

Original article

Reliability and validity of revised instrument on pain management and its relationship between knowledge and attitudes among nurses in Vietnam.

Pham Van Truong¹, Pham Thi Ngoc An², Tran Quang Huy³

Abstract:

Objective: This study aimed (1) to evaluate the internal consistency and test-retest reliability of the Vietnamese version of the Knowledge and Attitudes Survey Regarding Pain –revised questionnaire; and (2) to assess the relationship between the knowledge, attitudes and demographic factors in nurses.

Materials and methods: A cross-sectional survey and a correlation research design was used to evaluate test-retest reliability. 154 participants were tested twice with a 2-week interval. Multivariate analysis was performed by using multiple linear regressions to test the relationship between demographic data with nurse's knowledge and attitude of pain management. **Results and Discussion:** Reliability was confirmed by internal consistency (Cronbach $\alpha = 0.88$) and test-retest reliability (intraclass correlation coefficient, 0.88). The results of multiple regression indicated that age, nurses had level 5, and nurses from internal medicine, ICU, emergency, obstetric, oncology department, those with previous education in pain management, and routinely assess pain for patients were predicted to KASRP score, accounting for 11.6%.

Conclusion: The Vietnamese Knowledge and Attitudes Survey Regarding Pain- Revised questionnaire had satisfactory content validity and reliability for assessing pain management in nurses in Vietnam. Some demographic factors were predicted 11.6% of KASRP in Nurses. Further research need focus on those factors independently significant predicted to KASRP to improve nurse's knowledge and attitude.

Keywords: pain managements; knowledge; attitude; nursing.

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Introduction:

Chronic pain syndrome presents challenges to clinicians globally due to its complex nature, unclear underlying causes, and limited treatment efficacy.¹ Inadequate management of acute pain can adversely affect multiple systems in postoperative patients, such as respiratory (atelectasis, pneumonia), cardiovascular(myocardialischemia),gastrointestinal (malnutrition), musculoskeletal (muscle wasting), and neurological (thromboembolism).² Studies have reported a significant prevalence of persistent pain in both the United States and Vietnam, with a substantial

proportion of patients experiencing acute and chronic pain.^{3,4,5} Furthermore, inadequate knowledge and attitudes among healthcare providers, including nurses, can impact pain management outcomes.⁶

Nurses play a crucial role in pain assessment and management, and their knowledge and attitudes directly influence patient care.^{7,8} Understanding nurses' knowledge and attitudes is essential for identifying gaps and areas of improvement. Nurses face challenges in understanding pain concepts, pain assessment, medication effects and administration routes, non-pharmacological pain management,

1. Pham Van Truong, PhD, Department of Nursing, Vinmec Times City Hospital, Vinmec Healthcare System, Hanoi, Vietnam, Department of Nursing, Kusumi Hospital Hung Yen, Vietnam and Department of Nursing, Duy Tan University, Da Nang, Vietnam.
2. Pham Thi Ngoc An, MSc, Department of Nursing, Duy Tan University, Da Nang, Vietnam and Mind-Body Interface Laboratory (MBI-Lab), China Medical University Hospital, Taichung, Taiwan
3. Tran Quang Huy, PhD, Nursing Faculty, Dai Nam University, Hanoi, Vietnam

Correspondence: Tran Quang Huy, Nursing Faculty, Dai Nam University, Hanoi, Vietnam.
Email: Huyanhub@gmail.com

and end-of-life care.^{12,13,14,15} Several studies have highlighted the need for enhancing nurses' knowledge and attitudes in pain management, with factors like education, experience, and training influencing their effectiveness.^{9,10,11,16} Given contradictory findings regarding the relationship between nurses' knowledge and attitudes and demographic factors,^{13,17} necessitating further assessment in specific regions such as Vietnam.

Given the high and rising prevalence of pain, actions to improve the Vietnam nurses' knowledge and attitudes are imperative. A well-validated assessment instrument for assessing nurses' knowledge and attitudes in Vietnam's clinical setting is needed. To date, no validated nurses' knowledge and attitudes questionnaire has been used in Vietnam. Additionally, the Knowledge and Attitudes Survey Regarding Pain –revised (KASRP-revised) questionnaires reliability and validity was tested using a sample of various levels of nursing expertise such as students, new graduates, oncology nurses, graduate students, and senior pain experts. Test-retest reliability was acceptable.¹⁸

This study aims to (1) to evaluate the internal consistency and test-retest reliability of the Vietnamese version of the Knowledge and Attitudes Survey Regarding Pain –revised questionnaire; (2) to assess the relationship between the knowledge, attitudes and demographic factors in nurses

Methods and Material:

Design

This study applied a cross-sectional survey and a correlation research design. This study was approved by the Institutional Review Board (HTC.20.09. No. 4023780), and all participants gave written informed consent.

Sample and setting

This study was conducted in a private seven hospitals system in Vietnam from August 2020 to November 2020. We enrolled participants who routinely assessed pain in their clinical setting, and able to read and communicate in Vietnamese. A total of one thousand and fifty nurses were recruited. To evaluate test-retest reliability, 154 participants were tested twice with a 2-week interval between tests. This study applied the convenience sampling method in recruiting the nurses into the study.

Translation of the Knowledge and Attitudes Survey Regarding Pain- Revised questionnaire

To adapt the KASRP-revised questionnaire for use in Vietnam, permission to use the KASRP- revised questionnaire was obtained. The questionnaire was then translated from English to Vietnamese by 2 bilingual translators who were proficient in both languages. Any differences between the 2 translated versions were discussed. This procedure continued until the 2 translators agreed upon a Vietnamese translated version. Then, a third bilingual translator translated the Vietnamese version back into an English version. The original English version and the back-translated version were compared by the researcher to validate the accuracy, linguistic congruence, and cultural relevance of the translation process. Items 16, 25, and 30 refer to Vicodin, Meperidine, and Hydromorphone which are not used in Vietnam; therefore, the medications were changed to a drug which has similar properties and effect called OxyContin, Pethidine, and Morphine. Question 32 was changed to reflect cultural considerations in Vietnam and not the United States Consensus was reached by discussion among the 3 translators and the researcher, taking into account the most common and precise phrases in Vietnamese. The Vietnamese KASRP questionnaire also contains 39 items and has the same scoring method as that of the original KASRP - revised.

Measurements

Demographic variables included gender, age, years of experience, education level, nurse competency classification level, hospital level, income rating, routine patient assessment for pain, department, and previous education in pain management.

The KASRP-revised questionnaire comprises 22 true/false questions, 15 multiple-choice questions, and 2 patient case studies, each with 2 sub-questions. The case studies ask about the participant's knowledge and attitudes regarding pain assessment and opioid prescription and administration.¹⁸ The maximum score is 41, and the minimum score is 0. Each correctly answered item is given a score of 1, and each incorrectly answered item is given a score of 0. However, it has been previously established that questions with a less than 80% correct response rate were considered areas of a knowledge deficit.¹⁹ The KASRP –revised questionnaire demonstrated satisfactory internal consistency (Cronbach alpha >0.70), test-retest reliability ($r > 0.80$).¹⁸ Additionally, the total Cronbach α coefficient and the test-retest reliability of the Chinese version of KASRP - revised

(2014) were 0.717 and 0.765, respectively.²⁰

The Vietnamese KASRP –revised (2014) questionnaire was administered to the participants for reliability and validity testing.

Reliability analysis

Reliability analysis was assessed through internal consistency (Cronbach's α) and test-retest reliability. A Cronbach's α value greater than 0.7 indicated adequate internal consistency.²³ Participants were re-tested after a 2-week interval at the same location as the initial test. Test-retest reliability of the KASRP-revised questionnaire was examined using the intra-class correlation coefficient, with a value between 0.75 and 0.9 indicating good reliability.²⁴

Content validity

We tested the scale's content validity using individual items of the content validity index (I-CVI) and the scale-level content validity index (S-CVI/Ave). Five Vietnamese nursing and pharmacologist experts who had a PhD degree or master degree in nursing or pharmacology and more than 10 years of experience in teaching nursing examined the content validity, language suitability, and criteria for scoring the appropriateness, accuracy, and representativeness of the entire questionnaire.²¹ The content validity questionnaire provided a place for respondents to rate each item for its relevance to each particular dimension on a 4-point scale: 1- not relevant, 2 - unable to assess relevance without revision of item, 3- relevant but needs minor alteration, and 4 - relevant to the process. For a scale to be judged as having excellent content validity, it should be composed of items that have I-CVIs of 0.78 or higher and an S-CVI/Ave of 0.90 or higher.²² The researchers modified the scale based on expert recommendations.

Statistical analysis

Data were analyzed using the Statistical Program for Social Sciences (SPSS) version 23.0. For demographic data, the continuous data are presented as means with standard deviations, and the categorical data are presented as numbers and frequencies of observation. Univariate analysis was performed using the student t test, one-way analysis of variance (ANOVA), and Pearson correlation. Multivariate analysis was performed by using multiple linear regressions, and the variables for which the p value was lower than 0.20 by univariate analysis were selected as the independent variables.²⁵ A p-value <0.05 was considered statistically significant.

Results:

Participant characteristics

This study included 899 participants (85.62% response rate) with a mean (standard deviation) age of 30.66 (6.69). The majority of participants were female (81.5%) and bachelor degree (97.7%) and had routinely the patient for pain (83.55). In total, 48.4% had greater 5 years in nursing experience while 51.6% had less than 5 years. Only 54.4 % had previous education in pain assessment and management. 53.9% of participants were from the primary hospital, and worked in the emergency department (18.1%) and obstetric department (15.8%) (Table 1).

Content validity and Reliability Analysis

In this study, the I-CIVs of all items were from 0.93 to 0.98. The S-CVI/Ave was 0.95 (Table 2). Additionally, Cronbach alpha coefficient of the Vietnamese Knowledge and Attitudes Survey Regarding Pain- Revised questionnaire was 0.88. Test-retest reliability as represented by the intraclass correlation coefficient was 0.88 (table 3). The results indicated excellent content validity, and good internal consistency reliability and test-retest reliability.

Nurses' Knowledge and Attitudes Survey Regarding Pain Management

The total mean score on KASRP- revised was 21.21 (SD: 3.97), ranged from 10 to 35, and converted to a percentage for participant with minimum score of 24.39% and maximum score of 85.37% (mean 51.73%). Only 5 nurses (0.56%) had a percentage of score > 80, and that of 493 nurses (54.84%) was between 50 and 80 (figure 1). No significant differences in KASRP scores were found based on hospital level. Additionally, higher nurse competency classification level was correlated with higher KASRP score. Nurses working in the oncology department and nurses with higher income demonstrate a higher mean KASRP score (table 1).

In the univariate analysis gender, nurse competency classification level, department, income ranking, and routine assessment of patient for pain significantly influenced KASRP score. No significant differences in KASRP scores were found based on age, years of experience, education level, hospital level and previous education in pain management.

For multiple regression analysis, the independent variables included a p-value that was less than 0.2 by univariate analysis and assessment of independent variables (Table 4). The results of multiple regression

indicated that age, nurses had level 5, and nurses who were from internal medicine, ICU, emergency, obstetric, oncology department, had previous education in pain management, and routinely assess patients for pain were associated to KASRP score, accounting for 11.6% (table 5).

Discussion:

The KASRP questionnaire has been widely translated and used in previous studies. In this study, we established the validity and reliability of the Vietnamese version of the KASRP-revised questionnaire. The content validity, assessed through CVI, showed strong validity with item scores ranging from 0.93 to 0.98 and an average of 0.95. The Vietnamese KASRP demonstrated a Cronbach's alpha coefficient of 0.88, similar to the Greek version.²⁶ Compared to the Italian, Spanish, Korean, Icelandic, and original versions, our results indicated higher internal consistency (Cronbach's alpha 0.69, 0.78, 0.73, 0.75, and 0.70, respectively).^{18,26,27,28,29} Test-retest reliability varied across language versions, with Italian reporting the highest (0.97) and Greek the lowest (0.68).^{26,30} In our study, the test-retest reliability was 0.88, indicating an acceptable level of consistency. The Vietnamese KASRP-revised questionnaire was developed to include all original items and consider the treatment regimen and cultural factors specific to Vietnam. Overall, the Vietnamese KASRP is a valuable tool for assessing knowledge and attitudes regarding pain management among healthcare providers.

The study found that surveyed nurses had inadequate knowledge and attitude regarding pain management, scoring 51.73%, significantly lower than the expected 80% correct response rate.¹⁹ Compared to global studies, our survey reported a higher level of nurses' knowledge and attitude (40.3% to 45.3% range).^{8,12,17,31,33} However, our findings were lower than a Norwegian study's 75% correct rate.³⁴ Despite pain management being included in nursing education, the KASRP responses remained consistently below expectations.^{32,35} Most participants had bachelor's degrees, but over 45% lacked pain management education, reflecting scarce and unsystematic learning resources. Furthermore, more than 16% of nurses did not routinely use pain assessment, revealing a substantial gap in pain management practices in Vietnam. Lifelong educational courses on high-quality, standardized pain management are needed to address this issue. Nurses should strive for frequent and effective pain assessments.

Statistically significant differences in KASRP scores were found based on gender, nurse competency classification level, department, income rating, and routine pain assessment. This result was consistent with the findings of a previous study that showing higher knowledge and attitude scores with more frequent use of pain assessment tools.^{32,33} Nurses in the oncology department had the highest scores due to regular assessment of cancer-related pain and extensive pain management training. No significant differences were found in age, years of experience, education level, hospital level, and previous pain management education, consistent with other studies.^{7,8,31} However, contrary to previous studies, this research found no influence of educational level, years of experience, or previous education programs on nurses' pain knowledge and attitude.^{17,33} The study underscores the importance of continuing education programs in pain management and their effective integration into nursing practice. Age, nurse competency level, department, previous pain management education, and routine pain assessment were identified as explanatory variables, accounting for 11.6% of the KASRP variance. This predictive model improves upon previous analyses.³³ Future studies should explore more diverse variables to enhance the explanatory power of the regression equation.

Strengths and limitations

This study enhanced our understanding of nurses' knowledge and attitudes towards pain management in Vietnam, utilizing a favorable sample size from diverse hospitals. The development of a valid and reliable Vietnamese KASRP-revised questionnaire holds promise for supporting medical professionals in improving pain management. However, the study has limitations, including potential sample representation issues due to the convenient sampling technique. Nevertheless, the study benefits from a high response rate (85.62%) and a large sample size, which enhance data quality. Additionally, the study was limited to private hospitals, and the regression equation explained only 11.6% of the variance.

Conclusion and implications for nursing practice

The Vietnamese KASRP-revised questionnaire demonstrated good content validity and reliability for evaluating pain management in nursing in Vietnam. This scale can provide valuable insights into pain management knowledge among Vietnamese nurses and factors affecting it. By enhancing support for

Vietnamese nurses and informing evidence-based policy guidelines, it can contribute to improving their self-management. Future research should prioritize studying the effectiveness of nursing interventions on pain management knowledge and attitudes in nursing.

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Conflict of Interest

The authors report no conflicts of interest in this work. Acknowledgments Not applicable. Authorship TQH, PVT, and PTNA contributed equally to the experimentation. TQH and PVT wrote and edited the article. PTNA equally designed and conducted the experiment. PVT studied scientific literature about the topic. All authors read and approved the final manuscript.

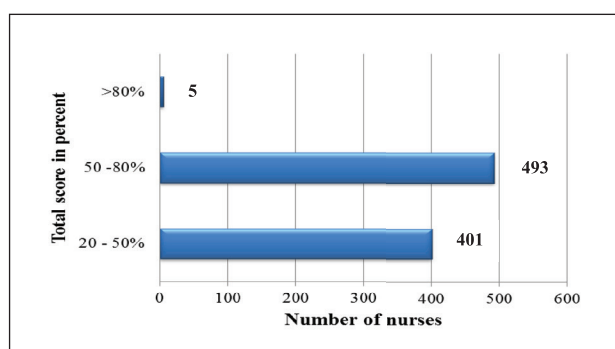


Figure 1. Distribution of total scores by percentage.

Table 1. Demographic characteristics and its related factor with nurses’ knowledge and survey regarding pain score (N=899)

Variables	Frequent (%)	Score (Mean, SD)	t/F/r	p
Gender				
Male	166 (18.5)	21.48(3.60)	0.99 ^a	0.02
Female	733 (81.5)	21.15(4.05)		
Age Min: 21 Max: 64 Mean: 30.66 SD: 6.69			-0.02 ^b	0.12
Years of experience				
< 5 years	464 (51.6)	21.02(3.98)	1.83 ^c	0.16
5- 10 years	286 (31.8)	21.58(4.07)		
> 10 years	149 (16.6)	21.07(3.70)		
Education level				
Bachelor	878 (97.7)	21.19(3.96)	0.65 ^a	0.15
Master	21(2.3)	21.76(4.40)		
Nurse competency classification level				
Level 1	177(19.7)	20.46(4.26)	3.53 ^c	0.004
Level 2	263 (29.3)	21.30(4.01)		
Level 3	264 (29.4)	21.02(3.80)		
Level 4	139 (15.5)	21.75(3.78)		
Level 5	43 (4.8)	22.56(3.90)		
Level 6	13(1.4)	23.08(3.50)		

Table 1. (cont.)

Variables	Frequent (%)	Score (Mean, SD)	t/F/r	p
Hospital level				
Primary hospitals	485 (53.9)	21.56(3.90)	0.40 ^a	0.69
Secondary hospitals	414 (46.1)	21.15(4.55)		
Income rating				
Poor	257 (28.6)	21.03(4.53)	3.13 ^c	0.025
Enough	500 (55.6)	21.04(3.72)		
Good	109 (12.1)	21.95(3.75)		
Very good	33 (3.7)	22.61(3.05)		
Do you routinely assess pain for patients?				
Yes	751 (83.5)	21.56(3.96)	-6.07 ^a	<0.001
No	148 (16.5)	19.43(3.54)		
Department				
Internal medicine	116 (12.9)	21.53(4.76)	10.60 ^c	<0.001
Surgery	82 (9.1)	19.65(3.36)		
ICU	73 (8.1)	22.66(3.68)		
Emergency	163 (18.1)	22.68(3.37)		
Obstetric	142 (15.8)	21.55(4.73)		
Pediatrics	130 (14.5)	19.69(3.19)		
Oncology	28 (3.1)	23.93(4.16)		
Operating theater	27 (3.0)	19.19(3.03)		
Anesthesia room	31 (4.2)	20.32(3.11)		

Table 1. (cont.)

Variables	Frequent (%)	Score (Mean, SD)	t/F/r	p
NICU	27 (3.0)	21.30(3.94)		
Other units	80 (8.9)	19.93(3.37)		
Previous education in pain management				
Yes	489 (54.4)	21.30(3.94)	0.77 ^a	0.14
No	410 (45.6)	21.10(4.00)		
KASRP score	Min 10	Max 35	Mean 21.21	SD:3.97

Note: a, t-test (t); b, Pearson correlation (r); c, ANOVA (F); SD, standard deviation; KASRP, knowledge and survey regarding pain

Table 2. Content validity Index of the Vietnamese Knowledge and Attitudes Survey Regarding Pain-Revised questionnaire (n=5)

Item	Experts in Agreement	I-CVIs
1. Dấu hiệu sinh tồn là những chỉ số đáng tin cậy phản ánh cường độ đau của bệnh nhân.	4	0.80
2. Vì hệ thống thần kinh chưa phát triển đầy đủ nên trẻ nhỏ dưới hai tuổi có độ nhạy cảm với đau thấp hơn và khả năng ghi nhớ ...	4	0.80
3. Bệnh nhân có thể bị sao lãng khỏi cơn đau thì thường không có những cơn đau dữ dội.	5	1.00
4. Bệnh nhân vẫn có thể ngủ mặc dù đang đau dữ dội.	4	0.80
5. Aspirin và những thuốc chống viêm không steroid không có tác dụng giảm đau hiệu quả trong những trường hợp di căn xương.	4	0.80
6. Suy hô hấp hiếm khi xảy ra ở những bệnh nhân nhận những liều opioid ổn định trong khoảng thời gian vài tháng	4	0.80
7. Sử dụng kết hợp các thuốc giảm đau theo những cơ chế khác nhau: Ví dụ kết hợp 1 thuốc giảm đau chống viêm không steroid	5	1.00
8. Thời gian tác dụng giảm đau thông thường của 1-2mg Morphine qua đường tĩnh mạch là 4-5 giờ.	5	1.00
9. Không nên sử dụng Opioid ở những bệnh nhân có tiền sử lạm dụng chất gây nghiện.	5	1.00
10. Bệnh nhân cao tuổi không thể dung nạp Opioid để giảm đau.	5	1.00
11. Bệnh nhân nên được khuyến khích chịu đựng cơn đau đến ngưỡng tối đa trước khi sử dụng opioid.	5	1.00
12. Trẻ em dưới 11 tuổi không thể phản ánh một cách đáng tin cậy mức độ đau vì vậy trong lâm sàng	5	1.00
13. Một số niềm tin tâm linh của bệnh nhân có thể khiến họ nghĩ rằng đau và việc chịu đựng cơn đau là cần thiết	5	1.00
15. Sau liều đầu tiên của thuốc giảm đau Opioid, những liều sau nên được chỉnh theo sự đáp ứng của bệnh nhân.	5	1.00
16. Tiêm nước vô trùng (placebo) là một test hữu hiệu để kiểm tra xem liệu cơn đau có phải là thật không	5	1.00

Table 2. (cont.)

Item	Experts in Agreement	I-CVIs
17. Vicodin (hydrocodone 5mg+acetaminophen 300mg) đường uống xấp xỉ bằng 5-10mg morphine qua cùng đường miệng.	4	0.80
18. Nếu nguồn gốc của cơn đau chưa được xác định rõ, không nên sử dụng Opioid trong giai đoạn đánh giá đau.....	5	1.00
19. Thuốc chống co giật như Gabapentin(neurontin) giảm đau tối ưu chỉ sau một liều duy nhất.	5	1.00
20. Benzodiazepime không phải là thuốc giảm đau hiệu quả và hiếm khi được sử dụng để giảm đau cho bệnh nhân.	5	1.00
21. Nghiện ma túy/ Opioid được định nghĩa là một bệnh thần kinh mạn tính, bao gồm một hay nhiều hành vi có đặc điểm dưới đây.....	5	1.00
22. Thuật ngữ Equianalgesia nghĩa là giảm đau tương đương, được sử dụng khi đề cập đến các liều thuốc giảm đau khác nhau ...	5	1.00
23. Đánh giá an thần được khuyến khích trong suốt quá trình quản lý cơn đau bởi an thần quá mức có thể gây suy hô hấp do Opioid.	5	1.00
24. Đường dùng được khuyến cáo để sử dụng thuốc giảm đau Opioid cho bệnh nhân có cơn đau dai dẳng do ung thư	5	1.00

Item	Experts in Agreement	I-CVIs
25. Đường dùng được khuyến cáo để dùng thuốc giảm đau Opioid cho bệnh nhân có cơn đau dữ dội khởi phát đột ngột như đau	5	1.00
26. Thuốc giảm đau nào dưới đây được xem xét là lựa chọn cho điều trị những cơn đau vừa hoặc nghiêm trọng...	5	1.00
27. Một liều 30mg Morphine qua đường uống giảm đau ...	4	0.80
28. Giảm đau sau mổ nên được cho liều đầu tiên vào khoảng thời ...	5	1.00
29. Một bệnh nhân có cơn đau dai dẳng do ung thư đang sử dụng thuốc giảm đau Opioid hằng ngày trong vòng hai tháng....	5	1.00
30. Lý do hay gặp nhất nếu một bệnh nhân yêu cầu tăng liều thuốc giảm đau là	4	0.80
31. Thuốc nào sau đây có hiệu quả trong điều trị đau do ung thư?	5	1.00
32. Người đánh giá chính xác nhất về cường độ cơn đau	5	1.00
33. Điều nào sau đây mô tả cách tiếp cận tốt nhất để cân nhắc về vấn đề văn hóa trong việc chăm sóc bệnh nhân đau	5	1.00

Table 2. (cont.)

Item	Experts in Agreement	I-CVIs
34. Bệnh nhân có cơn đau thì khả năng đã có lạm dụng rượu là	5	1.00
35. Thời gian đạt được hiệu quả tối đa của Morphine	4	0.80
36. Sau khi ngừng đột ngột một opioid, sự phụ thuộc thể chất được biểu hiện bằng các triệu chứng sau đây	5	1.00
37. Ý nào sau đây là đúng về suy hô hấp do opioid gây ra...	4	0.80
38A. Bệnh nhân A 25 tuổi, đây là ngày đầu tiên của anh ta sau khi phẫu thuật bụng....	5	1.00
38B. Trong hồ sơ của bệnh nhân, bạn phải đánh dấu mức đau của họ ở thang điểm dưới đây.	5	1.00
39A. Bệnh nhân B 25 tuổi và đây là ngày đầu tiên của anh ấy sau phẫu thuật bụng.....	5	1.00
39B. Trong hồ sơ bệnh án của bệnh nhân, bạn phải đánh dấu mức đau của họ ở thang điểm dưới đây....	5	1.00
S-CVI/Ave = 0.95		

Note: I-CVIs, items of the content validity index; S-CVI/Ave, the scale-level content validity index/Average

Table 3: Internal consistency of KASRP – revised

Variable	Cronbach alpha	Test-retest (ICC)
KASRP total	0.88	0.88

Note: KASRP, Knowledge and Attitudes Survey Regarding Pain; ICC, intraclass correlation coefficient

Table 4: Assignment of Independent Variables.

Independent variable	Assignment Method
Gender	0=male, 1 = female
Age (years)	Measure value
Years of experience	< 5 years (Z1= 0, Z2 = 0, Z3 = 0), 5 to 10 years (Z1= 0, Z2 = 1, Z3 = 0), > 10 years (Z1= 0, Z2 = 0, Z3 = 1)
Education level	0 = bachelor, 1= master
Nurse competency classification level	Level 1(Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0), level 2(Z1= 0, Z2 = 1, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0), Level 3(Z1= 0, Z2 = 0, Z3 = 1, Z4 = 0, Z5 = 0, Z6 =0), Level 4 (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 1, Z5 = 0, Z6 =0), Level 5(Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 1, Z6 =0), Level 6(Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =1).
Department	Internal medicine (Z1= 1, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0), Surgery (Z1= 0, Z2 = 1, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0), ICU (Z1= 0, Z2 = 0, Z3 =1, Z4 = 0, Z5 = 0, Z6 =0, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0), Emergency (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 1, Z5 = 0, Z6 =0, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0), Obstetric (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 1, Z6 =0, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0), Pediatrics (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =1, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0), Oncology (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0, Z7= 1, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0), Operating theater (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0, Z7= 0, Z8 = 1, Z9 = 0, Z10 = 0, Z11 = 0), Anesthesia room (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0, Z7= 0, Z8 = 0, Z9 = 1, Z10 = 0, Z11 = 0), NICU (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 1, Z11 = 0), Other units (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0, Z5 = 0, Z6 =0, Z7= 0, Z8 = 0, Z9 = 0, Z10 = 0, Z11 = 0)
Income rating	Poor (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 0), Enough (Z1= 0, Z2 = 1, Z3 = 0, Z4 = 0), Good (Z1= 0, Z2 = 0, Z3 = 1, Z4 = 0), Very good (Z1= 0, Z2 = 0, Z3 = 0, Z4 = 1)
Previous education in pain management	0= No, 1= Yes
routine assess pain for patients	0= No, 1= Yes

Table 5. Multiple Regression Analysis of Nurses’ Knowledge and Attitudes Survey Regarding Pain Scores

Variables	Regression coefficient (B)	S.E	Standardized Regression Coefficient (β)	t-value	p-value
Constant	19.60	0.90	-	21.78	<0.001
Age	-0.05	0.02	-0.08	-1.98	0.048
Level 5	2.08	0.81	0.11	2.56	0.011
Internal medicine	1.19	0.57	0.10	2.10	0.036
ICU	1.97	0.64	0.14	3.06	0.002
Emergency	2.24	0.56	0.22	4.04	<0.001
Obstetric	1.20	0.55	0.11	2.20	0.028
Oncology	3.08	0.85	0.14	3.64	<0.001
Previous education in pain management (yes)	1.24	0.38	0.12	3.31	0.001
Routine assess pain for patients (yes)	0.63	0.30	0.07	2.14	0.033

Note: R² = 0.139, adjusted R² = 0.116, p<0.001

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