date:	May 2020
Section:	Review Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English
Document type:	Journal Article
DOI:	https://doi.org/10.1016/j.anr.2020.03.004
ProQuest document ID:	2490468915
Document URL:	https://www.proquest.com/scholarly-journals/improvement-plan-nurse-staffing-standards-korea/docview/2490468915/se-2?accountid=211160
Copyright:	

Last updated:	2021-02-24
Database:	Publicly Available Content Database

The Sociocultural Meaning of “My Place”: Rural Korean Elderly People's Perspective of Aging in Place

Park, Sihyun [1] ; Ko, Yejung [2] [1] Department of Nursing, Chung-Ang University, Seoul, Republic of Korea [2] Department of Nursing, Gwangju University, Gwangju, Republic of Korea

ABSTRACT (ENGLISH)

Purpose

Aging in place becomes an important concept in elderly care plans worldwide. It pursues to enhance quality of later lives and maintain dignity in older adults. However, one's own place may have some kinds of symbols and meanings to an individual in accordance with the culture he/she belongs to. Without considering it, many cultural conflicts can emerge when policies are realized. Thus, the purpose of this study was to explore the sociocultural meaning of “my place” for elderly Koreans ahead of enacting a policy for the so-called “integrated community care” in South Korea, pursuant to aging in place for the elderly population.

Methods

This study used an ethnographical methodology. The data were collected by observation, in-depth interviews with 10 informants, home visits, field notes, and photos, and analyzed using Spradley's ethnographic approach.

Results

As a result, the cultural theme of “my place” in elderly Koreans was “A place that makes me be present.” Three categories representing the meaning of “my place” were emerged: keeping me safe and comfortable, representing my life, and maintaining my control and influence.

Conclusion

Researchers and policymakers should carefully consider the sociocultural perspective when planning, moderating, and implementing a new long-term care policy to achieve aging in place in South Korea.

FULL TEXT

Introduction

As life expectancy increases, many countries encounter demographic changes in which the proportion of the aging population grows rapidly. In this regard, policies and care systems worldwide are focusing on enhancing the quality of life (QOL) or dignity in older adults [1–3].

“Aging in place” (AIP) is a popular term related to aging issues. It refers to an elderly person's ability to live independently and safely in his/her own place for as long as possible [3]. Many countries are adopting this concept of AIP in their policies for the elderly, aiming to enhance QOL through community-based care. Indeed, it is known that older adults prefer to live in their own homes, which are more familiar and comfortable. As such, AIP ensures a more independent life, preserving a certain level of competency and autonomy [4].

South Korea is experiencing rapid demographic changes as well. Korea officially became an “aged society” in 2017, meaning that the proportion of the aging population reached 14% of the total population [5]. The rate of aging in Korea has been fast in that it took just 17 years to go from an “aging society,” meaning that the elderly represents 7% of the total population, to an “aged society.” At this rate, Korea is expected to become a “superaged society” by 2026. This rapid increase in the older population is expected to trigger sharp increases in medical costs and efforts to manage chronic diseases for the elderly, sequentially increasing the burden on families and the country [6].
Considering this situation, the Ministry of Health and Welfare in Korea has announced a blueprint of care service plans for the elderly called a “community care” (CC) policy. CC refers to a community-based and regional-driven social service care plan in which housing, health care, and various supports for independent living are all secured in an integrated manner so that older adults can receive services based on their individual needs while remaining in the community where they have always lived. Pursuing the idea of AIP, CC respects the elderly's right to live in their own places by providing adequate community-based care [6]. CC particularly targets vulnerable elderly people returning home from hospitals or facilities and needing consequent care. Thus, it is anticipated that CC will prevent their families from sending them to hospitals or facilities as a way to reduce the burden of care [7].
However, AIP is not always the best option, especially in a society such as South Korea where the proportion of elderly people living alone is increasing (19.7% in 2008 and 23.6% in 2017), as is the suicide rate in older adults, which is much higher in South Korea than in other countries (21.1% of elderly people showed depressive symptoms; 6.7% showed suicidal ideation) [8]. They may suffer from loneliness or a lack of support when living in their own places by themselves. Delayed access to resources such as medical facilities is also possible [9]. This is especially true when residential areas are marginalized or isolated and when the elderly person lives alone.
To compensate for the negative aspects of AIP and enhance the feasibility of the policy, the cultural peculiarities of South Korea should be considered. For instance, in Taiwan, which also faces the issues of a growing elderly population, the elderly find it most ideal to be cared by family at home; thus, adult children feel guilty about sending their parents to a facility [10]. Taking this strong family-oriented tradition and other cultural values, Taiwan's government developed a community-based care system (Long-Term Care 2.0) according to which older adults can receive various care services within their own homes and the communities in which they reside [11]. Still, a wide range of academic and practical efforts continue, aiming to enable as many households and older adults as possible to use the services without cultural value conflicts [10, 12].
Meanwhile, despite the rapid changes in policies and systems along with the increasing aging population, there has been no attempt to explore sociocultural meanings in the concepts related to aging in South Korea. Although CC and AIP are the main concepts that the national policies and care plans pursue, the cultural meaning of home—not merely the house itself but also the community—has not been explored. For the policies and systems of CC to take root in Korean society, it is essential to understand the sociocultural meanings of one's own place for elderly Koreans.
Therefore, the purpose of this study was to explore the sociocultural meaning of “my place,” including home and community, for older Korean adults. This is an essential part of the development and implementation of the policy, the goal of which is to enable people to stay in their homes and communities as they age.

Methods Study design

Ethnography pursues to describe a culture to understand a life from the native's perspectives [13]. Therefore, researchers used an ethnographic qualitative approach suggested by Spradley [13] to examine the meaning of “my place” for elderly Koreans. Specifically, researchers used diverse methods such as conversations with many elderly people in the community including 10 informants who provided rich data, observation of their natural lives, home visits, in-depth interviews, field notes, and photos. Researchers adhered to standards for reporting qualitative research to report this study [14].

Informants and data collection

To collect the data, researchers targeted a suburb located in the city of Gimcheon, called Bu-Hang. Gimcheon is one of the cities in South Korea that has been challenged by lower fertility rates and a higher aged population. In

particular, Bu-Hang, which is located in a rural area of Gimcheon and has an area of 82.64 km^2 and 1,322 dwellers, is one of the superaged towns in South Korea in which 43.3% of the population was 65 years old and older, and the mean age of the population was 59.2 years in 2019 [15]. The town is quite a remote area where there is a lack of transportation system and no city gas line. The people in the town mainly do farming for their living. Researchers chose this town because there are many older adults who had lived in the same place their whole lives, so researchers considered it to be a suitable place to examine the sociocultural meaning of “my place” from the perspective of AIP.

Researchers visited Bu-Hang once a week from May 9 to August 9 in 2019, along with a local social worker who regularly does the round visit twice a week to check up on the older adults in the community. Researchers spent about six to eight hours in the community per visit. Researchers did the round visit of elder people's homes with the social worker and often worked together with the elderly in the fields. Researchers also spend many times in the community halls where many elder people spend most of their times. While staying in the community, researchers observed the older people's lives in natural settings, freely asked questions, and spoke with the people in the community. Researchers took photos of the older people in their ordinary lives and wrote field notes about all of the information researchers heard and observed. Unfortunately, researchers were able to speak with few older male adults in the community because the majority of the older population was women.

In addition, researchers selected informants among the people in the community to collect rich data. The inclusion criteria for selecting informants were as follows: (1) aged 65 years and older, (2) able to communicate, (3) understanding the purpose of the study and agreeing to participate in the study, and (4) willing to invite us to their home and provide information under informed consent.

A total of 10 informants were recruited. The demographic information of the informants is listed in Table 1. Researchers made prior appointments with the informants before visiting their homes and then visited each informant's home at the time of appointment. Researchers spent one to two hours in each home. During the home visit, in-depth interviews were conducted with each informant. The semistructured interview lasted between 40 and 50 min. Examples of open-ended questions included the following: (1) How is your life going? (2) What does home/community mean to you? and (3) What are your feelings or thoughts when you think of your home/community? To clarify their thoughts on their home/community, researchers also asked about their honest thoughts on senior facilities, such as retirement homes, senior nursing homes, and hospitals—to contrast with the concept of their own home/community. All interviews were audio-recorded and transcribed.

Photo elicitation was also carried out. With permission from the informants and the social worker, one or two photos of each informant were taken to reveal their natural lives in their own homes during observation. Researchers discussed the photos with the informants during the interviews (Figure 1).

Ethical considerations

The Institutional Review Board of Inha University approved this study (Approval no. 190222-1A). In addition, the administrator of Bu-Hang understood the purpose of this study and gave permission to collect data from the community. A social worker in charge of taking care of the elderly population in Bu-Hang accompanied us while collecting the data. Finally, researchers obtained permission from the informants of this study to visit their houses, conduct and record interviews, and take photos and notes.

Data analysis

Researchers continued to visit the community until researchers completed the data analysis to fully ensure data saturation. The data were analyzed by ethnographic methods suggested by Spradley [13], which consisted of domain analysis, taxonomic analysis, componential analysis, and discovery of cultural themes.

Above all, interview transcripts were read carefully several times along with reviewing other collected data, including field notes, photos, and official data from the websites. Then, domains—categories of cultural meanings—were discovered from the collected data. Researchers began by extracting culturally meaningful domains related to our research questions from the interview transcripts. At this point, other data (e.g., photos, field notes, and official data) were used to help us understand and identify additional culturally meaningful domains. Various domains emerged

showing how the elderly Korean population perceived their places, including home and community. Similar domains were merged, and specific details were categorized into relevant domains. For a taxonomic analysis, researchers built a domain structure with the domains based on semantic relationships. Thus, several related domains were categorized into cover domains, and those were again merged into broader categories. Next, for a componential analysis, researchers clarified and refined our results by asking the elderly people additional questions during our visits. In particular, researchers tried to reveal a cultural meaning of “my place” for elderly Koreans by contrasting the 10 informants' thoughts regarding senior facilities, which researchers asked about during the interviews.

After spending considerable time in this cultural context and rigidly analyzing the data researchers collected, researchers confirmed that three categories, eight cover domains, and nineteen included domains had emerged to describe what “my place” means to elderly Koreans. These are shown in Figure 2, and researchers tried to use in vivo codes (informants' exact words and expressions) when labeling them. Finally, researchers discovered a cultural theme presenting the sociocultural meaning of “my place” for the elderly Korean population: A place that makes me be present.

Trustworthiness of the study

To ensure the trustworthiness of the study, researchers tried to enhance its credibility, transferability, dependability, and confirmability [16]. To ensure credibility, researchers spent a considerable time at the site where data collection took place. This helped us to develop a familiarity with the culture and understand the cultural meanings [17]. In addition, researchers used a peer debriefing method in which a qualitative researcher with a PhD in nursing confirmed the cultural theme as well as the categories and domains by going back and forth between the conceptual coding scheme and the interview data. To ensure transferability and dependability, researchers provided detailed descriptions in terms of research design, procedures, and results. Finally, in regard to confirmability, a social worker who had worked with the elderly in Bu-Hang for three years agreed with the results of this study, including the cultural theme and the conceptual coding scheme.

Sensitivity of the researcher

The authors of this study began to wonder how elderly Koreans perceive their homes when the Korean government announced a blueprint of CC policy. In particular, the corresponding author, who is a psychiatric nursing specialist, had been highly interested in the lives of the Korean elder population residing in rural areas as she performed dementia prevention programs for Korean elderly people few years ago. Both authors have expertise in conducting qualitative studies. The first author taught ‘qualitative methodology’ in the graduate program, and the corresponding author of this study has several experiences of conducting in-depth interviews with vulnerable people for a qualitative study, such as violence victims and people with mental disorders.

Results

From the ethnographical data, three categories, eight cover domains, and nineteen included domains emerged to present the sociocultural meaning of “my place” for the elderly Korean population. The cultural theme of “my place” is “A place that makes me be present.” Three categories that show the meaning of “my place” are (1) keeping me safe and comfortable, (2) representing my life, and (3) maintaining my control and influence.

Keeping me safe and comfortable

While visiting the community, researchers saw many elderly people spending time at home taking a nap or resting. Thus, the first category represented the basic functions of the house and community that the informants expressed, such as safety, stability, freedom, and comfort. In this category, two cover domains were included: (1) feeling safe and secure and (2) feeling free and comfortable.

The elderly people believed it was safe to live in their homes and community. Researchers could infer this from their strong rejection and distrust of care facilities such as nursing homes for the elderly. Many of the elderly people researchers met, including the informants, mentioned stories they had heard about elderly people who had died or were injured while living in a facility. Although the facts of the rumors could not be ascertained, distrust in facilities seemed to be high. *There is no freedom (in such facilities), you know, freedom. They don't even give you enough to eat. That's what people say. They say when you or your relatives bring snacks for you, the facility people do not give*

you enough because they are afraid you are going to poo and pee too much. (informant 1)

Stability was another issue for elderly Koreans in terms of living in their homes. They believed their home gave them stability; however, this seemed to be achieved only when the ownership of the house was secured. Indeed, almost all informants mentioned that the ownership of their houses was what mattered. The informants who owned their houses were relieved when they said that they had no fear of being evicted while alive. In contrast, those who did not own their houses showed anxiety, and they felt a great threat that they might have to move when they are older. *It is good to have this house under my name. It feels good and comfortable to own a house. (informant 3)Because I live in someone else's house, I always feel anxious. I don't know when they will ask me to get out because it is someone else's house. (informant 2)*

The elderly also felt that their homes and communities were free and comfortable places. They were in places where one could cook and eat according to one's preference without having to adjust to others or go out according to one's own will without having to get permission from others.*In my house, I can do whatever I want. I go where I want to because no one stops me from doing that. But, you see, (in the facilities for the elderly) you have to eat what you are given, and when they tell you to sit still, you have to sit still. (informant 5)*

Representing my life

According to the informants, their living places—home and community—were not just a concept of residential space but also symbolic of their lives. Three cover domains were included in this second category: (1) defining my identity, (2) reward of lifetime effort with the house spirit's (*Jib-Tur*'s) help, and (3) feeling attached throughout life.

All of the informants had lived in this community for about 40 to 80 years, which was almost their whole lives. Most informants said they had lived in one place with their in-laws because they married at the young age of 18 or 19 years. (Culturally, older Korean adults describe marriage as “move to in-law's house.”) For this reason, all of their life memories existed in their houses and communities. During interviews and home visits, the informants spent a lot of time talking about their home- and community-related memories.*When researchers remodeled this house 30 years ago, my husband invited his high school buddies, and they played traditional Korean band music. That has remained my biggest memory. That was the happiest time in my life. (informant 8)I moved to my in-law's house at the age of 19. I've been living here with my husband for 57 years. (informant 7)*

Because they have lived in one place for so long, the home has become a symbol of their lives and their existence. One informant thought of her house as a place where others could remember her life, and she wished for her children to visit the house after she dies to remember her. Another informant wanted to give her house to her oldest son who would take over the ancestral rites for her.*Even after I die, I hope my children will not sell this house and just come and go like their hometown... This house has let me live my life. That's the meaning of this house. (informant 6)I will give this house to my son because he is the one who will practice the memorial rituals... to my son, my eldest son ... This house must be given to the son who will do the rituals. (informant 9)*

Interestingly, many informants mentioned the house spirit (in Korean, *Jib-Tur*—literally, the site of the house). They believed that they could not live in the house if they were not compatible with their *Jib-Tur*. In addition, they talked about how well they fit with their *Jib-Tur* and how it gave them good luck. With the help from the *Jib-Tur*, they could raise children, save money, and stay healthy while living in their house. They said they had worked hard and made a great effort to own a house. They believed that their houses were the reward for their lifetime's hard work and that this would be difficult to achieve without the house spirit's help.*My husband built this house, so I have to live here. Researchers were starving because researchers did not have much to eat when building this house (because researchers were economically bad off). That's how researchers lived. (informant 7)I think this Jib-Tur has brought me luck. I've made my living and worked here without getting ill so far. (informant 8)*

Finally, many elderly people in the community, including all the informants, showed a great attachment to the familiar places of home and community, including the neighbors.*I love it (my house). I am happy here... because this is the place I feel attached to. What else can it be? I lived here with my husband, and so I feel so attached to it. I've never thought of selling this house and going to some other place. (informant 1)*

Particularly, the informants referred to their neighbors as people with whom they had interacted like family for a long

time. Still now, neighbors in the community are helping each other and experiencing life's great events together. Researchers also observed that people in the community spend most of their time together at the village hall playing traditional Korean games. They seemed to know everything about each other, shared food, and took meals together. Specifically, giving someone something to eat is seen as a sign of affection. The elderly people in the community gave us a lot of food during these visits.*Researchers (people in my neighborhood) are like a family. They call 119[911] if I become sick. When I am sick, they come and see if I am OK, and if I'm not home, they look for me and ask around. (informant 4)When I first came back to my home alone after my husband's death, the hometown grandmas took me to the village hall, fed me, and took me home. People in this village are warm-hearted. I feel comfortable here. (informant 5)*

Maintaining my control and influence

The last category focused on power and productivity in the elderly. Many informants believed that they could be powerful and influential in their own places, and indeed, researchers observed many of them working in their houses and fields. This category included three cover domains: (1) a place where I can meet my people, (2) still being productive, and (3) being able to be a good parent to my children.

The elderly people in the community were actually spending much time with people they were close to, and they put importance on such meetings. The informants showed a strong disagreement with our statement that they could still meet people at the facilities. They stressed that they valued intimacy with people they met. Actually, they formed close groups in their neighborhoods. Homes and neighborhoods were especially important places to meet with people. They invited close people to their homes or were invited to others' homes, and they always served tea or fruits when people came to visit.*I like it when my friends come to my house. When they come to my house, researchers drink tea and eat something, and researchers visit with one another. (When they come) I give them tea and fruit or something like that. I also go their homes, and they do the same for me. (informant 3)*

In addition, researchers saw that the homes of elderly Koreans were a means for them to live a productive life. Most of the elderly people in the community worked productively in their homes, paddies, and fields. They farmed, harvested, and shared their crops with their neighbors. Many informants said they felt rewarded for their productive activities. In contrast, they thought that aging in a facility was a passive and unproductive life.*I still like to work in the field because, after I finish my work in the field, I will have a good harvest. That's what I like... and I feel that's rewarding and worthwhile. (informant 1)When I get up, I wash my rags and clean the floor... From time to time, I straighten my back, and I feel good. (informant 6)(Facilities for the elderly) Dear, how can it be good? I am not going there because it is a living hell. Don't do that to me. I can't even work there. Well, I get locked up and can't do anything. (informant 7)*

Finally, the home had a meaning of preserving a parent's role for elderly Koreans. Home was a place where the children came to see them and where they could make some food for their children so that they could still play a parent's role for their children. Many elderly people in the community were very happy with their children's visits and looked forward to their arrival. Many of them talked to us about their children and boasted about their children's jobs or work although researchers had just met.*My youngest kid likes the side dishes that I've made for him. So, when he (my youngest son) comes to my house, I prepare some greens and side dishes for him to take home. (informant 9) When I can give them [children] Kimchi or other things, (I feel good). When I make Kimchi in my house and my sons and daughters take it, I feel good, even though it may take some doing for me. (informant 6)*

On the other hand, for elderly Koreans, living in one's own home by themselves seemed also to be related to thoughts that they did not want to burden their children. Although it has long been considered a virtue for children to serve and support their old parents, most informants stated that living with their adult children and receiving their support would be such a burden to adult children. They believed that aging in a facility for the elderly would put financial burdens on their children as well. For these reasons, they insisted on living alone.*My son says that he will not send me to a nursing home (and will take care of me by himself), but I know the current era is not such a time, so I need to take control of my own life. I am not going to my son's house. Whether it is inevitable or not, once I go to my son's house, it will be heavy in my mind... I am satisfied (living alone in my house). I've got to live by myself,*

errrrr. (informant 2)Even if I get sick, I will not go to my son's house. This is not such a time, is it? Researchers can't go (to the children's house) in this era. (informant 9)

Discussion

For elderly Koreans, their own homes and communities were the places that made them feel present and alive. It meant keeping them safe and comfortable, representing their lives, and maintaining their control and influence. Wiles et al [4], who explored the meaning of AIP for older people in New Zealand, reported that the meaning of AIP was related to their sense of attachment, security, familiarity, independence, autonomy, and social connection. This result was similar to that of our study in that the older Korean adults researchers met also stressed that their places were safe, secure, familiar, and comfortable, and they could keep their autonomy and independence. However, obviously, there were cultural specific findings in our results that have not been revealed in other studies; therefore, researchers discussed the meaning of “my place” by focusing on sociocultural aspects in Korea and provided policy implications based on this.

First of all, in Korean culture, the house is an important symbol to people. They believe that the house spirit exists at the site of the house (*Jib-Tur*), positively or negatively influencing the people who reside there. There are several cultural myths in some countries related to house spirits which protect the family residing the house [18]. For instance, in Finnish mythology, a spirit named “haltija” lives in the attics or barns of the house and protects the family who lives there. In Japanese folklore, the invisible household spirit “zashiki-warashi” becomes visible to the owners of a house when they decide to leave the house. Their leaving house is considered as a sign of bad luck in family, so the people consider this spirit as good luck. *Jib-Tur* in Korea, on the other hand, has a power, and it was believed that too much power of *Jib-Tur* would hurt or kill the family. However, family members were blessed if they were well matched with *Jib-Tur.* Nonetheless, this spiritual perspective has not been considered in terms of AIP as far as researchers know. Therefore, further investigation is needed.

Second, whether the house belonged to them or not was important to elderly Koreans. It was more than just a fear of being homeless and unstable, that is, for them, the house was more like their own identity. For example, the people who did not own a house described themselves as wanderers who could not achieve anything. In contrast, those owning a house felt very proud of themselves and thought of the house as a result of their lifelong efforts. This finding can be interpreted with other research studies that explored correlating factors in achieving successful aging for elderly Koreans [19], reporting that unlike other Western countries, economic status and stability is an important factor to elderly Koreans in their aging experiences. They asserted that the economic condition and its stability were highly related to psychological well-being in elderly Koreans, and this is understandable when looking back at the historical period in which they lived. The current elderly Korean population underwent rapid and critical social changes, from Japanese colonialism and the Korean War in the 1940s and 1950s to the economic boom in the 1960s and 1970s. Especially during the economic boom, the government and public motivated people to work hard and earn foreign currency by emphasizing the traditional Korean virtue “loyalty to country.” Older people, the Korean workers at that time, believed that they should revive the nation by hard work, and that was the way to be loyal to the nation [20]. Thus, elderly Korean people's thoughts about economic conditions and home ownership may represent those years.

Third, maternal affection in Korean women was fully manifested in the meaning of their home. Perhaps because of the influence of Confucianism, the informants expressed a stronger maternal affection toward their sons. All of the informants prepared foods for their sons (and occasionally for their daughters) at home and felt happy as mothers when their adult children took the foods. Indeed, there have been many studies about Korean women's strong maternal affection toward their children, influenced by Confucianism [21,22]. Korean women had traditionally considered it a virtue to raise the children well and support their children's success. Their children's success was regarded as their own success and their family's honor [21]. In fact, during our visits to Bu-Hang, researchers were surprised that many older people in the community talked about how socially successful and well grown up their children were although researchers had just met.

Finally and most importantly, the older Korean adults researchers met through this study wished to stay in their own

places until death, and this was consistent with findings in the previous literature [3,4,23]. Indeed, according to the national data [8], 57.2% of Korean adults say that they wish to die at home. Nonetheless, during this study, researchers became curious whether the elders really desire to stay at home or just have no particular place to go. After asking further in-depth questions, researchers came to understand that most of them did prefer to stay at home and did not want to go to a facility; on the other hand, aging in their own house was also a way for them to not become a burden to their children. They were lonely and showed anxiety and a fear of being alone, especially when they were sick. Korea, which has long been a Confucian country, had considered it a virtue for children to support their old parents. Nonetheless, the elderly confessed that they cannot burden their children because society has changed, and that was one of the reasons why they insisted to live in their own house by themselves. Lum et al. [1], who focused on socioeconomic status in elderly Chinese city dwellers in terms of their AIP preference, reported that very low income and community resources, including medical facilities, were related to their preferences of AIP. Bu-Hang was not a low-income town, but it did not have many accessible resources. There might be cultural issues in terms of the preference of AIP in elderly Korean people. Therefore, elderly Koreans' preference for AIP should be deeply investigated with various conditions through further research.

There are several implications for further research and policies on AIP based on the findings. First, the Korean government should consider the country's traditional values when planning and implementing new policies. Under the influence of familism, elderly Koreans belong to a generation that values family and considers the role of parents as a virtue [21]. The elderly researchers met in this study waited every day for their adult children to visit them. In addition, although researchers could not interview their adult children in person, the informants gave the impression that their children seemed to feel guilty about the parents living alone. In light of this, evidence-based nursing care services and systems are needed that will help preserve the traditional values of the family and community as part of CC. As the latest trend, using technology can be one option. Wang et al. [24] introduced the usage of mobile and wearable devices in older adults AIP in the US in their article and reported that most older adults were interested in sharing the data through the device with families, friends, and health providers.

Second, various and accessible community resources should be constructed, especially in rural areas. Those resources should include not only medical facilities but also adequate spaces for community gatherings. Those spaces could reduce the elderly's loneliness and help them to maintain their social engagement.

Finally, various elderly abuse and neglect cases at some geriatric care centers have scared some elderly people and have forced them to stay at home. Therefore, a strong and rigid legal system to prevent elderly abuse should be established.

Some limitations of this study should be considered: this study only targeted one town in South Korea. Perhaps, the findings would be different with elderly people living in urban areas. In addition, researchers were unable to recruit older male adults as informants. For the aforementioned reasons, caution should be taken when generalizing the results of this study.

Conclusion

The national plans for AIP have already begun in Korea and are picking up the pace. Still many older adults hope to age at home; however, researchers should understand that it was not only because of the familiar building itself but also because there are many meanings that are implicit in it. Through this study, researchers tried to explore a sociocultural meaning of “my place” in Korean older adults living in rural areas. Their place was a symbol of representing their presence. Therefore, the stakeholders in South Korea now have to think about how to make them meaningfully present and exist in the society, rather than just how to make them live. Importantly, enhancing the QOL and maintaining dignity to the end for elderly people can be achieved in consideration of the social culture of a nation rather than unquestioningly following the global trend.

Funding information

This research was supported by Chung-Ang University Research Grants in 2020.

Conflict of interest

The authors of this study declare that there is no conflict of interest.

Acknowledgments

The authors would like to express their gratitude to Ms. Shin, a social worker, for her help and advice in conducting the fieldwork of this ethnographical study.

ID	Gender	Age (yrs)	Years of living in the community/house	Cohabitant	Family	
Spouse	Children	1	Woman	80	57/57	None
dec. in 2005	1 son and 3 daughters	2	Woman	83	63/7	None
dec. in 1999	2 sons	3	Woman	81	38/18	None
dec. in 2015	2 sons and 2 daughters	4	Woman	77	55/55	None
dec. in 1995	3 sons and 1 daughter	5	Woman	75	56/40	None
dec. in 1995	1 son and 3 daughters	6	Woman	74	50/50	None
dec. in 1975	1 son and 2 daughters	7	Woman	78	57/57	None
dec. in 2017	3 sons and 1 daughter	8	Woman	85	60/60	None

dec. in 2009	3 sons and 1 daughter	9	Woman	84	64/10	None
dec. in 1984	2 sons and 2 daughters	10	Woman	87	87/37	None

DETAILS

Subject:	Hospitals; Researchers; Population; Ethnography; Older people; Aging in place; Society; Medical research; Qualitative research
Location:	Taiwan; South Korea
Identifier / keyword:	aging; cultural characteristics; health policy; Korea; qualitative research
Publication title:	Asian Nursing Research; Seoul
Volume:	14
Issue:	2
Pages:	97-104
Publication year:	2020
Publication date:	May 2020
Section:	Research Article
Publisher:	Elsevier Limited
Place of publication:	Seoul
Country of publication:	United Kingdom, Seoul
Publication subject:	Medical Sciences--Nurses And Nursing
ISSN:	19761317
e-ISSN:	20937482
Source type:	Scholarly Journal
Language of publication:	English

Bibliography

Citation style: APA 6th - Annotated with Abstracts - American Psychological Association, 6th Edition

Eun-Hyun, L., Young, W. L., Kwan-Woo, L., Hong, S., & Kim, S. H. (2020). A new objective health numeracy test for patients with type 2 diabetes: Development and evaluation of psychometric properties. Asian Nursing Research, 14(2), 66-72. doi:https://doi.org/10.1016/j.anr.2020.01.006

PurposePatients with diabetes frequently need to perform certain numeric tasks such as interpreting blood glucose levels. However, there is no psychometrically sound instrument for objectively measuring diabetes-specific health numeracy. This study aimed to develop a new objective diabetes health numeracy test (DHNT) and evaluate its psychometric properties in adult patients with type 2 diabetes.MethodsAn instrument development study was conducted. Initial items were evaluated by six experts for content validity. After a pilot test, a convenience sample of 257 participants with type 2 diabetes was recruited at 2 university hospitals from May to September 2018. The structural, convergent, and criteria validity, and internal consistency of the DHNT with binary item responses were evaluated. Data were analyzed using exploratory factor analysis, Rasch analysis, tetrachoric correlation, Spearman's correlation, and the Kuder–Richardson-20 formula.ResultsExploratory factor analysis yielded a single-factor solution comprising seven items. Rasch analysis confirmed that no item did not fit with the single factor and identified that the item difficulty parameters had moderate values. The convergent and criterion validity of the instrument were demonstrated, with diabetes knowledge and subjective diabetes numeracy, respectively, as was its acceptable internal consistency, by a Kuder–Richardson-20 coefficient of .81.ConclusionThe DHNT demonstrated satisfactory psychometric properties. The instrument with moderate levels of item difficulty may have a lower cognitive burden. The developed instrument can be applied in practice to tailor the education of diabetes self-management as per the levels of health numeracy of specific patients.

Baek, W., Jang, Y., Park, C. G., & Moon, M. (2020). Factors influencing satisfaction with patient-controlled analgesia among postoperative patients using a generalized ordinal logistic regression model. Asian Nursing Research, 14(2), 73-81. doi:https://doi.org/10.1016/j.anr.2020.03.001

SummaryPurposeThe purpose of this study was to identify the factors affecting the satisfaction with patient-controlled analgesia (PCA) of patients using a generalized ordinal logistic regression model and to evaluate the difference in results of the ordinal regression from those of binary regression.MethodsThe study design involved secondary analysis of electronic medical records from a single tertiary care hospital in Seoul, Korea. It included 2,409 patients treated with PCA for postoperative pain management after open or laparoscopic abdominal surgery. Binary logistic regression and generalized ordinal logistic regression were used to identify factors affecting satisfaction.ResultsBinary logistic regression analysis showed that there was insufficient information for analysis. Generalized ordinal logistic regression revealed that sex, age, pain, PCA usage, and side-effects were common factors affecting PCA satisfaction. However, the effect of some factors affecting PCA satisfaction differed with the level of satisfaction. In open surgery patients, the effect of pain at 6 hours after surgery was significantly greater in the group with lower satisfaction. While, in the laparoscopic surgery patients, the effect of pain at 6–24 hours after surgery was significantly greater in the group with lower satisfaction.ConclusionGeneralized logistic regression may be an appropriate statistical method for analyzing ordinal data. Degree of postoperative pain and assessment interval are the most important factors associated with PCA satisfaction. Because the factors affecting PCA satisfaction were different for the two types of abdominal surgeries, customizing PCA to individual patients may potentially improve pain management and consequently increase PCA satisfaction.

Wen, F., Wang, L., Fang, Z., Zhu, J., & Zhang, Y. (2020). The chinese version of the work control scale for nurses: Modifying the translation and psychometric testing. Asian Nursing Research, 14(2), 122-128. doi:https://doi.org/10.1016/j.anr.2020.04.006

PurposeThe aim of the study was to modify and test the psychometric properties of the Chinese version of the work control scale (C-WCS).MethodsThe translated scale was administered to 840 nurses in Shanghai. Validity was assessed in terms of content validity and construct validity using exploratory factor analysis and confirmatory factor analysis. Internal consistency and test–retest reliability were estimated using Cronbach α and the intraclass

correlation coefficient.ResultsPsychometric analyses of the C-WCS indicate high reliability and good content and construct validity.ConclusionThe C-WCS has good psychometric properties and can be used as a valid tool for measuring work control among nurses in China. The C-WCS will help to further explore the correlations between perceived work control and organizational quality indicators such as nurses' satisfaction, job stress, well-being, or intention to stay. It can also be used in nursing outcome studies of work control strategies.

Kang, J., & Young, S. C. (2020). Cross-cultural validation of the intensive care experience questionnaire in korean critical care survivors. Asian Nursing Research, 14(2), 89-96. doi:https://doi.org/10.1016/j.anr.2020.03.002

PurposeThe purpose of this study was to culturally adapt the Intensive Care Experience Questionnaire (ICEQ) for Korean patients and evaluate its validity and reliability.MethodsThis cross-sectional study comprised two phases. The first phase involved the cultural adaptation of the ICEQ. In the second phase, the psychometric properties of the adapted measure were evaluated. Cultural adaptation was conducted in accordance with the World Health Organization's process. The adapted questionnaire was administered to 200 Korean patients who had received treatment in an intensive care unit within the past six months. Model fit was assessed through confirmatory factor analysis, and convergent validity and discriminant validity of the items were assessed. Known-groups validity was evaluated using the t test and Cohen's effect size. Cronbach's α was used to examine internal consistency reliability.ResultsThe Korean version of the ICEQ (K-ICEQ) consists of 26 items and four subscales: Frightening Experiences, Awareness of Surroundings, Satisfaction with Care, and Recall of Experiences. The model fit indices, convergent validity, and discriminant validity of the K-ICEQ were all satisfactory. According to the results of the test of known-groups validity, intensive care unit (ICU) experience varied according to gender, planned ICU admission, mechanical ventilation, and restraints application. Cronbach's α of the K-ICEQ subscales ranged from .74 to .93.ConclusionThe validity and reliability of the K-ICEQ reflecting the characteristics of Korean ICU patients were satisfactory. The K-ICEQ can be used to evaluate the experience of Korean ICU patients and contribute to the development of interventions to improve the ICU experience.

Jeong, J. H., & Eun, J. K. (2020). Development and evaluation of an SBAR-based fall simulation program for nursing students. Asian Nursing Research, 14(2), 114-121. doi:https://doi.org/10.1016/j.anr.2020.04.004

SUMMARYPurposeThe purpose of this study was to develop an Situation-Background-Assessment-Recommendation (SBAR) fall simulation program for Korean nursing students and to evaluate its effectiveness.MethodsThis study used a single-blind randomized control pretest–posttest design. The 54 nursing students in their third semester at a college in Korea were selected through convenience sampling (SBAR group 26, handoff group 28). The SBAR-based program was provided to the experimental group, while the general handoff-based program was given to the control group. The program was designed for a total of three sessions each and no more than 120 minutes each. Measurement variables included the knowledge, skill, attitude, communication ability, and its clarity related to falls. The data were analyzed with x2 test, t test, and repeated measures of ANOVA using the SPSS 18.0 program.ResultsThe SBAR group showed the improved fall-related skill and communication clarity compared with the handoff group. There was a significant difference in the fall-related knowledge only in a time-dependent manner before and after intervention, while there was no statistically significant difference in the attitude and communication ability related to falls.ConclusionsSBAR-based simulation program revealed positive results in terms of patient safety of nursing college students compared with the general handoff-based method. Therefore, the SBAR-based simulation program is expected to be used as an educational intervention for nursing students not only to improve abilities in reporting and communication but to prevent or handle patient safety accidents efficiently.