Nurses' Performance Regarding Infusion Pumps' Medication Administration among Critically Ill Patients

Thesis

Submitted for Partial Fulfillment of the Requirement of
Master Degree in "Critical Care Nursing"

By

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Shaymaa Salah El-sayed Hassan

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Abstract

An infusion pump is a medical device that delivers fluids, such as nutrients and medications, into a patient's body in controlled amounts. Nurses have an important role in ensuring safety in the infusion pumps' medication administration process. This study ***aimed*** to assess the nurses' performance regarding the infusion pumps' medication administration among critically ill patients. The study ***design*** was a descriptive exploratory deign. It was ***conducted*** at the cardiac intensive care units at The Center of Cardiac and Digestive System at Sohag. The ***study subjects*** included a convenience sample of 30 nurses. Two ***tools*** were used for data collection, tool I: A designed infusion pumps' questionnaire; it included two parts; part 1 is concerned with the assessment of the demographic characteristics of nurses, part 2, nurses' knowledge questionnaire regarding intravenous medication administration using infusion pumps, and tool II: An infusion pumps' medication administration observational checklist. The main study ***result***s showed that 70% of the studied nurses had an unsatisfactory level of total knowledge regarding infusion pumps' medication administration among critically ill patients, 63.3% of them had unsatisfactory level of total practice regarding infusion pumps' medication administration among critically ill patients and there was a statistical significant correlation between the total nurses' knowledge and their total practice level regarding infusion pumps' medication administration among critically ill patients. It was ***concluded*** that the studied nurses' knowledge and practice were inadequate and there was statistical significant correlation between the total nurses' knowledge and their total practice. It was **recommended** that health care settings should provide in-service educational programs and upgrading courses based on evidence based guidelines to improve the nurses' knowledge and practice regarding the administration of intravenous medications using infusion pumps.

Keywords: Nurses' performance, Infusion pump, critically ill patients

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List of Abbreviations

Abb.	Full Term
AAMI	Association for the Advancement of Medical Instrumentation
CSII	Continuous Subcutaneous Insulin Infusion
CVC	Central Venous Catheter
DERSs	Dose Error Reduction Systems
ECRI	Emergency Care Research Institute
EN	Enteral Nutrition
FDA	Food and Drug Administration
ISMP	Institute for Safe Medication Practices
IV	Intravenous
MAR	Medical Administration Record
MDRs	Medical Device Reports
MHRA	Medicines and Health Care Products Regulatory Agency
NPSA	National Patient Safety Agency
PCA	Patient-Controlled Analgesia
PPE	Personal Protective Equipment
RNs	Registered Nurse
SPSS	Statistical Package for the Social Sciences
VADs	Vascular access devices
VIPs	Volumetric Infusion Pump

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Introduction

Acutely ill patients with life-threatening conditions require constant care, monitoring, and a number of life-sustaining med ications. Tight control of medication dosage and the need for immediate therapeutic effects make the controlled administration of medication directly into the patient's bloodstream an invaluable tool for patient care. The administration of medication and fluids into patient's veins is referred to as intravenous (IV) administration, and about 90% of hospitalized patients receive medications by this way. Infusion pumps are devices that accurately control the amount of medication patients receive and the rate at which the medication is administered **(Fan et al., 2014).**

An infusion pump electronically regulates the flow of intravenous solutions and drugs. They are used when a precise flow rate is required for instance, when administering total parentral nutrition, solutions and chemotherapeutic or cardiovascular agents. Infusion pumps are in widespread use in clinical settings. They are operated by a trained user who programs the rate and duration of fluid delivery through a built-in software interface. The application of infusion pump is helpful for lightening

nurses' work strength and improving the accuracy and efficiency **(Abramovitz, 2015 and Xuemei et al., 2017).**

There are many types of infusion pumps, including large volume, patient-controlled analgesia (PCA), elastomeric, syringe pumps, enteral, and insulin pumps. Some are designed mainly for stationary use at a patient's bedside. Others, called ambulatory infusion pumps, are designed to be portable or wearable **(Food and Drug Administration, 2016).**

Syringe pumps are the oldest established type of powered infusion devices. They are highly accurate and low volume devices which are particularly suitable for infusing at low flow rates. Most of them are designed to be programmed at an infusion rate set in ml per hour, with a type range of 0.1 to 99.9 ml/hr, and programming capabilities can include intermittent, fixed-volume, constant-rate infusions and continuous infusions. They are commonly used in settings where patients may need highly concentrated medication doses because of fluid restriction or fluid intolerance **(Wladis, 2012 & Food and Drug Administration, 2016).**

Infusion pumps offer increased control and accuracy of fluid flow and the ability to detect or prevent other