Assessment of nursing performance for patients with peripheral vascular lines

Thesis

Submitted for Partial fulfillment of the
Master Degree in
Medical-surgical Nursing

By

Heba Abd El-Azeem Mostafa

B.Sc. Nursing
Instructor in Technical Health Institute of Nursing
Dar Al-shifa Hospital, Ministry of Health

Faculty of Nursing
Ain Shams University
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SUPERVISORS

Dr. Hanan Said Ali

Assistant Professor of Medical-Surgical Nursing
Faculty of Nursing, Ain Shams University

Dr. Ola Abd Elaty Ahmed

Assistant Professor of Medical-Surgical Nursing
Faculty of Nursing, Ain Shams University

Dr. Hanan Sobeh Sobeh

Lecturer of Medical-Surgical Nursing
Faculty of Nursing, Ain Shams University

Faculty of Nursing
Ain Shams University
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INTRODUCTION

Peripheral vascular line insertion is a challenging clinical skill to be performed by either professional nurses or doctors. The keys to successful peripheral vascular line insertion are the assessment of patient's needs, and the selection of an appropriate site and device. This knowledge will assist the professional nurse or doctor to make some important decisions as to where to site the peripheral vascular line, what type of access is best used, and how to care for the patient with peripheral vascular line. Knowing what the nurse might need to ask about and some of the signs of complications will help alleviate any concerns patients may have, and would help them to concentrate on more important things like getting well ***(MacFarlane and Green-Thompson, 2006; Moureau, 2006)***.

Research design

A descriptive exploratory design was used in carrying out this study.

Setting

The study was conducted in the cardio-thoracic Intensive Care Units (ICUs) at Ain Shams University Hospital.

Subjects

Study subjects involved two groups, namely nurses and patients.

- ***Nurses group***: All available nurses working in cardio-thoracic Intensive Care Units at Ain Shams University Hospital and caring for patients with peripheral vascular lines (arterial and venous lines) at the time of study were eligible for inclusion in the study sample. Their number was 30 nurses.

- ***Patients group***: All available adult patients with peripheral vascular lines at the cardio-thoracic Intensive Care Units in the study settings were eligible for inclusion in the study sample. A consecutive sample was recruited for a period of six months. Their number was 100 patients.

  Exclusion Criteria:

Very complicated patients (vascular abnormalities, coagulation abnormality, chronic liver and renal failure, and diabetes mellitus)

Data collection tools

- ***Interview questionnaire***: This tool was designed by the researcher with supervisors' guidance. It included two parts (appendix I):
    - *Part 1*. Socio-demographic and job data of the nurse: age, gender, nursing qualification, experience years, previous training, and nurse/patient ratio in the unit.
    - *Part 2*. This part was intended for assessment of nurse's knowledge related to vascular lines. It covered the following areas:
- ***Observation checklist for nurses***: This checklist was intended for assessment of nurses' practice related to peripheral vascular line (appendix II).
- ***Insertion site observational checklist***: This tool was designed by the researcher, with supervisors' guidance, for assessment of patients with peripheral vascular

(appendix III). It was based on ***Jackson (1998)*** for grading infection at the cannula site, and ***Smeltzer and Bare (2000)*** for phlebitis assessment scale.

OPERATIONAL DESIGN

This design includes the preparatory phase, the pilot study, and the fieldwork.

Preparatory phase

Preparation of the protocol and tools for data collection was done during this phase. After extensive literature review ***(Hogan and Madayag, 2004)***, the study protocol was designed. It was reviewed by a panel of medical-surgical nursing experts. Then, the tools for data collection were constructed and reviewed by a panel of 10 experts.

Pilot study

Before performing the actual study, a pilot study was carried out on five patients having peripheral vascular lines, and five nurses working in the cardio-thoracic intensive care units at Ain Shams University Hospital. The pilot study was done to assess the clarity and applicability of the tools, estimate the time needed for data collection, and test the feasibility of conducting the research.

Fieldwork

The actual fieldwork started at the beginning of March 2007 and was completed by the end of August 2007. The researcher spent seven hours daily from 8:00 am to 3:00 pm every week until filling out the three study tools. The researcher visited the selected settings regularly, 3 days/week.

ADMINISTRATIVE DESIGN

The necessary official approvals to carry out the study were obtained from the directors of the cardio-thoracic intensive care units at Ain Shams University Hospital. Permission was also secured from the head nurses of the units.

The study results were as follows:

- Nurses:
    - Most nurses had secondary school (30.0%) or specialty diploma (36.7%), with experience between one and 19 years, and 93.3% attended training courses.
    - The highest percentage of nurses' satisfactory knowledge was about the insertion of arterial line

(93.3%), and the lowest was related to taking blood sample for blood gases (26.7%); in total, 83.3% had satisfactory knowledge.

- As regards performance, all nurses (100.0%) had adequate practice in preparing equipment of arterial line insertion by doctor, invasive blood pressure measurement, and obtaining sample from arterial line. Meanwhile, only 26.7% of them had adequate practice in removal of arterial line, and 46.7% had adequate practice of nursing role in arterial line insertion by doctor. In total, 70.0% had adequate total practice.

- The relation between nurses' knowledge and performance related to insertion of arterial line and IV cannulation could not reach statistical significance.

- Positive statistically significant correlations were revealed between nursing qualification and knowledge ($r=0.68$, $p<0.001$), and practice ($r=0.46$, $p=0.003$) scores.

- Patients:

  - Patients' mean age was 40.2 years, with slightly more males (52.0%).

- As regards body mass index (BMI), 44.0% were obese, and 25.0% were overweight.

- The most frequently observed complications of arterial line were thrombosis (46.0%), and arterial spasm (38.0%). Overall, 51.0% of the patients had at least one complication.

- The most common local and systemic complications of IV line were extravasation (60.0%), thrombosis (38.0%), and venous spasm (27.0%). In total, 61.0% of the patients had complications.

- Arterial line complications were statistically significantly more among females ($p=0.003$), with femoral insertion ($p=0.003$), cannula size 20 ($p=0.048$), non-sterile set ($p<0.001$), presence of blood in set ($p<0.001$), presence of air bubbles in set ($p=0.049$), kinked set ($p<0.001$), and loose connection ($p=0.005$).

- As for IV line complications, they were statistically significantly higher with insertion site near joints ($p<0.001$), unclean ($p=0.04$), with a non-sterile set ($p=0.02$), presence of blood in set ($p=0.03$), and with the use of hypertonic solution ($p=0.02$).