Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh and Its Related Factors

Shikha Rani Biswas

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Nursing Science (International Program)

Prince of Songkla University

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I hereby certify that this work has not been accepted in substance for any degree, and is not being currently submitted in candidature for any degree.

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ABSTRACT

This descriptive study was aimed to examine Technological Competency as Caring in Nursing (TCCN), and to examine the relationship between TCCN and selected factors (age, level of nursing education, length of working experience, continuing education and training, and nurses' self-awareness), as perceived by Intensive Care Unit (ICU) nurses in Bangladesh. One hundred and twenty ICU nurses at tertiary level public hospitals, Dhaka participated in this study. A demographic data form was used to obtain the participants' demographic information. In this study, the instruments used for data collection were the Technological Competency as Caring in Nursing Inventory (TCCNI), and the Nurses' Self-Awareness Questionnaire (NSAQ). The content of each tool was validated by three experts and reliability was tested on 30 ICU nurses, yielding a Cronbach's alpha coefficient of .87 for the TCCNI and of .80 for the NSAQ. The data were analyzed by using descriptive statistics, Pearson's product-moment correlation and independent t-test.

The results of this study show that the mean score of nurses' perception regarding TCCN was at a high level (M = 4.14, SD = 0.34). Among five

assumptions of TCCN, the four assumptions, including “persons are caring by virtue of their humanness”, “persons are whole and complete in the moment”, “technology is used to know the persons as whole”, and “nursing is a professional discipline” were at a high level (M = 4.21, SD = 0.36; M = 4.20, SD = 0.53; M = 4.12, SD = 0.43; M = 4.16, SD = 0.43, respectively). Only, “knowing person is a process of nursing allowing for continuous appreciation of persons” was at a moderate level (M = 3.35, SD = 0.37). Regarding the five selected factors including nurses’ age, level of nursing education, length of working experience, continuing education and training, and self-awareness; only the nurses’ self-awareness was significantly and moderately correlated with nurses’ perception on TCCN (r =.42, p <.01). Moreover, all four assumptions of TCCN were significantly correlated with the dimension of private self-awareness (r_s ranged from .30 to .73, p <.01). Whereas, only “knowing person is a process of nursing allowing for continuous appreciation of persons” was moderately correlated with public self-awareness (r = .46, p <.01).

The study showed that the ICU nurses in Bangladesh had high perception or agreement on TCCN and this perception related to their self-awareness. This research evidence can be served as a fundamental data for critical care nursing in Bangladesh.

Keywords: Bangladesh; Caring; Intensive Care Unit; Nurse; Nursing; Technological Competency.

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CHAPTER 1

INTRODUCTION

Background and Significance of the Problem

The intensive care unit (ICU) first emerged in the late nineteen fifties in the United States of America. Afterwards, ICUs were built in other countries all over the world (Dudley, as cited in Faruq et al., 2013). In Bangladesh, the ICU was first established in 1980 in the National Institute of Cardiovascular Diseases (NICVD) hospital in Dhaka. At present, there are many ICUs in Bangladesh and 90 % of them are located in the tertiary level hospitals in Dhaka (Faruq et al., 2010). From the outset, caring in the ICU has emphasized using advanced scientific knowledge and technologies to secure lives and extend the life of critically ill patients (Carlet et al., 2004; Halpern, Stephen, & Pastores, 2010). There are numerous forms of machine technology employed to treat and cure the patients in critical condition such as mechanical ventilator, electrocardiography monitoring machine, infusion pump, and hemodialysis machine. The nurses use machine technologies in order to sustain life. Thus, the nurses require an enormous amount of technical skills, effort, and competency when managing technologies harmoniously toward positive human health perspectives in the ICUs (Locsin & Kongsuwan, 2011).

Caring is the core of the nursing profession (Boykin & Schoenhoffer, 2001). Caring is a human mode of being, and nurses' caring attributes consist of compassion, competence, confidence, commitment, conscience, and comportment (Roach, 2002). Caring in the ICU is complex and dynamic, and appropriate nursing is

considered the most vital in this situation (Ashworth, as cited in Wilkin & Slevin, 2004). Leininger (1988) asserted that technology could take away the real meaning of caring in nursing, and the nurse-patient relationship might be at risk in this situation. Nurses may be viewed as uncaring when viewed as competent using technology (Leininger, 1988). However, expert use of technology plays a significant role in caring in the ICU (Kongsuwan & Locsin, 2011).

Locsin (1998) pointed out nursing as caring in the ICU includes technology, caring, and competency. Locsin developed the theory of Technological Competency as Caring in Nursing (TCCN) (Locsin, 2005). This theory views technological competency and caring as co-existing and harmonious in nursing practice. Technological competency as caring is the expert use of technologies to know persons as whole in a moment. The concepts of Locsin's theory could guide caring in nursing practice and maintain humanistic care and patients' well-being in a technological environment in the ICUs (Kongsuwan & Locsin, 2011; Locsin & Kongsuwan, 2011; 2013). Recently, the theorist developed the Technological Competency as Caring in Nursing Inventory (TCCNI) for measuring this subject (Parcells & Locsin, 2011).

No previous study was found that examined factors related to nurses' perception on TCCN in an ICU. Though, there were several factors related to the nurses' caring expressions in the ICU. These factors were nurses' characteristics which included nurse's age (Salonen, Kaunonen, Meretoja, & Tarkka, 2007), level of nursing education (Cho et al., 2009; Laila, Ahmed, & Mojahed, 2011), length of working experience (Laila, Ahmed, & Mojahed, 2011; Salonen, Kaunonen, Meretoja,

& Tarkka, 2007), and continuing education and training (Hind et al., 1999; Huggins, 2004).

In addition, it was found that a nurse's self-awareness was a significant individual factor which is associated with nurses' caring behavior (Daodee, 1994; Prompahakul, 2011). Awareness of one's own thoughts, feelings, and behavior is self-awareness and that could influence nurses to increase their therapeutic relationship with patients. Self-awareness helps to improve the nurses' positive caring behavior. According to Burnard (1988), it is not possible to understand the clients' perspectives whilst nurses do not understand themselves. Few studies showed a positive association between self-awareness and nurses' caring behavior in terminally ill patients (Daodee, 1994; Prompahakul, 2011).

From reviewing literature, it is apparent that many studies relating to caring and nursing in the ICUs have been conducted in many countries. A study by O'Connell and Landers (2008) which compared the perceptions of nurses and of relatives' regarding critical care nurses caring behavior in Ireland. Both groups placed a higher value on caring behaviors which was demonstrated by the technical competence, the altruistic and emotional pieces of caring in critical care setting. Wilkin and Slevin (2004) explored the meaning of nurses' caring in an ICU in the United Kingdom. They summarized the essential structure of caring, and identified that caring was a process of competency involving physical and technical action imbued with affective skills. In addition, Wikstrom, Cederborg, and Johanson (2007) conducted a research in Sweden with 12 ICU nurses that investigated the nurses' perceptions of technology in their daily activities. Technology decreased the workload

and made the treatment safe. The nurses stated that technology was vital in the ICU as it directed and controlled medical treatments in regard to the patients' well-being.

One study was conducted in Ireland by McGrath (2008), regarding nurses' caring experiences through using technology in an intensive care setting. The nurses explicated that technology saved the life of critical patients and made nurses closer to patients in their caring in nursing. Similarly, another study, conducted in the South of Thailand by Kongsuwan and Locsin (2011), examined nurses' experience of caring for patients who were dependent on life-sustaining technologies in ICUs. The study found that nurses' valued technological competency as caring, whereas they felt different uncertainties to use machine technology to know the patients as whole.

In Bangladesh, ICU nurses employ many forms of technology such as mechanical ventilator, infusion pump; pulse oximeter, electrocardiography machine, and arterial blood gas analysis machine. However, there is limited study related to the ICU, and no study has been found regarding caring for the patients in the ICU. One study was conducted by Faruq et al. (2010) to survey the facilities, bed strength, functional characteristics, manpower, operational practices and distribution of ICUs in Bangladesh. The result showed that the standards and management strategies were varied from one to another in the ICUs. Another study was conducted by Faruq et al. (2013) about the implementation of sepsis bundles in all ICUs in Bangladesh but was not relevant to the field of nursing.

Caring is fundamental to nursing. However, from the literature review, there has been no study that explored caring in an ICU in Bangladesh. In order to survey nurses' perception or thoughts regarding caring in the ICUs, the theory of Technological Competency as Caring in Nursing (Locsin, 2005) provides a suitable

framework for researching this issue. Hence, this study aimed to examine Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh and its related factors.

Objectives of the Study

The objectives of the study were:

1. To examine Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh.

2. To examine the relationship between selected factors (age, level of nursing education, length of working experience, continuing education and training, and nurses' self-awareness) and Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh.

Research Questions

The research questions of this study were:

1. What is Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh?

2. Is there a relationship between selected factors (age, level of nursing education, length of working experience, continuing education and training, and nurses' self-awareness) and Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh?

Theoretical Framework of the Study

The theory of Technological Competency as Caring in Nursing (Locsin, 2005) is used as a framework of the study. It is a middle-range theory and grounded in the theory of Nursing as Caring (Boykin & Schoenhofer, 2001). The theory of TCCN views technology and caring co-existing harmoniously in nursing practice. Technological competency is the expression of caring. Technological competency as caring mainly focuses on the process of knowing person as whole in the moment through efficient use of technology (Locsin, 2009). Technology can be an instrument, a tool or human (nurse) activity to make efficiency. The expectation of this knowing process is to enhance mutual trust and also respect in between the nurse and patient in order to improve quality of nursing (Locsin, 2010). The theory highlights that nurses use technological competency as a tool to express caring and build a relationship between technology, caring, and nursing. The focus of nursing in this theory is person (Locsin, 2010). There are five assumptions of the theory (Locsin & Kongsuwan, 2011) and are described as follows:

1. Persons are caring by virtue of their humanness (Boykin & Schohenhofer, 2001). The assumption emphasizes the understanding that everyone is caring; it is part of their characteristics. In the situation of caring in the ICU settings; the nurses, patients, patients' families, all are caring person. This perspective assists the ICU nurses to see the patients and their families as participants in care.

2. Persons are whole and complete in the moment (Boykin & Schohenhofer, 2001). In this assumption, human beings are as a complete person, regardless of composite parts. Viewing this concept, the ICU nurses share an

experience with the person being nursed, rather than focus on fixing the person's missing parts.

3. Knowing a person is a process of nursing allowing for continuous appreciation of person as whole person (Locsin, 2005). This assumption guides nursing in ICU to use the process of knowing persons being nursed in order to understand the person as a subject, not an object of care. The nurse and patient focus on appreciating, celebrating, supporting and affirming each other, allowing each other and to know each other mutually as participants in care. Four patterns of knowing are used in knowing person; such as empirical knowing, aesthetic knowing, personal knowing, and ethical knowing.

4. Technology is used to know the persons as whole (Locsin, 2005). This assumption works on the understanding that technologies of health and nursing are aspects of care that allows ICU nurses to know patients in a moment more fully as they are human beings who are participants in their care.

5. Nursing is a professional discipline (Boykin & Schoenhofer, 2001). This assumption offers the critical view of nursing as integral to the practice of health care. As a member of a discipline and professionals, ICU nurses use knowledge of nursing in their practice in ICU and focus on wellness of human beings as whole persons.

In reviewing the literature, there were several factors related to caring in nursing in the ICUs. These were the nurse's age, level of nursing education, length of working experience, continuing education and training, and self-awareness.

Age. Generally, the level and responsibility of assigned duties are increased by age. Salonen, Kaunonen, Meretoja, and Tarkka (2007) found a

significant correlation between the age and nurses' self-assessed competence level. Another study conducted by Lange, Thom, and Kline (2008) also found a significant association between nurses' age and positive caring attitude for patients in critical condition.

Level of nursing education. Nurses have had the opportunity to learn caring for critically ill patients and using equipment in the ICU when they studied for their bachelor degree. However, it can be expected that highly educated nurses are able to apply systematic thinking in order to enhance positive caring behavior (Laila, Ahmed, & Mojahed, 2011). The study found a significant correlation between nursing education and positive aspects of the use of technological equipment of higher care effectiveness, controls medical treatment, patient safety, and easy completion of nursing duties (Laila, Ahmed, & Mojahed, 2011).

Length of working experience. Working experience is a key element for caring the patients in critical condition. In the ICU, a novice nurse works under a senior nurses and receives instructions and guidelines. Nurses also learn caring for patients through their experience. An experienced nurse could be more expert in applying skill; knowledge, perception, and benefit from past experience in his/her caring practice. There was a significant correlation between nurses' experience and nurses' perception on caring for the patients in the ICU (Laila, Ahmed, & Mojahed, 2011; Salonen, Kaunonen, Meretoja, & Tarkka, 2007). Similarly, Lange, Thom, and Kline (2008) also revealed a significant association between nurses' work experience and nurses' positive caring attitude toward critical patients.

Continuing education and training. Lifelong education and training in critical care could affect the understanding of the nurses' caring knowledge,

attitude, and skills. ICU nurses have acquired knowledge and skills through a continuous learning process in order to become competent practitioners. However, it is essential that ICU nurses take part in educational programs and conferences on caring in ICU (Hind et al., 1999; Huggins, 2004).

Self-awareness. Self-awareness involves understanding of one's own characteristics and responses to a situation. With respect to a nurse, she can build an affirmative relationship with patients by confronting stressful situations in an ICU (Burnard, 1988). There was a significant correlation between nurses' self-awareness and nurses' caring behavior (Daodee, 1994; Prompahakul, 2011). According to Buss (1980), there are two dimensions of self-awareness: 1) Private self-awareness, and 2) Public self-awareness. Private self-awareness refers to awareness to the inner and personal characters of one's self that related with own perceptions, whereas public self-awareness is self attention to own characteristics which are presented to others through behavior, by talking, and by action.

Thus, the theoretical framework of this study was used as a model and direction to answer the research questions. The theoretical framework of this study is presented in the following Figure 1.

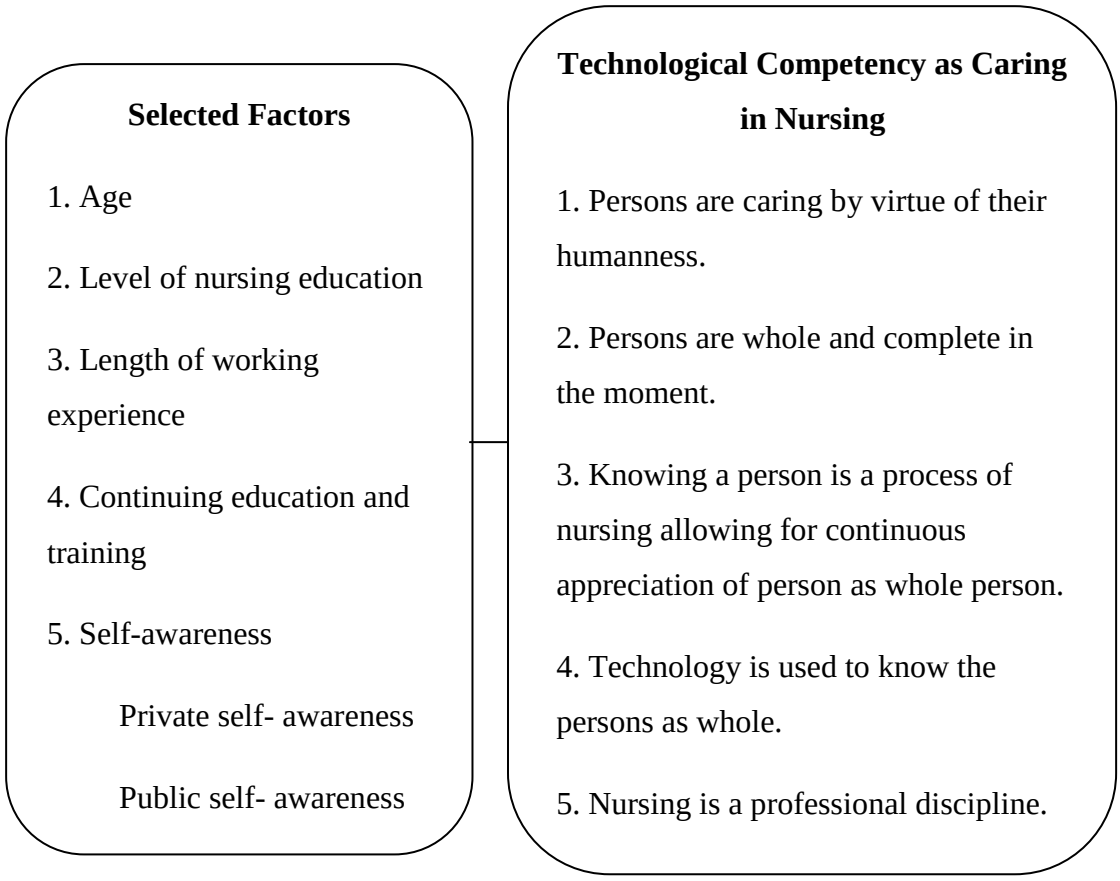


Figure 1.

Theoretical Framework of the Study

Hypothesis

The hypothesis of this study was:

There is a positive relationship between selected factors (age, level of nursing education, length of working experience, continuing education and training, and self-awareness) and Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh.

Definition of Terms

The definitions of terms used in this study were:

Technological Competency as Caring in Nursing. Technological Competency as Caring in Nursing refers to the perception or agreement of the ICU nurses on nurses' caring expressions in nursing practice in the ICU settings in Bangladesh based on the theory of Technological Competency as Caring in Nursing (Locsin, 2005). The theory of TCCN developed five assumptions (Locsin & Kongsuwan, 2011) namely, 1. Persons are caring by virtue of their humanness, 2. Persons are whole and complete in the moment, 3. Knowing a person is a process of nursing allowing for continuous appreciation of person as whole person, 4. Technology is used to know the persons as whole, and 5. Nursing is a professional discipline. In this study, nurses' perception on Technological Competency as Caring in Nursing was measured by the Technological Competency as Caring in Nursing Inventory (Parcells & Locsin, 2011). Higher score indicates that the participants had a high level of perception or agreement with the statements of Technological Competency as Caring in Nursing.

Selected factors refer to a nurse's age, level of nursing education, length of working experience, continuing education and training, and self awareness. The study determined the nurses' age, level of nursing education, length of working experience, and continuing education and training by using a Demographic Data Form (DDF).

Age. Age refers to the nurse's age in years.

Level of Nursing Education. Level of nursing education refers to the highest degree of nursing that an ICU nurse has: a diploma degree in nursing, a bachelor degree in nursing or a master's degree in nursing.

Length of Working Experience. Length of working experience refers to the length of services as a registered nurse at the public hospitals in Dhaka, Bangladesh.

Continuing Education and Training. Continuing education and training refers to the education by training in related topics in caring in the ICUs such as short courses and workshops on human caring or humanistic care, caring concepts or caring theory and technologies of human care, etc.

Self- Awareness. Self- awareness refers to the perception or understanding oneself in terms of nurses' thinking, feeling, and behavior in providing care in the ICU. Self-awareness consists of two dimensions: Private self-awareness and public self-awareness. Private self-awareness infers an affinity to focus on internal aspects of the self such as thinking, feeling, and acting, and public self-awareness is a tendency to express on the external, observable aspects of the self to others such as attitude, behavior, talking, and action. Self-awareness was measured by the Nurses' Self-Awareness Questionnaire (NSAQ) which was developed by Daodee (1994), and translated into English language by Prompahakul (2011). The 20 items NSAQ consisted of two aspects of self-awareness. The private self-awareness (items 1-10) and the public self-awareness (items 11-20).

Scope of the Study

This study was conducted at the ICUs in tertiary level public hospitals in Dhaka, Bangladesh. The data were collected during January to February, 2014 from 120 nurses working in the ICUs. The aim of the study was to explore the nurses' perception on Technological Competency as Caring in Nursing and its related factors including nurses' age, level of nursing education, length of working experience, continuing education and training, and self awareness.

Significance of the Study

The following statements indicate the significance of this study:

1. This study can provide evidence-based data of caring in the ICUs for the nursing profession in Bangladesh. The data of the perceptions on Technological Competency as Caring in Nursing and its related factors could be useful for hospitals in planning to improve and develop caring in nursing in Bangladeshi ICUs.

2. The results of this study could be served as baseline data for further study regarding Technological Competency as Caring in Nursing.

CHAPTER 2

LITERATURE REVIEW

The study aimed to examine Technological Competency as Caring in Nursing as perceived by ICU nurses and its related factors in Bangladesh. To gain understanding in relation to each variable of this study, this chapter presents literature review on the following topics:

1. Overview of Nursing in Bangladesh
    1.1 Nursing Organization
    1.2 Nursing Discipline
    1.3 Nursing Profession
2. Caring in Nursing in ICU
    2.1 ICU Context
    2.2 Nurses' Caring in ICU
3. The Theory of Technological Competency as Caring in Nursing
    3.1 Perspective of the Theory of Technological Competency as Caring in Nursing
    3.2 Assumptions of the Theory of Technological Competency as Caring in Nursing
    3.3 Significance of the Theory of Technological Competency as Caring in Nursing in ICU
    3.4 Measurement of Technological Competency as Caring in Nursing
4. Factor Relating to Nurses' Caring in ICU

Overview of Nursing in Bangladesh

This section presents nursing in Bangladesh regarding nursing organization, the discipline of nursing, and the nursing profession.

Nursing Organization

The nursing profession in Bangladesh has been organized by the Directorate of Nursing Services (DNS) under the Ministry of Health and Family Welfare. The Bangladesh Nursing Council (BNC) regulates registered nurses, midwives, and assistant nurses. The standard nursing education and nursing practice is the main goal of the Bangladesh Nursing Council. The BNC provides nurses registration; sets nursing curriculums, and organizes national nursing examinations for student nurses. The BNC committee members have taken some initiative and argued that nurses necessary to take advanced and positive role for improving nursing care quality and to achieve better health outcomes (BNC, 2012).

Nursing Discipline

The first nursing institute was established in 1947 at Dhaka Medical College Hospital, Dhaka, and was run by a few sister tutors and staff nurses from Madras, India. There are 38 public and five private nursing training institutions in Bangladesh. The private training institutions offer diploma, bachelor, and master's level education similar to the public institution. Only one college of nursing offers a two-year Bachelor in Nursing Science (B.Sc.) for registered nurses. There is no available public institute for master's level education for nurses in Bangladesh

(Berland, Richards, & Lund, 2010). In Bangladesh, the students are able to apply for admission to nursing training institutes after passing the Higher Secondary Certificate (HSC) examination. A student has to complete a four-year diploma in nursing which includes one year studying midwifery or orthopedic in nursing; a complete Bangladesh Nursing Council (BNC) licensing examination follows. A nurse is a legal practitioner while she is registered with the BNC (Zaman, 2009).

In Bangladesh, there is no distinction between an ICU nurse and a nurse in other settings. Nurses use several kinds of advanced technologies in the ICU. Notably, only 36% of nurses have been trained on cardiopulmonary resuscitation, as per a survey report by Faruque (2010). In addition, the Intensive Care Society has recommended that 25% of nurses should seek a formal qualification in regards to intensive care; and basic life support (BLS) training is mandatory for all levels critical care nurses (O'Riordan & Galley, 2003). Thus, it is logical to state that ICU nurses in Bangladesh have a limited background in critical care in contrast with nurses in other countries.

Nursing Profession

At present, there are approximately 22,000 registered nurse and around 15,000 of them are in service in different public health division (World Health Organization, 2009). The Bangladeshi nurses wear white uniforms and different color belts to recognize their professional seniority (Zaman, 2009). It is necessary for registered nurses to renew registration every five years to maintain their nursing license (Uddin, Islam, & Ullah, 2006).

Inadequate training, poor payment, lack of professional respect, and a nursing shortage are the main barriers to the development of the nursing profession in Bangladesh (Berland, Richards, & Lund, 2010). In Bangladesh, the nurses' promotion system is still based on seniority; not on their educational qualifications and competency level. All nurses are answerable to the hospital director, head person of the department, nursing superintendent, and also to the nursing supervisors. The nursing supervisors are responsible to make the nurses' work schedule (roster), and supervise their daily activities. The nursing superintendent occasionally visits the ward and monitors the nurses' work performance. Sometimes nurses' activities are supervised by the head of the department in each ward (Zaman, 2009).

Currently, the government of Bangladesh has increased the nurses' pay scale. The government of Bangladesh has taken some initiative to upgrade nursing education standards by revising the education curriculum with the International Council of Nurses (ICN), and formulate various training facilities at all nursing levels in regards to quality health outcomes. The prime minister stated in a speech that "the nursing profession would be the upgraded to world standards by enhancing the nurses' social dignity" (The Daily Star, as cited in Berland, Richards, & Lund, 2010).

Caring in Nursing in ICU

Caring has been described as the moral ideal of nursing (Watson, 1985), with many approaches to defining and analyzing the caring in nursing literature (McCance, Mckenna, & Boore, 1999). Caring in the ICU has also been

described as a process, as critical care nurses use caring emotions, knowledge and actions to meet the needs of critically ill patients (Bush, & Barr, 1997). This section describes, in detail, caring in nursing in the ICU, an ICU context, and how nurses care in the ICU, both in other countries and in Bangladesh.

ICU Context

In other countries

In the late nineteen fifties, the ICU was first established in the United States of America. Since then, many ICUs have emerged rapidly in many countries (Dudley, 1987). According to Ewart et al. (2004), the ICU is procedure oriented namely, complex decision making involving the patients such as, assessing patients, supporting the vital organs function, treatment of organ systems failure, and maintaining the patients' condition as normal.

In Bangladesh

In Bangladesh, the ICU was established in the year 1980 in the National Institute of Cardiovascular Diseases (NICVD) hospital, Dhaka. According to a survey report (2007), there were about 700 ICU beds, and one bed for every hundred general beds in Bangladesh. There are about 40 ICUs in Bangladesh, and among them, 27 (68%) are multidisciplinary, 7(18%) CCUs, 5 (12%) cardiac surgery, and 1(2%) are in neurology. Ninety percent of ICUs are located at the tertiary level in Dhaka, and 60% have attached mechanical ventilators. Ninety two percent of ICUs have a nurse-patient ratio of 1:2, and 36% of nurses are trained on cardiopulmonary resuscitation (CPR) (Faruque et al., 2010).

There have been some distinctions in developing the facilities within the ICUs of Bangladesh regarding the competencies, structures, and medical technologies. Sixty-four percent of ICUs are run by anesthesiologists who hold the head position in the ICU, and 85% of facilities are open units as opposed to 15% which are closed units. The Critical Care Medicine Society (BSCCM) of Bangladesh was established in 2009, aiming to enhance critical care medicine; expanding the number of ICUs, ICU beds, and increases the trained manpower for delivering critical care competently across the country. In 2009, the only training workshop on critical care nursing was pioneered at the ICU in BIRDEM hospital, Dhaka (Faruque, 2010).

In the ICU, a qualified intensivist performs general assessment of the patients and takes therapeutic decisions to manage the patients in critical condition. Sometimes the ICU patient requires noninvasive and invasive monitoring. For patients' recovery, it is necessary to obtain the different specialties opinion, such as, cardiology, nephrology, pulmonology, infectious diseases, neurosurgery, vascular surgery and so on while the patient is suffering from multi organ failure. Thus, ICU patient management becomes team work with different specialties and the intensivist plays a vital role as a leader of the team (Faruque, 2010).

Nurses' Caring in ICU

In other countries

Critical care nursing is the specialty of nursing that focuses on the care and treatment of critical patients (Canadian Association of Critical Care Nurses [CACCN], as cited in William et al., 2001). In the ICU, the patients' condition can change very rapidly and unpredictably, thus the nurses need to hold and constant

observation of patients which includes invasive haemodynamic monitoring, mechanical ventilation, and using drug infusions (Fairman, 1992).

According to Leininger (1988), caring is the soul of nursing. But it is concern that technology could distract the real meaning of nursing and might diminish the relationship between the nurse and the patient in high technological environment. Leininger also expressed that a professional nurses' activity often seems to be uncaring when caring is combined with technology; but a competent nurse uses technology in their routine activities that could reflect their caring in the ICU (Leininger, 1988). In addition, nurses, in a relaxed manner, assess the patients by asking their history and touching the body, and caring the patient as like a human beings rather they focus on patients' disease, technological demands of patient while they busy to collecting data from the machine technology (Almerud, Alapack, Fridlund, & Ekebergh, 2007; Locsin & Kongsuwan, 2011).

From the literature review, there were many studies that explored nurses' caring in ICU settings which were conducted in many countries. McGrath (2008) explored critical care nurses' experience of caring in a technological environment in Ireland. The findings concluded that technology has both advantages and disadvantages for critical care nursing. Life-saving technology can support the lives of critical patients and bring experienced nurses close to patients and their families.

One study conducted by Wilkin and Slevin (2004) explored the meaning of caring with twelve ICU nurses. Semi-structured interviews were used to collect data. The results concluded that the nurse participants expressed the importance of caring. They described caring as a process which involves feeling;

together with professional knowledge, competence, and skills in nursing. It is a basic component holistic human care to meet the patients and relatives individual needs.

In addition, O'Connell and Landers (2008) conducted a study in Ireland with 40 ICU nurses and 30 relatives of critical patients to compare the perceptions of nurses and relatives of critically ill patients with the importance of the caring behaviors of critical care nurses. The results revealed higher values on caring behaviors in both groups of participants which demonstrated technical competence, and the altruistic and emotional aspects of caring.

In England, Crocker and Timmons (2009) conducted an ethnographic approach with the participation of 12 critical care nurses to explore the meaning of critical care nurses of technology which is related to weaning from mechanical ventilation and how the nurses use technology in their practice. The findings concludes that the new nurses' attention only on come closer to weaning and treat weaning as a 'medical', and medical doctor move technology to them whereas the expert nurses perceived the importance of technology and used technology as a caring instruments or as a nursing technology in their practice. Kongsuwan and Locsin (2011) explored the experiences of Thai nurses of caring for patients who were depending on life-sustaining technology in the South of Thailand. Eight ICU nurses were interviewed. This study concluded that the experience of caring was valuing technological competency to care instead of feeling insecure when using technology in their care

In Bangladesh

Nurses play an important role toward the recovery of critical patients. The ICU nurses are more motivated than general ward nurses (Berland, Richards, &

Lund, 2010). Although, there is a lack of evidence regarding the nurse-patient ratio of ICUs in Bangladesh, practice in the ICU, the nurse-patient ratio is higher than in general wards. However, critical patients are subject to insufficiently trained staff and the high cost of medical necessaries. The hospital authorities are lax in their support of the patients' requirements in the ICUs in this situation (Nooruzzaman, 2013).

There is no study on caring in nursing in the ICU in Bangladesh which is covered in the literature review. The few prior studies of ICUs were of distinct features of health care. Faruq et al. (2010) conducted an audit of intensive care services in Bangladesh and found that almost all the ICUs are situated in the tertiary level hospitals in Dhaka, and most of these are run by the private sector; the ICU standards and management strategies varied greatly. Another study was conducted by Faruq et al. (2013) regarding the implementation of sepsis bundles in all ICUs in Bangladesh, and result showed that 49.2% of ICU patients are suffering from severe sepsis and that was significantly higher than countries. The resuscitation and management bundles of sepsis are at the zero level.

The Theory of Technological Competency as Caring in Nursing

There are several theories on caring in nursing, for example, the theory of cultural care (Leininger, 1984) which consists of learned actions, behaviors, techniques and patterns of care. Next, according to Watson (1985), the theory of human care, considers caring as the moral ideal of nursing where the end is protection, enhancement and preservation of human dignity. Roach (2002) described caring as the human mode of being and described caring attributes in six Cs,

compassion, competence, commitment, confidence, conscience, and comportment. Boykin and Schoenhofer (2001) developed the theory of Nursing as Caring, and viewed caring is a core of nursing. In addition, the theory of Technological Competency as Caring in Nursing developed by Locsin (2005) grounded in the theory of Nursing as Caring theory (Boykin & Schoenhofer, 2001), viewed the expressions of caring in intensive care that included technology, caring, and nursing. Locsin's theory of Technological Competency as Caring in Nursing was adapted to guide this study. This section clarifies the perspective of the theory of Technological Competency as Caring in Nursing, assumptions of the theory, significance of the theory of nurses caring in the ICU, and measurement of the theory.

Perspective of the Theory of Technological Competency as Caring in Nursing

Technological Competency as Caring in Nursing is a middle-range theory (Locsin, 2005) that emphasizes a good relationship between technologies and caring in nursing and reflects the nurse and patient expectations. The author has mentioned two supporting phenomena in this theory: (1) being cared for and (2) caring for. This study focuses the perceptions regarding caring and the importance of technological competency in the perspective of caring in an ICU. Locsin (1998) expressed that some nurses are technically skilled but fail to truly know their patients as a whole person. In contrast, some nurses, who are technologically competent, use technology as an expression of their routine activities. In respect of the theory, technological competency as caring assists nurses to focus their nursing on acknowledging the person as whole. Through the process of knowing persons, the

patient is known fully as a person and a participant in care. In this theory, the process of nursing is the process of knowing person (Locsin, 2010).

Assumptions of the Theory of Technological Competency as Caring in Nursing

The Theory of Technological Competency as Caring in Nursing has been developed continuously. In the beginning, this theory had four assumptions (Locsin, 2005; 2010). Recently, the theorist added one more assumption "persons are caring by virtue of their humanness" (Locsin & Kongsuwan, 2011; Parcell & Locsin, 2011). Some assumptions are grounded in the assumptions of the Theory of Nursing as Caring (Boykin & Schoenhofer, 2001). The five assumptions were as follows: (1) persons are caring by virtue of their humanness (Boykin & Schoenhofer, 2001), (2) persons are whole and complete in the moment (Boykin & Schoenhofer, 2001), (3) knowing a person is a process of nursing allowing for continuous appreciation of person as whole person, (4) technology is used to know the persons as whole, and (5) nursing is a professional discipline (Boykin & Schoenhofer, 2001). These assumptions provided the structural perspectives that influence the nurses' view on caring practice.

1. Persons are caring by virtue of their humanness. This assumption emphasizes on the understanding that all human beings are caring in their characteristics. In this assumption, 'persons are caring', is studied as integral to the practice of nursing profession and it shows that caring is part of being human.

2. Wholeness is the philosophical perspective that allows nurses to recognize human beings as a person and complete in a moment.

3. Knowing a person is a process of nursing allowing and appreciating the person continuously. Nursing is a process of caring which forms to know persons as whole. In nursing, knowing a person means showing intentionality in care, appreciating patient values, celebrating and supporting the patient with consideration of the four patterns of knowing are empirical, ethical, aesthetic and personal knowing.

4. Technology is used to know the persons as whole. Nursing as a knowing process, though technological competency is considered a vital aspect for nurses to know the patient with the perspective of true caring in nursing. Instrument technology provides patient data and could be helpful to understand the complete picture of a person. However, nurses' technological knowing is essential in knowing persons as whole in the moment.

5. Nursing is a professional discipline, offering a unique perspective and a distinct way of viewing phenomena which facilitates wellness of a person.

Significance of the Theory of Technological Competency as Caring in Nursing in ICU

Machine technology is developed to cure the patients in critical condition with safely, efficiently, and effectively. It covers the extensive area of treatment of critical patients (Almerud, Alapack, Fridlund, & Ekebergh, 2007). Technological management has emerged as a main component of an ICU nurse. Nurses need to be adequately prepared to meet the increasing demands of patients in a life-threatening condition (Browning, 2010). The nurses use ICU technology to assess the patients' conditions and get information as physiological parameters (Alasad, 2002). However, ICU nursing includes technology, competency, and caring. In this

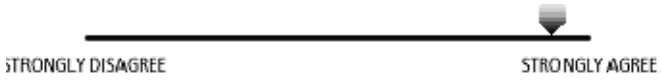
aspect, the nursing profession emphasizes and adapts technology as a relevant and influential tool in nursing care. The challenge of technology is the greatest for caring in nursing in ICU (Bernardo, 1998) and quality of care (Barnard, 2000). In contrast, as technology increases in the health care environment, thus the author Macleod (as cited in Musk, 2004) is concerned about the complexity of nursing practice and stated that technology could broaden the distinction between nurse and patients. According to Ying, Kunaviktikul, and Tonmukayakal, (2007) in practice in the ICU, where technology and nursing are constantly changing, the nurses are required to perform caring with greater competency in this situation (Ying, Kunaviktikul, & Tonmukayakal, 2007).

However, the theory of Technological Competency as Caring in Nursing (Locsin, 2005) is developed to guide the ICU nurses in caring by using technology competently to know persons as whole and shared live experiences between the nurse and the one nursed in respect of professional discipline. The Theory of Technological Competency as Caring in Nursing allows nurses to achieve competence to know the patients as whole when they provide nursing care in critical care settings. The ICU nurses will not see the one being nursed as an object of care; rather see the one being nursed as a participant in care. The patients' hopes, dreams, and aspirations are known and responded to by affirming, supporting and, cerebrating these (Locsin, 2010). Technologies as instruments and tools such as ECG, vital signs machine will be used to know a patients' data as a part of person or object. However, a nurse's activity to know persons competently is also used in the process of knowing. Thus, the person is known as a whole person. In addition, this theory explains the process of nursing which includes four phases of knowing, designing, implementing,

and verifying (Locsin & Kongsuwan, 2011). ICU nurses can use these processes in their nursing process to care for critically ill patients and their families in order to achieve competent nursing practice and maintain human health and well-being.

Measurement of Technological Competency as Caring in Nursing

The original TCCNI was 30 items (Locsin, 1999). In 2011, Parcells and Locsin revised the original TCCN and finally adapted 25 items based on experts' suggestions. The response format for 25 items was visual analogue scale anchored left by "Strongly Disagree" and right by "Strongly Agree."



TCCNI was developed to measure Technological Competency as Caring in Nursing based on the five assumptions of the theory. The Scale-level Content Validity Index (SCVI) of 25 items was 0.96. This measurement allows nurses to consider their practice within their own environments, and assist them to maintain and improve their practice.

Factor Relating to Nurses' Caring in ICU

From the literature review, several factors are related to caring in nursing in ICU. Detailed descriptions of each factor are as follows:

Age

A few studies found that nurses' age had a significant association with their self assessed level of caring competence (Meretoja, Isoaho, Leino-Kilpi, & Kaira, 2004; Salonen, Kaunonen, Meretoja, & Tarkka, 2007). The aged nurses will have more adaptability in managing many critical situations than younger. According to Benner, Tanner, and Catherine (1992), the novice nurses have less clinical management skills than older nurse.

Level of Nursing Education

Nursing education is essential to nursing. An educated nurse has systematic thinking and can utilize skills and knowledge to manage critical patients better in comparison to a nurse with lower education (Laila, Ahmed, & Mojahed, 2011). Singleton (as cited in Huryk, 2010) stated that the ICU nurses must have higher education than in other units in hospital as they perform their responsibilities with the most critical patients in a high technological environment. Higher educated nurses can provide accurate information to the patients about their condition, treatment and nursing care. In this regard, nurses require higher education to provide care to critical patients. According to the Tri-Council for Nursing (2010), a highly educated nurse can implement safe, effective patient care. Studies have proved a significant correlation between higher levels of nursing education and competent practice in the ICU (Cho et al., 2008; Laila, Ahmed, & Mojahed, 2011).

Length of Working Experience

Lengthy working experience can help the nurses to widen their vision when taking care of patients (Orem, 1995). Nurses who work for long periods of time beside patients may learn during practice (Clarke & Aiken, 2003). Studies have proved that a nurse's knowledge, perception, and experience are gained through their time of experience (Laila, Ahmed, & Mojahed, 2011; Salonen, Kaunonen, Meretoja, & Tarkka, 2007).

Continuing Education and Training

Nursing care related workshops and training make the nurses more conscious and eligible (Barriball, While, & Norman, 1992). However, continued nursing related training is a very effective process to increase skills and understanding of specific things which are essential for the up-to-date care of the patient (Huggins, 2004). According to the Department of Health (2001), in the ICU, most of the patients are in critical condition and require frequent changing to their treatment pattern, so the nurses are required to obtain evidence based practice to minimize the patient's life risk by attending continuous education classes and programs (Department of Health, 2001). Studies have revealed that ongoing education and training of nurses can greatly impact on their caring practice (Hind et al., 1999; Huggins, 2004).

Self-Awareness

Self- awareness in nursing refers to how well the nurses understand themselves, their strengths, weaknesses, beliefs and values in order to better deal with their patients. Nurses need to be able to empathize with their patients and treat them

with a high level of attention; they have to be self-aware. The nurses are able to adapt to, and positively change their attitudes and actions when they are self-aware and also understand how persons treat them, hence improving the nurse-patient relationship (Freshwater, 2002). Improved caring depends on nurses' own self-understanding. They cannot help others until they are clearer about themselves (Burnard, as cited in Jack & Smith, 2007). Self-awareness has come to cover the notion of an intrapersonal process of innovation of self. It is a basic humanistic, rational threads-undergirding for professional nursing (Rogers, as cited in Eckroth-Butcher, 2010). Self-awareness helps to improve dual performances. It is an essential factor to develop management capacity in a technological environment (Burnard, 1988; 2008; Jack & Smith, 2007). There was a significant correlation between nurses' self-awareness and caring behavior (Daedoo, 1994; Prompahakul, 2011).

Definition of self-awareness

The real concept of self-awareness was pioneered by Burnard (1998), who articulated that self-awareness is one's own thoughts, feelings, and behaviors and is not limited in itself. A nurse needs to form a relationship with her patient in order to recognize herself as a nurse of the patient. Self-awareness is a 'finite, rational, and self-motivated thing which displays consistency with itself and across contexts and time'. Nurses' self-awareness is commonly referred to as nurses' insight, which describes the patients' acknowledgement of his or her own strengths and limitations, and state the ability to understand the character of good or bad events and given value to solve it (Eckroth-Bucher, 2010).

According to Parks (1997), self-awareness is a term meaning to be aware of the "*multisensorial" inner dialogue, conscious and unconscious thinking,*

emotions, spontaneous visualizations, and somato-sensory experiences. *It is not a physical "thing," but is absolutely intangible in substance"* (Parks, 1997). Self-awareness combined with the external reality and inner experience (Prigatano & Schacter, 1991). Self-awareness comes from self-insights and presence knowingly to guide individual behavior; it is an essential element to make an affirmative interpersonal relationship (Eckroth-Bucher, 2010).

Dimensions of self-awareness

According to Buss (1980), there are two dimensions of self-awareness: 1) Private self-awareness and 2) Public self-awareness

1. Private self-awareness

Private self-awareness is the inner and personal features of one's self and it relates with personal perspectives, such as memorization, feelings of physical joy, and or pain. Strengthen emotional response, clarification of experienced knowledge to others, and more intense personal standards of behavior are the positive outcome of self-awareness individuals (Hull, 2007). Private self-awareness, for a nurse, results from his or her behavior and that could reflect their personal attitudes during practice (Froming, Walker, & Lopyan, 1982).

2. Public self-awareness

Public self-awareness is the self attention of own self characteristics that is presented to others by their behavior, their talking, and their action (Hull, 2007). According to Froming, Walker, and Lopyan (1982), public self-awareness is the awareness of oneself from the imagined perspective of others, and concentration of the public self-awareness may benefit to becoming a reliable person to the society.

Measurement of self-awareness

There are several tools to measure self-awareness. Govern and Marsch (2001) developed the situational self-awareness scale (SSAS) to quantify the level of public and private self-awareness. It is a reliable aspect ordered scale that is helpful to notice the discrepancy between public and private self-awareness. Daodee (1994) developed the Nurses' Self-Awareness Questionnaire (NSAQ) to examine nurses' self-awareness in caring terminally ill patients. The result revealed that the nurses, who have higher score of self-awareness, will have higher caring behavior in working with terminally ill patients. In 2011, Prompahakul translated the NSAQ from Thai language into English used to measure nurses' self-awareness in caring the dying patients.

The NSAQ had shown adequate validity and reliability in the previous studies. The internal consistency reliability was .80 (Daodee, 1994), and .84 (Prompahakul, 2011). The result had found that nurses perceived a high level of self-awareness for caring dying patients in a provincial hospital, southern Thailand. However, the current study used the NSAQ English translated version to assess the ICU nurses' self awareness in Bangladesh. Because, this tool was appropriate within the healthcare context and ICU nurses practice in Bangladesh. The NSAQ is a twenty-item self-report instrument that measures the level of perception of knowing and understanding of one's self. In present study used NSAQ, to measure the nurses' self-awareness within two dimensions, namely private self-awareness and public self-awareness (10 items in each dimension). Private self-awareness (item 1-10) and public self-awareness (item 11-20). There were eighteen positive statements (items 1-8, and 10-19) and two negative statements (items 9 and 20). The subjects were asked

to rate their self-awareness on a 4 point scale ranging from 1 (disagree) to 4 (strongly agree). The score of negative statements was reversed to 4 (disagree) to 1 (strongly agree).

Summary of the Literature Review

Health care services in Bangladesh are progressing. The government of Bangladesh has provided supports to improve the quality of health care services, including nursing educations. Current nursing education in Bangladesh includes the diploma in nursing and the bachelor of nursing degree. In addition, the nursing profession is promoted by the government. However, continuing education and training are limited in scope.

Intensive care nursing is the specialty of nursing that focuses on the care and management of patients by using medical technologies. In this respect, the nursing profession adapts technology as a relevant and influential tool in nursing care. Locsin (2005) developed the theory of '*Technological Competency as Caring in Nursing*' which focuses nursing on a person and the process of nursing is knowing that person. Technologies and care activities are design by the nurses and used to know the person as whole in the moment. These would assist the nurses to see the patients not to be an objectification, rather affirming, supporting, and cerebrating their hopes, dreams, and aspirations as whole person (Locsin, 2005). Based on review literature, some factors were related to nurses' perceptions to caring behaviors; such as age, level of nursing education, length of working experience, continuing education and training, and nurses' self-awareness. Nurses' self-awareness is considered as the

most closely related factor to perception of caring behavior. Some studies examined nurses' self-awareness by using NSAQ. However, from the literature review, there is no study about caring in an ICU in Bangladesh and a study using TCCNI.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes the research methodology used in this study. The details of research design, research methodology involving the population and setting, sample and sample size, sampling technique, instrumentation, ethical considerations, data collection, and data analysis are presented.

Research Design

A descriptive, correlational design was used to examine (1) Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh, (2) the relationship between selected factors, including nurses' age, level of nursing education, length of working experience, continuing education and training, and self-awareness and Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh.

Population and Setting

In Bangladesh, the hospitals are classified into three levels based on location. Sub-district hospitals are considered as primary level, district hospitals are secondary level, and divisional hospitals are tertiary level. There are approximately 400 registered nurses working in ICUs including all public and private hospitals in Bangladesh (R. Howlader, personal communication, November 17, 2013). According

to Faruq et al. (2010), ninety percent of all ICUs in Bangladesh were classified as tertiary level based on their location. In this study, the data were collected from all nurses who worked in ICUs at the tertiary level public hospitals in Dhaka, Bangladesh.

Sample and Sample Size

Sample

The following inclusion criteria were used to recruit participants who were registered nurses and: (1) had earned at least a diploma in nursing or a higher qualification, (2) were working in ICU in tertiary level public hospitals, Dhaka, (3) agreed to participate in this study.

Sample Size Estimation

According to the study design, the estimated number of participants was determined by power analysis. The necessary sample size was estimated at the level of significance (α) of .05, which was the accepted minimum level of significance. The 0.80 was a conventional standard for the power of the test (Polit & Beck, 2012, p. 425). The medium effect size (*ES* = 0.37) found in the previous study (Prompahakul, 2011). Due to the difference of study context and setting, the researcher decided to take a smaller effect size for calculation. In this study, the effect size of 0.25 was used for calculating sample size. Using these parameters, the estimated sample size was 123. However, there was a limited sample in ICU at tertiary level public hospitals in Dhaka, Bangladesh as there are only 120 ICU nurses

at this level. Therefore, the researcher had taken all 120 ICU nurses as a sample in this study.

Sampling Technique

There was limited sample in ICU at tertiary level public hospitals in Dhaka, Bangladesh. Thus, all of 120 nurses in this level who met the inclusion criteria were included in this study.

Instrumentation

A set of questionnaires was used in the study consisting of three parts. Part I: Demographic Data Form (DDF), Part II: Technological Competency as Caring in Nursing Inventory (TCCNI), and Part III: Nurses' Self-Awareness Questionnaire (NSAQ). The details of each part were presented as follows:

Part I: Demographic Data Form (DDF)

This part consisted of seven items which were developed by the researcher in order to get information about the nurses' demographic characteristics including age, gender, religion, marital status, level of nursing education, length of working experience, and continuing education and training.

Part II: Technological Competency as Caring in Nursing Inventory (TCCNI)

This study used the Technological Competency as Caring in Nursing Inventory (TCCNI) to examine Technological Competency as Caring in Nursing as

perceived by ICU nurses in Bangladesh. The revised TCCNI (Parcells & Locsin, 2011) consisted of 25 items, categorized into five sub-scales based on five assumptions of the theory: (1) persons are caring by virtue of their humanness (items 4, 5, 15, 21, 23), (2) persons are whole and complete in the moment (items 11, 18, 24), (3) knowing a person is a process of nursing allowing for continuous appreciation of person as whole person (items 7, 12, 14, 16, 17, 19, 20, (4) technology is used to know the persons as whole (items 2, 6, 10, 13), and (5) nursing is a professional discipline (items 1, 3, 8, 9, 22, 25). The five statements of the rating scale were as follows: 1 = strongly disagree with the item statement, 2 = disagree with the item statement, 3 = neutral, 4 = agree with the item statement and 5 = strongly agree with the item statement.

The mean scores were interpreted generally so that a high score indicates the perception score of the nurses in this study, in that they have high agreement with the statements of Technological Competency as Caring in Nursing. It can be inferred that the nurses are practicing caring in the ICU through the lens of the theory of Technological Competency as Caring in Nursing. A low score indicates the perception score of the nurses in this study showing that they had low agreement with the statements of Technological Competency as Caring in Nursing. It can be inferred that the nurses are not practicing caring in the ICU through the lens of the theory of Technological Competency as Caring in Nursing. Use of the TCCNI was permitted by the developers (Appendix A).

The scoring criteria and score interpretation are as follows:

Scoring Criteria

Strongly disagree with the item statement (1)	means	the participant does not agree with the statement at all
Disagree with the item statement (2)	means	the participant does not agree with the statement
Neutral (3)	means	participant neither disagrees nor agrees with the statement
Agree with the item statement (4)	means	the participant agrees with the statement
Strongly agree with the item statement (5)	means	the participant agrees with the statement to a considerable extent

Score Interpretation

The total mean score and subscale scores were divided into three levels as follows:

Score	Level of perception on TCCNI
1.00 - 2.33	Low
2.34 - 3.66	Moderate
3.67 - 5.00	High

Part III: Nurses' Self-Awareness Questionnaire (NSAQ)

The NSAQ, was developed by Daodee in Thai language (1994), and translated to English language by Prompahakul (2011), and was used to assess ICU

nurses' self-awareness. The NSAQ had shown adequate validity and reliability in the previous studies. The internal consistency reliability was .80 (Daodee, 1994), and .84 (Prompahakul, 2011). The NSAQ is a 20 items self report instrument which measures nurses' perception on knowing and understanding oneself when providing care of patients. The scale was designed to measure two dimensions of nurses' self-awareness: private self-awareness and public self-awareness. Each dimension consists of 10 items. Two dimensions of a nurses' self-awareness were measured: private self-awareness (item 1-10) and public self-awareness (item 11-20). These two dimensions consisted of 16 positive statements and 4 negative statements. However, in this study the researcher changed the two items (item 4 and 19) into positive items because the participants did not understand when the statement was in a negative sentence. Eventually, the questionnaire contained 18 positive items and 2 negative items.

The participants were asked to rate their perception of each item that measured self-awareness on a 4-point scale ranging from 1 (disagree) to 4 (strongly agree). The score of negative statements were reversed to be comprised between 4 (disagree) and 1 (strongly agree). The total score of a nurses' self-awareness ranged from 0-80. Permission was obtained by the researcher from the author of the English version of the NSAQ (Prompahakul, 2011) to use this tool in this study (Appendix A).

The scoring criteria and score interpretation are as follows:

Scoring Criteria

Disagree	refers to	the participant does not agree with the statement at all
Neutral	refers to	the participant neither disagrees nor agrees with the statement
Mostly agree	refers to	the participant agrees with the statement
Strongly agree	refers to	the participant agrees with the statement to a considerable extent

Score Interpretation

The total mean score and subscale scores were interpreted in the following:

Score	Level of self-awareness
1.00 - 2.00	Low
2.01 - 3.00	Moderate
3.01- 4.00	High

Validity and Reliability of the Instruments

Validity of the Instruments

The TCCNI was developed by Parcells and Locsin (2011) to measure Technological Competency as Caring in Nursing. The psychometric evaluation of

validity and reliability of TCCNI was also tested by Parcells and Locsin, (2011). The item content validity was 0.96. Since, the instrument reflects the views of subjects in the United States of America, a test of the validity and reliability of the TCCNI was advised for using in other countries (Parcells & Locsin, 2011).

In addition, the NSAQ was primarily developed and used in Thailand (Prompahakul, 2011); it was required to check the content validity of the NSAQ for cultural relevancy in the context of Bangladesh. A panel of three experts from Bangladesh (Appendix B) tested the clarity, cultural relevancy, and language appropriateness of the Demographic Data Form, the TCCNI and the NSAQ.

The experts agreed with the items in the instruments. However, an expert commented that the second scoring criteria of the NSAQ would be 'neutral' instead of 'slightly agree'. Since, the statements of NSAQ scoring criteria for "'slightly agree" was as "the participants neither disagree nor agree" (Prompahakul, 2011) which is most appropriate to use as "neutral". The instrument was therefore revised.

Translation of the Instruments

The original versions of the TCCNI and the NSAQ were in English. In this study, both instruments were translated into the Bengali version using the back translation procedure (Sperber, Devellis, & Boehlecke, 1994). In this approach, the first translator translated the instruments from the English version into the Bengali version. Then, the second translator translated the Bengali version back into English. Finally, the two English versions were compared by a third translator who checked

the appropriate meaning and ensured the equivalence of the two English versions (The name list of translators was attached in Appendix C).

Reliability of the Instruments

The pilot study was done at the Bangladesh Institute of Research Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) hospital, Dhaka, Bangladesh. The internal consistency reliability of the TCCNI and the NSAQ in Bengali version was tested by conducting a pilot study with 20 ICU nurses who had similar characteristics with the inclusion criteria of the study. Cronbach's alpha coefficient of TCCNI was .83 and the NSAQ was .74. Thus, the reliability of NSAQ was considered as low. So, the researcher converted two negative item questions of NSAQ into the positive form (item 4 and 19) and conducted the second pilot study of the NSAQ and TCCNI within another group of 30 ICU nurses. This revealed Cronbach's alpha coefficient of the TCCNI to be .87 and the NSAQ at .80. Thus, the questionnaires were then reliable. The final tools (TCCNI and NSAQ) in English version are shown in Appendix D and Bengali version in Appendix E.

Ethical Considerations

The study was approved by the Research Ethics Committee of the Faculty of Nursing, Prince of Songkhla University, Thailand and at tertiary level public hospitals in Dhaka, Bangladesh (Appendix F). Written informed consent was obtained from the participants before the data collection started. The participants were reassured that they could refuse to participate in the study and could withdraw at any

time and they were free to ask any question about the study. The confidentiality of the collected data was maintained. Only the researcher and her advisors were able to access the data.

Data Collection Procedures

Data were collected from the ICU nurses in tertiary level public hospitals in Dhaka by using self-report questionnaire during January to February, 2014. The data collection consisted of two phases: preparation phase and implementation phase.

Preparation Phase

1. The researcher submitted the final draft of the proposal and the questionnaire to the Research Ethics Committee, Faculty of Nursing, Prince of Songkla University, Thailand for ethical consideration of human rights aspects.

2. The researcher obtained an authorization letter for data collection from the Dean of Faculty of Nursing, Prince of Songkla University, Thailand.

3. The researcher acquired administrative permission from the Directors of the setting and permission from the Nursing Superintendent of tertiary level public hospitals in Dhaka.

4. The researcher prepared a list of nurses based on the inclusion criteria.

Implementation Phase

1. The researcher contacted the participants, and explained the purposes of the study to the participants. After receiving the explanation, the participants who agreed to participate in the study were asked to sign an informed consent form.

2. Written informed consent (Appendix G) was obtained from each participant after she agreed to participate in the study.

3. The researcher distributed a set of questionnaires including the DDF, TCCNI, and NSAQ to the participants with the help of Nursing Superintendent.

4. The researcher requested the participants to give back the completed questionnaire directly to the researcher.

5. The researcher collected the completed questionnaire by herself.

6. The necessary checking was done to confirm the completion of the questionnaires appropriately.

7. The researcher coded the questionnaires to ensure anonymity of the participants, and thanked them for their participation.

Data Analysis

All data were processed and analyzed with computer analytical software. In this study, the data were analyzed by using the following statistical techniques:

1. Descriptive statistics were used for analyzing demographic data comprising of frequencies, percentages, mean, standard deviation, range, minimum, and maximum score.

2. Descriptive statistics including frequency, percentage, mean, standard deviation were used for analyzing the score and levels of the nurses' perception on Technological Competency as Caring in Nursing and nurses' self-awareness. The levels of the nurses' perception on Technological Competency as Caring in Nursing and nurses' self-awareness were divided into three levels ranging from low to high level.

3. Pearson's product-moment correlation coefficient was used to test the relationship between three selected factors (age, working experience, and self-awareness) and Technological Competency as Caring in Nursing. The criteria for the level of Pearson's product-moment correlation coefficient are described as follows: High correlation = $r > .70$, moderate correlation = $r = .30 - .70$ and low correlation = $r < .30$ (Polit & Beck, 2012).

Before performing analysis, all the necessary assumptions related to the Pearson's product-moment correlation coefficient were tested. According to Polit and Beck (2010), there are four assumptions of Pearson's product-moment correlation coefficient statistics namely, the variables must be either an interval or ratio level of measurement, variables must be approximately normally distributed; there should be a linear relationship between two variables, and absence of outliers in the data set. Brief descriptions of each assumption are stated below:

Tests of Assumptions

First, in Pearson's product-moment correlation coefficient statistics, the first assumption is that the two variables have to be measured on either an interval or ratio scale. In this analysis, the researcher examined the relationship between TCCN and the age, working experience, and self awareness where; all the variables were measured in ratio level of measurement. Thus, assumption was met.

The second, the variables must be approximately normally distributed. In order to determine normality, normal Q-Q Plot was observed. The data points were close to the diagonal line that indicates that the data were normally distributed. In addition, it also determined by dividing the skewness and kurtosis by its standard errors. These results were also supported the normal distribution as it was within the range of ± 3.

Third, the relationship between two variables should be linear. In this analysis to examine the linearity the graphs of scatter plots were formed using TCCN and the age, working experience, and self-awareness as more commonly used methods of testing the linearity between the variables. The scatter plots revealed relationships between two variables by manifesting any non-random structure in the plots.

Fourth, outlier has a very large effect on the line of the best fit and the Pearson's product-moment correlation coefficient, which can lead to very different conclusions. Using the same scatter plots and visually inspecting the graph, no particular data point was found as outlier. Therefore, for conducting Pearson's product-moment correlation coefficient, all assumptions were met (Appendix H).

4. As the rest two variables (level of nursing education and continuing education and training) did not meet the assumptions of Pearson's product-moment correlation coefficient. T-test was used to examine the mean difference of nurses' perception on Technological Competency as Caring in Nursing based on the level of nursing education, and continuing education and training.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter presents results of the study and discusses the findings of each research question. The descriptive correlation study was designed to examine: (1) Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh, (2) relationship between selected factors (age, level of nursing education, length of working experience, continuing education and training, and self-awareness) and Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh. Data were collected from 120 ICU nurses from tertiary level public hospitals in Dhaka, Bangladesh.

Results

The results of this study are presented in three parts.

1. Nurses' characteristics (demographic data and self-awareness)

2. Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh.

3. Relationship between selected factors (age, level of education, length of working experience, continuing education and training, and self-awareness) and Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh.

Nurses' Characteristics

This part presents Bangladeshi ICU nurses' demographic data and their levels of self-awareness.

Demographic Data

The study recruited one hundred and twenty participants. Demographic data were analyzed by using frequency, percentage, minimum (Min), maximum (Max), mean (*M*), and standard deviation (*SD*). The findings are presented in Table 1.

Table 1

Frequency and Percentage of Nurses' Demographic Characteristics (n = 120)

Demographic Characteristics	*n*	*%*
Age (years)		
23- 31	45	37.4
32-40	54	45.2
41-50	21	17.4
(*M* = 34.70, *SD* = 7.09, Min = 23, Max = 50)		
Gender		
Female	120	100
Marital status		
Single	20	16.7
Married	100	83.3

Table 1 (*Continued*)

Demographic Characteristics	*n*	*%*
Religion		
Muslim	77	64.2
Hindu	34	28.3
Christian	9	7.5
Level of nursing education		
Diploma	101	84.2
Bachelor	15	12.5
Master's	4	3.3
Continuing education and training on ICU caring		
Yes	58	48.3
No	62	51.7
Length of working experience (years)		
1-10	74	61.7
11-20	34	28.3
21-29	12	10.0
(*M* = 9.72, *SD* = 7.25, Min = 1, Max = 29)		

From Table 1, the findings illustrated that the age of participants ranged from 23 to 50 years, whereas, the major group (45.2%) of nurses were in middle adult ranged from 32 to 40 years. All of them were female and the majority of them were married (83.3%). More than half of the participants (64.2%) were Muslim.

The majority of participants earned a diploma degree (84.2%), 12.5% had a bachelor degree, and very few participants had earned master's degree (3.3%). Their professional experience ranged from 1 to 29 years with a mean score of 9.72 years (*SD* = 7.25). More than half of the participants (61.7%) had experience as a registered nurse for 1 to 10 years. Nearly half of the participants (48.3%) received continuing education and training by attending workshops and conferences regarding caring in nursing in ICU.

Self-awareness

The NSAQ was used to measure nurses' self-awareness while providing care in ICU. Nurses' self-awareness scores were analyzed by using the descriptive statistics. The result is presented in Table 2.

Table 2

Frequency, Percentage, Mean, Standard Deviation, Range Score, and Level of Self-Awareness (n = 120)

Self-Awareness Score	Frequency (*n*)	Percentage (*%*)
Private		
Moderate	58	48.3
High	62	51.7
M = 3.11, *SD* = 0.38, Range Score (Min-Max) = 2.00 – 3.80		
Public		
Moderate	63	52.5
High	57	47.5

Table 2 (*Continued*)

Self-Awareness Score	Frequency (*n*)	Percentage (*%*)
M = 3.54, *SD* = 0.27, Range Score (Min-Max) = 2.70 - 4.00		
Overall		
Moderate	53	44.2
High	67	55.8
M = 3.32, *SD* = 0.25 , Range Score (Min-Max) = 2.35-3.85		

From Table 2, the result showed that the majority of participants (55.8 %) rated overall self-awareness at a high level, whereas, 44.2% of the participants rated their perception on overall self-awareness at a moderate level. The overall mean score of self awareness was at a high level (*M* = 3.32, *SD* = 0.25).

For the dimension of private self-awareness, nearly 52% of the participants rated at a high level and 48% rated at a moderate level. For the second dimension, public self awareness, 52.5% of participants perceived a moderate level of self awareness and 47.5% rated at a high level on public self awareness. The mean score of private and public self-awareness were at a high level (*M* = 3.11, *SD* = 0.38 and *M* = 3.54, *SD* = 0.27, respectively).

Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh

The perception on TCCN was analyzed by using frequency, percentage, and the levels of Technological Competency as Caring in Nursing are presented in Table 3.

Table 3

Frequency, Percentage, and Levels of Nurses' Perception on Technological Competency as Caring in Nursing (n = 120)

Level of Technological Competency as Caring in Nursing		Frequency (n)	Percentage (%)
Moderate	2.34 - 3.66	54	45.0
High	3.67 - 5.00	66	55.0

From Table 3, the result showed that fifty five percent (55 %) of the participants in this study reported high level of TCCN. The result revealed that 45% of the participants rated moderate level of score of TCCN.

The overall mean scores, standard deviation, and the level of subscales of TCCN were analyzed by using descriptive statistics. The result is presented in Table 4.

Table 4

Range Score, Mean, Standard Deviation, and Levels of Nurses' Perception on Technological Competency as Caring in Nursing based on Overall and Each Subscale (n = 120)

Technological Competency as Caring in Nursing	Range Score (Min-Max)	*Mean*	*SD*	Level
Overall Each Subscale	3.08- 4.84	4.14	0.34	High

Table 4 (*Continued*)

Technological Competency as Caring in Nursing	Range Score (Min-Max)	*Mean*	*SD*	Level
1. Persons are caring by virtue of their humanness	2.80- 4.80	4.21	0.36	High
2. Persons are whole and complete in the moment	2.00- 5.00	4.20	0.53	High
3. Knowing a person is a process of nursing allowing for continuous appreciation of person as whole person	2.29- 4.00	3.35	0.37	Moderate
4. Technology is used to know the persons as whole	3.00- 5.00	4.12	0.43	High
5. Nursing is a professional discipline	3.00- 5.00	4.16	0.43	High

From Table 4, the overall mean score of TCCN was at a high level (*M* = 4.14, *SD* = 0.34). The highest mean scores of TCCN of the ICU nurses were found on the subscale of "persons are caring by virtue of their humanness" (*M* = 4.21, *SD* = 0.36), followed by the subscale of "persons are whole and complete in the moment" (*M* = 4.20, *SD* = 0.53), and the next was "nursing is a professional discipline" (*M* = 4.16, *SD* = 0.43). The subscale of "technology is used to know the person as whole" which was ranked the fourth high level (*M* = 4.12, *SD* = 0.43). The subscale of "knowing a person is a process of nursing allowing for continuous appreciation of

person as whole person" was rated at a moderate level with the lowest mean score (*M* = 3.35, *SD* = 0.37).

The Relationship between Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh and Selected Factors

According to the research question; is there a relationship between selected factors and Technological Competency as Caring in Nursing as perceived by ICU nurses in Bangladesh? Five factors were selected to test for relationship. These factors included (1) age, (2) level of nursing education, (3) length of working experience, (4) continuing education and training, and (5) nurses' self-awareness.

Pearson's product- moment correlation coefficient was used to examine the relationship between age, length of working experience, and nurses' self-awareness, and TCCN as those variables were met the assumptions of Pearson's product- moment correlation coefficient. However, level of nursing education, and continuing education and training did not meet the assumptions of Pearson's product - moment correlation coefficient, since these two variables are categorical.

Pearson's product- moment correlation coefficient was used to examine the relationship between age, length of working experience, and nurses' self-awareness, and TCCN. The result is presented in Table 5.

Table 5

Correlation Coefficients Between Three Selected Factors and Nurses' Perception on Technological Competency as Caring in Nursing (n = 120)

Selected Factors	Technological Competency as Caring in Nursing	
	r	*p*
Age	.08	.93
Length of working experience	-.08	.37
Self-awareness	.42	.01
Private self-awareness	.57	.00
Public self-awareness	-.01	.86

Table 5 shows that there was a statistically significant and moderate positive correlation between self-awareness and nurses' perception on Technological Competency as Caring in Nursing ($r = .42$, $p = .01$). The private self-awareness was also statistically significant and correlated with TCCN ($r = .57$, $p = .00$). However, there was no correlation between age, length of working experience, and nurses' perception on Technological Competency as Caring in Nursing ($r = .08$, $p = .93$ and $r = -.08$, $p = .37$, respectively).

In addition, Pearson's product- moment correlation coefficient was used to test the relationship between each dimension of self-awareness and each subscale of Technological Competency as Caring in Nursing. The results were presented in Table 6.

Table 6

Correlation Coefficients Between Each Dimension of Self-Awareness and Each Subscale of Technological Competency as Caring in Nursing (n = 120)

	TCCN					
	1	2	3	4	5	Overall
Self-Awareness						
Private	.15	.30**	.73**	.41**	.54**	.57**
Public	-.05	.10	.46**	-.25	-.08	-.02
Overall	.08	.29**	.81**	.30**	.37**	.42**

** $p < .01$

Note: 1= Persons are caring by virtue of their humanness, 2 = Persons are whole and complete in the moment, 3 = Knowing a person is a process of nursing allowing for continuous appreciation of person as whole person, 4 = Technology is used to know persons as whole, and 5 = Nursing is a professional discipline.

From Table 6, the result revealed that the overall self-awareness was significantly and moderately correlated with TCCN ($r = .42$, $p < .01$). Moreover, the result showed that private self-awareness has significantly moderate correlation with the subscales of “persons are whole and complete in the moment”, “technology is used to know the persons as whole”, “nursing is a professional discipline”, and overall perception on TCCN ($r = .30$, $p < .01$; $r = .41$, $p < .01$; $r = .54$, $p < .01$, and $r = .57$, $p < .00$, respectively). “Knowing person is a process of nursing allowing for continuous appreciation of persons” was significantly and highly correlated with private self awareness ($r = .73$, $p < .01$). Moreover, the result showed that only “knowing a person is a process of nursing allowing for continuous appreciation of person as

whole" was significantly and moderately correlated with public self-awareness (r = .46, $p < .01$).

Nurses' education levels were classified into three groups including Diploma, Bachelor, and Master's degree. However, the number of participants based on each group seems too different: Diploma = 101, Bachelor = 15 and Master's = 4. As there was very a small number for the master's, the researcher made two groups of nursing education included Diploma, and higher than Diploma (Bachelor, and Master's). A *t*-test was done to compare the nurses' perception on Technological Competency as Caring in Nursing based on the level of nursing education and continuing education and training. The result is presented in Table 7.

Table 7

The Comparison of the Nurses' Perception on Technological Competency as Caring in Nursing Based on the Level of Nursing Education (n = 120)

Source	Level of Nursing Education				*t*	*p*- value
Technological	Diploma		> Diploma			
Competency as Caring	*M*	*SD*	*M*	*SD*		
in Nursing	4.14	0.33	4.10	0.37	0.51	.613

From Table 7, the findings revealed that there were no significant differences in nurses' perception on Technological Competency as Caring in Nursing based on nurses' education levels including diploma in nursing and higher than diploma in nursing (> diploma) (t = 0.51, $p > .05$).

Table 8

The Comparison of Mean Differences Between Nurses' Perception on Technological Competency as Caring in Nursing based on Continuing Education and Training (n = 120)

Source	Continuing Education & Training				*t*	*p*- value
Technological Competency as Caring in Nursing	Yes		No			
	M	*SD*	*M*	*SD*		
	4.16	0.36	4.11	0.31	0.87	.382

From Table 8, the findings revealed that there were no significant differences in nurses' perception on Technological Competency as Caring in Nursing based on continuing education and training and non-continuing education and training ($t = 0.87$, $p > .05$).

Discussion

This section presents the discussion of the findings corresponding to the study objectives of the study and research questions. The study examined Technological Competency as Caring in Nursing and the relationship between selected factors and Technological Competency as Caring in Nursing as perceived by ICU nurses at tertiary level public hospitals in Dhaka, Bangladesh. Based on the findings, three important parts were discussed as follows: (1) nurses' characteristics, (2) Technological Competency as Caring in Nursing as perceived by ICU nurses and (3) relationship between selected factors and Technological Competency as Caring in

Nursing as perceived by ICU nurses in Bangladesh. The participants were 120 ICU nurses from tertiary level public hospitals in Dhaka, Bangladesh.

Nurses' Characteristics

The nurses' demographic characteristics are summarized in Table 1. The findings showed that age ranged from 23 to 50 years with a mean of 34.7 years (*SD* = 7.09), and more than one-third (45.2%) of the nurses' ages ranged between 32 and 40 years. All participants of this study were female due to the fact that nursing in Bangladesh is a female oriented profession (Basak, 2010; Latif, 2010).

In regard to education levels, the majority (84.2%) of the participants had earned diploma in nursing, 12.5% had graduated with a bachelor's degree and 3.3% with a master's degree. Since 2008, apart from one public nursing college, nursing educational institutions only awarded a diploma (BNC, 2006). As a result, there is rather limited opportunity for nurses to study at a higher level of professional education. Currently in Bangladesh, a master's educational program in nursing fields has not yet been established (World Health Organization, 2011). In addition to this lack of opportunity, nurses in Bangladesh have less provision for on-the -job-training in all fields, including in the ICU (Latif, 2010). The present study showed that just over half of the participants (52%) had no formal training on caring patients in the ICU. This finding was comparable with the survey report conducted by Faruq et al. (2013).

In this study, 62% of the participants' working experience ranged from 1 to 10 years, whereas only 10% had 21 to 29 years of experience as a registered nurse since starting work in a public hospital. Working experience does not only

include the years of working experience in ICUs, but may also include the working experience in other wards. This study did not design a specific question to ask the years of ICU experience. The result of the nurses' working experience was similar to other studies in Bangladesh (Islam, 2010; Sickder, 2010). However, those two studies surveyed the nurses in general wards, not in ICU settings. Islam (2010) studied nurses' knowledge, attitude, and practice regarding pressure ulcer prevention, and Sickder (2010) studied about nurses' knowledge, attitude, and practice about the prevention of surgical site infection in Bangladesh.

Regarding the continuing education and training, more than half of the participants (51.7%) did not participate in continuing education and training on caring for ICU patients. This finding affirms that nurses in Bangladesh have limited opportunity for advance education and training after graduated their nursing education from nursing institutions (WHO, 2011).

In this study, the overall perception of nurses' self-awareness was at a high level (M = 3.32, SD = 0.25). The result was similar with the study conducted by Prompahakul, (2011) where, Thai nurses' overall perception on self-awareness was high level (M = 3.14, SD = .39). In the present study, nurses' perceived high level of self awareness might have a relation with nurses' perceived importance or values of self-awareness during practice in nursing, particularly in ICU. Because, usually the patients in ICU are critically ill where nurses require high self-awareness for ensuring patients' safety, understanding patients' feelings and evaluating patients' condition or progress. Nurses' self-awareness is a dynamic transformative feeling of understanding one-self which has a profound effect on how nurses experience another person's feelings and humanity (Eckroth-Bucher, 2010). Self-awareness has long been

addressed as fundamental for professional nursing (Eckroth-Bucher, 2010) and when nurses are self-aware; they are able to adapt or positively change their attitudes (Freshwater, (2002).

Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh

The result showed that 55 % of the participants reported a high level score of TCCN, while 45% of the participants rated a moderate level; the difference is therefore not large. However, the overall mean score of nurses' perception on TCCN was at a high level (M = 4.14, SD = 0.34). This indicates that the participants in this study had high agreement with the statements of the TCCN. It is interesting that although in Bangladesh, the theory of TCCN is not integrated into the existing nursing curriculums; the ICU nurses' agreement score on TCCN showed a high level. The nurses' high level of perception on TCCN may be a relation with the existing course contents of the diploma nursing education. Nurses in Bangladesh were educated on Fawcett's (1984) nursing metaparadigms which includes '*person*', '*environment*', '*health*', and '*nursing*' (Bangladesh Nursing Council, 2006).

In the metaparadigm of nursing, a person is individual who is being nursed, who must be recognized as a person in his or her totality (Fawcett, 1984). The view of a total person is similar with the concept of TCCN where person is considered as a whole person (Locsin, 2005). In the metaparadigm of health, it refers to a person's wellbeing, which can range from high-level of wellness to terminal illness (Fawcett, 1984). Congruently, TCCN focuses health on human well being (Locsin, 2005). Fawcett, (1984) refers the environment as the context surrounding the person

during the period of wellness and illness that could affect the person's views, believes and behaviors. According to Locsin (2013), environment refers to technologically-demanding world of the human care that is conducive to human living (Locsin, 2013). Finally, nursing is a process of diagnosis and treatment of human responses to actual or potential health problems (Fawcett, 1984). According to Locsin (2005), nursing is a process of knowing persons as whole through expert use of technology. It seems that the concepts of nursing metaparadigm, the person, health, and environment are interrelated to the concepts of TCCN except "nursing". Therefore, Bangladeshi ICU nurses could understand the most of the assumptions of TCCN and had high agreement with it.

The participants reported high agreement on the assumption of "*persons are caring by virtue of their humanness"* (*M* = 4.21, *SD* = 0.36). This assumption reflected that all human beings are caring in their characteristics which are integral to the practice of nursing profession (Locsin & Kongsuwan, 2011). The participants in this study had high agreement on this assumption, possibly because this assumption is a general truth of human nature; humans are caring, and morally grounded. The participants would have learned this perspective from the ethics of the nursing profession. There was an evidenced that nurses perception on moral and ethical behavior help to be accountable for their practice and to the patients (Jormsri, Kunaviktikul, Ketefian, & Chaowalit, 2005).

Regarding the second assumption of "*persons are whole and complete in the moment"*, the participants' agreement was at a high level (*M* = 4.20, *SD* = 0.53). According to Locsin (2001), wholeness is a philosophical perspective that allows nurses to see the person as whole person, regardless of a missing body part and

will not cause them to focus nursing on fixing the person. This idea of a person might be commonly known by all nurses. The literature review found many articles presented on this topic (Gottilieb, & Gottilieb, 2007; Murphy, & Walker, 2013; Poggenpoel, 1996; Thompson, & Smith, 2002; Trossman, 1998). Another similar term is holism in which often is used in nursing (Allen, 2014; Clark, 2012; Drick, 2013). Therefore, the participants in this study had this perspective and understood its value.

The participants rated agreement at a moderate level in the assumption of "*knowing a person is a process of nursing allowing for continuous appreciation of person as whole person*" (M = 3.35, SD = 0 .37). This assumption is a significant principle of the theory of Technological Competency as Caring in Nursing. Knowing a person is a process of nursing: in the process of knowing a person, the four patterns of knowing, such as empirical, ethical, aesthetic and, personal knowing are used to know a person as whole continuously in order to affirm, support, and cerebrate person's hopes, dreams, and aspirations (Locsin, 2010). The participants might not have learnt the essence of this specific tenet in their nursing course or ongoing nursing educations. Even though, knowing is one of the caring ingredients (Mayeroff, 1971) that nurses may be taught in fundamental nursing from published articles (Cook, & Cullen, 2003; Fusa, Hayama, & Misao, 1997; Meyerhoff, Van, Harwood, Drury, & Emblen, 2002). It is a basic caring that has some differences from the process of knowing a person as described by Locsin (2005; 2010). Therefore, the result showed that the score of agreement on this assumption was at the moderate level.

For the assumption of *"technology is used to know the persons as whole"*, the participant agreement was at a high level (M = 4.12, SD = 0.43). From

the perspective of the theory, technology is an aspect of care that assists nurses to know a person. Nurses can use technology in the forms of an instrument, a tool, or nurses' activities to know the person as whole (Locsin, 2005: 2010). This idea might be understood well by the participants who were working in ICU settings. They might have good understanding about person's wholeness. In addition, they might know how technology could be used to assist in knowing person from their working experience in an ICU setting. Few studies addressed that ICU nurses used technology to assess the patients' data (Dean, 1998; Locsin, & Kongsuwan, 2011). However, to know the patient as a whole person, it is includes both the objective and subjective data. ICU nurses also were concerned about the assessment of persons as whole (Locsin, 2005; Rew, 1990).

The fifth assumption, "*nursing is a professional discipline"*, the participants had agreement at a high level (M = 4.16, SD = 0.43). This assumption asserted that nurses used knowledge of nursing such as nursing theories, nursing research evidence in their practice in nursing and focus on human well-being (Locsin, 2005; 2010; Locsin & Kongsuwan, 2011). The essence of this assumption is common in nursing; the participants might be educated while studying nursing at diploma level (Majid et al., 2011). "Nursing is a professional discipline" is unique to nursing (Leininger, as cited in Vance, 2003). Therefore, the participants in this study had agreement with the statements of this assumption at the high level.

According to Parse (1999) "the goal of the profession is to provide service to humankind through living the art of the science". The nursing profession is responsible for maintaining the professional standards of practice based on disciplinary education and knowledge that reflects safe health service to society. Parse

in 1999 also stated that the discipline of nursing encompasses the knowledge in the existing of theories that are embedded in the totality and simultaneity of nursing paradigms. In Bangladesh, the ICU nurses' agreement on TCCN was at high level that may have a relation with the nurses' belief about the concept of 'nursing is a professional discipline'. Although the discipline and the profession of nursing have different goals, but it is interrelated (Parse, 1999). As a profession nursing is the enhancement of quality of life for humankind and the discipline provides nurses the scientific knowledge and the art of practice to ensure patients safety.

Relationship Between Selected Factors and TCCN as Perceived by ICU Nurses in Bangladesh

Regarding the demographic findings of the study, the results showed that there was no significant correlation between nurses' age and their perception on TCCN (r = .08, p > .05). This result was contrary to the study finding of Salonen**,** Kaunonen, Meretoja and Tarkka, (2007) who found a positive correlation between nurses' age and positive caring attitude in intensive care setting (r = 0.129, P < 0.001)**.** In addition, Prompahakul (2011) stated that a nurses' age could influence positive caring behaviors at the end of life. Lange, Thom, and Kline (2008) found a significant association between the nurses' age and their positive caring attitude for terminally ill patients. However, in this study, there was no relationship between age and nurses' perception on TCCN. From the researcher's point of view, this might be the reasonable that age does not alter the ICU nurses' thoughts or perceptions in caring expressions in nursing. Another reason is that every nurse has professional obligations of caring in nursing, and accountability for maintaining up-to-date care in

their professional discipline that are not articulating with the age of a nurse (International Council of Nurses, 2012). Moreover, the study found that nearly 80% of participants were with the age range from 23 to 40 years, reflecting a more homogenous age group. This may be a cause of no relation between the TCCN and age.

The findings of the study showed that there was no significant difference of nurses' perception on TCCN based on their level of nursing education ($t = 0.51$, $p > .05$). This result was different with the previous studies of Cho et al. (2009), and Laila, Ahmed, & Mogahed, (2011), where they found significant correlation between nurses' education levels and their perceptions on caring. Usually, the higher educated nurses should have high perception on caring because of their education may affect in changing attitudes on developing their clinical skills or knowledge (Barriball, While, & Norman, 1992). But in the present study, the non significant result of the perception on TCCN based on nurses' level of education might be related to the nurses' demographic characteristics who participated in this study. The data revealed that in this study nearly 85% of the participants had a diploma nursing degree, 12.5% had a bachelor degree, and close to the 3% had a master's in nursing which might be not enough to make a significant difference in the level of education.

The other selected factor, length of working experience was also non-significant correlation with nurses' perception on TCCN ($r = -.08$, $p > .05$). This study finding was dissimilar with the study of Mizuno, Ozawa, Evans, Okada, and Takeo (2005), who found a significant difference of nurses' perception on caring behaviors based on the level of working experience. In the present study, the non-significant

result of working experience of nurses' perception on TCCN may be related to the staffing pattern of the selected hospitals. For instance, usually the nurses in these hospitals work on a rotational basis in each ward for a short duration and the collected data on working experience were not in the specific field of ICU, rather it was nurses' working experience in general in the public hospital.

A non significant difference was found regarding the nurses' perception on TCCN based on continuous education and training. This result indicated that nurses' perception on TCCN may not depend on their absence or presence when continuing education and training. Huggins (2004) suggested that intensive care nurses learn knowledge and skills continually based on working situation in practice and through a lifelong learning process. Therefore, understanding the TCCN can be derived from learning by doing in ICU or experience caring in ICUs.

Finally, the selected factor, nurses' self-awareness was contributed to perception on TCCN: the result revealed that nurses' self-awareness was significantly and moderately correlated with TCCN (r = .42, p = .01). It means that self-awareness could influence the nurses' perceptions on TCCN. In addition, it can be inferred that self-awareness could influence caring performance based on TCCN. This result was congruent with the previous studies conducted in Thailand (Daodee, 1994; Prompahakul, 2011) which found that nurses' self-awareness is significantly correlated with nurses' caring behaviors for patients at the end of life. In the present study, the significant correlation between nurses' perceived self-awareness and TCCN may be due to a result of nurses' perceived value of self-awareness for using the different technologies in the ICUs during caring in critical patients. According to

Burnard (1992), self-awareness is the process of understanding of individuals' own beliefs, thoughts, and behaviors and identifying how they concern to others (Burnard, 1992). High perception level of self-awareness allows nurses to accept patients' disparities and uniqueness that is helpful to express more empathetic caring attitude to patients (Townsend, 2003). In addition, self awareness is an important skill of nurses that enables them to deliver quality care for the patient in critical situation (Burnard, 1997).

Moreover, the findings showed that there was a significant positive high correlation between private self-awareness and "knowing a person is a process of nursing allowing for continuous appreciation of person as whole person" (r = .73, P < 0.1). This was enthusiasm of personal aspiration could influence nurses' positive attitude to patients and assertive thought that might help to perceive caring in this situation (Fleeson, Malanos, & Achille, 2002). A previous study supported and viewed that nurses' self-awareness enhance nurses' curiosity to know the patient and to show a positive caring attitude in regards to their individual perception of real meaning of caring in their practice (Jack & Miller, 2008).

Additionally, results revealed that only one assumption of TCCN, "knowing a person is a process of nursing allowing for continuous appreciation of person as whole person" was significantly correlated with public self-awareness (r = .46, p = .01). It might be reasonable as the public self awareness is often dealing with the adherence to social norms, such as, behavior that is socially acceptable and desirable (Froming, Corley, & Rinker, 1990). The nurses in the ICU deal with critically ill patients and their concentration is more focusing on the wellbeing of the patients as caring, rather than social desirability or expectation. But, this assumption

is important for nurses to explore the patients' needs or disabilities through which reflects nurses' caring attitude in nursing practice.

Moreover, while a nurse is aware of her own beliefs and values and is open to another person's interpretation, she tends to focus on her caring expressions with the client (Burnard, 1989). This caring expression allows nurses in assessing their patients and taken data from patients in order to discover their basic requirements and planning of care (Rogers, as cited in Eckroth-Bucher, 2010). In this regard, nurses' public self-awareness is important to knowing the patients in the theory of TCCN.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary of the study findings, strengths and limitations of the study, and implications and recommendations for further studies. This descriptive study was conducted to examine Technological Competency as Caring in Nursing and its relationship with selected factors as perceived by ICU nurses at tertiary level public hospitals in Dhaka, Bangladesh. The participants' selection was based on inclusion criteria. Data were collected by using the self-reported questionnaire composed of three main parts, namely the Demographic Data Form, Technological Competency as Caring in Nursing Inventory, and Nurse's Self-Awareness Questionnaire. The content validity of all instruments was tested by experts and the reliability of the TCCNI was .87 and NSAQ was .80. The collected data were analyzed by using the descriptive, parametric, and non-parametric statistics.

Summary of the Study Findings

Of the 120 participants who participated in this study, the youngest was 25 and the oldest was 50, their mean age was 34.7 years (34.70 ±7.09). They were recruited from tertiary level public hospitals in Dhaka, Bangladesh. All were female and the majority (83.3%) of them was married. In respect to religion, more than half of the participants (64.2%) were Muslim. With regards to education, the majority of the participants (84.2%) had a diploma, 12.5% had a bachelor's, and a low number of participants (3.3%) had a master's degree. More than half of the

participants (51.7%) did not continuing education and training regarding human caring in the ICU. With regard to length of working experience as a registered nurse, more than half of the participants (61.7%) had 1 to 10 years followed by approximately one-third (28.3%) of the participants who had 11 to 20 years of working experience.

Nevertheless, the overall nurses' perception of TCCN was at a high level (M = 4.14, SD = 0.34). The four assumptions of TCCN include "persons are caring by virtue of their humanness", "persons are whole and complete in the moment", "technology is used to the know the persons as whole", and "nursing is a professional discipline" were at a high level (M = 4.21, SD = 0.36; M = 4.20, SD = 0.53; M = 4.12, SD = 0.43; M = 4.16, SD = 0.43, respectively). Only "knowing a person is a process of nursing allowing for continuous appreciation of person as whole person" was at a moderate level (M = 3.35, SD = 0.37).

In this study, five factors were selected consisting of nurses' age, level of nursing education, length of working experience, continuing education and training, and nurses' self-awareness. Pearson's product-moment correlation coefficient was done to examine the relationship between TCCN and nurses' age, length of working experience, and self-awareness. The result showed that only the nurses' self-awareness had a significant correlation with TCCN (r =.42, p <.01). The t-test was computed to examine the mean differences of nurses' perceptions on the TCCN based on the level of nursing education and continuing education and training. The results revealed a non-significant difference for nurses' perception on TCCN by those two factors; nurses' education levels (t = 0.51, p = .61), and continuing education and training (t = 0 .87, p = .38).

Strengths and Limitations of the Study

Strength of the Study

The study was conducted in the ICUs of the tertiary level public hospitals in Dhaka, where 90% of the ICUs in Bangladesh are located. The participants of study included all the nurses working of those hospitals numbering a total of 120 ICU nurses. The data analysis was performed and conclusion was made based on the original information collected from the ICU nurses of those selected hospitals. Thus, the result can be generalized in other tertiary level ICU settings in Bangladesh where the ICU nurses may have a similar perception regarding Technological Competency as Caring in Nursing. In addition, the results can be inferred to other ICU settings where the cultural and context are similar.

Limitations of the Study

1. This study examined the ICU nurses' perceptions or agreements on the tenets of the theory of Technological Competency as Caring in Nursing. The results cannot refer to the ICU nurses' caring performances or behaviors in their practice.

2. This study used the NSAQ, which is a 4-point rating scale, namely disagree, neutral, mostly agree, and strongly agree. Thus, the neutral might not be appropriate in regards of 4-point rating scale that may result a measurement error in measuring the nurses' self-awareness.

3. The data for nurses' working experience was not specific in the field of ICU, and it was included in general ward experience. Thus, the non relationship

with nurses' work experience and perceived TCCN may not be an accurate reflection in the field of ICU.

Implications and Recommendations

There are some implications and recommendations from this study.

1**.** The results of the level of ICU nurses' agreements on the assumptions of the theory of TCCN measured by using the TCCNI cannot be referred to the ICU nurses' caring actions in their practice. In order to survey ICU nurses' caring actions or caring behaviors, the Technological Competency as Caring in Nursing Inventory (TCCNI) (Parcells & Locsin, 2011) is recommended to be adapted by revising the item statements.

2. For the next study to survey nurses' self-awareness, it is recommended to use the NSAQ (Prompahakul, 2011) as a tool in the study. However, the researcher should consider changing the measurement scale of the NSAQ, since the original scale never reported any problem or error in the measurement (Prompahakul, 2011).

3. The results of this study can serve as basic data for nursing in Bangladesh. However, nurse educators and nurse administrators should be concerned or aware of the finding of the participants' perception being at a moderate level for the assumption "knowing a person is a process of nursing that allows for continuous appreciation of a person moment to moment" (Locsin, 2005). Perception, thought or attitude can influence practice (Ajzen, 1991).

According to Locsin (2010), knowing persons is a considerable process in order to understand the persons as whole and participate in the care that would prevent risk to life and enhance patients' wellness. To increase a better understanding on this assumption, the theory of TCCN (Locsin, 2005) should be taught to ICU nurses in their continuing education or short course training. Nurse educators can consider integrating this theory in a nursing course for a bachelor or master's program.

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APPENDICES

APPENDIX A

Permission Letters for Using the Instruments (TCCNI)

Dear Shikha Rani Biswas,

Yes, you have my permission to use the tool. Thank you for your interest in the theory of Technological Competency as Caring in Nursing.

Dr. Locsin
ROZZANO C. LOCSIN, RN; PhD, FAAN
Professor of Nursing
Florida Atlantic University,
Christine E. Lynn College of Nursing
777 Glades Road Boca Raton, FL 33431-0991 tel: 561-297-2875 ;
FAX: 561-297-2416. Email: locsin@fau.edu web: http://nursing.fau.edu

From: Shikha rani Biswas [shikha_dhaka24@yahoo.com
To: Rozzano Locsin < locsin@fau.edu
Sent: Friday, July 12, 2013 12:11 AM
Subject: Ask the permission for revised TCCNI
Dear Sir (Prof. Dr. Locsin)

Good morning. I am Shikha Rani Biswas, International master nursing students of Prince of Songkla University, Thailand. My research study title is about technological competency as caring in nursing as perceived by ICU nurses in Bangladesh and Its related factors. I already accomplished the proposal defense. Further, the committee suggests me to use your instruments related to technological competency as caring in nursing because the content is similar with my study outcome. However, this will be psychometric testing with the subjects of my research population and setting. Therefore, I would like to ask permission from you in order to use your inventory (TCCNI).Thank you for your helps and attention.

Shikha Rani Biswas

Permission Letter for Using the Instrument (NSAQ)

บันทึกข้อความ

ส่วนราชการ ศูนย์ทรัพย์สินทางปัญญา อุทยานวิทยาศาสตร์ มหาวิทยาลัยสงขลานครินทร์ โทร.๙๓๒๒
ที่ มอ ๑๖๔.๓/๐๒๙ **วันที่** ๔ กุมภาพันธ์ ๒๕๕๗
เรื่อง อนุญาตให้ใช้ลิขสิทธิ์ในวิทยานิพนธ์

เรียน คณบดีคณะพยาบาลศาสตร์

ตามหนังสือที่ มอ ๖๐๐/๒๙๗ ลงวันที่ ๓๐ มกราคม ๒๕๕๗ Mrs. Shikha Rani Biswas นักศึกษาหลักสูตรพยาบาลศาสตรมหาบัณฑิต (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ มีความประสงค์ขอใช้เครื่องมือวิจัย คือ Nurses Self-Awareness Questionnaire ของ นางสาวชุลีพร พรหมพาหกุล ซึ่งได้นำมาปรับปรุงและเป็นส่วนหนึ่งของวิทยานิพนธ์ เรื่อง "Factors Relating Nurses' Caring Behavior for Dying Patient in Southern Thailand" ของหลักสูตรพยาบาลศาสตรมหาบัณฑิต (หลักสูตรนานาชาติ) คณะพยาบาลศาสตร์ ปี ๒๕๕๓ นั้น

ในการนี้ มหาวิทยาลัยสงขลานครินทร์ ได้พิจารณาแล้วมีความเห็นว่าควรอนุญาตให้ทางคณะพยาบาลศาสตร์ ใช้ผลงานลิขสิทธิ์ดังกล่าวโดยไม่มีค่าตอบแทนและใช้สิทธิได้เฉพาะภายในคณะพยาบาลศาสตร์ มหาวิทยาลัยสงขลานครินทร์ เท่านั้น ทั้งนี้จะต้องมีการอ้างถึงมหาวิทยาลัยฯ และชื่อผู้สร้างสรรค์ผลงานให้เป็นที่ประจักษ์ในการใช้ผลงานดังกล่าวด้วย หากมีผู้ประสงค์จะใช้งานในผลงานอันมีลิขสิทธิ์ดังกล่าวนอกเหนือจากที่ได้อนุญาตไว้ จักต้องมีการขออนุญาตและได้รับการอนุญาตจากมหาวิทยาลัยสงขลานครินทร์ก่อนทุกครั้ง

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร. อัครวิทย์ กาญจนโอภาษ)
ผู้อำนวยการอุทยานวิทยาศาสตร์
มหาวิทยาลัยสงขลานครินทร์

อุทยานวิทยาศาสตร์ มหาวิทยาลัยสงขลานครินทร์
อุทยานวิทยาศาสตร์ มหาวิทยาลัยสงขลานครินทร์ Prince of Songkla University Science Park
ชั้น ๑๒ อาคารศูนย์ทรัพยากรการเรียนรู้ มหาวิทยาลัยสงขลานครินทร์ ตำบลคอหงส์ อำเภอหาดใหญ่
จังหวัดสงขลา ๙๐๑๑๐ โทรศัพท์ ๐-๗๔๒๘-๙๓๓๓ โทรสาร ๐-๗๔๒๘-๙๓๓๙
E-mail : southerntsp@gmail.com Website : http://www.psusp.psu.ac.th

APPENDIX B

List of the Experts for Content Validity Test

Three experts validated the contents of the instruments. The name of the experts is:

1. Mrs. Saleha Begum, MSN in Nursing, RN. Instructor.
   College of Nursing, Mohakhali, Dhaka, Bangladesh.

2. Mrs. Ira Dibra, MSN in Public Health, RN. Principal.
   Dhaka Nursing College. Dhaka Medical College Hospital, Dhaka, Bangladesh.

3. Mrs. Salma Khatun, MSN in Public Health, Nursing Officer.
   Directorate of Nursing Services, 14/15, Motijeel C/A, Dhaka, Bangladesh.

APPENDIX C

List of the Translators of the Instrument

Three bilingual translators were used in the translation process of the Inventory of Technological Competency as Caring in Nursing and Nurses' Self-Awareness Questionnaire. Two translators were involved in the process of translation and back translation and third translator checked the consistency and discrepancy of the meaning and appropriateness of the word used.

The translators are:

1. Md. Zakir Hossain, Master in public health, RN, National Institute of Kidney Diseases and Hospital, Dhaka, Bangladesh.

2. Md. Nurul Anowar, PhD in nursing Nursing Instructor, Directorate of Nursing Services, Dhaka, Bangladesh.

3. Dr. Liakat Ali, Emergency Medical Officer, National Institute of Kidney Diseases and Hospital, Dhaka, Bangladesh.

APPENDIX D

English Version of the Instruments for Data Collection

Code ……

Introduction: A set of questionnaire was used in the study. The questionnaires was consisted of three parts are Part I: Demographic Data Form (DDF), Part II: Technological Competency as Caring in Nursing Inventory (TCCNI), and Part III: Nurses Self-Awareness Questionnaire (NSAQ).

General Instruction: Please follow the instructions to answer the questionnaire:

1. Do not write your name on any part of this questionnaire.

2. Answer the items as you prefer and there is no right or wrong answer.

Part 1: The Demographic Data Form (DDF)

Instruction: Please provide information about your personal and service related data. Put (✓) mark in the box (no. 2-6), and fill in the available space (no.1 & 7) according to your opinion.

1. Age: …… years old.

2. Gender: ( ) Male ( ) Female

3. Marital status: ( ) Single ( ) Married
( ) Divorced ( ) Separated

4. Religion: ( ) Islam ( ) Hinduism
( ) Christian ( ) Buddhism

5. Level of nursing education: ( ) Diploma ( ) Bachelor
( ) Master

6. Have you ever participated in a continuous education and training according to:

6.1 Human caring or humanistic care, caring concept or caring theory, and technologies of human care in ICU ( ) Yes ( ) No

7. Working experience …… years.

Part II: **Technological Competency as Caring in Nursing Inventory (TCCNI)**

Instruction: Please read the item statement that describes Technological Competency as Caring in Nursing. Place (✓) mark on the most appropriate number for each statement. The answer scale is categorized into five rating scale as follows:

1 = strongly disagree with the item statement

2 = disagree with the item statement

3 = neutral

4 = agree with the item statement

5 = strongly agree with the item statement

No	Technological Competency as Caring in Nursing	1	2	3	4	5
1	Nursing, is an important part of healthcare, focuses on human caring.					
2	Technology assists nurses in knowing who the person is and what the person is.					
3	The outcome of nursing is healing by saving lives and increasing a sense of self.					
4	Nurses use unique techniques to care for patients.					
5	Caring is engaging in compassion, physical					

No	Technological Competency as Caring in Nursing	1	2	3	4	5
	presence, comforting, and respecting the whole person.					
	…….					
	…….					
	…….					
25	Nurses use technology and human touch together in order to relate to their patients with true presence and caring intentions.					

Part III: Nurses' Self-Awareness Questionnaire (NSAQ)

Instructions: Please carefully read each statement which consists of 20 items and answer by marking ✓ in the space available that is appropriate for you and only one answer per question. The answer categorized into four levels as the follows:

Disagree	(1)	refers to	the participant does not agree with the statement at all
Neutral	(2)	refers to	the participant neither disagrees nor agrees with the statement
Mostly agree	(3)	refers to	the participant agrees with the statement
Strongly agree	(4)	refers to	the participant agrees with the statement to a considerable extent

No	**Private self-awareness**	1	2	3	4
1	While taking care of a patient, I know what I am thinking				
2	While taking care of a patient, I know what I am doing for the patient				
3	While taking care of a patient, I always consider my				

No	**Private self-awareness**	1	2	3	4
	actions				
4	While taking care of a patient, I frequently do not intend with activities that I am doing at the moment for the patient				
	……				
	……				
	……				
10	While taking care of a patient, I feel that I am attempting to look for my standpoint.				
	Public self-awareness				
11	While taking care of a patient, I pay attention to my physical neatness and uniform.				
12	While taking care of a patient, I pay attention to my manner.				
13	While taking care of a patient, I am aware of my words and my facial expression.				
14	While taking care of a patient, I am aware of using body language to communicate with the patient.				
	……				
	……				
	……				
20	While taking care of a patient, I always do activities without considering how the patient feels about me.				

APPENDIX E

Bengali Version of the Instruments for Data Collection

হাসপাতাল কোড নং.....

সূচনাঃ এই প্রশ্নপত্রটি তিনটি অংশে বিভক্ত। প্রথমঅংশটি হল, ব্যক্তিগত ও চাকুরী সংক্রান্ত ফরম। দ্বিতীয় অংশটি হল মানবসেবায় যত্ন হিসাবে প্রযুক্তিগত যোগ্যতা সম্বন্ধীয় প্রশ্নাবলী এবং তৃতীয় অংশটি হল নার্সগনের আত্ম-সচেতন সম্বন্ধীয় প্রশ্নাবলী।

অংশ ১: ব্যক্তিগত ও চাকুরী সংক্রান্ত ফরম (ডিডিএফ)

নির্দেশনা: আপনার ব্যক্তিগত ও চাকুরী সংক্রান্ত তথ্য প্রদান করুন। প্রশ্নপত্রের কোন অংশে দয়া করে আপনার নাম লিখবেন না। আপনার মত অনুসারে বক্সে টিক চিহ্ন (✓) দিন (২-৬ নং) ও খালি জায়গা পুরন করুন (১ এবং ৭ নং)।

১. বয়স..... বছর

২. লিঙ্গ ( ) ১. পুরুষ ( ) ২. মহিলা

৩. বৈবাহিক অবস্থা ( ) ১. অবিবাহিত ( ) ২. বিবাহিত

( ) ৩. তালাকপ্রাপ্ত ( ) ৪. বিধবা

৪. ধর্ম ( ) ১. ইসলাম ( ) ২. হিন্দু ( ) ৩. খ্রীস্টান

৫. নার্সিং শিক্ষার লেভেল ( ) ১. ডিপ্লোমা ( ) ২. স্নাতক ( ) ৩. মাস্টার

৬. আপনি কি নিম্নলিখিত বিষয়গুলি অনুসারে অবিরত শিক্ষা ও প্রশিক্ষনে অংশ গ্রহন করেছেন?

মানবীয় যত্ন বা মাবনতান্ত্রিক যত্ন, যত্ন নেওয়ার ধারনা বা তত্ত্ব, আইসিইউতে মানব যত্নের প্রযুক্তি

( ) ১. হ্যাঁ ( ) ২. না

৭. কাজ করার অভিজ্ঞতা ..... বছর

অংশ ২: মানবসেবায় যত্ন হিসাবে প্রযুক্তিগত যোগ্যতা সম্বন্ধীয় প্রশ্নাবলী (টিসিসিএনআই)

নির্দেশনা: মানবসেবায় যত্ন হিসাবে প্রযুক্তিগত যোগ্যতার বিবরন পাঠ করুন। এবং প্রতিটি বিবরনের জন্য অধিক উপযুক্ত নাম্বারে (✓) চিহ্ন দিন। পাচটি রেটিং স্কেলে উত্তর মাপদন্ড নিম্নরুপে শ্রেণীভুক্ত করা হয়েছে:

১ = আইটেম বিবরনের সাথে প্রবলভাবে অসম্মত ২ = আইটেম বিবরনের সাথে অসম্মত

৩ = স্বাভাবিক ৪ = আইটেম বিবরনের সাথে সম্মত

৫ = আইটেম বিবরনের সাথে প্রবলভাবে সম্মত

মানব সেবায় যত্ন হিসাবে প্রযুক্তিগত যোগ্যতার বিবরন

নং	মানবসেবায় যত্ন হিসাবে প্রযুক্তিগত যোগ্যতার প্রশ্নাবলী (২৫টি)	১	২	৩	৪	৫
১	নার্সিং স্বাস্থ্যসেবার একটি গুরত্বপুর্ন অংশ যাহা মানব সেবার উপর প্রাধান্য দেয়।					
২	ব্যক্তি কে এবং ব্যক্তির কি তা জানতে প্রযুক্তি নার্সদের সহায়তা করে।					
৩	নার্সিং এর ফলাফল হল আরোগ্যলাভ ও জীবন রক্ষা এবং নিজের সম্পর্কে আত্ম-উপলব্ধি বৃদ্ধি করা ।					
৪	রোগী পরিচর্যার ক্ষেত্রে নার্সরা একক/স্বতন্ত্র কৌশল ব্যবহার করে থাকে।					
৫	মানবসেবা- সহানুভুতি, শারিরীক সত্ত্বা,শান্তনা এবং কোন ব্যক্তির সামগ্রিক বিষয়ের প্রতি শ্রদ্ধাশীল হওয়ার সাথে জড়িত।					
	.....					
	.....					
	.....					
২৫	নার্সরা রোগীদেরকে বাস্তব পরিস্থিতিও সেবার সংকল্পতার সাথে সম্পৃক্ত করার জন্য প্রযুক্তি ও মানবীয় গুনাবলী ব্যবহার করে থাকে।					

অংশ ৩: নার্সগনের আত্ম -সচেতন সম্বন্ধীয় প্রশ্নাবলী (এনএসএকিউ)

নির্দেশনা: অনুগ্রহ করে নিম্নে বর্নিত বিবরন পাঠ করুন যাহাতে আত্ম-সচেতন সম্বন্ধীয় ২০টি আইটেম আছে এবং সঠিক উওরের পার্শ্বে টিক (✓) চিহ্ন দিন। চারটি স্কেলে উওর মাপদন্ড নিম্নরুপে শ্রেনীভূক্ত করা হয়েছেঃ

১ = আইটেম বিবরনের সাথে অসম্মত ২ = স্বাভাবিক /নমনীয়

৩ = আইটেম বিবরনের সাথে সম্মত ৪ = আইটেম বিবরনের সাথে প্রবলভাবে সম্মত

নং	নার্সগনের আত্ম-সচেতন সম্বন্ধীয় প্রশ্নাবলী	১	২	৩	৪
	ব্যক্তিগত আত্ম -সচেতনতা				
১	রোগী পরিচর্যার সময়ে আমি জানি আমি কি চিন্তা করি।				
২	রোগী পরিচর্যার সময়ে আমি জানি আমি রোগীর জন্য কাজ করছি।				
৩	রোগী পরিচর্যার সময়ে আমি সর্বদা আমার কর্তব্য বিবেচনা করি।				
৪	রোগী পরিচর্যার সময়ে যাহা করনীয় তাহা করতে আমি প্রায়শই আগ্রহী থাকি না।				
	.....				
	.....				
	.....				
১০	রোগী পরিচর্যার সময়ে আমি অনুভব করি যে আমি আমার লক্ষ্যবস্তুর প্রতি পদক্ষেপ নিচ্ছি।				
	জন আত্ম-সচেতনতা				
১১	রোগী পরিচর্যার সময়ে আমি আমার শারিরীক পরিপাটি ও পোষাকের প্রতি খেয়াল রাখি।				
১২	রোগী পরিচর্যার সময়ে আমি আমার আচরনের প্রতি খেয়াল রাখি।				
১৩	রোগী পরিচর্যার সময়ে আমি আমার কথা ও ভাব-ভঙ্গির প্রতি সচেতন থাকি।				
১৪	রোগী পরিচর্যার সময়ে রোগীর সাথে তথ্য আদান-প্রদানে আমি আমার অঙ্গ-ভঙ্গির ব্যবহারের প্রতি সচেতন থাকি।				
	.....				
	.....				
	.....				
২০	রোগী পরিচর্যার সময়ে আমি সর্বদা রোগীর অনুভূতি বিবেচনা ব্যতীত কাজ করি।				

APPENDIX F

Permission Letters for Data Collection

FACULTY OF NURSING

PRINCE OF SONGKLA UNIVERSITY

P.O. BOX 9, KHOR HONG, HATYAI
SONGKHLA, THAILAND, 90112
FAX NO. 66-74-286421
TEL. NO. 66 74 286456,
66-74-286459

MOE 0521.1.05/181

January 21 , 2014

To Director of Dhaka Medical College Hospital,
Dhaka, Bangladesh

This letter is to inform you that Mrs. Shikha Rani Biswas ID. 5510420027, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in her last semester. As part of the requirement of the course, she has to conduct a research study in Bangladesh. Her thesis is entitled : "Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh and Its Related Factors." The thesis proposal has been approved on 5 January 2014. Therefore, she will collect data from nurses in Dhaka Medical College Hospital, Dhaka, Bangladesh, during 1 month (February 2014)

I will be greatly appreciated if Mrs. Shikha Rani Biswas is permitted to collect data in Dhaka Medical College Hospital, Dhaka, Bangladesh, as it will provide valuable information for this group of nurses in the future.

If you need any further information regarding her study, please do not hesitate to contact us at the above address or e-mail us at: waraporn.k@psu.ac.th.

Sincerely Yours,

Tasanee Nasae

Assistant Professor Tasanee Nasae, PhD., RN
Acting Dean,
Faculty of Nursing
Prince of Songkla University
Hat Yai, Songkhla 90110
THAILAND

FACULTY OF NURSING

PRINCE OF SONGKLA UNIVERSITY

P.O. BOX 9, KHOR HONG, HATYAI
SONGKHLA, THAILAND, 90112
FAX NO. 66-74-286421
TEL. NO. 66 74 286456,
66-74-286459

MOE 0521.1.05/180

January 21 , 2014

To Director of Sir Sallimullah Medical College Mitford Hospital,
Dhaka, Bangladesh

This letter is to inform you that Mrs. Shikha Rani Biswas ID. 5510420027, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in her last semester. As part of the requirement of the course, she has to conduct a research study in Bangladesh. Her thesis is entitled : "Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh and Its Related Factors." The thesis proposal has been approved on 5 January 2014. Therefore, she will collect data from nurses in Sir Sallimullah Medical College Mitford Hospital, Dhaka, Bangladesh, during 1 month (February 2014)

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If you need any further information regarding her study, please do not hesitate to contact us at the above address or e mail us at: waraporn.k@psu.ac.th.

Sincerely Yours,

Tasanee Nasae

Assistant Professor Tasanee Nasae, PhD., RN
Acting Dean,
Faculty of Nursing
Prince of Songkla University
Hat Yai, Songkhla 90110
THAILAND

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TEL. NO. 66 74 286456,
66-74-286459

MOE 0521.1.05/178

January 21 , 2014

To Director of Bangladesh Institute of Research and Rehabilitation
in Diabetes, Endocrine and Metabolie (BIRDEM),
Dhaka, Bangladesh

This letter is to inform you that Mrs.Shikha Rani Biswas ID. 5510420027, a master student of the Faculty of Nursing, Prince of Songkla University, Thailand, is taking a thesis in her last semester. As part of the requirement of the course, she has to conduct a research study in Bangladesh. Her thesis is entitled : "Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh and Its Related Factors." The thesis proposal has been approved on 5 January 2014. Therefore, she will try-out research instruments from nurse in Bangladesh Institute of Research and Rehabilitation Institute in Diabetes, Endocrine and Metabolie (BIRDEM), Dhaka, Bangladesh, during 1 month (February, 2014)

I will be greatly appreciated if Mrs.Shikha Rani Biswas is permitted to try-out research instruments in Bangladesh Institute of Research and Rehabilitation Institute in Diabetes, Endocrine and Metabolie (BIRDEM), Dhaka, Bangladesh, as it will provide valuable information for adult nursing to enhance nurses' competence in this particular area.

If you need any further information regarding her study, please do not hesitate to contact us at the above address or e-mail us at: waraporn.k@psu.ac.th.

Sincerely Yours,

Tasanee Nasae

Assistant Professor Tasanee Nasae, PhD., RN
Acting Dean,
Faculty of Nursing
Prince of Songkla University
Hat Yai, Songkhla 90110
THAILAND

APPENDIX G

Informed Consent Form

Dear Colleagues,

My name is Shikha Rani Biswas and I am a Senior Staff Nurse in Sir Salimullah Medical College Hospital, Dhaka, Bangladesh. I am also a master nursing student of Faculty of Nursing, Prince of Songkla University, Thailand. I am conducting a research study entitled “Technological Competency as Caring in Nursing as Perceived by ICU Nurses in Bangladesh and Its Related Factors”. This study has been approved by the Research Ethics Committee of Faculty of Nursing, Prince of Songkla University, Thailand and it is also granted permission by the Ethical Committee of tertiary level public hospitals, Dhaka, Bangladesh.

If you are interested in participating in this study, you will be asked to complete a set of questionnaires, the demographic data form, Technological Competency as Caring in Nursing Inventory, and Nurses’ Self-Awareness Questionnaire. This will take your time 30-40 minutes to complete the questionnaires. There is no known risk related to participating in the study and there is neither cost nor payment to you for participating in this study. It is therefore expected that this study will be used as an evidence to support area for assessing nurses’ perception on technological competency as caring in nursing. This research finding could provide the valuable information about technological competency as caring in nursing and baseline data for further research related to technological competency as caring in nursing as perceived by ICU nurses in Bangladesh and its related factors.

All information and your responses in this study will be kept confidential and anonymous. Only the researcher and the advisors are eligible accessing the data. Neither your name nor any identifying information will be used in the reports of the study. Your participation in this study is voluntary. Signing the informed consent to participate indicates that you understand what is involved and you consent to participate in this study. You have the right to withdraw from participation anytime without any problems prior to completion of data collection. Finally, if you have questions in completing the questionnaires or need more information, please contact either the researcher or advisor listed below:

Thank you for your willingness and cooperation to participate in this study.

……...	....……
( )	(Shikha Rani Biswas)
(Participant)	(Researcher)

Advisor	Researcher
Waraporn Kongsuwan, RN, PhD	Shikha Rani Biswas
Faculty of Nursing	Senior Staff Nurse , SSMC, Mitford
Prince of Songkla University	Hospital, Dhaka
Thailand	Email: shikha_dhaka24@yahoo.com
Email: waraporn.k@psu.ac.th	Mobile: 0172-0514025
Phone: 66-74-286522	

APPENDIX H

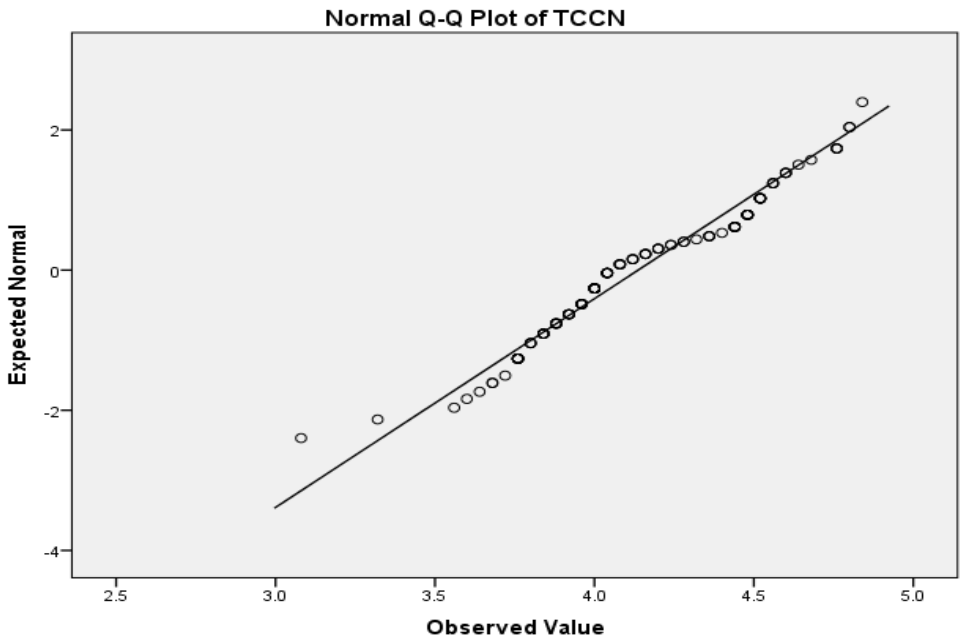
Statistical Assumptions' Test

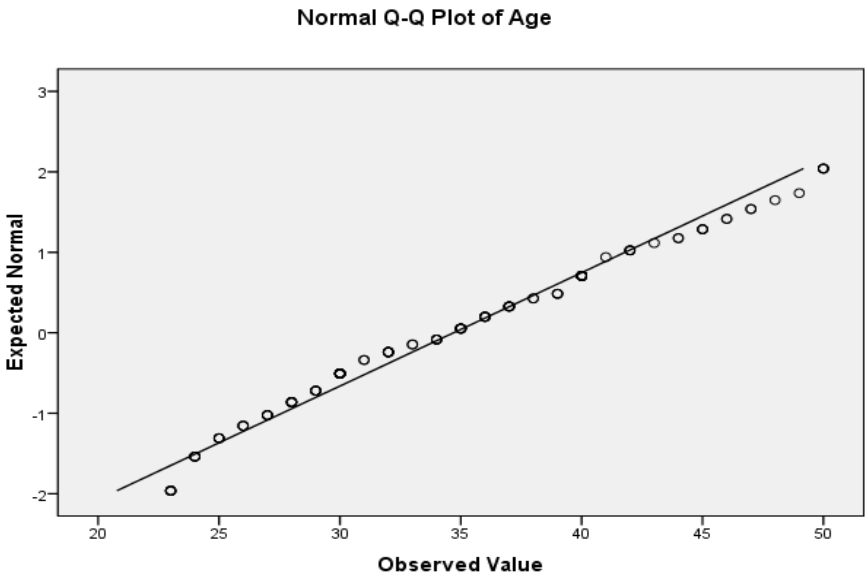
Tests of Normality

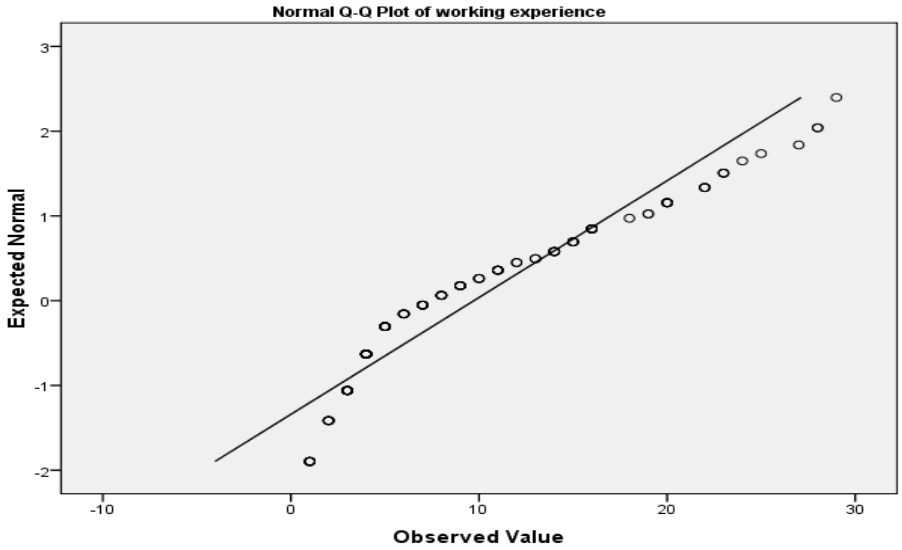
Skewness and kurtosis of the study variables

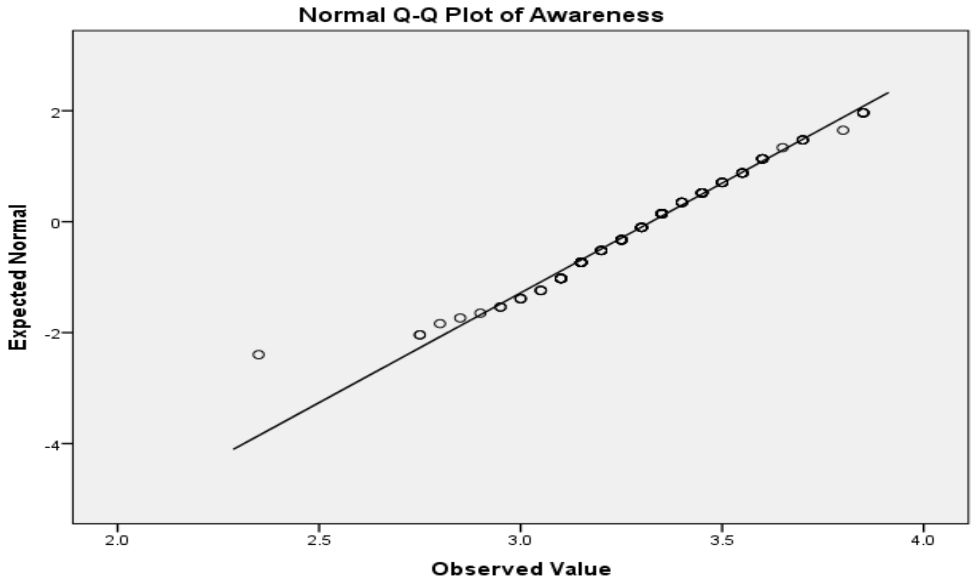
Items	Skewness/SE of Skewness	Kurtosis/ SE of Kurtosis
Age	.278/.221	-.682/.438
Working experience	.579/.221	-.200/.438
Self-awareness	-.362/.221	1.244/.438
TCCN	.019/.221	-.193/.438

Test of normality by normal Q-Q plots



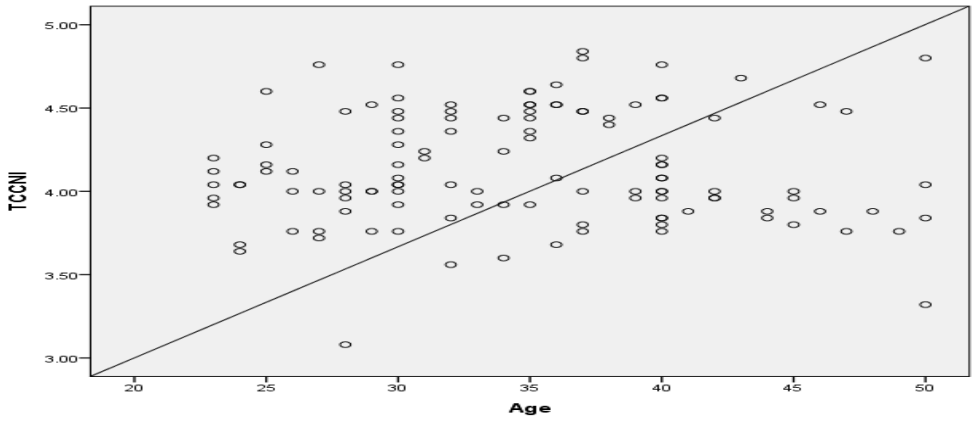

Normal Q-Q Plot of Age
Expected Normal
Observed Value
3
2
1
0
-1
-2
20
25
30
35
40
45
50

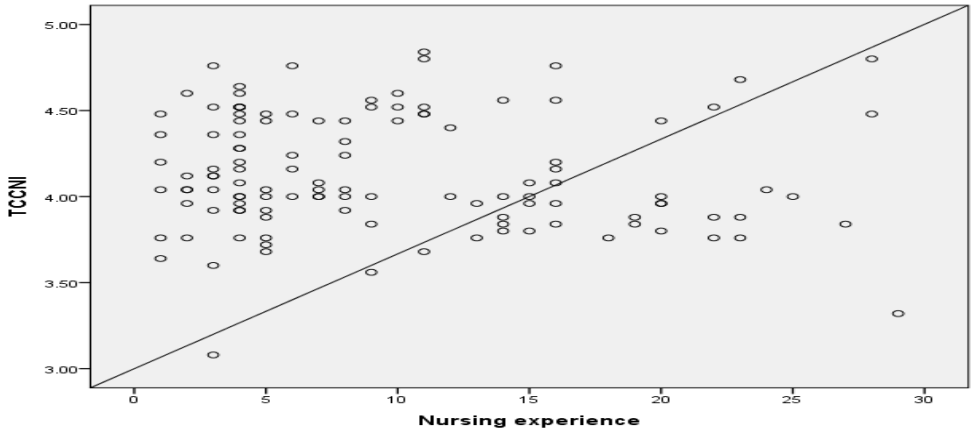

Normal Q-Q Plot of working experience
Expected Normal
Observed Value
3
2
1
0
-1
-2
-10
0
10
20
30

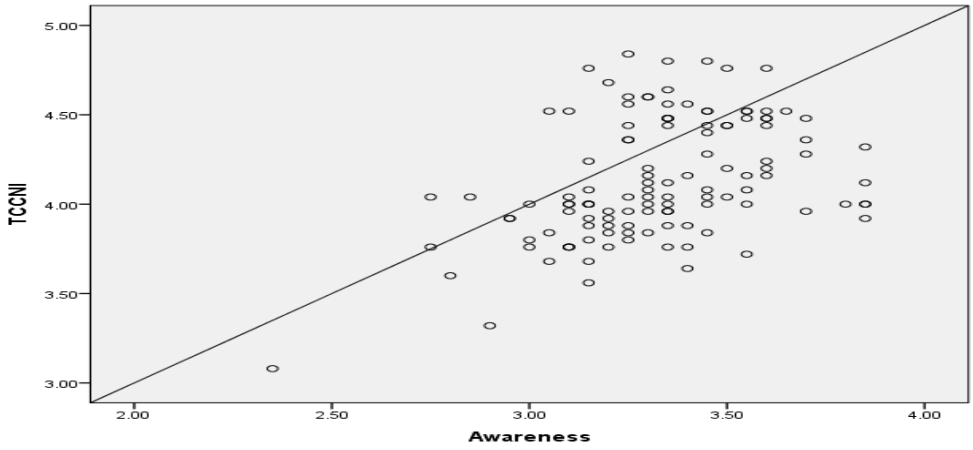


Test of Linearity and Outliers

Graph for assumptions of linearity between the error variance of independent variables (age, working experience, and self-awareness) with Technological Competency as Caring in Nursing.




TCCNI
5.00
4.50
4.00
3.50
3.00
0
5
10
15
20
25
30
Nursing experience


TCCNI
5.00
4.50
4.00
3.50
3.00
2.00
2.50
3.00
3.50
4.00
Awareness

VITAE

Name Mrs. Shikha Rani Biswas

Student ID 5510420027

Educational Attainment

Degree	Name of Institution	Year of Graduation
Bachelor of Nursing Science	College of Nursing, University of Dhaka, Bangladesh	2007

Scholarship Award during Enrollment

2012 - 2013 Scholarship for the Degree of Master of Nursing Science (International Program), Faculty of Nursing, Prince of Songkla University, Hat Yai, Thailand, Funded by the Ministry of Health and Family Welfare (MOHFW), Government of the People's Republic of Bangladesh.

Work-Position and Address

Senior Staff Nurse

Sir Salimullah Medical College, Mitford Hospital, Dhaka, Bangladesh. Phone: 0172-0514025.

Email: shikha_dhaka24@yahoo.com