Original Article

Knowledge and Attitudes about Pain Management among Canadian Nursing Students

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ABSTRACT

Background: Poorly managed pain is a problem that affects individuals, entire health care systems, and societies worldwide. Nurses are involved in pain management, yet little is known about the knowledge and attitudes of nursing students.
Aims: The aim of this study was to examine preregistration nursing students' knowledge and attitudes about the assessment and management of pain.
Design: This was a cross-sectional, descriptive survey.
Settings: Four education sites from two post-secondary institutions in Ontario, Canada.
Participants/Subjects: A convenience sample of 336 final year Bachelor of Science in Nursing and practical nursing students.
Methods: Participants were recruited in the classroom setting to complete the Knowledge and Attitudes Survey Regarding Pain. A score of eighty percent is considered a pass.
Results: Ninety percent of students who were in class on the day of the survey agreed to participate (n = 336/373). Fifteen (4.5%) participants passed the Knowledge and Attitudes Survey Regarding Pain, and the mean score was 66.7% (standard deviation 9.1). English as primary language, institution attended, and prior experience caring for someone with pain were independently associated with higher scores ($p < .05$). Students were found to have major gaps in knowledge and attitudes related to understanding the risk of respiratory depression after opioid therapy, calculating medication dosages, administrating medication, and understanding pharmacology.
Conclusions: The majority of nursing students in this sample did not have adequate knowledge and positive attitudes about pain assessment and management.
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Pain is a personal, multifaceted experience influenced by ethnicity, prior pain experiences, opinions, attitudes, and coping strategies (Schug, Palmer, Scott, Halliwell, & Trinca, 2015). Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (International Association for the Study of Pain, 2011, p. 250). Treating pain involves multidisciplinary, multimodal care. Despite available guidelines, acute and chronic pain are persistent health issues (Argoff & Fine, 2010). Worldwide estimates of the prevalence of acute pain in hospitalized adult patients range from 37.7% to 84.0% (Gregory & McGowan, 2016). In a prospective study of acute pain in women undergoing gynecologic surgery in Canada, moderate to severe postoperative pain was reported in 66% of patients in the postanesthetic care unit, 26% on discharge from hospital, and 63% at 1 week postoperatively (VanDenKerkhof et al., 2012). The reported prevalence of chronic pain is also highly variable, with conservative estimates suggesting approximately 19% of community dwelling adults report moderate to severe chronic pain (Reitsma, Tranmer, Buchanan, & VanDenKerkhof, 2011).

The high prevalence of pain has been attributed to several factors, including values and beliefs about treatment of pain amongst health care professionals and/or inadequate knowledge about pain theory. These factors may affect pain management decision making, knowledge translation, use of available evidence, and prioritization of pain assessment and management at individual and institutional levels (Seers, Watt-Watson, & Bucknall, 2006). Nurses are key participants in interprofessional pain management teams and are involved in the assessment and management of pain (Brown, 2013; Courtenay & Carey, 2008; Francis & Fitzpatrick, 2013). It is during the nursing educational process that nurses acquire the foundational knowledge, attitudes, and skills that are then translated into nursing practice (Clark, 2004). Therefore it is important to understand nursing students' foundational pain knowledge and attitudes before they enter professional practice. Students develop attitudes through socialization (Holinger, 1999) and through interactions with co-students, patients, and educators (Ferguson & Day, 2005; Gelder, Lopez-Ibor & Andreason, 2003; Liaschenko & Peter, 2004; Lindeman, 2000). An understanding of nursing students' knowledge and attitudes about pain and pain management will identify potential gaps and areas in need of intervention during their educational program.

The purpose of this study was to examine final-year, preregistration nursing students' knowledge of and attitudes about the assessment and management of pain. The research objectives were to identify gaps and factors that contribute to those gaps and to determine whether students perceive their pain management education to be adequate.

The theoretical basis for this study was the Critical Thinking Framework (Edwards, 2007). This framework describes how nurses or nursing students can employ critical thinking while in practice. The framework involves two overlapping phases. Phase one examines the potential choices and courses of action that can be taken by a practitioner, and phase two is related to taking responsibility for actions associated with the choices in phase one. The phases are bidirectional, indicating that one can move between phases as needed. In the present study this framework was used because nurses and nursing students are consistently faced with pain assessment and management decision making while caring for people experiencing pain and must evaluate the outcomes of their decisions (Ferrell, Virani, Grant, Vallerand, & McCaffery, 2000).

Methods

Design

This study used a cross-sectional survey design. During scheduled class time, participants completed a paper version of the Knowledge and Attitudes Survey Regarding Pain (KASRP).

Measurement Tool

The KASRP is the most commonly used tool to measure the pain knowledge and attitudes of nurses and nursing students (Ferrell & McCaffery, 1997). The KASRP can be divided into two sections, reflecting the two phases of the critical thinking framework. A series of 36 true/false and multiple-choice questions testing pain beliefs and knowledge about the assessment and management of pain address factors such as hidden assumptions, considering pain management options, and nursing knowledge. Case scenarios and questions regarding the assessment and treatment of pain after abdominal surgery force students to test their assumptions and knowledge (phase one of framework) and to indirectly reflect on assumptions and knowledge to justify decisions (phase two of framework). Content validity for the KASRP was established by

specialists in the pain management field. Internal consistency reliability was determined to be satisfactory ($\alpha > .70$). Construct validity was determined by assessing the results of nurses at differing stages of education and expertise (students, new graduates, oncology nurses, graduate nurses, and senior pain experts). Results revealed that the KASRP discriminates between levels of expertise. Test-retest reliability ($r > 0.80$) was conducted across a sample of registered nurses. Eighty percent is considered a passing score on the KASRP Ferrell and McCaffery (2012).

At the beginning and end of the survey, students were asked to reflect on their perception of the adequacy of their pain education (pre/post adequacy). The purpose was to see if completing the KASRP changed their perception of their educational preparedness. The question was divided into a four-level variable representing whether the students felt they were (1) adequately prepared before and after completing the KASRP; (2) adequately prepared before but not after; (3) not adequately prepared before or after; and (4) not adequately prepared before but felt adequately prepared after completing the KASRP.

Sample and Procedure

The target population was final year preregistration nursing students. The sampling frame was all Bachelor of Science in nursing (B.Sc.N.) and practical nursing (P.N.) students in their final year of study in two postsecondary institutions at four different sites in Ontario, Canada. A total of 467 participants were enrolled in the seven classes where the survey was administered.

Ethical Considerations

The study was reviewed for ethical compliance by the Queen's University Health Sciences and Affiliated Hospitals Research Ethics Board and the participating institutions. The proposal was shared with appropriate authorities at both educational institutions to inform them about the research project and to gain access to potential participants. All participants completed the informed consent form before completing the KASRP. To maintain confidentiality, unique participant identifying numbers were used on the questionnaires. Individuals were asked to provide their contact information if they consented to the research team contacting them in 3 years for a follow-up study.

Statistical Analysis

Demographic characteristics were summarized using frequencies and percentages. Mean (standard deviation) KASRP scores and the frequency and percentage of participants who passed ($\geq 80\%$) were calculated. Unpaired Student's t test and Cohen's d effect size were used to compare mean KASRP scores according to age (≤ 22 and ≥ 23 years), program (B.Sc.N. or P.N.), institution (A or B), previous education in health care (yes or no), previous education in pain management (yes or no), experience having cared for someone in pain before (yes or no), and primary language (English or non-English). A two-way analysis of variance (ANOVA) was conducted to assess the combined effect of institution and program on KASRP scores. Linear regression was used to identify demographic and educational factors associated with KASRP scores. Independent variables were included in the multivariate model if the p value was $\leq .15$ in bivariate analysis. A manual backward stepwise method was used for the multivariate analysis, until only variables with $p < .05$ remained. An ANOVA was conducted to assess for statistically significant differences in mean KASRP scores across levels of perceived adequacy of education. A p value $\leq .05$ was considered statistically significant. Major areas of strength and

Table 1
Demographic Characteristics of Participants

	n	%[*]
Age (years)		
Age frequencies[†]		
19	16	4.8
20	25	7.4
21	94	28.0
22	44	13.1
23	32	9.5
24	25	7.4
25 and older	92	28.0
Median split (years of age) 22 and younger	179	54.6
23 and older	149	45.4
Language[‡]		
English	309	92.8
French	8	2.4
Other	16	4.8
Nursing program		
R.N. program	197	58.6
P.N. program	139	41.4
Previous education in health care[§]		
Yes	72	22.0
No	255	78.0
Previous education in pain management[‖]		
Yes	30	9.3
No	294	90.7
Cared for someone in pain before[¶]		
Yes	309	95.7
No	14	4.3

R.N. = registered nurse; P.N. = practical nursing.

[*] The valid percent is reported for each item (i.e., missing responses are not included in the denominator).

[†] Age: 8 missing entries (2.4%).

[‡] Language: 3 missing entries (0.9%).

[§] Previous education in health care: 9 missing entries (2.8%).

[‖] Previous education in pain management: 12 missing entries (3.7%).

[¶] Cared for someone in pain before: 13 missing entries (4.0%).

weakness were identified by examining the percentage of students who correctly answered each question. If ≥90% of participants responded correctly, the topic in question was classified as a major area of strength. If ≤40% of respondents answered correctly, the topic in question was considered a major area of weakness. If participants did not respond to a question (n = 44), it was coded as an incorrect response, similar to how it would be marked in a classroom testing situation.

Results

A total of 373 students attended their respective class on the day that the survey was administered. There was a 90.1% (n = 336/373) participation rate with 71.9% (n = 336/467) of the target sample participating. All eligible students in attendance were given the questionnaire; 26 (7.0%) decided not to participate by handing in blank questionnaires or leaving before questionnaire administration, 3 (0.8%) filled in demographic information but did not complete the KASRP portion, and 8 participants (2.1%) were not eligible because they did not expect to graduate in 2016.

A total 196 participants (58.3%) were enrolled in the B.Sc.N. programs and 140 (41.6%) in the P.N. program (Table 1). The age of participants ranged from 19 to 62 years. Age was not normally distributed. The median age (interquartile range) was 22 (21, 25) years. Age was dichotomized at the median (≤22 years versus ≥23 years). English was reported as the primary language by 309 participants (92.8%). Seventy-three participants (22.0%) had education in health care before entering their nursing program. Types of prior health care education included personal support worker (n = 22, 6.7%); pre–health sciences certificate (n = 11, 3.4%); pre-nursing certificate (n = 7, 2.1%); medical laboratory science (n = 3, .9%); and miscellaneous courses, programs, and certificates (n = 30, 8.9%). Fifteen participants (4.5 %) scored 80% or greater on the KASRP, and the mean score was 66.7% (standard deviation 9.1).

English as primary language, having previously cared for someone with pain, studying at institution A, and being enrolled in a B.Sc.N. program were associated with improved KASRP scores (p < .05) (Table 2). The overall F test for the two-way ANOVA between institution and program and KASRP score was statistically significant (F test = 20.5, p < .001). Post-hoc Tukey honest significant difference analysis revealed that the statistically significant difference was between the B.Sc.N. program in institution A (71.0 [6.9]) and both programs in institution B (B.Sc.N. 64.0 (10.6), P.N. 65.0 (8.6), p < .001). There was no statistically significant difference in KASRP scores between the B.Sc.N. and P.N. programs in institution B.

Only language and having cared for someone with pain were significantly associated with the KASRP in the bivariate analysis (Table 3). Language, previous experience caring for someone with pain, institution, and program were included in the multiple linear regression; however, program was removed because it did not attain statistical significance (p < .05) in the final model (Table 4). To illustrate these findings at an individual level, a participant who reported English as his or her primary language, attended institution A, and previously cared for someone with pain had an estimated KASRP score of 78.6% (Y[score] = 60.5[intercept] + 5.9 * 1 [Institution A] + 6.4 * 1[English] + 5.8 * 1 [cared] = 78.6%) compared with 60.5% for a participant with a primary language other than English, from institution B, and with no previous experience caring for someone with pain. These three factors explained 16.0% of the variation in KASRP score (r^2). The overall model was significant (p < .001).

Table 2
Institution and Program in Relationship to Mean KASRP Scores (n = 336)

Independent Variable	n	Mean (SD)	Statistical Test	df	p	Cohen's d or n^2
Institution			−7.06	279.3	<.001	0.78
Institution A	109	71.0 (6.9)				
Institution B	227	64.6 (9.4)				
Program			2.9	334	.004	0.32
B.Sc.N.	197	67.9 (9.4)				
P.N.	139	65 (8.6)				
Institution & program[*,†]			20.5	2	<.001	0.11
A/B.Sc.N.	109	71.0 (6.9)				
B/B.Sc.N.	87	64.0 (10.6)				
B/P.N.	140	65.0 (8.6)				

KASRP = Knowledge and Attitudes Survey Regarding Pain; SD = standard deviation; B.Sc.N. = bachelor of science in nursing; P.N. = practical nursing.

[*] df = degrees of freedom.

[†] School A (BScN program) and School B (BScN and PN programs).

Table 3
Bivariate Analysis of Independent Variables and KASRP Scores

Independent Variable	n (%)	Mean (SD)	t test	df	p	Cohen's d
Language			3.8	331	<.001	0.83
English	309 (92.8)	67.4 (8.8)				
non-English	24 (7.2)	60.3 (8.2)				
Age (median split)			0.60	326	.548	0.07
22 and younger	179 (55%)	67.3 (8.7)				
23 and older	149 (45%)	66.7 (9.1)				
Previous education in health care			1.64	325	.103	0.22
Yes	72	65.3 (9.7)				
No	255	67.3 (8.8)				
Previous education in pain management			−1.49	322	.137	0.27
Yes	30	69.1 (9.62)				
No	294	66.6 (8.9)				
Cared for someone in pain before			−2.65	321	.009	0.71
Yes	309	67.2 (8.9)				
No	14	60.7 (9.3)				

KASRP = Knowledge and Attitudes Survey Regarding Pain; SD = standard deviation; df = degrees of freedom.

Major gaps in knowledge included awareness of the magnitude of the risk of respiratory depression after receiving an opioid, understanding how to calculate medication dosages, and knowing about medication administration and pharmacology (Table 5). Major strengths in knowledge and demonstration of positive attitudes included being aware that patients are the best judge of their own pain, knowing that children can reliability self-report pain, and being aware of the symptoms of withdrawal from opioid medications (Table 6).

Students who reported their pain education was adequate before they completed the KASRP tended to have higher mean KASRP scores (range 67.1%-67.8%) than those who felt they were not adequately prepared before completing the KASRP (range 62.0%-65.0%). Minimal differences in KASRP scores are reported for those who felt they were adequately prepared after taking the KASRP (62.0%-67.8%) and for those who felt they were not adequately prepared after taking the KASRP (65.0%-67.1%). Because of small cell frequencies, there was no statistically significant difference between mean KASRP score across the levels of perception of adequacy of pain education.

Discussion

The key finding of this study is that the majority of students who participated did not have adequate knowledge about and positive attitudes toward pain (McCaffery & Robinson, 2002). English as a primary language, attending institution A, and previous experience caring for someone in pain were independently associated with improved KASRP scores. The key areas of weakness were related to medication administration.

Although the overall pass rate was low in the present study, the mean KASRP score was higher (66.7%) than in reports from other studies conducted among nursing students outside of North America, where scores ranged from 34% to 55% (Al-Khawaldeh, Al-Hussami, & Darawad, 2013; Al Khalaileh & Al Qadire, 2013; Chan & Hamamura, 2016; Chiang, Chen, & Huang, 2006; Plaisance & Logan, 2006; Rahimi-Madiseh, Tavakol, & Dennick, 2010). Our results are similar to those of other studies conducted in North America (64%-70%) (Duke, Haas, Yarbrough, & Northam, 2013; Evans & Mixon, 2015; Plaisance & Logan, 2006). Our findings that medication administration is an area of low knowledge is consistent with the report by Evans and Mixon (2015), where students in the United States performed poorly on KASRP questions in which they had to choose between several options for pro re nata (PRN) opioid medications. Al-Khawaldeh et al. (2013) reported that only 31.7% of students in Jordan disagreed with the statement that patients should be encouraged to endure as much pain as possible before opioid use. Attitudes about, and skills in, pain assessment may partially explain why students answer questions regarding PRN medication administration incorrectly; they may feel patients need to be displaying physical signs of pain before administration of medication. This is supported by findings from the case vignettes questions in the present study wherein participants indicated they would give less medication to a patient who smiles when reporting a pain score of 8/10 than a patient reporting the same pain score while grimacing.

Table 4
Multiple Linear Regression of Independent Variables and KASRP Scores: Final Reduced Model

Variable	Coefficient β	SE	Standard Coefficient β	t	Sig	95% CI
Intercept	60.5	3.3		18.3	0.00	53.9-66.9
Institution*	5.9	1.0	.31	6.0	0.00	4.0-7.9
Language[†]	6.4	1.8	1.9	3.6	0.00	2.9-9.9
Previously cared for someone with pain[‡]	5.8	2.3	.13	2.5	.01	1.3-10.3[§]
R	0.40					
R^2	0.16					
Sum of squares	4082.6					
df	3					
Mean square	1360.9					
F	19.7					
Sig	p < .001					

KASRP = Knowledge and Attitudes Survey Regarding Pain; SE = standard error; Sig = significance; CI = confidence interval; df = degrees of freedom.

[*] Institution reference category = institution B.

[†] Language reference category = non-English.

[‡] Previous experience caring for someone with pain reference category = no experience caring for someone in pain.

[§] Variables removed in the following order: nursing program, education in health care, age, education in pain management, and adequacy change.

Table 5
KASRP Questions Identifying Major Gaps in Pain Knowledge and Attitudes in Final-Year Students (≤40% Answered Correctly)

Question	All Participants (%)	School A (%)	School B (%)
#27. 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 than 1%, b. 1-10%, c. 11-20%, d. 21-40%. (Correct answer = a)	9.5	7.3	10.6
#22. 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. (Correct answer = d)	15.8	14.5	18.3
#36.2 Andrew. Your assessment, above is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time: A. administer no morphine at this time, b. administer morphine 1 mg IV now, c. administer morphine 2 mg IV now, d. administer morphine 3 mg IV now". (Correct answer = d).	23.8	35.8	18.1
#9. The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours (correct answer = false)	26.8	26.6	26.9
#35. 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 (Correct answer = a)	28.6	40.4	22.9
#25. Which of the following IV doses of morphine administered over a 4-hour period would be equivalent to 30 mg of oral morphine given q 4 hours? (correct answer = b) a. Morphine 5 mg IV b. Morphine 10 mg IV c. Morphine 30 mg IV d. Morphine 60 mg IV	31.8	39.4	28.2
#37.2 Robert. Your assessment, above, is made two hours after he received morphine 2 mg IV. Half hourly pain ratings following the injection ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2/10 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." Check the action you will take at this time: a. Administer no morphine at this time. b. Administer morphine 1 mg IV now. c. Administer morphine 2 mg IV now. d. Administer morphine 3 mg IV (Correct answer = d)	32.1	26.0	26.0
#32. How likely is it that patients who develop pain already have an alcohol and/or drug abuse problem? <1% 5 − 15% 25 − 50% 75 − 100% (Correct answer = 5-15%)	34.5	26.7	33.5
#7. Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months (Correct answer = true)	36.6	51.4	29.5
#20. Benzodiazepines are not effective pain relievers unless the pain is due to muscle spasm (Correct answer = true)	38.7	34.9	40.5
#11. Morphine has a dose ceiling (i.e. a dose above which no greater pain relief can be obtained) (Correct answer = false)	39.6	36.7	41.0

KASRP = Knowledge and Attitudes Survey Regarding Pain; IV = intravenous; PRN = pro re nata (nothing by mouth).

The inadequate level of both knowledge and positive attitudes about pain among nursing students is also supported by findings from studies using questionnaires other than the KASRP (Arber, 2001; Briggs, Carr, & Whittaker, 2011; Latchman, 2014; Ortiz et al., 2015; Watt-Watson et al., 2004). Studies that include case vignettes, semistructured interviews, and unpublished tools also report inadequate levels of both pain knowledge and positive attitudes (Briggs, 2010; Chiu, Trinca, Lim, & Tuazon, 2002; Hadjistavropoulos et al., 2015; Igier, Mullet, & Sorum, 2006; Lasch et al., 2002; Mackintosh-Franklin, 2014; Shaw & Lee, 2010; Watt-Watson, 1987).

Our findings are also consistent with factors associated with levels of pain knowledge and positive attitudes that have been identified by other authors. Greenberger, Reches, and Riba (2006) found that knowledge and positive attitude levels among nursing students were positively correlated with how frequently they were willing to provide pain care (p < .001), yet knowledge and positive attitudes were negatively correlated with their perception of their success in pain care (p < .001). This is supported by the present study in that students with experience caring for someone in pain were most likely to receive a higher score on the KASRP. McCaffery and Robinson (2002) and Rieman and Gordon (2007) also reported that years of professional experience affect both pain knowledge and positive attitudes among nurses.

The higher KASRP scores found in this and other studies conducted in North America may be related to the tool being developed in the United States, possibly affecting its sensitivity to pain experiences and attitudes in other countries and cultures. Language may also affect KASRP scores. In the present study the KASRP was administered in English. Participants with English as a primary language had significantly higher scores than did students with other primary languages, despite their experience in the same English-based nursing educational programs.

Table 6
KASRP Questions Identifying Major Strengths in Pain Knowledge and Attitudes in Final-Year Students (≥90% Answered Correctly)

Question	All Participants (%)	School A (%)	School B (%)
#30. 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. (Correct answer = c)	98.5	99.1	98.2
#14. Children less than 11 years old cannot reliably report pain so clinicians should rely solely on the parent's assessment of the child's pain intensity. True or False. (Correct answer = false)	98.2	100.0	97.4
#21. Narcotic/opioid addiction is defined as a chronic neurobiological 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. True or False. (Correct answer = true)	97.3	97.2	97.4
#13. Patients should be encouraged to endure as much pain as possible before using an opioid. True or False. (Correct answer = false)	97.3	99.1	96.5
#12. Elderly patients cannot tolerate opioids for pain relief (Correct answer = false)	97.0	100.0	95.6
#28. 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 (Correct answer = a)	96.4	98.2	95.6
#15. Patients' spiritual beliefs may lead them to think pain and suffering are necessary (Correct answer = true)	95.8	94.5	96.5
#16. After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response (Correct answer = true)	94.3	96.3	93.4
#31. Which of the following describes the best approach for cultural considerations in caring for patients in pain: a. There are no longer cultural influences in Canada due to the diversity of the 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) (Correct answer = c)	92.0	98.2	89.0
#36.1 Circle the number that represents your assessment of Robert's pain: 0-10 Likert Scale (Correct answer = 8)	90.5	95.4	88.1

KASRP = Knowledge and Attitudes Survey Regarding Pain.

In the present study there were inconsistent findings between program and KASRP scores. In one of the 4-year B.Sc.N. program (institution A), participants scored significantly higher than students in the 2-year P.N. program, but students in the other B.Sc.N. program (institution B) did not score higher than the P.N. program. Therefore, how well a participant scored on the KASRP was not related to the length or type of program but to the educational institution they attended. These findings are only partially supported by the results of the study by Plaisance and Logan (2006) where students in 4-year baccalaureate nursing programs had significantly higher KASRP scores than did students in 2-year associate degree programs. Given that the educational institution that students attended affected KASRP scores, a question arises: What between-institution factors result in differentiations in knowledge and positive attitudes among students at those institutions? It is possible that faculty knowledge and positive attitudes, and the institutions' philosophies, play roles in how pain education is relayed to students or the resultant uptake of learning by students. These in turn may be the precipitating factors in determining which institutions train students so they are better prepared to correctly answer the questions on the KASRP.

Areas where all participants had high levels of pain knowledge and positive attitudes included knowing who can best judge patients' pain, understanding pain physiology, and questions about pain in subpopulations. This could suggest that students may have strong theoretical knowledgeable about general pain concepts, even in subpopulations such as the elderly and children, but they do not apply this knowledge adequately to practice situations.

Results in the Context of the Critical Thinking Framework

The Critical Thinking Framework (Edwards, 2007) establishes that nursing students' knowledge is first obtained (phase one) and then defended (phase two). Phase one of the framework involves gathering and sorting information and making an informed decision. Phase two involves defending the decisions that were made, reflecting on the process, and evaluating what has been done. In the present study the KASRP was used as a means of assessing students' abilities to make informed decisions and defend their knowledge and positive attitudes about pain (phase two). Only 4.5% of the students displayed optimal pain knowledge and positive attitudes as indicated through achievement of a KASRP score of 80% or greater. Therefore, according to the critical thinking framework, more needs to be done during phase one to assist students in attaining adequate subjective and objective knowledge related to pain so that adequate knowledge and positive attitudes develop within this population. This is essential to undergraduate nursing education as nurses acquire their foundational knowledge, attitudes, and skills and translate this into nursing practice during the time of nursing education (Clark, 2004). Through interactions with co-students, patients, and educators, students continue to learn about pain (Ferguson & Day, 2005; Gelder et al., 2003; Liaschenko & Peter, 2004; Lindeman, 2000).

Strengths and Limitations

This study has several strengths: (1) The data were readily attainable because the sample was drawn from local institutions, and students were recruited and completed questionnaires in the classroom setting; this contributed to a high participation rate, thereby making the findings generalizable to nursing students at these two institutions. (2) Results from this study can help to guide changes in curricula at the classroom, program, and institution level in the region. (3) The results can be used as a basis for generating and testing interventions to improve students' pain knowledge. (4) This study assessed the knowledge of both degree- and diploma-prepared nursing students, which may promote further analysis of the nursing educational system. (5) The unique finding that institution, more than program, influenced knowledge and attitude is a new finding and requires further analysis of the curricula of these, and possibly other, programs.

This study also has limitations. (1) The sampling frame was limited to two institutions. (2) The curricular content of the programs was not assessed; therefore the appropriateness of the KASRP questions relative to the curricular content is not known, and the results cannot

be generalized beyond these two institutions. (3) Some questions related to pain medications and their administration were not answered by some students. Duke et al. (2013) suggest that missing responses might be an indication of inadequate knowledge and/or misconceptions. Kiekkas et al. (2015) attempted to avoid this problem by providing an "unsure" option for each question. This allowed students the opportunity to not guess responses to questions about which they were not confident. However, in the present study missing entries were coded as incorrect responses because it is general practice in the classroom setting to assign an assessment of "incorrect" when a question is not answered. (4) The KASRP does not address complementary approaches to pain management, and it is possible that students might have had differing KASRP scores had these been included.

Implications for Nursing Practice, Research, and Education

It is important that nursing education involve appropriate and adequate pain content so that nursing students have the opportunity to develop appropriate pain assessment and management knowledge and positive attitudes. This knowledge is imperative to the nursing role because nurses educate and care for patients with pain. It is recommended that the KASRP be used as part of a guideline when reviewing or planning curriculum to support students in what they are taught and what will be expected of them once they enter clinical practice. The KASRP could also be used as an assessment tool within educational programs to evaluate students' uptake of appropriate knowledge and the ability to apply this knowledge to practice. Nursing curricula could be improved through the application of additional attention to areas in which the students show weakness. As indicated earlier, assessment of nursing faculty members' knowledge and attitudes about pain could identify why some institutions score higher on the KASRP than others. Including complementary approaches to pain management within the KASRP would allow educators to appreciate students understanding of this important information.

Conclusions

Pain management falls within the scope of nursing practice, and this study is consistent with other reports indicating that the majority of final-year nursing students do not have either adequate knowledge of or positive attitudes about pain assessment and management. Without a proper understanding of pain and its management, nursing students may not contribute adequately to the assessment and management of pain. In extension, this study suggests that many nursing students may complete their nursing programs and enter practice with inadequate pain assessment and management knowledge and attitudes, and this may contribute to poor pain management and high levels of moderate to severe acute and chronic pain among patients in their care. Further work is required to generalize these findings to other sites and to gain further understanding of where specific gaps in knowledge and positive attitudes exist so that appropriate interventions can be developed and tested. Nursing educators may find this information useful when developing and/or advancing curricula for nursing education. Additionally, this information may be useful for educators when planning clinical opportunities for students to acquire appropriate pain assessment and management knowledge and attitudes, with the goals of improving nursing practice and enhancing patient care.

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