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RESEARCH ARTICLE

CRITICAL CARE COMPETENCIES OF NURSES TOWARD A STRUCTURED TRAINING FRAME WORK, AT PRINCE SULTAN MILITARY MEDICAL CITY, SAUDI ARABIA (2013-2016)

¹Eltoma Musa Mohamed Saleh Ph.D., ²Marwa Adam Abdelrahman Adam Ph.D., ³Prof Mohi Eldin Magzoub and ⁴Prof. Magda alhadi Ahmed Yousif

¹Nursing Clinical Director, Psychiatry Department, Prince Sultan Military City, Doctor of Philosophy, University of Gezira, Faculty of Applied Medical Science, Khartoum Sudan

²Registered Nurse, Psychiatry Department, Prince Sultan Military City, Doctor of Philosophy, University of Gezira, Faculty of Applied Medical Science, Khartoum Sudan

³Doctorate Degree PHD in medicine and surgery, Maastricht University

⁴Professor of Community Medicine, Director of Primary Health Care Center, Faculty of Medicine, University of Gezira, Sudan

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*Corresponding author:

Eltoma Musa Mohamed Saleh Ph.D.,

ABSTRACT

Clinical competency of the critical care nurses should be reinforced to ensure provision of safe, effective and quality nursing care among the patients. A need to structure a training framework to reinforce these competencies was the focus of this study. A descriptive quasi experimental research design was utilized to assess the level of competence of the nurses both in the control and study group. The sample size was 100 out of the 216 population finalized after consideration of the inclusion criteria. Data were collected using self-assessment tool. BKAT and Unit Specific Competency Assessment Tool. The results revealed significant relationships between self-assessment and demographic profile specifically age (.005 and .049) in the pretest and posttest and educational attainment (.013) of control group. The results also revealed relationships on BKAT and years of experience (.015 and .038) pretest and posttest. Significant relationships were also established between unit specific competencies and demographic profile specifically on; Age and mechanical ventilator (.043) and age and Pulmonary Catheter (.036) from the control group and age and mechanical ventilator (.043) in the study group. Significant difference also existed between the level of competency of both groups on BKAT and Unit Specific competencies both at .001. All the results were compared and interpreted at 0.05 level of significance. The study concluded to reject the null hypothesis. Recommendation include adoption of the training framework formulated to reinforce clinical competencies of nurses

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INTRODUCTION

Few would dispute that patient' families, nurses, colleagues, professional organizations and accreditation agencies expect practicing nurses to be competent, however, the definition of competency or competence and the ability to assess competency remains the topic of much discussion. Hospital competency programs are strongly influenced by The Joint Commission's standards and requirements. The Joint Commission defines competency assessment as "a determination of an individual's skills, knowledge, and

capability to meet defined expectations" and mandates that competency assessment occur at the time of hire, during orientation, and on an ongoing basis. The assessment and demonstration of competency have become even more important in an era of heightened safety awareness (Goran, 2011). Clinical competence is a must not only in nursing but in almost other profession that require skills and knowledge. In history, clinical competence arose in the United States as intelligence testing where a higher level of intellect was not deemed important to a job (McClelland 1973). This testing was for specific skills for an occupation that required them. In nursing, the idea of competence is deeply rooted in the practice

as seen in the changing paradigm of the nursing curricula. The shift from a disease-oriented curriculum to community based, and now to competency-based curriculum was a manifest to this. The Joint Commission for Accreditation of Health Care Organizations (JCAHO, 1999) requires that clinical competence be assessed for all nurses. It likewise stated that institutional leaders and management are accountable for making sure that the staffs' competency are assessed, maintained, demonstrated and continually improved. Training novice nurses or nurses with lesser qualifications and competence in the critical care pose an equally challenging responsibility to clinical resource nurses and educators. No one can argue the fact that nurses contribute to improved patient outcomes, reduce complications and errors, thus reducing mortality and morbidity as well as costs, (West et al 2009, cited by Lakanmaa 2012).

On the other hand, recruitment and retention of qualified critical care staff nurses are a constant challenge to health agencies, not only in the Middle East countries and United States but in other countries as well (Nuss and Franco, 2001, cited by Wael,203). Saudi Arabia has a large population of expatriates working in almost all sectors. There is a rapid turnover of foreign nurses, as nurses seek the best work environment commensurate to the quality of service they give. Similarly the aging registered nursing workforce who are baby boomers are retiring, causing significant shortfall of qualified ICU nurses, (Patrician et al 2010, cited by McHugh 2010). This in turn causes unfavorable nursing practice environment with job dissatisfaction, emotional exhaustion, and intent to leave and with fair to poor quality care. The researcher is driven by the belief that along with reinforcing the competencies of the nursing staff is a need to structure a training program that will be beneficial to the development of the nursing workforce which led in the pursuance of this study.

Problem Statement

The study aimed to structure a training framework through assessment of the level of competencies of the critical care nurses. The study aimed to answer the following research questions:

What is the demographic profile of the critical care nurses when grouped according to?

- age;
- gender;
- years of experience;
- educational attainment?

What is the level of competence of the critical care nurses on both groups in the following:

- Self-assessment;
- BKAT;
- Unit Specific Competencies?

Is there a significant relationship between the level of competence of the critical care nurse on unit specific competencies and their demographic profile when grouped accordingly?

Is there a significant difference between the levels of competence of the

critical care nurses on competencies when grouped accordingly?

Based on the findings, what structured training framework can be proposed?

Hypothesis

- There was no significant relationship between the level of competence of the critical care nurses on competencies and their demographic profile when grouped accordingly.
- 2. There was no significant difference between the level of competence of the critical care nurses on competencies when grouped accordingly.

Justification and Rationale: The researcher is driven by the belief that along with reinforcing the competencies of the nursing staff is a need to structure a training program that will be beneficial to the development of the nursing workforce which led in the pursuance of this study. Moreover, working in the Nursing Education and Staff Development of a reputable institution is the leverage to pursue this study. It is the innate in the experience of the researcher to focus on clinical competencies of the critical care nurses and propose a training framework as an output of this study.

General Objective: To determine a structured training framework that can be proposed to enhance the competence (knowledge, self-assessment, and skills) of Critical Care Nurses at Prince Sultan Military Medical City (PSMMC).

Specific Objectives

Describe the demographic profile of the critical care nurses when group according to:

- age;
- gender;
- years of experience;
- educational attainment.

Determine the level of competence of the critical care nurses on both groups in the following:

- Self-assessment;
- BKAT;
- Unit Specific Competencies.
- Determine if there is significant relationship between the level of competence of the critical care nurses and their demographic profile when grouped accordingly.
- Determine if there is a there a significant difference between the level of competence of the critical care nurses when grouped accordingly.
- Propose a Structured Training Framework based on the findings.

Significance of the Study: The results of this study will help in the development of Critical Care Nursing Training Framework. The development of a working framework for skills acquisition will become the basis for orientation programs and staff development training towards a safe, quality and effective delivery of care. The study is deemed beneficial on the following areas:

Hospital: At PSMCC, a new critical care nurse, undergoes a General Orientation Program (GNO) that covers a wide array of expectations and entry competencies. They must be able to attend study days and pass generic competencies and preceptors' evaluation within the first ninety (90) days period. However, unit specific competencies are scheduled much later, giving them time to adjust to the new environment. In three months' time, considering evaluation outcome of their GNO program, they are expected to attend in-service trainings on nine identified Critical Care specific competencies. However, unit specific competencies have been developed recently and are due for implementation to Critical Care Nurses. Unit-specific competencies allow the Critical Care Nurses to practice skills, knowledge and clinical decision making in high acuity settings. The study is beneficial to hospital as it will set forth a structured framework that can be utilized in the critical care areas. A structured training framework can provide reference point for training and development programs that will aid critical care nurses' competencies which may yield in quality of care delivery.

Nursing Administration-Critical Care Units: Critical care nurses play a very important role in (1) facilitating quality and safety of patients by setting clear expectations for continued (2) professional growth and professionalism. Moreover, establishing a supportive nursing administration (3) promotes the development of critical care competencies in high acuity units. Critical care unit managers should be able to discern differences in quality of care of the caregivers in assuring quality and safe care. Identifying these challenges and needs of the nurses and arranging appropriate educational and training programs help unit managers in ensuring, maintaining quality care in the critical care units.

Critical Care Nurses: The results of this study will help develop a comprehensive and intense educational program to meet the needs of professional nurses which will impact patient outcomes. Nurse characteristics are derived from the different needs of each patient and professional practice, thus practice guidelines are based on relevant theories, updated research and evidences about health care outcomes for the patient. As nurses, it is mandatory to strive to deliver the highest quality of care especially to severely ill patients. Nurses should not only be compassionate and committed but should have adequate knowledge base and competent skills in fulfilling their legal and professional obligations to enhance quality of care to patients. Enhancing, updating and maintaining knowledge and skills are important tasks in competency building and those are the personal and professional responsibilities of each nurse. The Clinical Resource Nurses (CRNs) and unit managers are often tasked with regularly monitoring, evaluating and maintaining competencies of intensive care nurses. Increased competency, accountability and professionalism have become the norm in the health care expectation. Expectation is that standards of acceptable performance of a profession that will be adhered to so that patient's trust and welfare will be safeguarded, (AHA, Patient's Bill of Rights Number 1, 1992).

Future Researchers

The study is deemed beneficial to future researches as it sets as leverage for other researches in a wider context: The 3 stage in input-process-output model defines characteristics for the development of effective structured training framework

(Figure 1). This framework uses inputs (demographic profile) maintains internal processes and generates outputs. In developing the framework, the input encompassed the attributes of the nurse, such as education level, years of experience, age and gender which were believed to influence an individual's clinical expertise and competencies. Consideration of the input is an important factor to consider in the conduct of this research. Exclusion criteria for the selection of participants were also rooted in the input component of this research study. The process of the research includes determining the level of competence of the critical care nurses on both groups (Control and study) on the following: self-assessment, BKAT and Unit Specific Competencies. The relationship between demographic profile and level of competence on Unit Specific Competencies and The difference on the level of competence (Unit Specific Competencies) of both groups were also established. The results of these processes led to the output of the study. The output of the study detailed on a structured Training framework based on the results of the processes undertaken. This output encompassed consideration not only the process of the study but also the input.

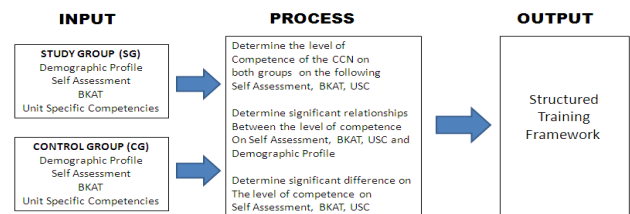


Figure 1. Input- Process-Output for the Development of Structured Training Framework

THEORETICAL FRAMEWORK

Nurses continuously adapt to the ever changing demands in the work force as they increase their competence over time through various training, education and clinical experience. In this regard the study utilized Benner's theory on stages of clinical competence as the theoretical basis of this undertaking. According to this model, as individuals begin learning a skill, they first master the rules and policies governing the situation and then acquire the skills in decision making process on how and when to apply them. As their level of skill improves, nurses rely less and less on these rules or formulas, and can handle more complex situations with facility. At the higher levels of skills development, actions are based more from intuition; there is less reliance on applying rules and accepted standards. Nurses could recognize patterns in the in patients' conditions and reflexively know what actions are appropriate and simply act on them (Benner, 1984, 2004). As elaborated on by Benner (1984, 2004), each stage in the Dreyfus model are associated with key identifiable characteristics.

Benner's Stages of Clinical Competence Benner's Stages of Clinical Competence was used to guide the staff nurses in self-assessment of the perceived level of competency in the survey questionnaire.

Benner (1984) detailed the acquisition of nursing expertise and proposed five possible expertise levels. Nurses at the novice stage (1) are still fresh graduates from a nursing school. (2) Nurses at the advanced beginner stage use learned procedures

and rules to determine what actions are required for the immediate situation. (3) Competent nurses are task-oriented and deliberately structure their work in terms of plans for goal achievement. Competent nurses can respond to many clinical situations but lack the ability to recognize situations in terms of an overall picture. (4) Proficient nurses perceive situations as a whole and have more ability to recognize and respond to changing circumstances. (5) Expert nurses recognize unexpected clinical responses and can alert others to potential problems before they occur. Experts have an intuitive grasp of whole situations and are able to accurately diagnose and respond without wasteful consideration of ineffective possibilities. Because of their superior performance, expert nurses are often consulted by other nurses and relied upon to be preceptors.

Each stage in the Dreyfus model has identifiable key characteristics which are summarized below. Characteristics of Dreyfus Model of Skills Acquisition Stages adopted by Benner 1984

Novice

- Rigid adherence to taught rules or plans
- Little situational perception
- No discretionary judgment

Advanced Beginner

- Guidelines for action based on attributes or aspects.
- Situational perception still limited
- All attributes and aspects

Competent

- Are treated separately and given equal importance
- Coping with "crowdedness"
- Now sees actions at least partly in terms of longer-term goals
- Conscious deliberate planning
- Standardized and routinized procedures

Proficient

- Sees situations holistically rather than in terms of aspects
- Sees what is most important in a situation
- Perceives deviations from the normal pattern
- Decision-making less labored
- Uses maxims for guidance, whose meaning varies

Expert

- No longer relies on rules, guidelines or maxims
- Intuitive grasp of situations based on deep tacit understanding
- Analytic approaches used only in novel situations or when problems occur
- Has a clear vision of what is possible

Based on in-depth interviews with nurses, Benner (1984; 2004) adapted the Dreyfus model of skills acquisition to define comparable stages in the development of clinical competence. With this perspective, measurement of competence was done by evaluating the ICU nurse by the use of self-assessment

tools, Using Benner's Model of Skills Acquisition that determines the perceived level of competency aided by the use of the Basic Knowledge Assessment Tool (BKAT, Toth, Version 8). The BKAT was used as basis for the pretest and post test and evaluation of clinical competency assessments by the clinical resource nurse. The Basic Knowledge Assessment Tool, a paper and pencil test was originally developed in 1984 and updated in four (4) subsequent versions. It has been used extensively in the United States and abroad to measure basic knowledge of critical care nursing.

MATERIALS AND METHODS

The research questions required selection of materials and methods. Therefore, a variety of materials and methods were used in the study.

Study Design: The study utilized a quantitative descriptive quasi-experimental research design to structure a training framework based on the results of this study. The respondents were divided into two groups, control and study group. The study group was given the educational training of 10 days lecture and laboratory training. The control (comparison) group did not receive the training. The intervention for this research study was the training program that the study group underwent. The two groups were evaluated before and after the intervention (Training program) based on their level of competency.

Study Area: The participants were selected from all high dependency units at Prince Sultan Military Medical City, formerly called the Riyadh Military Hospital. Established in 1978, under the flagship of Saudi Ministry of Defense, it is now one of the largest hospitals in the Kingdom. With over 1,800 beds and a well-trained staff of about over 7,000 personnel, the hospital has emerged as an important healthcare institution, providing state-of-the-art emergency and critical care services. The critical care units of the PSMMC include the Main GICU, Fast Tract, Respiratory ICU, Surgical ICU, Neurologic ICU, OB ICU, and Burns ICU. Nurses in these high dependency units were placed in one rotation schedule. This was used as the database/ list of nurses (secondary data) in the intensive care units to draw upon the study participants.

Study Population: There were 216 registered nurses (SN 1 and SN 2), working in different high dependency units at Prince Sultan Military Medical City at the time of data collection. Nurses comprise the majority of workers in the Critical Care Units of PSMMC. These nurses came from different countries bringing with them their varied training, education and experiences. All of these Critical Care Nurses underwent General Orientation Program and clinical adaptation courses for 90 days before being immersed in the ICU environment.

Inclusion Criteria

The study participants were chosen based on the following criteria: Graduates of Bachelor in Science in Nursing (BSN), Diploma or equivalent or higher. Has a critical care experience

Nurses are either Staff Nurse 11, Staff Nurse 1 or a Charge Nurse;

Nurses are able to articulate their experience fluently in the English language.

Exclusion criteria: The participants who were excluded from the study were based on the following criteria:

- Ten (10) Nurses on palace duty
- Thirteen (13) on annual leave
- Seven (7) Nurses on study leave
- Three (3) Staff Nurse who had been a patient in a critical care unit in Saudi Arabia
- Fifteen (15) Patient Care Assistants (even if they are BSNs)
- Sixteen (16) nurses have resigned or will be resigning
- Four (4) Participants who dropped out from the course
- Eleven (11) Staff who were not reached because of undisclosed reasons
- Thirty seven (37) Nurses who have more than 20 years ICU experience

Those nurses who had been a patient in the ICU were excluded because it was assumed that they might recount their experiences of being a patient rather than caring for a patient and this might distort their responses. Therefore biases could be avoided that could undermine the value of the research (Nieswiadomy, 2012). Out of 216 nurses assigned in Critical Care areas 116 were excluded from the study which made the participants a total number of 100 nurses. Written consent for participation in the study was obtained after a brief explanation of what were expected of them and the benefits of the study to the quality of care for the patients.

Sample Size: Out of 216 nurses assigned in Critical Care areas 116 were excluded from the study which made the participants a total number of 100 nurses. This is based on the inclusion and exclusion criteria of this study.

Sampling Techniques: The total population was 216 SN 1 and SN 2 (including PCAs) staff nurses in the PSMHC high dependency units. After the inclusion criteria have been met, 100 nurses were randomly selected by purposive sampling technique. The assignment for the respondents in each group was done through a random sampling technique. Sampling was done by getting all the names of those who were qualified in the inclusion criteria from the database and the self-administered questionnaires for ICU nurses. All the nurses in the different ICUs were listed in one Rotation Schedule. Experimental and comparison group were then selected from the same pool of potential participants in the ICU. It is important to note that the research acquired rich data, because the participants represented a range of nationalities, ages and years of critical care experience across a large critical care unit. The training sessions started on September 2015 – December 2015 with target participants of 50 ICU staff nurses who underwent the training sessions. Ten – twenty participants were assigned by the head nurse for each training session which will be offered every month. Four (4) groups of 10-15 participants were assigned in the intervention group and were trained on four separate sessions for ten (10) days training and competency check offs. They were then evaluated by the use of competency assessment tools, done after the training by the clinical resource nurses. The other 50 staff nurses who were qualified in the inclusion criteria served as the control group but will receive their training in the next year. Threats to

internal validity, such as selection, maturation, testing, and mortality were possible and were considered to analyze its impact on the results. However, the design was relatively strong because the gathering of data at the time of pretest allowed the researcher to compare the equivalence of the two groups on important antecedent variables before the independent variables were even introduced, (Lo-Biondo Wood & Haber 2010).

Data Collection Tools

Self-Assessment Tool (Survey Questionnaires)

Survey questionnaires were self-structured and developed based on the premise to encompass the demographic profile of the respondents including their self-assessment on their level of competency. Survey questionnaires were piloted to ten (10) Neuro Critical Care Nurses who were not participants of the actual study. The content and validity of the questionnaires were reviewed by three nursing experts. Recommendations of the panel were accepted and revisions were made.

BKAT

The Basic Knowledge Assessment Tool: (BKAT-8) © For Adult Critical Care Nursing (Version Eight, 2009) was used for basis of writing the items in the 30 items pretest and 30 items posttest assessment. A letter was sent for permission to use the tool to Jean C. Toth, RN, MSN, CNS, PhD, BCCC, PO Box 6295, Washington, DC 20015, or sending an email to BKAT7.toth@yahoo.com on June, 2013. The primary aim of in-service education in critical care nursing is to assure that staff nurses demonstrate an understanding of this basic knowledge. BKAT over the past 29 years, it has become accepted as one standard for measuring basic knowledge in critical care nursing. Items on the BKAT contain multiple choice and fill-in-the-blank questions that measure both the recall of basic information and the application of basic knowledge in practice situations.

Competency Assessment Tools: Competency Assessment tools for nine (9) unit-specific procedures were used to assess and evaluate the competency level of the respondents after the training sessions. These tools were developed based on the Lippincott Manual of Nursing Practice, (2010) and the Joint Commission International Standards (2014). Validity, reliability of the competency tools have been assured through consultation with three experts in a Delphi panel, and tested with Cronbach's alpha test. Content of the lectures in the training sessions were consistent with the concepts and items found on the competency assessment tools. The competency tools involve unit-specific procedures most commonly performed in the ICU. These were:

- Assisting in insertion of Arterial Lines, care and removal
- Assisting in insertion Central venous Access, care and removal
- Assisting in insertion Chest Tube Thoracotomy, care and removal
- Electrocardiography, interpretation of electrocardiogram
- External Ventricular Drain, care and removal
- Mechanical Ventilator, care and trouble shooting
- Assisting in insertion Pulmonary Artery Catheter, care and removal

- Assisting in insertion of tracheotomy tube, care and removal
- Vasoactive Drugs

The competencies of each staff for each of the competencies were evaluated in a 5 point ordinal Likert Scale, which were computed, analyzed and interpreted. The checklist used a set of criteria to be met that were related to the specific specialty and based on Skills, Knowledge and attitude (SKA) of the nurse.

The Likert Scale was developed in 1932 by Rensis Likert (Likert, 1932) to measure attitudes in a 5- point ordinal scale used by respondents to rate the degree to which they agree or disagree with a statement.

Likert-type items, were grouped into a "survey scale," and then calculated a total score or mean score for the scale items. Using the Cronbach's alpha or factor analysis technique provided evidence that the components of the scale were sufficiently intercorrelated and that the grouped items measure the underlying variable.

Likert scale was chosen to achieve objectivity, degree of accomplishment and enhance reliability.

Objective Structured Clinical Examination / OSCEs. Objective Structured Clinical Examination (OSCEs) stations were used in assessing the competencies of the respondents using the structured competency tools with the likert scale. OSCEs originated in medicine and were used in nursing in 1980's. The students rotated through several timed schedule stations where they were presented with patient scenarios or clinical skills to be evaluated by the CRNs. Performance was observed, recorded and scored using the competency assessment tools and criteria.

DATA COLLECTION

- A letter of intent to conduct the study was sent to the PSMMC Research and Ethics Committee for primary screening of the research paper and its contents. The approval was sent to the Medical Services Department and the Director of Nursing, PSMMC.
- Upon approval of the PSMMC officials, a letter was sent to the Clinical Director of the ICU, with a cover letter stating the purpose of the research study, the instrument, and the needed samples and the time frame of the study.
- Collaboration was necessary with the Clinical Director, the Head nurse and Charge Nurses of the ICU in the selection of respondent and their time schedule for training sessions. A data base of staff nurses in the ICU was needed for purposive sampling.
- An approval for the use of ICU CRNs in the research were also sought and approved from the ICU Clinical Director and the Nursing Education and Staff Development (NESD). Data collectors were four selected Clinical Resource Nurses (CRNs) in the ICU at Nursing Education and Staff Development (NESD), PSMMC. The four data collectors were appraised of the research study. The CRNs were selected because they were highly qualified ICU nurses and were currently the educators for the ICU nurses. The ICU CRNs were volunteers and were not paid and claimed to have no conflict of interests.
- After a brief explanation about the research and the survey and gaining their consent of the respondents, survey questionnaires were distributed to the respondents

and collected by the CRNs after 10 minutes at Building 57, 6th Floor, and Room 601 at 0800-0830 on specified dates.

- The participants were instructed to fill up questionnaires honestly and completely after signing the consent.
- Pretest and posttest were given for both the intervention and control group. The post test for the intervention group were given after the training sessions.
- The same data collectors conducted the training sessions for ten days for the intervention group and the competency check offs during Objective Structured Clinical Examination (OSCEs) and posttest for both groups.
- Objective Structured Clinical Examination (OSCEs) stations were used in assessing the competencies of the respondents using the structured competency tools with the likert scale. The ICU clinical resource nurses under the Nursing Education & Staff Development Department were tasked with giving the training as well as completing the competency check offs on nine selected unit- specific competencies.
- The results /data gathered were tabulated in an excel spreadsheet for encoding and analysis by the statistician.

Data Analysis

All significant tests were tested against $\alpha=.05$.

- Descriptive statistics including mean and percentages were utilized in determining the demographic profile of the respondents
- Weighted averages were utilized to determine the level of competence of the staff wherein areas with at least 3.50 are considered strengths while weighted averages less than 3.50 are weaknesses
- Analysis of Covariance (ANCOVA) and Mann Whitney U-Test was utilized to determine significant differences of the level of competence of the staff when grouped accordingly.
- Multiple regression analysis was utilized to determine significant relationships between the demographic profile and the level of competency of the respondents.
- The data were computed using SPSS (Statistical Package for Social Sciences) Software version 20.0

RESULTS AND DISCUSSION

In this chapter, data collected in the survey questionnaires and competency results were presented, interpreted and analyzed in both tabular and narrative forms. Data were reported and computed as aggregate of all responses by the respondents. The data were organized in reference to the research questions in this study. Problem Statement No. 1: Demographic Profile of the Respondents

Table 1 shows the percentage distribution of the demographic profile of the respondents. As shown in the table, the total number of respondents of the study is 100 equally divided into two groups garnering 50 respondents for each group. In the control group, majority of the participants obtaining 66% belong to the age group between 20-29 years old. As the percentages indicate, young workforce means having more innovative minds, increase efficiency, physically fit, it means less cost pressures.

Table 1. Percentage Distribution of the Demographic Profile of the Respondents

Demographic Profile	Respondents (N=100)		Total
	Study Group (N=50)	Control Group (N=50)	
Age Distribution			
<19 yrs old	0	0	0
20 - 29 yrs old	32 (64%)	33 (66%)	65 (65%)
30 - 39 yrs old	17 (34%)	14 (28%)	31 (31%)
>40 yrs old	1 (2%)	3 (6%)	4 (4%)
Gender Distribution			
Male	9 (18%)	7 (14%)	16 (16%)
Female	41 (82%)	43 (86%)	84 (84%)
Years of Experience			
<1 yr	1 (2%)	2 (4%)	3 (3%)
1 - 4 yrs	33 (66%)	33 (66%)	66 (66%)
5 - 9 yrs	10 (20%)	9 (18%)	19 (19%)
10 - 14 yrs	5 (10%)	5 (10%)	10 (10%)
>15 yrs	1 (2%)	1 (2%)	2 (2%)
Educational Attainment			
Diploma	4 (8%)	5 (10%)	9 (9%)
BSN	44 (88%)	45 (90%)	89 (89%)
MAN	2 (4%)	0	2 (2%)
Others	0	0	0%

Eighty-six (86%) percent were females, as indicated by the data, critical care as a female dominated area, more women is working than ever before. Coping with this change will be one of the great challenges of the coming decades. It may also be deduced that majority of the nurses are female since Saudi Arabia is a gender sensitive country. Majority of the respondents comprising 66% were still new in the area with less than 5 years of experience in PSMC critical care area. As the percentages indicate, a fast turnover of nurses is one of the reasons why majority of the critical care nurses have experience of less than 5 years. Retention program should also be taken into consideration. Although there was a sharp increase in the number of young people who entered nursing over the past decade, the effect on the size of the RN workforce is not expected to be felt until the latter part of the current decade, and particularly after 2020. Thus, it seems likely that growth in the demand for RNs over the next few years will outstrip the projected growth in the workforce, leading to renewed shortages of RNs in the near term (Staiger et al 2012). Turnover of qualified nurses has consequences for health organizations as well as the profession as a whole. Nurse turnover can have a negative impact on the capacity to meet patient needs and provide quality care. In addition, the loss of nurses leads to inadequate staffing, which in turn, may decrease morale and create more stress on the 'stayers' due to increased workloads (Al Malkietal 2012). Ninety (90%) percent of the sample in the control group were Bachelors' Degree Holder. A well educated workforce is the key to institution's success. PSMC has a workforce that is productive and competitive.

In the study group, majority of the participants obtaining 64% belong to the age group between 20-29 years old. As the percentages indicate, young workforce means having more innovative minds and increase efficiency. Eighty-two (82%) percent were females, as indicated by the data, critical care as a female dominated area; more women are working than ever before. Coping with this change will be one of the great challenges of the coming decades. Majority of the respondents 66% were still new in the area with less than 5 years experience in PSMC critical care area. As the percentages indicate, a fast turnover of nurses is one of the reasons why

majority of the critical care nurses have experience of less than 5 years. Retention program should also be taken into consideration. Eighty-eight (88%) percent of the sample in the control group were Bachelors' Degree Holder. A well educated workforce is the key to institution's success. PSMC has a workforce that is productive and competitive.

Table 2. Level of Competence Based on Self-Assessment

Groups	Self-Assessment		Interpretation
	Pretest	Posttest	
Study Group	2.42	3.90	Increased
Control Group	2.58	3.02	Increased

Legend: 1.00-1.80=Needs Improvement; 1.81-2.60=Poor; 2.61-3.40=Good; 3.41-4.20=Very Good; 4.21-5.00=Excellent

Table 2 shows the level of competence based on self-assessment between the study and the control group pre and posttest. Among the study group, basic competence was self-rated as poor (2.42) on the pretest self-assessment and very good (3.90) after initiation of intervention. Among the control group, basic competence was self-rated at pre assessment as poor (2.58) and post assessment as good (3.02). Based on the findings, it can be construed that critical care nurses who received intervention had significantly higher self-assessment scores than in the control group. Expertise in critical care nursing is influenced by relevant experience as well as associated factors, such as learning styles and education opportunities, all over a period of time. The holistic definition of competence in critical care is not a new finding. In earlier literature, knowledge base, skill base, attitude and value base as well as experience base have been included in nursing competence (e.g. Benner 1984, WHO 2003; Schribante et al. 1996). On the other hand, the results in the control group has also a noticeable increase in the level of competence as self-assessed which may be due to the process of competency assessment. Nevertheless, the results showed that self-assessment of competencies increased in both groups. Table 3 shows the level of competence of the respondents based on BKAT between the two groups. Results indicated an increase in the mean score of both groups but have a more noticeable increase in the study group.

Table 3. Level of Competence Based on BKAT

Groups	BKAT		Interpretation
	Pretest	Posttest	
Study Group	59	68	Increased
Control Group	52	59	Increased

Based on the findings, it can be deduced that critical care nurses who received intervention had significantly higher BKAT scores than nurses in the control group. The BKAT scores for participants in the study group prior to initiation of intervention were low. After the intervention, there was an increase in the BKAT posttest scores. Expertise in critical care nursing is influenced by relevant experience as well as associated factors, such as learning styles and education opportunities, all over a period of time. The knowledge of critical care nurses has been monitored since the advent of professional nursing (Toth, 2006). BKAT reflects the basic knowledge of the participants in critical care nursing which is a good input in the conduct of this study. Such results are relevant in determining a training framework that will increase and reinforce not only the skills acquisition of the participants but also their knowledge in critical care nursing.

Table 4. Level of Competence Based on Unit Specific Competencies Specifically in Assisting in Arterial Line Insertion, Care & Removal

Criteria	Study Group		Control Group	
	Mean	Interpretation	Mean	Interpretation
Definition	4.49	Excellent	4.34	Excellent
Indication	4.78	Excellent	3.84	Very Good
Sites	4.86	Excellent	3.68	Very Good
Contraindications	4.56	Excellent	3.58	Very Good
Complications	4.56	Excellent	3.58	Very Good
Assisting in AL insertion	4.12	Very Good	3.34	Good
Assembly of Transducer	4.06	Very Good	3.34	Good
Calibration	4.04	Very Good	3.50	Very Good
Care	4.28	Excellent	3.62	Very Good
Removal of AL	4.12	Very Good	3.38	Good
Documentation	4.58	Excellent	4.04	Very Good
Average Weighted Mean	4.44	Excellent	3.65	Very Good

Legend: 1.00-1.80=Needs Improvement; 1.81-2.60=Poor; 2.61-3.40=Good; 3.41-4.20=Very Good; 4.21-5.00=Excellent

Table 4 shows the level of competence of critical care nurses based on unit specific competencies specifically on assisting in arterial line insertion, care and removal. In the study group, the average weighted mean was 4.44 interpreted as Excellent and 3.65 interpreted as Very good in the control group. Study group who received training prior to administration of unit specific competencies are found to be more competent in assisting, care and removal of arterial line than the control group. Continuous reassessment of competencies relevant to local contexts should drive a learning process that preserves valuable old skills, discards outdated procedures, and adds new capabilities (Crisp et al 2014). In the study group, seven dimensions scored Excellent (definition (4.49), indication (4.78), sites (4.86), contraindications (4.56), complications (4.56), care of arterial line (4.28) and documentation (4.58) while 3 dimensions scored very good (assisting in AL insertion (4.12), assembly of transducer (4.06), calibration(4.04) and removal of arterial line (4.12). Based on the findings, critical care leaders should focus on the staff skills in assisting arterial line insertion, assembly and calibration of transducer as well as documentation of the procedure to achieve excellence. In the Control group one dimension scored excellent (definition of AL (4.34), 7 dimensions scored very good (indication (3.84), site (3.68), contraindication (3.58), complication (3.58), calibration (3.50), care (3.62) and documentation (4.04), 3 dimensions scored good (assembly (3.34), assisting in AL insertion (3.34) and removal of AL (3.38). Arterial lines are routinely used in critical care areas for monitoring arterial blood pressure or serial blood gas measurements and can be associated with morbidity and mortality. Critical care nurses are accountable for their practice and in the exercise of their professional accountability thus knowledge and competence are necessary for them to perform the task safely and in a skilled manner to ensure that a patient receives optimal treatment. For a staff to be competent in a unit standard, they must demonstrate competency in every aspect of the unit standard. Knowledge, theory and skills were assessed. PSMCC's critical care nurses in the intervention group benefited from this additional training/exposure. Assisting in the insertion, care and removal of patient's arterial line involves mastery of knowledge as well as the skills thus improving patient safety and outcome. It is also evident in the result that there are weakness identified in the level of competence of the nurses in the control group which include assisting in the insertion of arterial line,

Assembly of transducer and assisting in the removal. These components of unit specific competency were found to garner a mean lower than 3.50 which were considered weaknesses of this competency assessment. The level of competence in this competency was focused on the skills. It implied that demonstration of skills is relevant which was not done among control group.

Summary, Conclusion and Recommendations

This chapter is a presentation of the summary, conclusions and recommendations of the study.

CONCLUSION

The average mean garnered from the assessment of level of competency on unit specific competencies were considered strengths both in the control and study group though there were some dimensions in the level of competency assessment in each unit specific competency that were considered as weaknesses. Significant relationships existed between the demographic profile and level of competency based on self-assessment, BKAT, and Unit specific competencies which include Central Line, Mechanical Ventilator, and Pulmonary Catheter which were all tested on 0.05 level of confidence which may be concluded the rejection of the null hypothesis. Significant difference also existed between the level of competency of the critical care nurses on BKAT and Unit Specific Competencies which were tested in 0.05 level of confidence. Based on the findings, it can be concluded the rejection of the null hypothesis

Recommendation

The major findings and conclusions drawn from this study led to recommendations directed toward two critical areas. First, are the general recommendations on reinforcing the critical care competencies and second, are the recommendations on the area of future researchers. Adoption of the Critical Care Nursing Framework. Reiteration of the critical care competencies. Sustenance of the strengths in the level of competency of the critical care nurses through continuous monitoring and updates on the current trends and standards. Conduct a wider range of study that may include other health care personnel involved in the care of patients. Utilize study in other disciplines.

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