

Feature Article

Nurses' Knowledge and Attitudes About Pain in Hospitalized Patients

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Purpose:

The purpose of the study was to measure knowledge and attitudes of nursing about pain management in patients before education, immediately after, and 6 months later. The end-point measure was Hospital Consumer Assessment of Healthcare Providers and Systems quarterly scores and percentile rank.

Design:

This longitudinal, quasi-experimental, quantitative study used survey method with pretest and posttest scores to measure immediate learning and 6 months later to measure sustained changes in knowledge and attitudes for nurses in this facility.

Setting:

The setting was a 360-bed acute care community hospital in the midsouth.

Sample:

The sample consisted of approximately 206 bedside nurses who worked in an acute care facility and 164 final posttest participants.

Methods:

The survey was used in a group setting immediately prior to a didactic learning experience. Immediately after the session, a posttest survey was administered. The 6-month follow-up occurred via an online module developed by the principal investigator. A repeated-measures analysis of variance, a pairwise comparison with a paired *t* test, and a Bonferroni

correction were performed to determine if sustained knowledge and attitudes have changed.

Findings:

Posttest scores were significantly higher than pretest scores on the *Knowledge and Attitudes Survey Regarding Pain* immediately after a didactic education session and 6 months later ($P < .017$).

Conclusions:

Six months later, scores remained higher than pretest or immediate posttest scores.

Implications:

Nurses with a stronger knowledge base may lead to better pain management, improved outcomes, and higher patient satisfaction scores.

KEY WORDS:

attitudes, knowledge, pain

Pain is a symptom experienced frequently in the acute care setting and is one of the symptoms that patients fear and dread the most. Nurses' inadequate management of pain and their reluctance to be a patient advocate in the relief of pain continue to be a major issue.^{1,2} Despite development of guidelines, specific to hospitals and wards directed at the control of pain, patients still are not receiving adequate pain relief.³⁻⁶

In 1995, more than half of all hospitalized patients experienced pain in the last days of their lives, and although therapies were present to alleviate most pain for those dying of cancer, research shows that 50% to 75% of patients die in moderate to severe pain.⁷ Almost 2 decades later, despite increased public awareness of the need for adequate pain management, there has been no significant improvement.

The Centers for Medicare & Medicaid Services asked the Agency for Healthcare Research and Quality to develop a patient satisfaction survey as part of Centers for Medicare & Medicaid Services' commitment to providing consumers, purchasers, and providers with reliable comparative information about healthcare quality.⁸ The result was a 27-item

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survey of hospital patients addressing varied aspects of the hospital environment and the care received. Hospitals have been surveying patients for decades, but the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) is unique.⁹ Most surveys are developed either by individual hospitals for their own use or by survey vendors for use by their hospital clients, so the development of the HCAHPS survey by Agency for Healthcare Research and Quality was uncommon.¹⁰ It is the first national, standardized, publicly reported survey of patients' perspectives of hospital care. The goals of the survey are to produce data about patients' perspectives of care that allow objective and meaningful comparisons of hospitals on topics that are important to consumers, to create new incentives for hospitals to improve quality of care, and to enhance accountability in healthcare by increasing transparency of the quality of hospital care provided in return for the public investment.⁹

The survey contains 18 core questions about critical aspects of patients' hospital experiences. The areas include communication with nurses and doctors, responsiveness of hospital staff, cleanliness and quietness of the hospital environment, pain management, communicating about medicines, discharge information, overall rating, and recommendation of the hospital. The survey includes 4 items to direct patients to relevant questions, 3 items to adjust for the mix of patients across hospitals, and 2 items that support congressionally mandated reports. It is administered to a random sample of adult patients across medical conditions between 48 hours and 6 weeks after discharge. It is administered by mail, telephone, mail with telephone follow-up, or active interactive voice recognition. The results of the surveys are shared with individual hospitals on a monthly and an as-needed basis.¹⁰

This survey measured staff nurses' ability and willingness to manage pain and educate about pain medication. Based on baseline HCAHPS pain management scores, there was evidence to support the need for better outcomes management through a policy change, education and resensitization about pain assessment and management, and changes in electronic documentation templates to support the increased documentation requirements. This study proposed both education and an attitudes and perception resensitization process necessary to provide comprehensive pain management for patients at this facility.

BACKGROUND AND SIGNIFICANCE

Pain is a complex, multidimensional phenomenon, and it is one of the most common clinical problems seen in the acute care setting.^{11,12} Pain is a subjective experience, and it is always exactly what the patient says it is.¹³ Pain assessment, sometimes known as the fifth vital sign, is an integral part of the nursing assessment. Nurses spend more

time with patients in pain than any other healthcare team member, and providing pain relief is an important part of the role of being a nurse. Being able to manage pain effectively is consistent with the ideals of the nursing profession.¹⁴

Patients feel they are not receiving adequate pain management while hospitalized.¹⁵⁻¹⁷ Unrelieved pain delays healing, alters immune function, and increases levels of stress and anxiety.¹⁵ Furthermore, the prospect of future medical interventions would produce increased anxiety if pain was not managed well in the past.¹¹

Benefits of pain relief include better patient outcomes, shortened lengths of stay, reduced costs of care, faster postoperative recovery, improved sleep, and increased mobility. In turn, these improvements result in increased patient satisfaction.¹⁵ Pain that is not treated adequately leads to worsening patient conditions and decreased quality of life. Patients with unrelieved pain have longer hospital stays, higher readmission rates, and more frequent outpatient visits. These factors may result in decreased patient satisfaction and increase in healthcare costs.

In 2010, the Office of the Army Surgeon General released the *Pain Management Task Force Final Report*, a 2-year evaluation of pain management completed by the Department of Defense and the Veterans Health Administration. The task force outlined 109 recommendations that would lead to a comprehensive pain management strategy. This approach was described as holistic, multidisciplinary, and multimodal.¹⁷ This comprehensive approach serves as a model for current pain management practice guidelines.

The depth of nurses' knowledge and their perceptions regarding pain management are linked to the patient's perception of adequate pain control.^{12,18-20} To achieve a goal of better pain management for improved patient satisfaction, one must ensure that nurses have sufficient knowledge to adequately manage pain.

This intervention was constructed based on Knowles'²¹ adult learning theory andragogy and Coutu's²² concepts of transformational learning. A literature review resulted in previous theory-based educational interventions and concept development about quality nursing care to guide the study.^{16,23} The goal was to construct a method of learning that was in a safe environment with complete anonymity. The presenters quickly established a need to know why they were learning, problems were introduced via case studies to illustrate concepts, and the content was of immediate use for all participants.

PURPOSE/STUDY OBJECTIVE

Hospital Consumer Assessment of Healthcare Providers and Systems scores related to pain management for the selected study site were reported at 66%, which measures the percentage of time that nurses are perceived by patients as always managing their pain effectively. The

baseline period was the first calendar quarter 2011, with a report date April 2011. The score was below the 50th percentile measure. The immediate target was the 75th percentile, and the ultimate goal being the 95th percentile. There are economic incentives for hospitals to score at target or above and economic disincentives for hospitals to score below minimum (50% percentile).

Based on HCAHPS score results that are tied to economic incentives, this 360-bed acute care community hospital in the midsouth tasked 3 clinical nurse specialists from intensive care, emergency department, medical-surgical, and oncology units to develop a method to improve pain management at the facility as measured by the HCAHPS scores.

It was expected that posttest scores would be higher than pretest scores on the *Knowledge and Attitudes Survey Regarding Pain*²⁴ immediately after an education session. It was further hypothesized that 6 months after pain management education and the introduction of a newly developed Pain Assessment and Management Policy at the study site, retest scores on the nursing survey would indicate sustained knowledge and increased sensitivity regarding pain assessment and management principles addressed during the education session of the study. Scores were expected to remain higher than the pretest scores. The research study was approved through the institutional review board as an “exempt” study prior to data collection.

METHODS

Pretest-posttest designs measure the degree of change occurring as a result of treatments or interventions.²⁵ This longitudinal and quantitative study utilized a survey method with pretest scores prior to an in-service education offering in August 2011, with education posttest scores immediately after the session and 6 months later. The 6-month testing occurred online. These scores were used to measure immediate learning and sustained changes in knowledge and practice at a 6-month interval for all registered nurses who practice clinical bedside nursing in a 360-bed acute care community hospital in the midsouth.

The timing of the HCAHPS data in relation to the timing of the knowledge and attitudes data collection periods overlapped. Hospital Consumer Assessment of Healthcare Providers and Systems baseline data occurred from January to March 2011, which was the first time hospitals received HCAHPS data. This was the baseline from which to measure progress with patient satisfaction. The second period for HCAHPS data collection was April to June 2011, which showed some improvement without a specific intervention. The attitudes and knowledge hospital education was offered through the month of August 2011. The October 2011 HCAHPS data included July–September 2011, which would have included 2 months of data collected after the education. The January 2012 HCAHPS data included the months October–December

2011. The 6-month follow-up scores were reflected on the HCAHPS report periods for October 2011 and December 2011, which included 5 months during and after the education offering. Because of the lag in data reporting, March 2012 data were not available at the time of the data analysis.

Sample

The original sample consisted of approximately 436 nurses working in an acute care facility. It was a convenience sample, recruited prior to a mandatory education session to introduce a new pain management policy at the selected site. Nurses considered eligible for the study were registered nurses who worked in acute care areas within the health system providing direct patient care. There were 206 pretest and immediate posttest participants who agreed to participate in the survey and 164 final posttest participants. Of the 436 nurses working in the facility, 57 nurses separated between the first and last survey, 56 nurses were newly hired in the same period, and 34 nurses transferred outside the selected departments, which reflected a 26% attrition rate for this study. Therefore, the final survey sample was reduced to 286 potential participants. Participation rates for the first 2 surveys were 47.2% and 57.3%, respectively.

Because of restrictions for anonymity agreed on between the principal investigator and the institutional review board, specific descriptive demographics are unavailable. The participants in this study consisted of primarily female nurses. In the facility, nurses ranged in age from 21 to 69 years, with a mean age of 38 years. The range of years of employment ranged from less than 1 year to 34 years. The bedside practice sites of the participants were medical and surgical nursing units, intensive care, emergency department, surgery and postsurgical units, and same-day surgery suites. This study encompassed nurses providing care for emergent, acute, urgent, and nonurgent patients who reported pain.

Design

The *Knowledge and Attitudes Survey Regarding Pain*²⁴ was selected to measure both learning and attitudes. Content validity has previously been established by review of pain experts. The content of the instrument was derived from current standards of pain management such as the American Pain Society, the World Health Organization, and the Agency for Health Care Policy and Research. Construct validity has been established by comparing scores of nurses at various levels of expertise such as students, new graduates, oncology nurses, graduate students, and senior pain experts. The instrument was identified as discriminating between levels of expertise. Test-retest reliability was established ($r > 0.80$) by repeat testing in a continuing education class of staff nurses ($N = 60$). Internal consistency reliability was established ($\alpha > .70$), with items reflecting

both knowledge and attitude domains. The authors of the survey caution researchers to avoid distinguishing items as measuring either knowledge or attitudes. Many items such as one measuring the incidence of addiction measure both knowledge and attitude about addiction. Therefore, it was recommended that data be analyzed in terms of the percentage of complete scores and by analyzing individual items using item-analysis methods.²⁶

The *Knowledge and Attitudes Survey Regarding Pain*²⁴ was used in a group setting immediately prior to a didactic learning experience. Permission was obtained for use of the instrument. Immediately after the session, a posttest survey was administered. The pretest and posttest took an average of 10 minutes each. The learning session occurred in 60 minutes. One contact hour was granted by the State Registered Nurses Association. The 6-month posttest occurred via an online module developed by the principal investigator. Participants were told at the time of the first survey that, if they completed all 3 surveys, they would be awarded a certificate of completion at the conclusion of the study. These certificates were placed in their employee evaluation folder for merit consideration during annual review by nursing administration. When the 6-month posttest survey was complete, a repeated-measures analysis of variance (RM-ANOVA) was performed on all 3 scores to determine if sustained knowledge and attitudes have changed.

This study design has been used for other learning experiences²⁷ but not to measure knowledge and attitude changes as the result of pain management education. Nurses were recruited using fliers and intranet e-mail correspondences, and an honors nursing student participated in unit-to-unit campaigning to encourage participation.

To sustain the knowledge, the clinical nurse specialists created flyers for the months between the original presentation and the retest period 6 months later. The topics covered on the flyers covered the same content that was presented in the original presentation, including myths about pain management, analgesic conversion charts, and patient satisfaction. None of the flyers included specific content found on the survey.

During the last 3 weeks of the period, a selected nursing student recruited and reminded nurses to participate in the posttest survey. The student introduced herself to the nurses on the unit and reminded each person about the survey. She passed out flyers with reminders to follow up with the posttest. The second week, she hung pain management survey reminder flyers with the dates the posttest was available, how to access it, and the people to contact with questions. She hung surveys in prominent spots throughout the hospital and on each nursing unit so nurses would see them and be reminded about the survey. She again spent this time encouraging the nurses to help with the completion of the project. In the final week, the student distributed favors

to nurses who completed the survey as a way to thank them for completing the posttest and let them know how valuable they were to the completion of the study. These measures appeared to have been successful. The one-on-one campaigning let nurses know how much they were appreciated and how their participation could make a real difference in the success of the study.

The assumption was nurses with adequate knowledge about pain management would lead to improved patient satisfaction and increased sensitivity to pain management needs of patients. This would result in nurses being more effective pain management advocates for their patients. Patient satisfaction, as a quality indicator, was a valid end-point measure for improved pain management. The improved patient satisfaction would be evidenced by a higher HCAHPS composite score in the pain domain compared with the baseline score.

RESULTS

The repeated-measures model is used to measure behavior over a given period. The results of the study were 2-fold. The first part of the analysis focused on item analyses for all 3 surveys. The second part used RM-ANOVA.

Item Analysis

Item analysis was done to determine how well each individual item predicts the overall score. Point biserial correlation denoted how well a particular item discriminated between high and low performance on the test. *P* value denoted the difficulty of each individual item.²⁶

Point biserial correlations on the first test ranged from -0.04 to 0.47 . *P* values ranged from $.03$ to 1.00 . There was no discernible relationship between specific item numbers and point biserial correlations and *P* values. Overall, point biserial correlations for the test were less than accepted (>0.20). From that result, one could conclude that the individual items were not good predictors of overall scores. Since the education session did *not* teach to the test, guessing by participants could account for the low point biserial correlations. The inconsistency in relationship of *P* values yielded unreliable data.

Point biserial correlations on the second test ranged from 0.03 to 0.45 . *P* values ranged from $.15$ to $.99$. Overall, this survey yielded higher point biserial correlations and midrange *P* values. However, items 37 through 40 consisted of specific case scenarios in which the participant would identify a specific amount of narcotic required for individuals. Items 38 and 39 were least predictive of overall scores. These items asked for specific amounts of narcotic to administer when ranges were ordered. Because ordering medicine in dosage ranges is no longer an acceptable practice, it was felt that these nurses may not have been able to answer these questions with certainty. When the

	n	Minimum	Maximum	Mean	SD
First score	206	16	36	27.67	3.515
Second score	206	19	37	31.66	2.957
Third score	164	32	40	36.47	2.651
Valid n (listwise)	164				

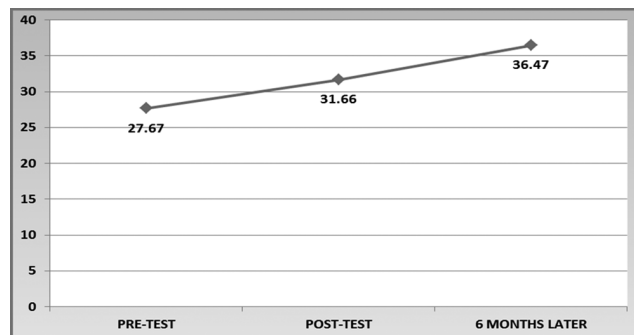


FIGURE 1. Mean knowledge and attitudes survey regarding pain scores.

problematic items were discarded, point biserial correlations ranged from 0.13 to 0.59, *P* values ranged from .17 to .92.

Point biserial correlations on the last test ranged from 0.37 to 0.72. *P* values ranged from .35 to .94. Point biserial correlations were more predictive of overall scores, and *P* values denoted item difficulty. However, item 38 again had a low point biserial correlation and a high *P* value, indicating a problematic question. Therefore, this item was discarded, and item analysis was refigured. Point biserial correlations ranged from .32 to .59. *P* values now ranged from .67 to .98.

Repeated-Measures ANOVA

The 6-month posttest survey required a 1-way RM-ANOVA on all 3 scores. The RM-ANOVA was conducted using the software package SPSS. The RM-ANOVA compares variances among groups or groups of data when there are more than 2 data sets or groups. Descriptive statistics for first score, second score, and third score comprise the data set (Table 1).

The scores continued to be higher with each test attempt, even though there was a 6-month period between the second and third tests (Figure 1).

One of the core underlying assumptions in the univariate RM-ANOVA procedure is that of sphericity. Mauchly's test of sphericity measures the equivalence of the hypothesized and the observed variance/covariance patterns.²⁸ The test was statistically significant suggesting that the observed matrix does not have approximately equal variances and equal covariances. The sphericity assumption has been violated, which would invalidate the results of the *F* test.²⁹ Because the Greenhouse-Geisser correction was the lower-bound estimate, it was selected to correct

the *df* for the "worst case scenario" in order to raise the critical *F* value needed to reject the null hypothesis. For these data, Greenhouse-Geisser $\epsilon = .86$ (Table 2). Using the Greenhouse-Geisser corrective coefficient, there is a significant change in the pain scores across time, $F_{1,725,281.174} = 373.96$, $P < .05$ (Table 3).

The standard post hoc analyses for multiple-comparisons procedures are not generally run for repeated-measures analyses. Because these analyses involve within-subject comparisons, the multiple comparisons do not fit logically as they are based on overall group differences. Therefore, a paired *t* test to look at differences between pairs of means was done using a pairwise comparison as a difference score to determine which means were significantly different. The RM-ANOVA reported a significant difference and the paired *t* test with a Bonferroni adjustment ($\alpha = .05/3$) with an α of .017 or less identified which difference was significant. There was a significant difference between the first score and the second score, as well as a significant difference between the second and third scores, $P < .017$.

The first reported HCAHPS scores were higher than the baseline period, as were the following quarters. Six months later, scores remained higher than pretest scores (Figure 2; Table 4).

DISCUSSION

A heightened awareness for the need of systematic education, measurement, and attitude toward pain management at this institution cannot be directly attributed to improvement in patient satisfaction scores from April 2011 through

Within-Subjects Effect	Mauchly's <i>W</i>	Approximate χ^2	df	P	ϵ^a	
					Greenhouse-Geisser	Lower-Bound
Scores	0.841	28.135	2	.000	0.862	0.500

^aGreenhouse-Geisser correction.

Table 3. Tests of Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	P
Scores	Sphericity assumed	6379.493	2	3189.746	373.960	.000
	Greenhouse-Geisser	6379.493	1.725	3698.274	373.960	.000
	Lower bound	6379.493	1.000	6379.493	373.960	.000
Error (scores)	Sphericity assumed	2780.667	326	8.530		
	Greenhouse-Geisser	2780.667	281.174	9.889		
	Lower bound	2780.667	163.000	17.059		

January 2012. A limitation of this study was that because it was not an experimental design, it is not possible to infer a cause and effect in these findings.

Therefore, in order to reconcile the improvement in pain survey scores after 6 months, nurses were asked to collaborate with the research team to uncover reasons for the improvement. Nurses who participated in the original study were informally asked what factors they believed contributed to the improvement in HCAHPS scores from 54th to 79th percentile. The majority of the responses listed in frequency of comment were education about pain, differences in acute and chronic pain, managing pain on a schedule rather than as needed, dispelling myths and biases, and being reminded that everyone perceives pain differently. When asked how the program changed the way they approached pain management, the most frequent comments were that they now gave pain medication on a schedule, they are more empathetic to the patient's response, and for some, the education resulted in more frequent reassessments of pain and improved pain management.

The design of the instrument used was not intended to separate attitudes from knowledge.²⁴ After conducting an exhaustive literature review, the researchers assumed that, to increase knowledge about pain and pain management, practices would positively impact attitudes. For this study, that assumption was supported.

It is recognized, however, that other variables impact attitudes. One's culture, comfort with the role as nurse, variations in institutional policies that allow nurses more autonomy in practice, and nurse staffing patterns that allow nurses time to attend to individual patient needs could have an impact on nurses' attitudes. Each of these variables warrants further investigation.

Furthermore, because a 6-month window was a satisfactory period to retain and learn to use new knowledge, perhaps extending the window to find the threshold for education offerings would be beneficial. It must be also recognized that intermittent reminders were used as knowledge reinforcements in this study.

Similar studies conducted in the past 3 years support the intervention of this study, but none of the studies are able to articulate a specific "process" that works best for changing the attitudes and beliefs of nurses to promote better patient outcomes.^{2-5,11,12} Decisions about pain management by providers and caregivers are highly complex. Increasing the awareness or lack of willingness to acknowledge biases related to pain management may be a crucial step in resolving and improving this patient care dilemma.³

A second study will be conducted by an honor student working in the same facility to measure patient satisfaction with pain management by tracking and trending HCAHCP scores over another year. This will reflect long-term changes in practice without formal education offerings or reminders.

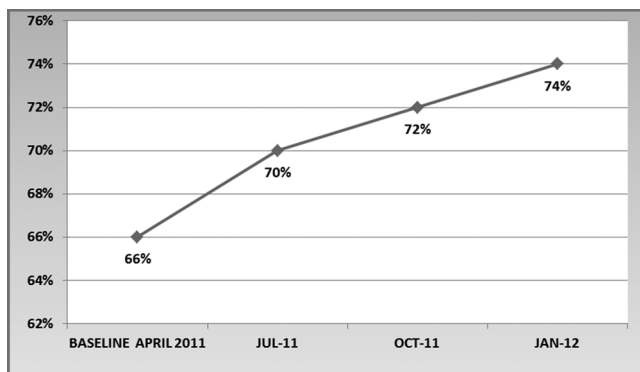


FIGURE 2. Mean hospital consumer assessments of healthcare providers and systems scores.

Table 4. Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Scores

HCAHPS Pain Management Report Dates	Score	n	Percentile Rank
Baseline period—April 2011	66%	187	23
July 2011	70%	262	38
October 2011	72%	231	62
January 2012	74%	251	75

CONCLUSION

Nurses' knowledge and perceptions regarding pain management are linked to how well patients perceive their nurse manages their pain,^{5,12,23,30} and this study supports that proposition. Providing an initial comprehensive education offering and sustaining the learning by intermittent reinforcement with memory aids were a successful strategy for learning. Based on the findings of this study, it would support the statement that nurses with a stronger knowledge base lead to better pain management, improved outcomes, and higher patient satisfaction scores.

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References

1. McCaffery R, Zerwekh K, Keller K. Pain management: cognitive restructuring as a model for teaching nursing students. *Nurse Educ.* 2005;5:226–230.
2. Hirsh A, Jensen M, Robinson M. Evaluation of nurses' self-insight into their pain assessment and treatment decisions. *J Pain.* 2010;11(5):454–461.
3. Titler M, Herr K, Brooks JM, et al. Translating research into practice intervention improves management of acute pain in older hip fracture patients. *Health Serv Res.* 2009;44(1):264–287.
4. Nett M. Postoperative pain management. *Orthopedics.* 2010;33(9), supplement.
5. Walling AM, Asch SM, Lorenz KA, et al. The quality of care provided to hospitalized patients at the end of life. *Arch Intern Med.* 2010;170(12):1057–1063.
6. Sieber F, Barnett S. Preventing postoperative complications in the elderly. *Anesth Analg.* 2011;29(10):83–97.
7. Connors AF, Dawson NV, Desbiens NA, et al. A controlled trial to improve care for severely ill hospitalized patients. *JAMA.* 1995;274(20):1591–1598.
8. Levey B. The HCAHPS satisfaction survey. Hospital consumer assessment of healthcare providers and systems. *Podiatry Manage.* 2009;28(5):245.
9. Hospital Care Quality Information from the Consumer Perspective. HCAHPS Fact Sheet. July 2010. <http://www.hcahpsonline.org/Facts.aspx>. Accessed March 6, 2012.
10. Centers for Medicare and Medicaid Services. HCAHPS: patients' perspectives of care survey. 2012. <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html>. Accessed March 12, 2012.
11. Jahn P, Kitzmantel M, Renz P, et al. Improvement of pain related self management for oncologic patients through a trans institutional modular nursing intervention: protocol of a cluster randomized multicenter trial. *Trials.* 2010;11:29.
12. Lewthwaite BJ, Wheeler BJ, Milles J, Fedorowicz A. Nurses' knowledge and attitudes regarding pain management in hospitalized adults. *J Cont Ed Nurs.* 2011;42(6):251–257.
13. McCaffery M. *Nursing Practice Theories Related to Cognition, Bodily Pain, and Man-Environment Interactions.* Los Angeles, CA: University of California at LA Students Store; 1968.
14. McCaffery M, Ferrell BR. Nurses' knowledge of pain assessment and management: how much progress have we made? *J Pain Symptom Manage.* 1997;14(3):175–188.
15. Adams R, White B, Beckett C. The effects of massage therapy on pain management in the acute care setting. *Int J Ther Massage Bodywork.* 2010;3(1):4–11.
16. Borglin G, Gustafsson M, Krona H. A theory-based educational intervention targeting nurses' attitudes and knowledge concerning cancer-related pain management: a study protocol of a quasi-experimental design. *BMC Health Serv Res.* 2011;11:233–239.
17. Pain Management Task Force Report. Providing a standardized DoD and VHA vision and approach to pain management to optimize the care of warriors and their families. Executive Summary. http://www.armymedicine.army.mil/reports/Pain_Management_Task_Force.pdf. Accessed March 20, 2012.
18. Bernhofer E. Ethics and pain management in hospitalized patients. *Online J Issues Nurs.* 2012;17(1).
19. Gupta A, Daigle S, Mojica J, Hurley R. Patient perception of pain care in hospitals in the United States. *J Pain Res.* 2009;2:157–164.
20. Herr K, Titler M, Fine P, et al. Assessing and treating pain in hospices: current state of evidence-based practices. *J Pain Symptom Manage.* 2010;39(5):803–819.
21. Knowles MS. *The Modern Practice of Adult Education: From Pedagogy to Andragogy.* 2nd ed. New York: Cambridge Books; 1980.
22. Coutu D. The anxiety of learning. *Harvard Bus Rev.* 2002;1–8.
23. Izumi S, Baggs J, Knafk K. Quality nursing care for hospitalized patients with advanced illness: concept development. *Res Nurs Health.* 2010;33(4):299–315.
24. Ferrell B, McCaffery M. *Knowledge and Attitudes Survey Regarding Pain Survey.* Revised. 2008. <http://prc.coh.org/Knowledge%20Attitude%20Survey%20updated%2005-08.pdf>. Accessed June 1, 2011.
25. Dimitro D, Rumrill P. Pretest-posttest designs and measurement of change. *WORK J Prev Assess Rehabil.* 2003;20(2):159–165.
26. Rensselaer Polytechnic Institute. Item analysis: what does item analysis really tell us? <http://homepages.rpi.edu/~verwyc/chap4tm.htm>. Accessed March 10, 2012.
27. Ballard N, Bairan A, Newberry L, Van Brackle L, Barnett G. Effect of education on a chest pain mnemonic on door-to-ECG time. *J Emerg Nurs.* 2011;37(3):220–224.
28. Chajewski M. An example of an APA-style write-up for the repeated measures analysis of variance and multivariate analysis of variance lab example. http://www.chajewski.com/Teaching/Graduate/hmw6_answer_key.pdf. Accessed March 10, 2012.
29. Berge DB. Problems with repeated measures analysis: demonstration with a study of diversification and performance relationship. *Acad Manage J.* 1995;38(6):1692–1708.
30. Grant M, Ferrell B, Hanson J, Sun V, Uman G. The enduring need for the pain resource nurse (PRN) training program. *J Canc Educ.* 2011;26:598–603.