Title:
Clinical Nurse Leadership: An Original Research Study on Blood Sampling Methods in Hospitalized Pediatric Patients

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Session Title:
Leadership Poster Session 2

Slot (superslotted):
LDP PST 2: Monday, 19 September 2016: 7:00 AM-8:00 AM

Slot (superslotted):
LDP PST 2: Monday, 19 September 2016: 9:45 AM-10:15 AM

Slot (superslotted):
LDP PST 2: Monday, 19 September 2016: 12:00 PM-1:30 PM

Slot (superslotted):
LDP PST 2: Monday, 19 September 2016: 3:15 PM-3:45 PM

Purpose:
The purposes of this presentation are to (a) overview a nurse-led research study that compared quality outcomes from two methods of blood sampling, specifically drawing blood per venipuncture and from peripheral intravenous infusions in hospitalized pediatric patients, and (b) provide a model for direct care nurse leadership in clinical inquiry.

Keywords:
direct care nurse leadership, pediatric blood sampling and research

References:

Abstract Summary:
This session illuminates a controversial, high-stakes clinical issue: Can blood samples be accurately drawn from peripheral intravenous infusions to avoid venipuncture in hospitalized pediatric patients? The presentation overviews the step-by-step conduction of an original research study. A model is offered for engaging direct care nurses in research and clinical inquiry.
**LEARNING OBJECTIVES**

Learning Objective #1. The learner will be able to explain the methods and results of an original research study designed to compare quality outcomes from two methods of blood sampling in hospitalized pediatric patient.

**EXPANDED CONTENT OUTLINE**

Content Outline for Learning Objective #1: I. Background of the research study a. Venipuncture and pediatric patients/families b. Infusion Nurses’ Society Guidelines on blood sampling through infusing IVs c. Debate on using IVs as a site for blood sampling II. Steps of the research process followed in this study a. Formulation of the problem i. Review of evidence on the problem ii. Gap in knowledge that this study will fill b. Purpose statement i. Research questions/hypothesis 1. Are there differences in lab test outcomes between the two methods that would suggest contamination of the blood sample by IV fluid? 2. Are there differences in lab test outcomes between the two methods that would suggest increased hemolysis in either sampling method? 3. Are there differences in patient/family satisfaction between the two blood draw methods? 4. Are there differences in patient/family distress between the two blood draw methods? 5. Which blood sampling method do patients/families prefer? c. Methods i. Design ii. Sampling plan 1. Target population 2. Inclusion and exclusion criteria 3. Recruitment plan 4. Protection of human subjects plan iii. Instrumentation iv. Protocol for data collection v. Data analysis 1. Examination of level of data and selected statistics d. Results i. Descriptive analysis of demographic variables ii. Descriptive analysis of mean scores of key study variables iii. Findings that address research question 1. Are there differences in lab test outcomes between the two methods that would suggest contamination of the blood sample by IV fluid? a. There were no statistically significant differences in potassium or glucose between the two methods. b. There were no clinically significant differences in hemoglobin between the two methods 2. Are there differences in lab test outcomes between the two methods that would suggest increased hemolysis in either
<table>
<thead>
<tr>
<th>Sampling method?</th>
<th>a. There was no hemolysis of blood samples beyond the usual expected rate per national standards.</th>
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<tbody>
<tr>
<td>Differences in patient/family satisfaction between the two blood draw methods?</td>
<td>a. At a statistically significant level, patients and families reported higher satisfaction with the IV blood sampling method.</td>
</tr>
<tr>
<td>Differences in patient/family distress between the two blood draw methods?</td>
<td>a. At a statistically significant level, patients and families reported higher satisfaction with the IV blood sampling method.</td>
</tr>
<tr>
<td>Which blood sampling method do patients/families prefer?</td>
<td>a. 99% of patients/families preferred the IV blood sampling method.</td>
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e. Discussion of results
i. By research question
ii. Compared to existing literature
iii. Limitations of the study
f. Conclusions
g. Implications for practice
h. Recommendations for future research

III. Reflections on the research process in this study

Learning Outcome #2. The learner will be able to describe the value a direct care nurse brings to a research leadership team and a model for engaging direct care nurses in original research.

Content Outline for Learning Objective #2: I. Model for the engagement of direct care nurses in clinical inquiry in a shared governance system.

a. Concepts: shared governance, clinical inquiry, and direct care nurse
b. Structure and processes for empowering direct care nurses in shared governance
c. Strategies for engaging direct care nurses in leading clinical inquiries
d. Mentoring direct care nurses in original research studies
e. Certification of direct care nurses in protection of rights of human subjects in research

II. Value of direct care nurses in clinical inquiry.

a. Generation of clinical inquiries
b. Expert perspectives on research protocols
c. Enrollment of participants
d. Data collection specialists
e. Co-investigators on original nurse-led research studies

III. Benefits of direct care nurse clinical leadership in research studies.

a. Benefits for the direct care nurse
b. Benefits for the system
c. Benefits for the discipline of nursing
d. Benefits for patients/families
Abstract Text:

Introduction: An exemplar of direct care nurse leadership in a clinical inquiry process began when a pediatric nurse raised a question. The question was, “Since venipunctures are painful for children, could blood samples be drawn from pre-existing peripheral intravenous (IV) infusions?” The case that prompted the clinical inquiry was one of a young inpatient who had a peripheral IV but experienced over 30 venipunctures for blood sampling during a short hospitalization. The clinical inquiry was submitted to the shared governance system of one Midwestern teaching hospital, and it was assigned to the Nursing Research Council. An evidence review revealed that the majority of pediatric patients have multiple venipunctures during hospitalization and that patients and families report pain, emotional distress and dissatisfaction with venipunctures. A small number of research studies offered mixed results regarding the accuracy of blood drawn from infusing peripheral IVs. Professional guidelines did not support drawing blood from infusing peripheral IVs. Following the Iowa Model for Evidence-based Practice, the hospital’s Nursing Research Council recommended an original nurse-led research study to explore further this clinical inquiry.

A clinical inquiry team was formed and included the pediatric direct care nurse, an infusion nurse specialist, medical laboratory scientist, nurse researcher, academic faculty partner, and pediatric nurse educator. Doctorally prepared team members provided mentoring of the direct care nurse in research processes. The research study proposal and protocol were designed collaboratively by the team and approved by the hospital’s Institutional Review Board, with the direct care nurse leader as co-investigator. The purposes of the study were to (a) compare quality outcomes from two methods of blood sampling, specifically drawing blood per venipuncture and per pre-existing peripheral infusing intravenous (IV) access, and (b) provide a model of direct care nurse leadership in an original research study.

Methods: The design of the study was correlational. The sample consisted of patients on one pediatric unit in one Midwestern teaching hospital who were between 6 months and 17 years of age. Parental consent and participant assent for children 7 years of age and older were required. Per study protocol, two blood samples were drawn, one blood sample per venipuncture and one blood sample from an existing infusing IV. The two blood samples were compared for accuracy through tests of hemoglobin, glucose and potassium. The protocol prescribed the sequence and timing for pausing and flushing the existing IV. In addition, patients or family members scored patient satisfaction and patient distress for both methods on 1-10-point visual analog scales and stated their preference of methods. Rates of hemolysis and IV occlusion were recorded. The pediatric direct care nurse enrolled 95 patients with complete data sets. The response rate was approximately 66%.

Results: The convenience sample (n = 95) was 52% female and averaged eight years of age. Potassium and glucose levels were not statistically significantly different between the two blood draw methods. Hemoglobin levels were significantly different (p < .001). A case-by-case review of the hemoglobin values was conducted by a team that included an experienced pathologist, statistician, and medical laboratory scientist. The statistically significant variance in hemoglobin levels was within the acceptable margin of error set by the College of American Pathologists and was not deemed clinically significant. Patient satisfaction was higher and patient distress was lower with the IV method (p < .001, p < .001, respectively). Samples drawn per IVs were more likely to hemolyze than were the samples from venipuncture, per laboratory reports (p < .002). However, the frequency of hemolyzed samples was not beyond the usual expected rate per national standards. Younger participants reported higher distress with the venipuncture method than older participants (p < .05). No IVs occluded. Participants (99%) overwhelmingly preferred the IV method of blood sampling.

Conclusions: The results indicate that blood samples can be drawn accurately and safely from existing infusing peripheral IVs in hospitalized pediatric patients, as compared to blood samples drawn by venipuncture. Hemoglobin, potassium and glucose levels across the two sampling methods were similar. There was no clinically significant evidence of hemolysis or IV occlusions when blood samples were drawn from IVs. Participants strongly preferred the IV method.
Implications: Pediatric nurses can pilot procedures to draw blood samples from existing infusing peripheral IVs in hospitalized children, giving careful attention to the pausing and flushing of the IV and the monitoring of quality outcomes. Recommendations are that this study be modified and conducted as a randomized control trial, with each participant assigned randomly to a blood sampling group, rather than all participants experiencing both methods of blood sampling. This study provides a model for direct care nurse leadership in clinical inquiry within the structure and processes of a shared governance system.