Knowledge Surveys in Nursing Education: Nursing Students' Perceptions of Their Knowledge and Clinical Skill Abilities

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Knowledge surveys have been used for educational assessment to measure cognitive knowledge, assess student confidence and perceptions of knowledge, identify content areas that need further development, and provide students a guide for study. The purpose of this study was to discover and examine pre-licensure nursing students' perceptions of their own knowledge (and expectations) regarding their clinical abilities and, to evaluate the effectiveness of knowledge surveys as an educational tool for increasing students' knowledge and clinical skill(s). The conceptual framework selected for this research study was derived from Lave and Wegner's (1991) seminal work, which contributed to the understanding of situated learning through a focus upon the act of learning and its relationship with the social and cultural contexts where such learning occurs.

I developed the pre- and post- knowledge surveys based upon the work of Wirth and Perkins (2005) and Jarzemsky, McCarthy and Ellis (2010) for use with professional, pre-licensure nursing students. In addition I created a demographic survey, a clinical simulation performance evaluation and finally, I created evaluation items for this study, I used an experimental, randomized pre-test, post-test design and, participants received didactic learning materials and participated in a high fidelity simulation specifically focused upon end-of-life care.

Using non-parametric tests using chi square (with Phi or Cramer's V) as well as the *t*-test for paired samples, I evaluated whether or not the use of a knowledge survey increased knowledge and clinical skill/ability. The participants reported a perception of improvement in their knowledge and clinical skill/abilities; they overwhelmingly overestimated their knowledge; they over/under estimated their abilities to perform clinical skills; and their perceptions did not reflect actual ability to safely demonstrate clinical skills/abilities. These findings may be consistent with the Dunning-Kruger effect. This effect is found when low performing students over-estimate their ability and high performing students' under-estimate or have an accurate perception of their ability. I also used non-parametric tests, including chi square test (with the McNemar test and Phi correlational coefficient) to evaluate whether there was a relationship between student perceptions and their cognitive knowledge and clinical skills/abilities. It was difficult to determine whether the student's perceptions of their knowledge and clinical skill/ability were strongly or directly related to their actual ability and, student's perceptions of their knowledge and clinical skill/ability were more strongly and positively related to their actual clinical ability during a simulation.

There are several strengths and limitations of this study. The strengths included: there are no published studies in nursing regarding the use of a knowledge survey; the literature does not reveal any discipline that has assessed behavioral components using a knowledge survey and this study introduces a behavioral component; there is the potential to expand a knowledge survey across an entire semester of a nursing course rather than focus upon a single area of content; and, finally, the incorporation of the QSEN competencies illustrates how profession-specific competencies can be incorporated into a knowledge survey. The limitations of this study included the fact that this was a pilot study; the sample size was small; the use of on-line surveys may affect student accuracy; the lack of debriefing items in the surveys; the lack of diversity of participants, the use of non-parametric statistics; and the difficulty of ensuring that participants did not talk with one another and influence the findings of the study.

There are a number of directions for future research and nursing education practice. The directions for research include: planning ahead when creating a knowledge survey in order to ensure the validity/reliability of items; planning to control for bias by using participants not known to the researcher; exposing students to the concept and function of knowledge surveys prior to conducting a research study;

providing a thorough description of the knowledge survey with students prior to recruitment; administering the knowledge survey in class rather than on-line; consider offering extra credit or a small incentive for students to participate in knowledge survey research; collect data from a knowledge survey that is administered over several semesters; and lastly, categorize the skill of participants into levels of high, mid and low.

There are several ways in which the use of knowledge surveys can impact nursing education practice. For instance, it may be helpful to explain to students the goal of using knowledge surveys and how the use of such surveys can improve metacognition. In addition, educators should be mindful of the possibility of the Dunning-Kruger effect; closely monitor student activities in the clinical setting; provide timely and accurate feedback to improve metacognition; recognize students may not accurately self and/or peer evaluations for simulations; and finally, encourage the practice of reflective judgement.

Title:

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Keywords:

Educational assessment in nursing education, Knowledge surveys, and Student perceptions of knowledge and clinical skill/ability

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Abstract Summary:

Pre- and post-knowledge surveys (KS) related to end-of-life care were developed for pre-licensure nursing students. This experimental design study evaluated whether or not the use of knowledge surveys increased knowledge and clinical skill/abilities; and, whether there is relationship between student perceptions and their cognitive knowledge and clinical skills/abilities.

Content Outline:

1. Introduction
a. Background of research study
b. Interest in education intervention study

2. Literature Review
a. Integrative literature review strategy followed; years 2009-2013
b. FOCUS: Use of simulation as an educational strategy in pre-licensure nursing education.
c. LITERATURE GAP HIGHLIGHTS:
i. Clinical performance and competency are concepts which have been studied in a variety of ways with inconclusive results.
ii. The continued development of simulation evaluation tools will help determine the effectiveness of educational strategies and simulation.
iii. Student perceptions of their knowledge and clinical skills are measured after the completion of a simulation.
iv. There are no published knowledge surveys used in nursing and no studies which evaluate behavioral items.

3. Research Problem
a. The focus of teaching and learning in nursing education has shifted to the knowledge, skills and attitudes of the profession.
b. Learners are expected to take more responsibility for their own learning.
c. There is a dearth of evidence related to students' perceptions of their knowledge and clinical skill abilities.
d. There is a lack of educational tools that demonstrate an increase in student knowledge and clinical skill ability.

4. Purpose of Research Study
a. To discover and examine pre-licensure nursing students' perceptions of their own knowledge (and expectations) regarding their clinical abilities.
b. To evaluate the effectiveness of knowledge surveys as an educational tool for increasing students' knowledge and clinical skill(s).

5. Theoretical Framework (evolved through different scholars)
a. Lave & Wegner (1991): Situated Learning
i. Legitimate peripheral participation
ii. Engagement in the social and cultural practices of the profession.
b. Johnson & Pratt (1998): The Apprenticeship Perspective
i. Learners use existing "schema" to interpret new information.
1. Process: How schema are built.
2. Product: The cognitive or behavioral change that occurs in the schema

b. Paige and Daley (2009): Situated Cognition
iv. Ingredient or tools: Pre- and post-knowledge surveys, allowing participants to assess their own knowledge and abilities.
v. Content of the knowledge survey serves as a tool for cognitive recall as well as a learning guide.
vi. People (patient, family members and other health professionals) were available during the simulation.
vii. Activity was provided to participants through the use of a realistic clinical context in a clinical simulation.

6. Research Questions
a. Does the use of a pre-post knowledge survey increase student knowledge and clinical ability when compared to standard teaching techniques?
b. What is the relationship between pre-licensure nursing students' perceptions of their own knowledge

and clinical ability on the post-knowledge survey and written examination and clinical simulation performance evaluation scores?

7. Methodology
a. An experimental, randomized pre-test, post-test design
i. Experimental Group
ii. Control Group

b. Instruments:
i. Demographic Survey
ii. Pre- and Post-KS
iii. Evaluation Items (EI)
1. On-line Quiz Format
iv. Clinical Simulation Performance Evaluation (CSPE)
1. Checklist for Faculty Evaluator
c. Analysis: Question 1
i. CG and EG (between)
1. non-parametric tests using chi square (with Phi or Cramer's V)
ii. EG (within)
1. t-test for paired samples
d. Analysis: Question 2
i. Non-parametric tests
1. Chi Square test
2. McNemar test
a. Phi correlational coefficient

8. Pre- and Post- KS Item Examples and response Options
a. *Examples of Cognitive Items*
i. [Level 1: Remember] What are three goals of end-of-life care are?
ii. [Level 2: Understand] How can the nurse identify appropriate approaches to addressing cultural beliefs in end-of-life care care?
iii. [Level 3: Apply] What can cause of the symptom of fatigue at the end of life?
iv. [Level 4: Analyze] What is the difference between hospice and palliative care?
v. [Level 5: Evaluate] What are effective communication pattern(s) health care providers can use when caring for patients and families or significant other(s) at the end of life?
b. *Cognitive Response Options*
i. I do not understand the question. I am not familiar enough with the terminology or am not confident that I can answer the question well enough for grading purposes at this time.
ii. I understand the question and a) I am confident that I could answer at least 50% of it correctly or, b) I know precisely where to find the necessary information and could provide an answer for grading in less than 20 minutes.
iii. I am confident that I can answer the question sufficiently well enough for grading at this time.
c. *Behavioral Response Options*
i. I do not understand what clinical skill/activity is needed. I am not familiar enough with the terminology or am not confident that I can attempt or perform the clinical skill/activity with satisfactory competency and safety at this time.
ii. I understand what clinical skill/activity is needed and I am confident that I could attempt or perform the skill with some aspects of safety and competency at this time.
iii. I understand what clinical skill/activity is needed well enough to perform it safely and with competency at this time.

d. *Examples of Behavioral Items*
i. [Level 1: Remember] Recognize when a patient's condition/symptoms have changed near the end of life and take action after performing a focused nursing assessment.

ii. [Level 2: Comprehension] Consider potential safety risks in the patient care environment and how to avoid them.

iii. [Level 3: Application] Adapt evidence-based guidelines for the treatment of patients and families or significant other(s) during the end of life experience.

iv. [Level 5: Synthesis] Seek and include input from the patient who is at the end of life.

v. [Level 6: Evaluate] Evaluate a patient's response(s) to specific end of life nursing interventions.

e. CSPE Choices for Faculty Evaluator (three part scale responses)

i. Student does not perform the clinical skill/ activity with satisfactory competency and safety.

ii. Student attempts or performs the skill with some aspects of safety and competency.

iii. Student performs the clinical skill/activity with satisfactory competency and safety.

iv. **Student's peer performed clinical skill/activity, so no opportunity to perform skill.

1. NOTE: **If student's partner performs clinical skill(s), a fourth scale response was added to the performance evaluation

9. Research Question #1: Results
a. CG EI scores compared to the EG EI scores
i. The surveys did not significantly increase student knowledge when compared to standard teaching techniques.
b. EG post-KS scores compared to the CG CSPE scores
i. The surveys did not significantly or consistently increase clinical skills/ability when compared to standard teaching techniques.
c. EG pre-KS scores compared to the EG post-KS scores.
i. Participants reported a perception of improvement in their knowledge and clinical skill/abilities.
ii. In spite of a perception of improvement, the findings were mixed.
d. EG post-KS scores compared to the EG EI scores
i. Participants overwhelmingly overestimated their knowledge.
e. EG post-KS scores compared to EG CSPE scores
i. Participants over/under estimated their abilities to perform clinical skills.
ii. Perceptions did not correlate with actual ability to safely demonstrate clinical skills/abilities.

10. Research Question #2: Results
a. Relationship of the EG post-KS survey responses to the EG EI responses.
i. It is difficult to illustrate that student's perceptions of their knowledge are strongly or directly related to their actual knowledge (mixed results).
b. Relationship of the EG post-KS survey responses to the EG CSPE responses.
i. Student perceptions are more strongly and positively related to their clinical ability during a simulation (slightly mixed results).

11. Strengths and Limitations
a. STRENGTHS
i. There are no published studies in nursing regarding the use of knowledge surveys (existing surveys are in science courses).
ii. The fields where knowledge surveys have been used do not have any behavioral components.
iii. There is the potential to expand KS into an entire semester of a nursing course.
iv. Incorporation of the QSEN competencies illustrates how profession-specific competencies can be incorporated into a knowledge survey.
b. LIMITATIONS
i. Pilot study limits reliability/validity of survey items.
ii. Small participant number
iii. Timing of research study
iv. The use of on-line surveys
v. Lack of debriefing items
vi. Non-parametric statistics
vii. Lack of diversity of participants

12. Directions for Future Research
a. Plan ahead when creating KS in order to evaluate validity/reliability of items through the use of multiple reviewers.
b. Expose students to KS prior to conducting a research study.
c. Discuss KS with students prior to recruitment
d. Provide time for completion of KS during class.
e. Consider offering extra credit or a small incentive for participation in KS.
f. Collect information from KS administered over several semesters.
g. Differentiate skill level of participants.

13. Directions for Practice (local and global)
a. Explain to students the goal of KS and how the use of such surveys can improve metacognition.
b. Be mindful of the Dunning-Kruger effect, and;
i. closely monitor student activities in the clinical setting;
ii. provide timely and accurate feedback to improve metacognition;
iii. recognize students may not accurately self and/or peer evaluations for simulations; and,
iv. encourage the practice of reflective judgement.

14. Closing Remarks and Questions

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Author Summary: Dr. Goering has been in academic positions for 20 years. She became interested in conducting nursing education research during her MS and PhD programs. During her master's program, Dr. Goering completed a research study that evaluated an educational intervention for LPN students. In her doctoral program, Dr. Goering became interested in conducting research related to simulation. Dr. Goering will discuss her initial research using pre- and post-knowledge surveys with pre-licensure nursing students.