Effect of Educational Program regarding Drug Calculation and Administration on Nurse's Knowledge, Skills and Commitment

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Abstract

Nursing responsibilities in medication management include prescription, calculation, constitution, checking, administration, patient assessment, documentation and patient medication education. **Aim:** The study aimed to evaluate the effect educational program regarding drug calculation and administration on nurse's knowledge, skills and commitment. **Setting:** The study was carried out at general surgical and medical departments in Benha University Hospital. **Research design:** A Quasi experimental design was used. **Sample:** convenience sample composed of 103 head nurses and staff nurses working at general surgical and medical units. **Tools:** Two tools were used for data collection; Drug calculation questionnaire which includes demographic characteristics of study subjects, drug calculation and observational checklist for nurses' commitment. **Result:** Most of subjects (91.3%) had nursing diploma. Less than three quarters (70.9%) had 1-10 years of experience. Post program; Most of nurses (91.3%) applied formula methods in drug calculation. Regarding nurses' commitment toward drug calculation and administration, there was an improvement in nurses' post program mean scores commitment (78.33+2.21). Positive correlation coefficient was detected among nurses' knowledge, skills, and commitment toward drug calculation and administration. **Conclusion:** The study concluded that there were statistically significant differences between pre and post program and there were improvements in nurses' knowledge, skills and commitment toward drug calculation and administration. **Recommendations:** The study recommended that nurses should continue to practice and refresh the different formula types of drug calculations as often as possible with regular self-test of their ability. Further researches should be conducted to detect the relation between drug calculation skills and medication errors.
Keywords: Drug calculation, administration, nursing skills, Knowledge, commitment, medication errors.

Introduction

Medications administration forms a major part of the registered nurses' role. Medications are prescribed by a prescriber and dispensed by the pharmacist but responsibility for correct administration rests with the registered nurse. Each registered nurse is accountable for his/her practice. It is important that the patient receives the correct medication at each medication administration; however, medication errors occur and are a persistent problem associated with nursing practice. The Trust will ensure that this risk is minimizing (Geake & Williams, 2012).

The role of the nurse in medication management has developed exponentially over time. Nursing responsibilities in medication management include prescription, calculation, constitution, checking, administration, patient assessment, documentation and patient medication education. However, the fundamentals of the nurse’s role in medication management remain unchanged and nurses are expected to deliver and execute the highest standards of care and safety when it comes to medication management. As a healthcare professional, medication safety is a critical part of nurse's job. Patients’ safety and lives depend on receiving the correct dose of medications. To maintain patient safety, it is imperative that nurses’ pre-registration and post registration skills and knowledge are developed so that they are able to competently perform drug calculations and administer medication (Leufer & Holdforth, 2011).
Studies that examined the types of medication errors divided them in categories, according to the description of the event: omission error, wrong drug error, wrong patient error, wrong route error, wrong time error, wrong technique error, wrong dosage-form error and extra dose error (Efstratios, 2012). Medication administration errors rank third in the list of causes leading to loss of function or patient death. Most medication errors occur at the point of administration. Medication incidents accounted for 11% of all patient incidents reported to the National Reporting and Learning System (2012), in England and Wales, between June 2010 and June 2011. Although 90% of the 141,387 incidents were reported as causing no harm to the patient, 253 caused severe harm and 50 caused the patient’s death. Medication errors are most frequently due to the wrong dose, omitted or delayed medication or the wrong medication being administered. The most frequently cited wrong-dose error stems from calculation error (National Patient Safety Agency, 2012).

Drug calculations are an essential skill for nurses. Nurses need to be able to perform them accurately to calculate correct dosages of drugs to administer to patients. Incorrect calculations can cause drug errors and potential harm to patients. The ability to calculate drug dosages correctly is an essential skill for registered nurses to possess. Administering medications is probably the highest-risk task a nurse can perform and accidents can lead to devastating consequences for the patient and the nurse’s career (Simpson, Keijzers & Lind, 2009).

Majority of drugs are prescribed based on the medicinal substance weight and their calculation is done according to patient’s weight. In addition, a large number of drugs are in injection form and the density of drug in solvent is specified in milligrams or micrograms in milliter.
Therefore, the amount of drug that patient needs, can be easily, accurately and quickly determined and calculated. The importance of the accuracy in calculation of these drugs and similar drugs is so high. The different impact of drugs in different doses and their potential dangers and irretrievable side effects have led to taking some measures for reduction of computational errors, due to the necessity of preparation of nurses as the first care and treatment forces who are faced with critical situations and the importance of accurate and correct application of drugs in shortest time (Nasiri, Babatabar & Mortazavi, 2009).

Commitment is defined as acting according to certain accepted standards, focused on improving quality of care at skilled nursing and long-term care facilities. Professional commitment may be defined as an employee’s affective attachment to his/her profession with respect to the person’s belief in, and acceptance of the values of one’s occupation or in line with work, and a willingness to maintain membership in that profession (Armitage & Knapman, 2003).

Professional commitment describes the loyalty of nurses to the nursing profession. High commitment professionals may be more responsive in making efforts to advance professional values. Moreover, professional commitment relates to involvement, dedication, love, and belief in the positive values of nursing, which may create a large gap between practice and expectations, strengthening the negative impacts of burnout (Keohane, Bane & Featherstone, 2008).

Nurses, as self-regulated professionals, implicitly promise to provide safe, effective and ethical care. Because of their commitment to clients, nurses try to act in the best interest of clients according to clients’ wishes and the standards of practice. Nurses are obliged to refrain from
abandoning, abusing or neglecting clients, and to provide empathic and knowledgeable care. The commitment to clients also includes a commitment to respect family members and/or significant other(s), some of whose needs may conflict with those of clients (College of Nurses of Ontario, 2009).

Significance of the study
The National Coordinating Council for Medication Errors Reporting and Preventing (NCC. MERP) found that 7% of reported medication errors were related to calculation skills of practicing nurses. It also showed that the majority of nurses were unable to calculate medication at 90% of level of proficiency. Improving the drug calculation skills of nurses can reduce the number of drug errors. So, this study was conducted to improve the nurse's knowledge, skills and commitment toward drug calculation and administration.

Aim of the study
To evaluate the effect of educational program regarding drug calculation and administration on nurse's knowledge, skills and commitment.

This aim was fulfilled through:

1- Assessing nurse's knowledge, skills and commitment regarding drug calculation and administration.

2- Designing and implementing an educational program about drug calculation and administration.

3- Evaluating the effect of the educational program on nurses' knowledge, skills and their commitment regarding drug calculation and administration.
Research hypotheses

1. The post-program nurses' knowledge, skills and commitment scores toward drug calculation and administration will be higher than the pre-program for those who will be exposed to the designed educational program as compared to those who won't.

2. There will be a positive correlation between nurse's knowledge and their commitment scores.

Material and Methods

Design:
Aquasi experimental research design was used to carry out this study.

Setting:
The study was conducted in Benha University Hospital in the following departments; a general surgical department, which contains three units (one for male and two units for female) and a medical department which includes six units (1, 2,3,4,5 & unit 6).