

BSc thesis

2010-2011

**Nurses' experiences of the most common medical errors in the intensive
care unit and the coronary care unit**

A hermeneutic phenomenological study

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Essay title: Nurses' experiences of the most common medical errors in ICU and CCU

A hermeneutic phenomenological study.

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Topic: Medical errors in nursing

Level and Credits: BSc, 2Cr.

Course: Nursing Graduation Project

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Abstract:

Background: Human error occurs in every occupation. Medical errors may result in a near miss or an actual injury to a patient that has nothing to do with the underlying medical condition. Intensive care has one of the highest incidences of medical error and patient injury in any specialty medical area; thought to be related to the rapidly changing patient status and complex diagnoses and treatments.

Aims: The primary aim of the study is to investigate about nurses' experience of the most common medical errors in critical care units and coronary care units.

The secondary aims: to assess the nature, consequences and associations of medical errors in ICUs/CCUs, to examine the factors influencing nurses' error, and to propose strategies to prevent errors.

Setting: five intensive care units(ICU) and two coronary care units(CCU) in five governmental hospitals and one coronary care unit in a private hospital in the west bank of Palestine.

Sample: fifteen registered nurses (12 ICU nurses, 3 CCU nurses) who has at least four years experience in the critical or coronary care units.

Research methodological design: Using qualitative methodology, hermenutic phemenological approachs semi-structured interviews were guided by a script which included a series of both open-ended and Pop questions.

Results: the nurses'experiences of the most common medical errors in ICUand CCU are presented in nine themes: Medication errors, technical equipments errors, patient's monitoring errors, resuscitation errors, nursing procedure errors, intravenous solutions errors, patient care errors, documentation and assessment errors, and communication errors among health teams.

Conclusion: Practical nurses made substantially more medical errors. To work frequent shifts of 24 hours is a strong factor to commit medical errors. Increase the competency and number of nurses per patients and reduce the number of working hours can reduce medical errors and address patient safety concerns in intensive and coronary care units.

Key words: *nurses' experience, intensive care unit, coronary care unit, medical error, patient safety, hermenutic, phenomenology.*

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1. Introduction

Nurses' experiences of maintaining the quality of practice is important in the context of today's safety and quality agenda (**Great et al 2009**). The intensive care unit (ICU) is complex and has one of the highest prevalence of medical errors. Patient injury is believed to be related to the rapidly changing patient status and complex diagnoses and treatments (**Tracey et al 2009**).

The organization of ICU patients vary greatly and taken care of by a number of different providers use different technologies. Therefore, the adverse event reports an important component for improving patient safety. Studies suggest that errors and adverse events that may result are common in ICUs (**Beckmann et al 1998**). One study found that staff reported a serious event for 17% of patients (**Andrews et al 1997**). An evaluation of errors in the intensive care unit that is used both self-produced reports and direct observations to count errors found 1.7 errors per patient per day (**Donchin et al 2003**) of these errors were 29% can cause significant injury, including death and for every day in hospital likelihood of experiencing an adverse event increased by 6% (**Andrews et al 1997**).

Studies have recognized that the safety of patients in this high risk area can be compromised resulting in an increased risk of medical error (**Osmon et al 2004, Rothschild et al 2005**). Researchers have suggested that the control of error should be an integral part of quality assurance of all the health providers (**Leap et al 1991**).

There are no reported studies on nursing medical errors in Palestine, and therefore we sought to examine the nature, consequences and associations of medical errors in ICU / CCUs reported by the ICU-CCU nurses and to examine the factors influencing nurses' errors. This will help to suggest strategies to prevent errors.

2. Background

Attention to medical errors escalated over some years ago with the release of a study from the Institute of Medicine (IOM), which reported the Medical errors cause more than one million injuries and between 44,000 and 98,000 Americans die annually in hospitalized patients due to medical errors which can preventable. Hospital errors rank between the fifth and eighth leading cause of death, killing more Americans than breast cancer, traffic accidents or AIDS. Serious medication errors occur

in the cases of five to 10 percent of patients admitted to hospitals. The Intensive care units (ICUs) are sites where the highest rates of medical errors occur (Colleen et al 2008).

In study of Flattten et al (1999) which recorded eighty seven errors for 87 patients, their distribution within the ICU sections as the following: thirty-six (41.3%) were medication errors, and 17 (19.5%) related to intravenous infusions; 15 (17.2%) were errors with technical equipment, and 19 errors (21.8%) were miscellaneous. Only 14/88 (16%) errors were reported during the night.

2.1 Definition of medical errors:

The most commonly used definition of medical error is one developed by Institute of Medicine defines medical error as “the failure of a planned action to be completed as intended (i.e. error of execution) or the use of a wrong plan to achieve an aim (i.e. error of planning)” (Tracey et al 2010, David et al 2006).

2.2 Classification of medical errors.

Medical errors were classified according to clinical activity, including diagnosis, treatment, procedures, monitoring, and communicating clinical information. Errors were further classified according to the associated individual and systems factors and the behavioral performance class or type.

Performance errors were classified as skillbased errors (failure to carry out intended plans of action, including unintended acts and lapses or omitted acts), rule-based mistakes (such as using an incorrect treatment protocol), and knowledge-based mistakes (Jeffrey et al 2005).

2.3 Causes of medical errors:

The causes of medical errors are complex and not yet completely understood. Some causes that have been identified include the following:

- Communication errors.

In some cases the nurses face misinterpretation of the doctor's prescription or the message from the peer .

- The increasing specialization and fragmentation of health care. The more people involved in a patient's treatment, the greater the possibility that important information will be missing along the chain.

- Human errors resulting from overwork and burnout. For some years, hospital interns, residents, and nurses have attributed many of the errors made in patient care to the long hours they are expected to work, many times with inadequate sleep. With the coming of managed care, many hospitals have cut the size of their nursing staff and require those that remain to work mandatory overtime shifts
- Manufacturing errors. Instances have been reported of blood products being mislabeled during the production process, resulting in patients being given transfusions of an incompatible blood type.
- Equipment failure. A typical example of equipment failure might be intravenous pump with a malfunctioning valve, which would allow too much of the patient's medication to be delivered over too short a time period.
- Poorly designed buildings and facilities. Hallways that end in sharp right angles, for example, increase the likelihood of falls or collisions between people on foot and patients being wheeled to an operating room (**Medical errors book 2005**).

3. Theoretical frame work:

Patient safety

Research shows that patient safety is affected by several factors. Everyone working in complex organizations to which hospitals are counted, are interdependent interactions. Those who are involved in patient care must understand their roles and responsibilities that their behavior affects all members of the team (**Rosenstein & O`Daniel, 2005**).

A study by (**Leonard et al 2004**) shows that the working climate at hospitals varies, there are "quiet" hospitals where problems that arise are ignored because of poor leadership, hierarchy and fear of reprisals. What is not visible is no possibility to do something about.

Joyce Travelbees nursing theory dealing with interpersonal aspects of nursing.

Travelbee (1971) argues that nurses need to understand what happens between patient and nurse caring for understanding how interactions are perceived and what impact this may have for the patient. **Travelbee (1971)** argues that communication is important to make cooperation work. If cooperation is disturbing deficiencies can occur in relationships that affect patient safety. **Travelbee (1971)** rejects the generalized concepts such as nurse and patient, as they blur the individual's characteristics and turning people into stereotypes. She focuses on the interaction between nurse and patient, the patient is at the center.

4. Problem statement

Medical errors are common in ICU and CCUs . A hermeneutic phenomenological approach (interpretation of meaning) can help us to identify nurses' experiences of the most common medical errors in the ICU and CCU, and the importance they attach to these experiences. This will help us to determine the causes of medical errors in order to propose strategies to prevent errors.

5. Significance of the study

Health care organizations are facing increased pressure to adopt intelligent technology to promote quality and safety of care in hospitals. Medical error is each event during treatment of the patient in an ICU, which if not detected and corrected in time would affect the outcome of patient. The importance of monitoring by a trained person is thus emphasized. Since the care of another human being is the essence of nursing and it is important for nurses to understand how their actions and experiences affect quality care. Since the quality of clinical practice affects patient outcomes, quality has become one of the main issues of health care worldwide. Patient safety is good quality and an important input in health care. Research shows that patient safety is affected by several factors. Those who are involved in healthcare must understand their roles and responsibilities that their behavior affects all members of the team (**Rosenstein et al 2005**).

6. Literature review

A review of the related ICU and CCU errors literature revealed that errors, incidents and events are common and in some cases reported while in others, not so to the full potential.

In a study by **Thomas et al (2000)** shown that between 4% and 17.7% of patients suffer from some kind of harm (including permanent disability and death) as a result of adverse events while in hospitals (ICUs).

In one large intensive care unit (ICU) study **Andrews et al (1997)** shown that 45.8% of patients were found to have an adverse event, with 17.7% suffering from death or severe disability, and for every day in hospital the likelihood of experiencing an adverse event increased by 6%.

A one-year observational study completed by (**Rothschild et al 2005**) in Medical intensive care unit and coronary care unit patients of tertiary-care urban hospital recorded that 120 adverse events (55%

non-preventable and 45% preventable) for 79 ICU patients during 1490 patient days. These statistics represent a rate of 80.5 for all adverse events, 36.2 preventable adverse events and 149.7 for serious errors per 1000 patient days. **Rothschild et al (2005)** found that most common errors occurred associated with prevention and diagnostic errors, failure to take precautions or follow protocol to prevent accidental injury, premature self-extubations, failure to use indicated tests or act on test results, inadequate patient assessment, treatment and procedure errors, medication error in ordering or execution of treatment (wrong dosage, duplicate medication orders, wrong medication, failure to discontinue a medication order, wrong rate or frequency, wrong route, omitted medication, wrong patient), inadequate reporting or communication, failure to check equipment or defective equipment.

Another study in Australia where data collected over 16 randomly selected days at different medication round times was done by **Fahimi et al (2008)**. They found most of medication errors regarded to fast bolus administration, wrong infusion rate, wrong dose or diluents, calculation errors, inappropriate diluents, inappropriate storage of drug before dilution, inappropriate storage of diluted drugs.

A comprehensive review of errors in ICU by **Boyle et al (2006)** highlighted missed diagnosis found on autopsies may have changed or improved treatments in 30% of ICU patients, while 30% of patients incurred medication errors. Arterial cannula adverse events were shown in 15% of ICU patients and central venous catheter (CVC) adverse events in up to 26%. Although preventative measures are available for CVC adverse events, such as anti-microbial impregnated catheters and use of the sub-clavian site to reduce infection and thrombosis and for ventilator associated pneumonia, such as using the appropriate antimicrobial treatments, they may not be routinely implemented.

A prospective study in India by **Mohandeep et al (2008)** was designed to have an insight into critical events occurring in the 13-bedded multidisciplinary intensive care unit (ICU) to report the critical events. The errors reported were due to wrong mechanical or human performance. Repeated performance errors of the same kind pointed to the problem area, to which was paid proper attention in the required manner. Some malfunctioning equipments were abandoned and the need for adequate availability of staff was emphasized, so most of errors associated with ventilator, intubation and extubation which shown as the following: Extubation 29.62%, Intubation problem 7.40%, Blocked endotracheal tube 7.40%, Ventilator disconnection 11.11%, Oxygen disconnection from central pipeline 3.70%, Fall from bed 3.70%, Improper mode of ventilator 3.70%, CVP related 3.70%.

A study by **Graf et al (2005)** in UK conducted a two-hundred and sixteen consecutive patients with predominantly cardiovascular and pulmonary disorders admitted to ICUs. Most of errors that were occurred frequently related to different causes which include rules and orders, communication

insufficiency, misunderstanding, echocardiographic assessment, delayed intervention, overwork and lack of time, lack of experience, electrocardiographic assessment, wrong diagnosis , drug-related errors (drug given but not prescribed, wrong dose) , equipment error, very ill/complex patient.

In a multicenter prospective study by **David et al (2007)** of 646 incidents involving adult medical patients and 707 incidents involving adult surgical patients. They compared incident characteristics, patient harm, and associated system factors for medical versus surgical patients. For 2 years period they found that the proportion of safety incidents reported for medical versus surgical patients differed for only 3 of 11 categories: equipment/devices (14% vs 19%), tube, or drain events (8% vs 13%). The type of patient harm associated with incidents also did not differ. System factors were similar for medical versus surgical patients, with training and teamwork being the most important factors in both groups.

7. Main objectives of this study are to:

- assess the nature, consequences and associations of medical errors in ICUs/CCUs.
- examine the factors influencing nurses' errors.
- propose strategies to prevent errors.

8. Research Questions

- What are the types of medical errors (such as incorrect medication, intravenous infusions, equipment failure, procedures, or miscellaneous)?
- When the error has happened (hours to days)?
- What are the consequences of failure (such as circulatory, respiratory, allergy, hyper / hypo-glycemia, physical injury, bleeding, death, other) and the use of additional monitoring and interventions are needed?

9. Research Methodological design

A qualitative method, hermeneutic phenomenological approach this study used a phenomenological hermeneutic method inspired by Ricoeur philosophy, was developed by Lindseth and Norberg (2004). Hermeneutics is the research method seeking to understand the meaning of a phenomenon through interpretation. According to Ricoeur, text can generate new knowledge to enhance understanding of the lived experience phenomenon. Semi-structured individual interviews with informants were guided by a script which included a number of open questions. The interviews began with a general conversation to establish trustful contact between researcher and informant (**Kvale et al 1997,**

Polit et al 1999). The interviews was last between 30-60 minutes. Interviewees are females and males registered nurses and aged between 25-50 years. The number of years in the profession ranged from 2 to 20 years. The interview opened with the following an Oppen ended question " Through your experience in the intensive care uite What are the most common errors of nursing ?

Then pop questions followed such as: "What the consequence or the adverse events on the patient?

What is the causes of error?When occurred? Is the night shift affect on the occurrence of errors?Who made the error, a practical or registered nurse?" The interviews tape-recorded and transcribed verbatim, then to text.

Trustworthiness of the data ensured by appropriate sample selection to ensure *credibility*, show the logic flow of the data collection and analysis, and by verifying the findings with the informants to demonstrate *fittingness*, or transferability of the findings (**De Laine et al 1997, Holloway et al 2002**).

9.1 Participant

Fifteen of the ICU and CCU nurses (8 men and 7 women) were interviewed to gain deeper knowledge of how they experience medical errors in intensive care; Demographic data were collected for all eligible participants. These include age, gender, years of experience and marital status.

9.2 Selection of sample

Convenience sampling is used in sample selection which entails using the most conveniently available study participants were recruited in the study.

Selection: Registered nurses (males and females) from the nursing staff they full fill the **including criteria** which are:

- RN's working in the ICU or CCU with up to 2 years experience
- Working day and night shifts
- Be 25 years or older.
- Understand and speak the Arabic language.

2 to 3 nurses were selected from each unit of the target ICU units (12 participant 7 males and 5 females) and thee nurses from the CCU unit (one male and two female). Totally they are 15 participants.

Setting: This investigation conducted in a combined ICU and CCU ward at governmental hospitals in west bank in Palestine.

Geographically separate hospitals that are willing to take an active part in reporting medical errors. The study conducted in five Palestinian intensive care settings, including public/governmental hospitals: Al Watani (ICU-2N), Rafedia (ICU-3N), Hebron (ICU-2N and CCU-2N), Tulkarem (ICU-2) and Jenin (ICU-3), added to this the pilot test interview (one CCU nurse) that was taking place in a private hospital.

These departments in the target hospital described as poor design (low service area), except one coronary care unit with good design and one intensive care unit has ideal design, in addition the all target units has practical and registered nurses.

Period: a period of four months which is, from September to December 2010

10. Data Collection

Health care director at each hospital selected nurses eligible for entry in the study. One of researcher contacted nurses and informed them, both in writing (Information for Research [Appendix No. 2](#)) and orally about the study and agree on the time of the interview.

At the beginning of the interview, the researcher repeated the information and asked for consent to interview ([Appendix No.2](#)). The interview conducted during the current work of nurses. Data collection has done through qualitative interviews in the form of conversations with open question that are considered the most appropriate way to raise awareness of people's experience of a phenomenon. We implemented fifteen semi structured individual interviews which are about an hour in duration each.

The interviews recorded on tape. The interviews conducted in a separate meeting room in the department, where the nurse works. In the interview situation is only the informant and the interviewer, who is the current researcher ([Lindseth et al 2004](#)). In this study, interviews conducted in the hospitals because the work is focused on creating an understanding of the everyday lives are affected by medical errors. The interviews are intended to be semi-structured ([Kvale et al 2007](#)). The interviews, however, is open in character. An interview guide used (Annex 1). The purpose of the interview guide is to provide a framework interviews ([Kvale et al 2007](#)). The audio-taped interviews guided by a set of trigger questions designed to reveal the informants' behavior, meanings, ways of thinking and emotions. Interviews transcribed for analysis, with additional information from field notes, which helped triangulate data sources. The interview's a preliminary question is " Through your experience in the intensive care unite what are the most common errors of nursing ?

, this question posed to all nurses as it would be allowed to speak freely about what they considered important. Additional questions used to deepen the answers "Can you tell us about your experience with medical errors in your health department?", "What are the types of medical errors that can occur in your department?", "How often incidents? What the consequence or the adverse events on the patient?

What is the causes of error?When occurred? Is the night shift affect on the occurrence of errors?Who made the error, a practical or registered nurse?" . When people interviewed talked about several things at once. It is important to be able to come back and deepen the conversation around the issues

perceived as relevant by the interviewees. The interviews ended with asking if there is anything they want to talk further. The conversation ends with a short informal conversation after the tape recorder switched off (Lindseth et al 2004). The interviews transcribed verbatim to maintain openness to the text and allow finding the meaning-bearing units in the text. Transcribed interviews produces a text that contains descriptions of perceived experiences of medical errors.

10.1 PILOT STUDY

The above method tested in the pilot study. The pilot study involved one male informant in a coronary care unit of a private hospital. Health care manager choose a nurse, who asked to participate in the study. The interviewer was told, the nurse who wished to participate. The interviewer contacted the nurse and informed about the study orally and submitted in writing information for research (Annex No 2), the agreement was available at interview. The interviews done in isolated room in CCU. The call was taped and the text treated in accordance with the above analysis. This pilot interview included in the study sample.

11. Analysis

Using a hermeneutic phenomenology framework for the research enabled development of an interpretive relationship with the experience described by the 15 (7 females, 8 males) nurses who participated in the study. Potential participants were identified by the head department of ICU-CCU and subsequently provided an invitation to take part in the study. These practical- and- registered nurses, from across the continuum of care (ICU, CCU), provided care to ICU-CCU patients as part of their regular duties. They were not specialists in ICU-CCU care. Their nursing experience ranged from slightly more than 2 year to 20 years; their ages ranged from 25s to late 50s. The semi- structure interviews were conducted individually and away from the workplace and recorded and transcribed. The transcripts provided rich data for interpretation. The voices of the nurses in this study spoke with a powerful unity that imparted a message that should resonate with all ICU-CCU care clinicians.

The analysis seeks to illuminate the meaning of the text. Within hermeneutics analyzed the text, it is read as a continuous change between parts and whole. The whole can never be understood solely of parts and components can not be understood without the whole (Kvale et al 1997, Thomsson et al 2002).

The interviews transcribed verbatim and all identifying features removed to ensure anonymity. Word processing involves three phases: naive reading, structural analysis and interpretation entirety. The naive interpretation created after several read and wouldl be part of this whole analysis process. When meaningful units used in the phenomenological part of the method. Pre-understanding could be allocated for the production of meaning-bearing units. A meaningful unit may be a paragraph, a

sentence or part of a sentence (Lindseth et al 2004). To make thematic structural analysis the interviews read with an open and flexible attitude to get the basic sense of the interview participants' stories. The meaning-bearing units reflected against the naive analysis. The meaning-bearing units are condensed. (Lindseth et al 2004). The condensed sentences are read and the similarities and differences were applied. The goal to find similarities and differences are to form subthemes and then the main themes. The interpretation process allowed to get to use pre-understanding. During the formation of the key themes and sub themes used by previous experience of working in ICU and also understanding of the phenomenon of literature. According to Lindseth and Norberg (2004), condensation and sub-themes all the time compared with the naive interpretation. The main themes and sub themes are the result of the thematic structural analysis.

12. Research Ethical considerations

The study approved by the Ministry of Health and An-Najah National university's Research Ethics Boards (IRB). Consent obtained from informants who agree to take part in the study. (Annex 2). The informants, who wish to attend informed by the interviewer, both verbally and in writing (Annex I) for the purpose of the interview and study, the agreement was obtained on the time of the interview. The informants informed that the interview conducted in a private room which just the informant and the interviewer present and that the interview recorded by tape recorder and that no individuals can be identified after text processing. Information on all bands and prints the text stored under the current rules in locked cabinets. The informants also informed of the voluntary nature to participate in the study and that at any time can stop the interview and that these not affect them in any way. The data stored until the investigation is completed. After that the data the material will be destroyed from the interviews.

On the information sheet there are telephone numbers to interviewers and supervisors about any issues will arise if the informant feels the need for further discussion.

These considerations are based on the Helsinki Agreement (World Medical Association. Helsinki Declaration (2008) on ethical guidelines for nursing research on volunteerism, to withdraw from the project, potential risks or discomfort, anonymity, confidentiality and contacts for any information needed.

There is a risk that nurses feel offended at questions about their experiences. The interview can elicit negative emotions and bring back difficult memories. There is a risk that the participant would have thought that he / she said during the interview may affect the way ahead, while there is an advantage that the Nurses' experience of maintaining the quality of practice is important in the context of today's safety and quality agenda. Therefore, the risk is minimal compared to the benefits of the study.

13. RESULTS

13.1 Naive understanding

The naive understanding, that is, the first understanding of the text as a whole, and the preliminary interpretation of the phenomena is in the context of nurses' experiences of the most common medical errors in ICU and CCU. The meaning of the nurses' experiences is also evident as a quest to fulfill an ideal image of the most common medical errors in ICU, CCU. Through our interviews with nurses working in ICU, CCU, we have noted that the errors have occurred and still occur so far are:

One of the most common error recorded was in the rout of medication administration and one of the other errors relating to medication was wrong in the amount of drugs that are given (error in the calculation of medication dose), in addition to the information that we have raised that the lack of adequate knowledge among ICU / CCU nurses about the dilution of narcotic drugs and during the conversion of the drug amount units from mg to ml. The nurses showed that the lack of guidelines, knowledge of the drugs' side effects, and standards for drug dilution and for how long should be given (specific period of administration) were the main reasons to commit these errors.

The second most common errors are shown where in the handling of equipment, machinery and appliances used in these departments, and nurses have to do with the ventilators as a routine and follow the same parameters that are stored on their minds, so there was no one nurse on the ward can manage children ventilators. In addition, when there are many patients in the same department and nurses were occupied in the care of another patient that increases the risk of errors. Another error in the handling of machines have been produced by poor interpretation of the readings that lead to wrong actions. These errors associated with certain reasons summarized in the bug damage in cables and not enough attention given to the screens of monitors of group members.

Data said another error was about monitoring patients. These are presented in not recording the intake and outputs, or not recording it accurately on the basis of workload and not concentrated attention was given to it. Because of a lack of team members has led to some of patients were falling down which haad caused patients harm. It was shown that most of the fall event happened especially in children and it was happened with the avarage twice a month.

Nurses expressed that there is some error during work on heart-lung resuscitation situations which includes wrong drug to be administered as adrenaline, deralin and atropine. This related to certain factors that the large number of employees during the procedure, lack of regulation and issue

commands to more than a leader, not enough experience in dealing with patients requiring CPR in the sequence of steps as well as the lack of manual skills that need to be made, also some of the nurses do not have sufficient knowledge and experience in the use of Ambo-bag in the right way and make appropriate open airway management and not frequent inspection of D \ C shock which founded damaged and have not worked in some cases, which often led to patients loss and this occurred especially during night shifts.

Interviews with nurses described some errors during the implementation of interventions, including needle insertion, Foley catheters and nasogastric intubation. This causes mainly severe bleeding and other complications that happened in the absence of manual skills ..

In addition, there are some errors related to the IV fluids that occurred often. In many cases nurses forget to complete IV Lines after the completion of the solution provides, and there are a lot of IV fluids are not given on their time because worsening in IV lines, canulas and machinery dropper. Many nurses gave IV fluids instead of others, such as N \ S instead of D \ W for hypertensive patients, and this eventually led to the increasing deterioration of the cases. The main reasons for it were work overload, negligence and lack of attention by team members.

In many cases, as explained by nurses is an error that happened during the suction procedure that does not use Ambo bag between the measures that led to cyanosis and lower the level of oxygen saturation in tissues and most of the nurses did not proceed the suction on the right and safe way , this led to airway blockage and infection, all these because of the lack of manual skills, misconduct and malpractice of the nurses

Other errors were expressed in sterile techniques during certain procedures such as the introduction of the catheter, in many cases led to UTI occurrence and other errors identified in the care of IV Canulas, CV lines, arterial lines, and this often cause the infection to their sites.

It was also found that nurses do not often change the position of the patients. This led to the development of bedsores, which harms the patients much.

The nurses have not made oral care for patients who are on ventilators, which led to the cause of pneumonia and chest infections in many cases. Interpretation was not appropriate team members and negligence.

Some of the errors that occurred in the documentation and evaluation that includes forgetting

medication record and made no assessment of the patients and did not take a complete history of patients . All these things can harm the patients.

13.2 Structural analysis

In the structural analysis the text has been divided into units of meaning. A meaningful unit could be a word, a paragraph or a sentence that expressed similar content and meaning of the most common medical errors in ICU and CCU. Then condensed of meaning units was proceed. The text of abstracts then formulated into subthemes and finally into themes (Table 1). The results presented in the meaning of the nine themes. The theme of the nurses' experiences of the most common medical errors in ICU and CCU and clearance is presented as a separate table (Table 2) to illustrate the analysis process.

Table 1:themes

Themes	Subthemes
1.Medication errors.	<ul style="list-style-type: none"> ➤ Errors in Rout of medications administration. ➤ Errors in calculation of medications doses. ➤ Errors in giving the right medications(wrong medication). ➤ Errors in the dilution of medications. ➤ Errors in medications administration time.
2.Technical equipments errors.	<ul style="list-style-type: none"> ➤ Errors in dealing with ventilator. ➤ Errors in dealing with monitors. ➤ Errors in dealing with defibrillator. ➤ Errors in dealing with dropper machines.
3.Patient's monitoring errors.	<ul style="list-style-type: none"> ➤ Errors in Intake/ output measurement. ➤ Patient's falling down. ➤ Patient's self – extubation. ➤ Patients self – injury.

4. Resuscitation errors.	<ul style="list-style-type: none"> ➤ Errors in steps consequence. ➤ Errors in Ambo- bag use.
5. Nursing procedure errors.	<ul style="list-style-type: none"> ➤ Suction errors. ➤ Invasive procedures errors.
6. Intravenous solutions errors.	<ul style="list-style-type: none"> ➤ Errors in administration of IVF. ➤ Error in the duration of administration of I.V solutions.
7. Patient care errors.	<ul style="list-style-type: none"> ➤ Dressing errors. ➤ Positioning errors. ➤ Mouth care errors. ➤ Morning care errors.
8. Documentation and assessment errors.	<ul style="list-style-type: none"> ➤ Errors in recording of vital signs. ➤ Missed of medications' documentation. ➤ Errors in documentation of patient's history and assessment.
9. Miscellaneous	<ul style="list-style-type: none"> ➤ Poor communications.

Table 2: example how to emerge the medications error them on the basis of meaning - bearing units, condensation and subthem and theme of medication error

Meaning bearing units	Condensation	Subtheme	Theme
<ul style="list-style-type: none"> ▪ Giving the narcotic drugs as pethidine IV instead of IM. ▪ Administration of Rufenal I.V instead of I.M ▪ Administration of inhalant arovent I.V instead of nebulizer. ▪ giving the antibiotics drug in arterial line instead of venous line ▪ Giving the doputamine cardiac dose instead of renal dose. 	<ul style="list-style-type: none"> ▪ Giving the I.M medications by I.V rout. ▪ Giving the inhalant medications by I.V rout. ▪ Giving the I.V medications in arterial line. 	Errors in Rout of medications administration.	

<ul style="list-style-type: none"> ▪ Giving wrong dose of magnesium sulfate and dopamine. ▪ Giving the manitol 500cc instead of 100cc. 	<ul style="list-style-type: none"> ▪ Giving the wrong dose of medications for the patients. 	Errors in calculation of medications doses.	Medications errors
<ul style="list-style-type: none"> ▪ Giving fortum instead of rocephine. ▪ Giving atropine or de-cort instead of adrenalin. ▪ Giving succicylcoline instead og gentamicyne... 	<ul style="list-style-type: none"> ▪ Hodgepodge between medications or giving the wrong medications for the patient during administration. 	Wrong medication.	
<ul style="list-style-type: none"> ▪ Giving vancomycin deluted with 10cc rapidly instead of 200cc/2h. ▪ Giving zetromax I.V push instead of dilution in 500cc. ▪ Giving dormicom and morphine I.V push instead of dilution in 20cc. 	<ul style="list-style-type: none"> ▪ Dilute the medications in the wrong amount of solution. 	Errors in the dilution of medications.	
<ul style="list-style-type: none"> ▪ Giving the diluted lido-caine rapidly that should be give during six hrs. 	<ul style="list-style-type: none"> ▪ Administration of diluted medications during wrong period of time. 	Errors in medications administration time.	

Structural analysis was thematic; themes were identified and formulated from the text. The whole text was divided into significant units and these were reflected in the naive understanding of the text and concentrated in order to find similarities and differences. The nine themes that emerged from mediated nurses' experiences of medical errors that were essential importance of the interviewees. These are presented below with the respective sub-themes, which presented with short summaries of the interviews.

Theme 1: medication errors.

This them about errors occur in medications, the nurses experienced many medication errors in ICUs and CCUs which happened under preparation and administration of the medication.

Under this theme, five sub-themes were emerged as illustrated below:

1- Rout errors.

errors in the rout of administration of medication was one of most common errors in the ICU.

“...giving Inhalant aerovent through a vein instead of nebulizer”(N9).

“pethedine (narcotic) through intravenous (IV) instead of IM”(N1).

“antibiotics in the arterial line instead of venous line”(N11).

“scobutyl instead of rantidine and Rufenal IV instead of IM...”(N1).

”a new graduated nurse gave rufenal I.V instead of I.M”(N15).

2- Errors in calculation of dose.

The interviews revealed error in the amount of medication given as some of nurses said:

“They gave dopamine cardiac dose instead of renal dose because of lack of precision in the calculation of the amount of medicine where there has been occur in the afternoon shift”(N12).

“Some nurses do not have sufficient knowledge and experience to convert the amount of the drug from mg to ml, such as: magnesium sulfate, calcium sandose and others, especially in cases of resuscitation”(N3,N4,N14).

”few nurses unaccuretly measure or calculate the dose of dopamine.....”(N15).

“ A practical nurse on the night shift gave 500cc mannitol instead of 100cc and so the nurse gave a much higher amount than the amount described which led to that the patient enter in a severe dehydration”(N11).

3- Errors in giving the right medication.

Some of the interviews shown that some of nurses experianced a mistakes in giving the right medications to the patients in some cases“One nurse gave fortum instead of recophin but it did not cause any damage to the patient,they thought the cause of error could be that the nurse was using to work double shift...”(N8).

"in emergency cases sometimes giving atropine or decort instead of adrenalin due to overlapping orders of the medical doctors"(N4).

“In the emergency situations, a practical nurse who was working on the night shift gave succinylcholine/succinylcholine (muscle relaxant) instead of gentamycin and the patient got in cardiac arrest and was placed on a respirator”(N11) .

4- Errors in dilution of medication.

The data was expressed that the lack of sufficient knowledge in ICU/CCU nurses regarding the dilution of drugs, in addition the nurse explained that the lack of guide lines and standard on how to dilute this drug and for how long time should be given was the reason in committing an error.

"...some of nurses dilute the vancomycin in 10 cc and give it to the patient quickly which was originally should be diluted in 200 ml for one gram vancomycin vial and should be given in two hours"(N13).

“zetromax was given IV push which should be diluted with 500cc N / s, and this led to the occurrence of skin burn at the cannula's site”(N8).

“dormicum gave IV push instead of its dilution in 20 cc N / s and led to the occurrence of hallucinations and nausea and that happened in the night shift with a patient who was suffering from hypoxia.....", As well as “morphine IV push instead of dilution in the 20cc N / s...”(N7).

5- Errors in medication administration time.

Some of nurses were not giving the medication on time and in the specified period:

“one nurse speed up a solution containing Lidocain which was supposed to be given within 6 hours to one patient who was suffering from cardiac problem This led to the occurrence of tremor in the patient , and the reason for committing error was lack of knowledge of the side effect of the drug”(N8).

”in a case of epilepsy one nurse administered morphine in the volume set which has an epinephrine that led to drug reaction.....also some of nurses give cephalosporine medication with vancomycin without know that lead to milk reaction.....”(N14).

Theme 2: Equipment and devices (technical equipment) errors.

This theme divided into four sub-themes below:

1- Errors in dealing with ventilators.

The nurses experience returned to error of ventilators, there is a lack of adequate knowledge among nurses about ventilator use, especially for children.

"A nurse sets up the ventilator with tidal volume of 700 ml for a child. This amount used for adults,

but he/she discovered the error and quickly adapted to it”(N11).

"A Practical Nurse Puts a patient who is on ventilator at high PEEP, and this has led to the emergence of emphysema and the reason was the lack of sufficient experience in the use of this machine, as well as the existence of a defect in the machine. This happened in the night shift with COPD patients' (N8).

"An RN placing a child with a diagnosis of a scorpion bite on the ventilator with a respiratory rate of 75 per minute instead of 15-25 as usual. This error was discovered during the first hour without causing any harm to the patient (N1).

"Nurses use ventilator as a routine, they are using the same parameters that are saved to their memory. There is no nurse on the ward who can deal with children on ventilator"(N1).

3- Errors in dealing with monitor.

Through the interviews we noted that the presence of errors was in dealing with Monitors

"Some nurses do not pay attention to the screen of cardiac monitor, in one case, tachycardia occurred for the patient but the nurse did not give attention to it, in addition, some nurses did not remember to re-connect the electrodes on the patient's chest after the Patient returned back from the bathroom" (N4).

" multiple errors in the interpretation of the ECG due to a bug and damage in the cable, and this happened several times”(N8).

4- Errors in dealing with defibrillator.

Some nurses did not give attention to control of the defibrillator to keep it ready for use..

"It happened with a patient who needs a D \ C Shock, shock driver does not work.....it's defective, and device founded out of order and this led to patient loss" (N8).

5- Errors in dealing with Dropper machine.

“In some cases nurses experienced that the solution and medications were not given on time or not delivered to the patient in the determined period, because machines are old fashion and inappropriate speed was given N1,N2).

Theme 3: Patient's monitoring errors

Some of nurses note that errors in Patient Monitoring occurred:

1- Errors in patient's intake and output measurement.

Incorrect measure of the patient's intake and output as one of nurses said:

"There are a few of the practical nurses were not paying attention to the registration of E & O or that they do not record it exactly because of pressure from work" (N1,N12).

"Sometimes the patient becomes anurea and the nurses did not pay any attention to it"(N3,N15).

Another added "a patient gave a large amount of N \ S without attention to the lack of output which has led to a general edema and the reason for this event was negligence and lack of ongoing communication/poor communication among members of the team as well not to pursue the good of the patient . This event was happened in night shift"(N8).

2- Falling down.

Sometimes the lack of patient monitoring led to falling down injury.

"In one case, the patient falls from her bed, this led to nosebleeds, wounds, and removal of the drain" (N11).

"In many cases of falling down of the patients caused by a lack of number of nurses when there are many patients on the ward '(N1, N2, N5).

3- Patient's self-injury.

"In a confused case, the foley catheter disconnected which led to wrong measurement of urine output that occurred in a myocardial infarction patient,

In another case, they found that the pt bled from the i.v. cannula site after it removed unintentionally by the patient. The pt was on an anticoagulant therapy , this led to hypovolemic shock"(N9).

4- Patient's self-extubation.

The Patient self-extubation mostly occurred in the weaning stage where some of them never had any complications as a consequence of self extubation and some of them have been re-intubated and some of them entered in a arrest.

" one patient, pulled out the endotracheal tube in the last stage of weaning, there has been no complications and was treated with oxygen. It is estimated to occur 2-3 times per year"(N11).

" 5 cases of self-extubation were occurred with children because the uncuffed tube as a result some of them reintubated and some of them died"(N11).

"in some cases the self extubation occurred at the time of consciousness"(N13,N15).

as a result Most of medical errors were occurred when there are many patients in the department and

nurses were occupied in providing care for another patients.

Theme 4: resuscitation error.

This theme divided in two sub-themes as the following:

1- Steps consequence errors.

“the error was happened because nurses have not sufficient experience with dealing how to work with patient who needs CPR in terms of the sequence of steps as well as the lack of manual skills. some of nurses do not have sufficient knowledge and experience to use the ambo-bag correctly and often lead to the death of the patient and this happens especially in the night Shift ”(N10).

some of errors were occurred during the work with cardio-pulmonary resuscitation. The wrong medication was given. “adrenalin, deralin, atropine because of the large number of staff and lack of leadership and the commands were given by of more than one person” (N4).

2- Errors in ambo-bag use.

Some of nurse they lack how to use the ambo-bag appropriately and effectively during the resuscitation process, as one of ICU nurses said”in our department some of nurse they don’t use ambo-baging appropriately”(N14).

Theme 5: Nursing procedures errors.

This theme divided in 2 sub-themes:

1- Suction errors: ineffective suctioning of the endotracheal tube,

In some nursing procedures such as Suctioning the ET-tube may cause adverse events for the patients "In many cases when the suction is not proceeding correctly led to a Cyanosis and the low level of oxygen saturation in the tissues”(N7).

"most of the nurses are not applying the Suction in the right and safe way, so often led to a blockage in the airway, as well as Infection. All of these errors could be happen because of the lack of nurses sufficient skill as well as negligence and malpractices by nurses”(N10).

2- Invasive procedure errors:

The data were expressed that some mistakes occurred during Invasive Procedures

“There was a Practical nurse and wanted to put a Cannula for the patient , during applying the cannula, he/she injured the pt’s nerve in the hand”(N11).

“during the insertion of a foly’s Catheter for patients who had MI and treated with Streptokinase, bleeding was occurred during the insertion of folly catheter . This was occurred because of insufficient awareness to the adverse event of the treatment “(N7).

"during the insertion of NGT for a Stroke patient who was treated with heparin. Severe bleeding was occurred . The reason was lack of knowledge of nurses and unavailability of the skills manual that required”(N8).

Theme 6: intravenous fluid / solution errors (IVF).

This theme divided in two sub-themes:

1- Errors in administration of IVF.

"Many of the nurses gave the wrong solutions to the patients, as giving N \ S instead of D \ W for hypertensive patients, and giving D \ W instead of N \ S for patients with diabetes, and this eventually led to an increased matters worse in both cases "(N9).

2- Error in the duration of administration of I.V solutions.

In many cases of administration of the IV Fluids some of “.....the nurses forget to close the IV Line, after the completion of the solution and the reason for that is the pressure of work and negleance as well.....”(N2).

And “many times IV Fluids were not given to the patients on it’s time because of the problem in either the i.v. line or Canula or the lach of attention by the nurses”(N2,N3).

”some nurses forget to give the IVF at the accurate timedelay the adminstration of the solution.....anothers gave the solution before the accurate time ”(N12).

Theme 7: patient’s care errors.

This theme divided in four sub-themes:

1- Dressing errors.

Lack of sterility in some procedure that can be harmful to the patient

“Some of nurses did not apply the sterile technique during the insertion of the folly catheter in many of cases which led to the occurrence of UTI and other complications” (N10).

"Nurses do not follow the sterile technique when applying needle, CV line, arterial line, and this often cause infections"(N7).

2- Positioning errors.

Patient Care is neglected in some cases which affect on the patient status negatively.

"Sometimes many hours pass without a position change for the long-lying patient as stroke patient. This often led to the occurrence of pressure ulcers. This happens for several reasons mainly the lack of an adequate number of staff, as well as negligence. This often occurs in the evening and night shift (N6, N10 , N7).

3- Mouth care errors.

"The nurses didn't make the mouth care as intended and in a proper way or they neglect that This can cause problem as Pneumonia."(N7).

4- Morning care errors.

"Some nurses are not interested in delivering the morning care for the patients, or they do that inappropriately"(N5,N6).

Theme 8: documentation and assessment errors.

This theme divided on three sub-themes:

1- Errors in recording of vital signs.

"The nurse recorded the vital signs to the wrong patient, but fortunately the readings were normal"(N2).

2- Missed medications documentation.

In certain situation errors occurred in the documentation and data recording.

"A practical nurse gave pethedine (Narcotic) and do not record it, after an investigation found and there were some nurses who do not carry out physical assessment of the patient or they do not do it the right way and often with practical nurse "(N5).

3- Errors in documentation of patient's history and assessment.

"some nurses do not take the full history of the patient and could cause harm to the patient, such as: gave patient aspirin who has gastric pain and ulcer"(N4).

Theme 9: miscellaneous

This theme include one sub-theme which is poor communication between the nurse and doctors lead to errors and in the other hand between the nurse and the patients may affect the patient monitoring and the subjective data.

As one of nurses said: "the poor communication especially during resuscitation cases lead to error as hodgepodge in the given medications" (N14).

Another said "in some time the patient in the intensive care unit seemed sleep, but actually the patient in bad condition....."(N12).

13.3 Interpreted whole

During the third and final step in the process of interpretation, the decoded picture, the study collected the various parts together and reflected on to a new whole. The researcher takes a subjective transparency, this new whole with the pre-understanding reflects the significance / meaning was hidden in the text [Lindseth et al \(2004\)](#). A new meaning and deeper understanding of the meaning of the phenomenon emerges.

Nurses' experience of the most common medical errors in ICU and CCU can be understood as: The most common error occurred in ICU and CCU which are:

We found from nurse's experience the common medical errors in intensive and coronary care units are: Medication errors (the dilution, dose calculation, rout, administration), devices errors (in dealing with ventilator, monitor, defibrillator, dropper machine), patient's monitoring errors (in I&O measurement, falling down, self-extubation and injury), resuscitation errors (in consequences of steps, ambo-bag use, and the defibrillator preparation), nursing procedure errors (as suction and invasive procedures), errors in administration of intravenous fluid and it's administration duration, patient care error (in morning care, dressing, mouth care, positioning), assessment and documentation errors (Errors in recording of vital signs, medications documentation, documentation of patient's history and assessment).

The nurses concluded the causes of these errors as the following:

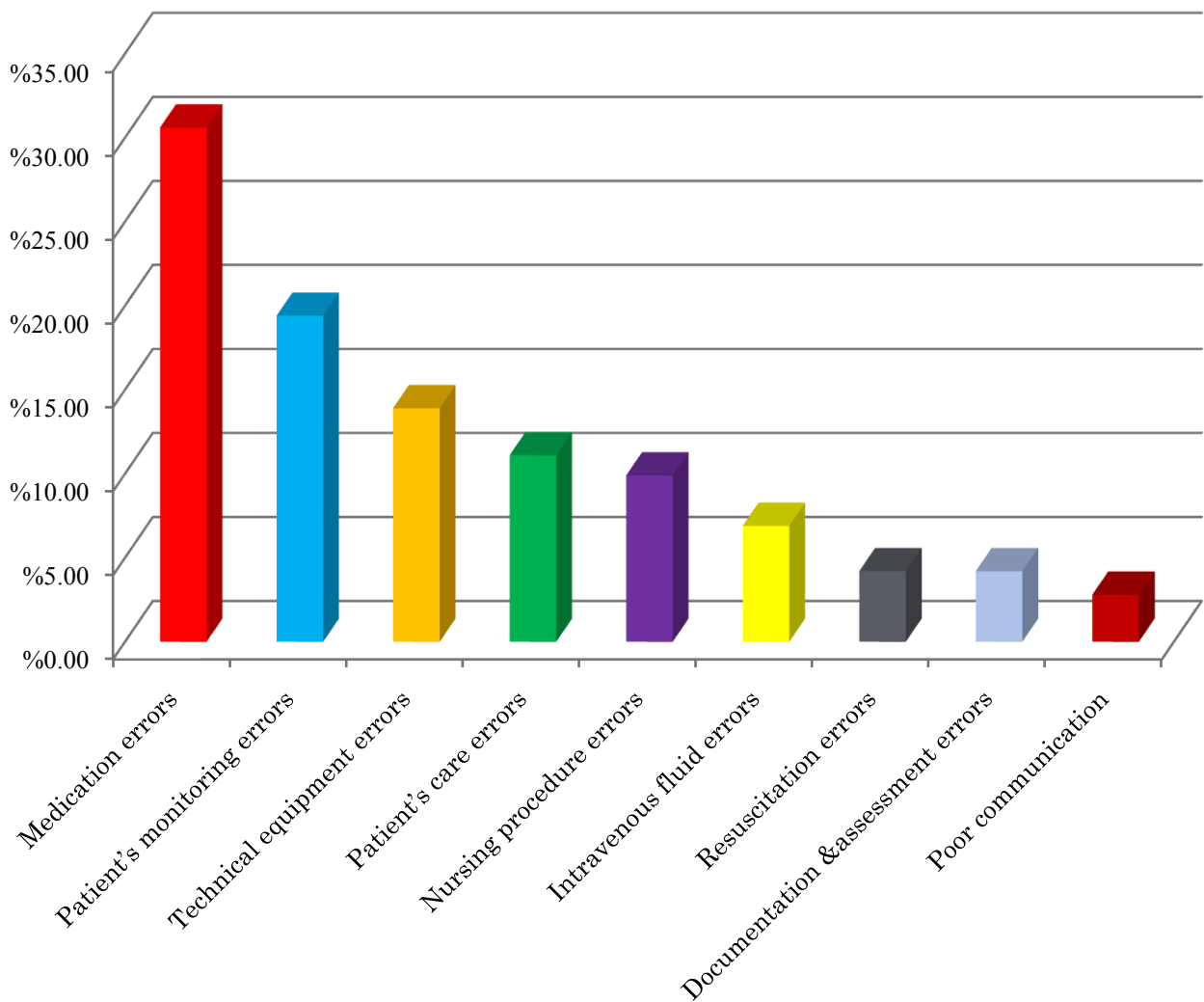
1. Insufficient number of team and hard work.
2. Lack of knowledge and experience.
3. Lack of concentration.

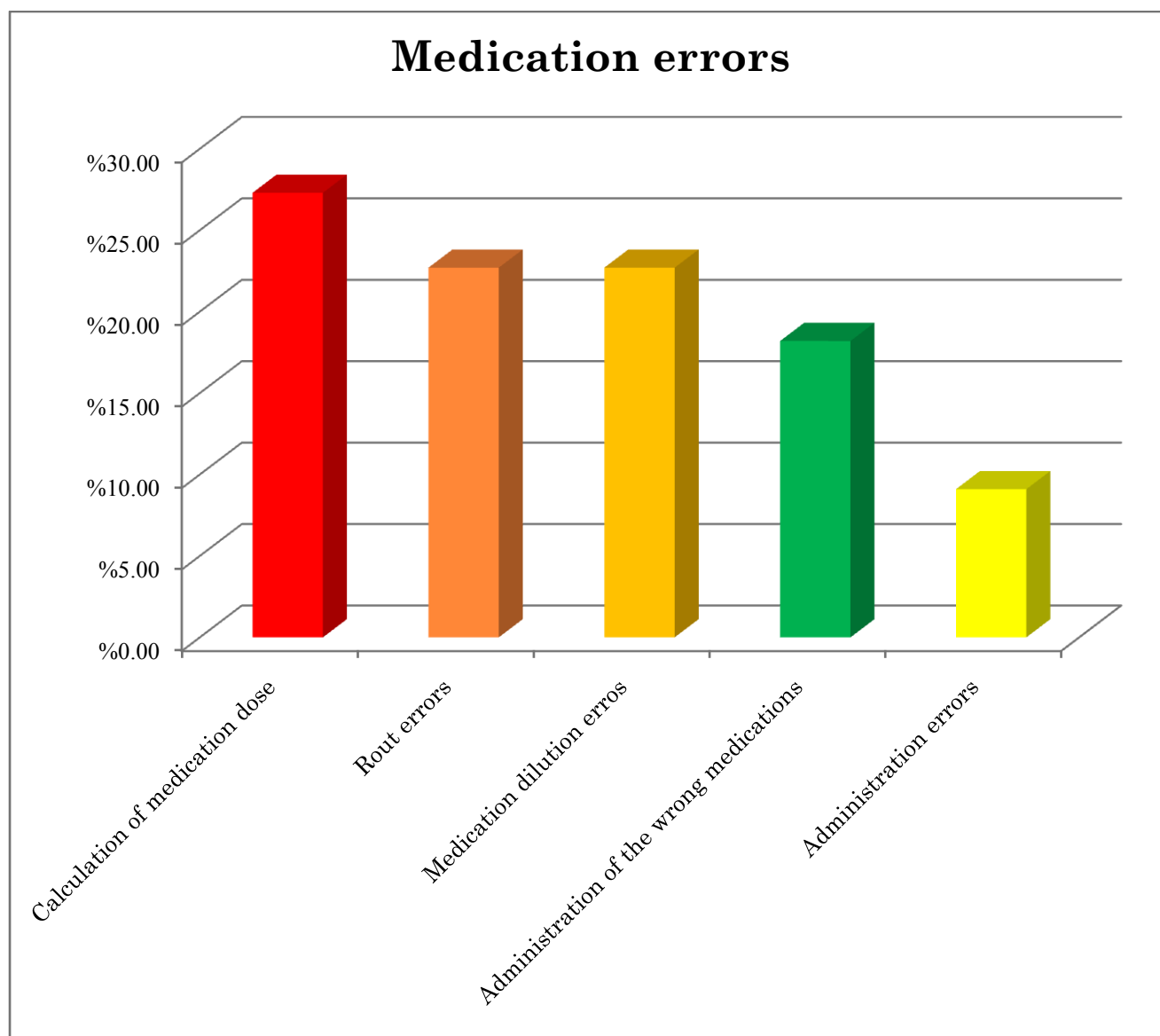
4. Tension and stress.
5. Speed and acceleration
6. Double shifts and fatigue.
7. Lack of awareness.
8. lacking of guidelines and standards.

14. The results in numeric data:

Of fifteen interviews in intensive and coronary care units in five public hospitals in the West Bank, we found the most common medical errors much percentage of medication errors that are 22/72 (30.6%) were more specific in the calculation of medication dose 6/22 (27.3%) from medication errors (rout 22.7%, 22.7% drug dilution, administration of wrong drugs 18.2%, administrative error 9.1%). In addition, patient monitoring errors 14/72 (19.4%), technical equipment errors 10/72 (13.9%), patient care errors 8 / 72 (11.1%), nursing practice error 5 / 72 (9.9 %), intravenous fluids error 5 / 72 (6.9%), resuscitation failure 3 / 72 (4.2%), documentation and assessment error 3 / 72 (4.2%), poor communication 2/ 72 (2,8%). In addition, medical errors caused by practical nurses were about 39/72 (54%) and the errors occurred in the night shift were around 23/72 (32%).

Most common medical errors in ICUs\CCUs





15. Method Discussion

Since the aim of this study was to describe and interpret the meaning of the nurses' experiences of the most common medical errors in intensive and coronary care units of the public hospitals, and we are a 4th years nursing student, it was natural to choose the hermeneutic phenomenological method. This method is allowed in certain parts of the research use of its pre-understanding and interpretation based on theories. our pre-understanding has been an asset to understand, explain, describe and interpret the phenomena we examined, but it may also have involved a risk. we may have taken things for granted and not listened to the interview subjects, or not been sufficiently responsive and open. However, we have reflected much of my pre-understanding during the process. The choice of method had been an option purely phenomenological approach, but then we shall bring our pre-understanding in brackets, it was impossible that pure shall use the method. Merely using a hermeneutic method was not current when we were interested in studying the phenomenon from a life-world approach. The choice to use our of a hermeneutic phenomenological approach has enabled

them to come to a deeper and wider interpretation to illustrate the phenomenon.

Our results will present one of several possible interpretations. Ricour (1998) argues that the text invites various readings and interpretations. Validity in qualitative studies is that the researcher must be aware that the validity should be carried out under certain policies throughout the research process (Kvale, 1997; Morse, Barrett, Mayan, Olson, & Spiers, 2002). We have worked in the study based on the hermeneutic circle, we have oscillated between parts and whole and back again to the whole. During structural analysis, we have endeavored to relate ourself as objective as possible, to try to be open and questioning what is actually said during the analysis. In order to validate our work, the participants have carefully described their professional experience, context in which the interviews conducted; the data material is processed in both the transcription and analysis. The study quotes used to support the interpretations and to validate the meanings described in the results (Sandelowski, 1994). One way to further validate the result had been to discuss and criticize the study in workshops with teachers and students, but this has not been possible where there currently are few students who work with her graduate thesis at the department. We have used the scientific literature as relevant to the topic and under the supervision process, discussed the design, implementation and analysis, together with our supervisor who has experience in the chosen research method.

The study has a small data set used, but more had not been possible given the time frame. The study objectives are not looking to be generalize but to describe the meanings of the phenomenon of nurses' experiences of the most common medical errors in ICU and CCU. All those surveyed nurses were willing to participate in the study. The nurses told with passion and commitment and tried hard to talk about situations they experienced as a nurse. However, they showed at times some difficulty in talking about their experiences and sometimes returned with statements like: "it is so difficult to describe it." The nurses felt that there was a large and diverse area and that they were not prepared for an "open question". One possibility would therefore be to attach the initial question in connection with the request for participation in the study.

16. Result discussion:

We found the medical error mostly caused by practical nurses. Inadequate training was a strong factor in committing the medical error which is in agreement with medical errors report which was issued by European Commission (2006). Medical error results from inadequate training or from a few "bad apples" in the system. It is then assumed that medical errors can be reduced or eliminated by identifying the individuals, and firing or disciplining them. The major drawback of this judgmental attitude is that it makes health care workers hesitate to report errors for fear of losing their own jobs or fear of some other form of reprisal. As a result of underreporting, hospital managers and others concerned with patient safety often do not have an accurate picture of the frequency of occurrence of some types of medical errors.

Nurses' stories about their experiences of most common medical errors in ICUs\CCUs can be understood as the nurses moving to a product which is characterized by contrasts and contradictions in their daily work. Contrasts in the role that experiences can be seen as highly prominent differences and contradictions in the importance of these experiences contain conflicting ideas. The meaning of experience about most common medical errors in this context is about the nurse moves from one situation during the day's work where the shifts of experiences is great.

To clarify our interpretation we depended on some articles that we read about. So in **Rothschild JM et al. (2005)** who talked about various most common medical errors in the ICUs \CCUs wards in general and divided them to different categories. One of these categories was medication error in ordering or execution of treatment (wrong dosage, duplicate medication orders, wrong medication, failure to discontinue a medication order, wrong rate or frequency, wrong route, omitted medication, wrong patient). In addition to **Fahimi F et al (2008)** who reflected that most of medication errors regarded to fast bolus administration, wrong infusion rate, wrong dose or diluents, calculation errors, inappropriate diluents, inappropriate storage of drug before dilution, inappropriate storage of diluted drugs. Which highly agreed with our results about medication errors that was highly percentage which are (22/72) 30.6% of most common errors in these wards that include errors in route of medications administration 22.7%, errors in calculation of medications doses 27.3%, errors in giving the right medications 18.2%, errors in the dilution of medications 22.7%, and errors in medications administration time 9.1%.

In addition, other studies gave other wide ideas about the most common errors reported due to wrong mechanical or human performance which associated with some malfunctioning of equipments and checking it specially ventilators, monitors use and interpretation, defibrillator and dropper machines. These results are in consistency with the results of our study shown that high percentage of **technical equipment errors** 13.9% which includes errors in dealing with ventilator, errors in dealing with monitors, errors in dealing with defibrillator, and errors in dealing with dropper machines (**Rothschild et al 2005, Mohandeeep et al 2008, Graf et al 2005, David et al.(2007)**).

Some of studies gave clear ideas about errors that were happen related to patient monitoring. This consists of failure to take precautions or follow protocol to prevent accidental injury as self-extubations and other type of errors (**Mohandeeep et al 2008, Rothschild et al 2005**) which really reflected in our results.

Do-not-resuscitate order and did not match true code status that what **Rothschild JM et al. (2005)** described in their study and what we found that resuscitation errors occurred specially in steps consequence and Ambo- bag usage.

Procedure errors are other category that **Boyle et al (2006)** and **Rothschild JM et al (2005)** described as invasive procedures (Arterial cannula, central venous catheter, foley's catheter). This was clear in our study, added to it suction errors.

Other errors associated with negligence was about IV fluids (administration and duration) which clearly presence in **Fahimi F et al (2008)** and **David J et al.(2007)** studies and proved in our study which happen in low percentage (6.9%).

Boyle et al (2006) were shown that not using the appropriate antimicrobial treatments (mouth and other body opens), and other care they may not be routinely implemented leading to some complications such as pneumonia and other injured and invasive procedures sites infections (cannula, CV line). This what clarified by the presence of some patient care errors (11.1%) include wound dressing, Positioning, Mouth care and morning care errors.

Documentation and inadequate patient assessment errors (such physical and electrocardiographic assessment) are strongly presence in **Rothschild J et al. (2005)** and **Graf J et al (2005)** studies. this is in agreement of our study associated specially with recording of vital signs, missed of medications' documentation and documentation of patient's history and assessment errors.

Communication errors that was described in Graf J et al (2005) and Rothschild JM et al. (2005) studies are reflected in our study and it was the lowest prevalence (2.8%).

17. Conclusion

Medical errors are common in ICU and CCUs. Nurses' experiences of maintaining the quality of practice is important in the context of today's safety and quality agenda. The method for identifying deficiencies and redesigning faulty systems appears to be a promising way to propose strategies to prevent errors, Practical nurses made substantially more medical errors. To work frequent shifts of 24 hours is a strong factor to commit medical errors. Increase the competency and number of nurses per patient and reduce the number of working hours can reduce medical errors and address patient safety concerns in intensive and coronary care units.

18. Study limitations:

- Ramallah hospital excluded from our study due to the hospital transient stage.
- Limited number of participant who fulfill or meet the including criteria “there is a practical and registered nurses in ICU, CCU” so we obligate to choice Convenience sample instead of randomized sample.
- Some of participant refused record the interview.
- Study stress.

19. The recommendations for reducing medical errors:

1st Ask when you do not know.

2nd Enhance and develop your knowledge.eg. constitutes a talk ...

3rd training programs.

4th Provide enough team.

5th Distribution shifts comfortable.

6th Follow the rights of medication given

7th do not let a nurse who had no ICU experience working in ICU and CCU.

8th Check department equipment daily.

9th Awareness.

10th Availability of the Job Description.

11th A committee should be established as head of appliances and equipment.

12th improve the skills of critical care nurses. there should be a minimum of BSc nurse.

13th improve the communication process among health team.

14th Insertion of incident reporting system, and computerized reporting.

We recommended for reducing the medical errors in ICU and CCU to use the computerized reporting system which highlighted in [Kohen et al \(1999\)](#) emphasized reporting systems as an important strategy to learn from mistakes and prevent recurrence. Reporting systems have the potential to serve two important functions. They can hold providers accountable for performance, and can provide information that leads to improved patients' safety.

Improving medication safety can be achieved by optimize the safety of medication process, eliminating situational risk factors, and provide strategies for both intercept errors and mitigating their consequences. Several interventions have been shown to reduce medical errors in ICU. The safest and most effective way to improve patient safety is to improve the safety of pharmaceutical process. Strategies that have proved successful include medication standardization computerized physician Order entry (CPOE), computerized infusion devices. The technology enables physicians to enter orders directly into a computer workstation connected to a hospital clinical information systems. The main advantages of these systems is that they can detect allergies recommends drug dosages, make adjustments for patients with altered renal or function and identify potential interactions with other drugs.

Two systematic reviews have documented that CPOE systems increase clinician adherence to guidelines and warnings, improving organizational efficiency, reduce costs and to prevent medication errors, but there is limited evidence to support improved patient safety. In this regard, CPOE technology highlights the important distinction between errors and damage, failure is an important intermediate result, but prevent harm to the patient is the ultimate goal. CPOE technology currently used in the majority of the ICU. Bar code technology case management phase of medication process. Used in conjunction with CPOE, bar code labels for medicines, patient, and provider administer medicines scanned, reconciled, and electronically documented. This process helps to the right patient gets the right dose of the right medicine by the way at the right time. Administration errors have been documented by 60%. Computerized intravenous infusion devices may incorporate of CPOE and bar code technology for intravenous medications so that the standard concentrations, infusion rates, and dosage limits can be provided to prevent intravenous medication errors.

Nurses play a particularly important role in patient safety because they are the caregivers with whom patients are likely to spend the greatest amount of time. This has two important implications. One, declining nurse-to patient staffing levels may be associated with an increased the risk of medical error . Nurse-to-patient ratio of 1:1 or 1:2 seems to be the safest in the ICU. Second, nursing experience can have a major impact on patient safety.

Experienced nurses are more likely to intercept error compared with less experienced nurses

Three simple strategies to change the medicine's approach to medication error has proposed: (a) recognize that the current strategies for preventing medication errors is inadequate; (B) improve the reporting client system, avoid punishment and focus on identifying potential performance improvement; and (c) understand and improve human performance in medication use process. We should focus on developing the system that sees people as fallible and assume that errors will occur, even in the best organizations. Error reporting is an important part of this strategy, because it

shows how active failures and latent conditions in systems. Incidents that do not lead to injury but could have led to patient injuries. Preferably error reporting should be voluntary, anonymous, centralized increase the pool of data, and aims to identify opportunities for performance improvement. But errors reporting alone will not improve patient safety, but rather is first step in a continuous quality improvement cycle.

20. Acknowledgment

We express our sincere gratitude to all who have supported us in various and in particular, all participants in the study, without which it would have been no results. We wish to thank the Dean of Nursing College Dr. Aidah Abu Elsoud Alkaissi, Assistant Prof, PhD, our Tutor and our Mentor for all her professional, accurate scientific guidance and generous support. We would also like to thank the institutional review board at a-Najah National University, Palestinian Ministry of Health and all hospitals are in place for support, kindness and positive attitude. Your support will enable us to surf on life.

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This table shows the data bases of our research:

Search words	Web site	Results number	Taken results
ICU Errors	Science direct	8263	2
most common ICU errors	Science direct	4884	1
intensive care unit common errors	Science direct	23003	3
common errors in the intensive care unit	Science direct	23000	3
common errors in the intensive care unit	Ebesco	46733	1
ICU Errors	Ebesco	18	1
most common ICU errors	Google	609000	3
common errors in the intensive care unit	Google	7990000	2
intensive care unit common errors	Google	2950000	0

Appendix 1: interview Guide

The open question:

- Through your experience in the intensive care unit what are the most common errors of nurses?

The pop questions for every error:

- What the consequence or the adverse events on the patient?
- What is the cause of error?
- When occurred? Is the night shift affect on the occurrence of errors?
- Who made the error, a practical or registered nurse?

If there is an errors related to the following topics:

- Machines e.g. ventilator, monitor, dropper machine...
- Patient monitoring e.g. measurement of intake and output, falling down...
- Medications e.g. rout, calculation ...
- Invasive procedure ...

At the end of the interview:

What are your recommendations to reduce the error in ICU/CCU?

Appendix 2: IRB

AN-NAJAH UNIVERS
PROTOCOL FOR HUMAN SUBJECTS RESEARCH
NEW PROJECTS ONLY

Investigator's Assurance

By submitting this protocol, I attest that I am aware of the applicable principles, policies, regulations, and laws governing the protection of human subjects in research and that I will be guided by them in the conduct of this research.

To apply for human subjects IRB review:

1. Download this New Projects IRB Protocol and save it on a floppy disk or on your hard drive. You may then open it, type in all requested information, save the file (please use your last name and New Project Protocol as the title: e.g., Musmar New Project Protocol), and send the file as an e-mail attachment, along with your informed consent letter(s), to the Institutional Review Board at

“**irb@najah.edu**”.

It is essential that you answer all questions on this form since this is the primary source of information used by Board members to make their decisions. Also, only include information necessary to answer the questions. Please keep your responses as free of jargon as possible.

2. Please also send, by campus mail, all supporting materials that cannot be e-mailed (e.g., measures, permission letters from off-campus sites) to the IRB at An-Najah University, Nablus, Palestine. If your research requires review by the full Board, you will be so notified and asked to provide an additional 12 copies of the supporting materials.

PLEASE DO NOT INCLUDE THIS PAGE WITH YOUR SUBMISSION

REV 9/08

Office of the Institutional Review Board

PLEASE BE SURE TO COMPLETE ALL SECTIONS

Current Date of Submission: _____

IRB office use only: Date received in IRB office (stamp)_____

If this is a revision in response to an IRB Report of Action (ROA)-approval pending, indicate the date of the ROA: _____

Title of Research: __Nurses' experience of the most common medical errors in Intensive Care
Units
A phenomenological hermeneutic study

Principal Investigator: __Dr Aidah
Alkaisi_____

Department/School____Nursing College_____

Room # where mail can be sent _____

Phone __0597395520_____ **E-mail** _____

Other Investigator: _

**Maher Battat, Khadeejah Kittaneh and Ayman
Ali**_____

Department/School_____

Room # where mail can be sent _____

Phone _____ **E-mail** _____

****Faculty Sponsor (for Student Research):** _____

Department/School_____

Room # where mail can be sent _____

Phone _____ **E-mail** _____

Student Street Address _____

City _____ **State** _____ **Zip** _____

Type of Research (please check):

Dissertation _____ (PLEASE NOTE: IRB review of dissertation research
requires prior successful proposal defense.)

PhD Defense Date: _____

Master's Thesis _____

Class project _____

all other projects____Undergraduate project__

** If the primary investigator is a student, check here to indicate that your faculty sponsor has read the entire application, including cover letters, informed consents, and data collection instruments, and asserts that this application is accurate and complete.

Dates Human Subjects Portion of Research Scheduled: from: September 2010 to December 2010.

Site(s) of Human Subject Data Collection: ICU in public hospitals of West Bank

(NOTE: If sites are administratively separate from the University, please submit approval letters, or indicate when they will be forthcoming.)

Funding Agency (if applicable): No

I. NATURE OF THE RESEARCH

In the judgment of the Principal Investigator, this research qualifies for which of the following types of review:

Review Type: exempt (category) X expedited (category) full Board¹

II. PURPOSE OF RESEARCH

Briefly describe the objective(s) of the research (please keep description jargon free and use 100 words or less; the IRB will file this information in our descriptions of approved projects).

Nurses' experiences of maintaining the quality of practice is important in the context of today's safety and quality agenda (Great Sound & McMurray 2009). The intensive care unit (ICU) is

¹ All research that is either externally funded or greater than minimal risk must be reviewed by the full Board

complex and has one of the highest prevalence of medical errors and patient injury is believed to be related to the rapidly changing patient status and complex diagnoses and treatments (Tracey & Bucknall 2009).

Main objectives of this study is to:

- Assess the frequency, nature, consequences and associations of medical errors in medical and surgical ICUs
- Examine the factors influencing nurses' errors
- Propose strategies to prevent errors

Research Questions

- What are the types of medical errors (such as incorrect medication, intravenous infusions, equipment failure, procedures, or miscellaneous).
- When the error has happened (hours to days)
- What are the consequences of failure (such as circulatory, respiratory, allergy, hyper / hypo-glycaemia, physical injury, bleeding, death, other) and the use of additional monitoring and treatment are needed.

III. METHODS

Approximate number of subjects: _____

Subjects will be (check only if applicable):

☐ minors (under 18)

☐ involuntarily institutionalized

☐ mentally handicapped

Describe in detail how the subjects will be selected and recruited:

The study will be approved by the Ministry of Health and An-Najah National university's Research Ethics Boards. A simple random sample: Two RN's (one male and one female) will be selected from a larger number of nurses who work in each ICU and full fill the inclusion criteria. Seven intensive care units (medical and surgical) will be included. Researchers will contact nurses and informs him / her, both in writing (Information for Research Annex No. I) and orally about the study and agree on the time of the interview. At the beginning of the interview, the researcher repeats the information and ask for consent to interview (Annex No.II).

Describe exactly what will be done to subjects once they have agreed to participate in the project:

What will be done

We will implement (16) interviews which were about an hour in duration each. The interviews will be recorded on tape. The interviews will be conducted in a separate meeting room in the department, where the nurse works. In the interview situation is only the informant and the interviewer, who is the current researcher (Lindseth & Norberg, 2004). In this study, conducted interviews at the hospital because the work is focused on creating an understanding of the everyday lives are affected by medical error. The interviews are intended to be semi-structured (Kvale 2007). An interview guide will be used. The purpose of the interview guide is to provide a framework interviews (Kvale 2007).

What incentives will be offered, if any? _No_____

IV. RISKS/BENEFITS TO PARTICIPANTS

Identify possible risks to subjects:

(NOTE: These may be of a physical, psychological, social or legal nature. If subjects are vulnerable populations, or if risks are more than minimal, please describe what additional safeguards will be taken.)

There is a risk that nurses feel offended at questions about their experiences. The interview can elicit negative emotions and bring back difficult memories. There is a risk that the participant would have thought that he / she said during the interview may affect the way ahead. While Patient safety is an important health issue because of the consequences of iatrogenic injuries. Medical errors in critical care are common, serious and predictable. So the approach to identifying deficiencies and redesigning faulty systems seem to be promising way to reduce human error.

Therefore, the risk is minimal compared to the benefits of the study.

The interviews will be transcribed verbatim and all identifying features will be removed to ensure anonymity

What are the benefits and how will they be optimized?

Health care organizations are facing increased pressure to adopt intelligent technology to promote quality and safety of care in hospitals. Medical error is each event during treatment of the patient in an ICU, which if not detected and corrected in time would affect the outcome of patient. The importance of monitoring by a trained person is thus emphasized. Since the care of another human being is the essence of nursing and it is important for nurses to understand how their actions and experiences affect quality care. Since the quality of clinical practice affects patient outcomes, quality has become one of the main issues of health care worldwide

Do benefits outweigh risks in your opinion? Yes X No _____

Are there potential legal risks to the Principal Investigator or University? Yes _____ No

V. INFORMED CONSENT

Consent Form (AnnexII)

Consent for participation in the study on Nurses' experience of the most common medical errors in intensive care

I have received both written and verbal information about the study and had the opportunity to questions. I am aware that participation in this study is voluntary and that I may at any time and without providing any reason to cancel my participation in the study.

I hereby give my consent to participate in the interview study.

Signature

Date

Describe how participants will be informed about the research before they give their consent. Be sure to submit with this protocol a copy of the informed consent/assent letter(s) you will use. Please prepare your informed consent letter at the 8th grade reading level or lower as dictated by the needs of the subjects. (See IRB website for required elements of an informed consent.)

(Annex I)

Participant Information Sheet

Nurses' experience of the most common medical errors in Intensive Care Units A phenomenological hermeneutic study

We are two students in the nursing college at An-Najah National University, fourth year. We have to write a nursing project as a university requirement. The project describes a scientific study on the Nurses' experiences of the most common medical errors in intensive care. your cooperation will be very appreciated.

Background

Studies show that medical errors are common in ICUs. Nurses' experiences of maintaining the quality of practice is important in the context of today's safety and quality agenda. The method for identifying deficiencies and redesigning faulty systems appears to be a promising way to reduce human error.

Main objectives of this study is to:

- assess the frequency, nature, consequences and associations of medical errors in medical and surgical ICU
- explore factors that influence nurses' errors
- propose strategies to prevent errors

Those who choose to participate, will be invited to participate in an interview. In the interview involved only the nurse and the interviewer. In order not to miss any important information, we will record interviews with the use of tape recorder. What will be said during the interview will be printed as text and analyzed and then compiled and processed. No subject could be identified after the treatment of the text. All tapes and prints text will then be stored under the current rules in locked cabinets. After writing the final report, we will destroy all material from the interviews.

Personal data and privacy

All information provided on this occasion will be treated to prevent unauthorized access to it.

Participation in the study is completely voluntary. This means, at any time you can withdraw from the study without giving a reason and without being penalised.

If you need any clarifications, please contact

Dr. Aidah Alkaissi

Supervisor

An-Najah National University

Nursing College

Jawwal, 0597395520

VI. PRIVACY/CONFIDENTIALITY

Please describe whether the research would involve observation or intrusion in situations where subjects have a reasonable expectation of privacy. If existing records are to be examined, has appropriate permission been sought; i.e. from institutions, subjects, physicians? What specific provisions have been made to protect the confidentiality of sensitive information about individuals?

Please see participant Information Sheet