CHAPTER I
INTRODUCTION
## CHAPTER I
### INTRODUCTION

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CHAPTER I
INTRODUCTION

1.1 BACKGROUND
Quality of care in nursing practice in general and critical care in particular is the responsibility of the care provider. Nurses involved in providing the care are, therefore, morally and ethically bound to enhance quality. Level of care varies among Intensive Care Units (ICUs) and within ICUs. Even small adjustments can significantly improve quality of care and patient outcome. Nursing care before and after improvement initiatives can be quantified provided attributes to measure the care are predefined. Quantification of ICU performances is not an easy task. It depends on multiple variables involving nursing and medical knowledge, ethics, economics, systems, engineering, sociology, and philosophy. Regular monitoring of parameters is a labor-intensive process. Therefore, selection of nursing quality indicators and prioritization should be done to ensure maximum impact with minimum data collection (Angwood P. et al 2010).

Monitoring of nursing Quality Indicators (QIs) is done to identify level of care provided on a time scale. Trend analyses of such data help in quantifying the standard of care offered in the same setup and compare the same with selected benchmarks. Improvement initiatives are subsequently taken to bridge the gap between the levels offered and benchmark levels, as per need. The entire nursing quantification of quality parameters includes
A: Formulating a Conceptual Basis.
B. Selection and Implementation of Parameters.
C: Finalizing the Conceptual Basis of Quality Indicators, followed by
D: Defining the Implementation of Nursing Quality Indicators.
(Beck S.L.et al 2013)

Quantification of parameters must have relevance to patients, hospital and society. Before selecting indicators it is important to understand the conceptual basis of quality in critical care nursing. Nurses themselves need to focus on establishment and improvement as a process with a continued strategic base formulated by them, for
better nursing and care outcomes. This allows the entire exercise to be accepted by the ICU healthcare team as a necessity (Davies H. et al 2007).

Quality Indicators in Critical Care is a jump towards Patient Safety. Through this study the researcher wants to find if nursing in ICUs emphasizes quantification of quality parameters.

“To Err is Human:” 44,000 to 98,000 deaths were reported annually in the USA (1999) due to medical errors. This is roughly equivalent to a jumbo jet full of passengers crashing every day. Hence, a new “safety” movement in medicine was initiated. The term “safety” is more diplomatic than “error” as the latter implies the direct fault of a healthcare provider. An error of “omission,” i.e. what we fail to do (meeting standard of care) is often termed as “quality” and error of “commission” i.e. what has already been done (not meeting standard) is termed “safety”. Quality and safety are two sides of the same coin and it is difficult to know where quality ends and safety begins (Carlson K.K. 2009). Nursing researchers have so far concentrated on the clinical management part of patient care and only lately has attention been given to research in implementation of therapy and safe patient care. In order to standardize and compare, regulatory authorities have laid down definitions pertaining to safe patient care. The concept of going one step beyond nursing management of critically ill patients and emphasizing/ensuring nursing measures of a potential quality through quantification of quality parameters is a goal for all nurses (Erwin –Toth P. & Spencer M. 1991). This study too wants to do the same and set an example for many to follow.

Quality parameters are closely associated with patient safety: Errors, Incidents, Near Misses, Adverse Events and Preventable Adverse Events. Levin V.H.I. 1995 clearly identifies these and gives the following meaning to this terminology -

Patient Safety: It is defined as the absence of the potential for, or occurrence of, healthcare–associated injury to patients. It is created by avoiding medical errors as well as taking action to prevent errors from causing injury.

Error: It is defined as a mistake made in the process of care that results in, or has the potential to result in, harm to patients. Mistakes include the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim. These can be the result of an action that is taken (error or commission) or an action...
that is not taken (error of omission).

Incident: Unexpected or unanticipated events or circumstances not consistent with the routine care of a particular patient, which could have, or led to, an unintended or unnecessary harm to a person, or complaint, loss, or damage.

Near Miss: An occurrence of an error that did not result in harm.

Adverse Event: An injury resulting from medical intervention.

Preventable Adverse Event: Harm that could be avoided through reasonable planning or proper execution of an action.

Currently patient safety, error, incident reporting, near miss, adverse event and preventable adverse event are equally relevant whilst nursing in a critical care setting and this study indicates that this needs to be significantly considered and quantified. As patient safety is a concept and an abstract term, converting it into numerical terms for nursing research and audit purposes is difficult. One has to consider many dimensions of safe patient care. We all try to practice safe patient care but for quantifying it, certain basic principles need to be followed. Principles of Management from industry are being increasingly incorporated in medicine and this is most evident in patient safety. Safe industries (e.g. aviation) report defect rate in terms of sigma or defects per 10,000 or 1,000 events. One sigma equates to a 69% defect rate and a six sigma rating equals three defects per million. Healthcare industry’s record is abysmal in this regard, at one or two sigma. Any quantification tool will be meaningful if it consists of a numerator (number of events observed) and denominator (number at risk) so that a rate can be calculated. It is labor intensive to keep tab on rates of adverse events, and a more subjective approach may be more appropriate, which acts to highlight problem areas to be specifically addressed in a more objective way. Examples of such a subjective approach are peer review, morbidity and mortality conferences, investigation of liability claims, and incident reports. In all these, a single event is analyzed, which is not linked to a denominator, which limits the ability to estimate rates. Nonetheless, it helps to identify problem areas (Sale D.N. 2000)

Incident Report: This evaluates how a single patient is harmed but can also be utilized to look at near misses, i.e. incidents that did not but could have caused harm. This needs to be emphasized while nursing in the ICU’s.

An audit of incident reports, their root cause analyses or FMEA (Failure Mode Effect Analysis) should be performed periodically by a multidisciplinary team consisting of
an ICU director, a Nursing Director, Quality Control personnel, and a Hospital Administrator. Corrective measures should be identified and feedback given to healthcare providers.

Quality Indicators in Critical Care: Personnel Development (Weiner B. J. et al 2006). Historically, the specialty of critical care started by dividing acutely ill patients into cohorts/groups, in separate clinical areas. These discrete geographical areas were subsequently named Intensive Care Units. With the advent of various new technologies, these specialized clinical areas were segregated from other hospital wards and had personnel needs which were different from that of the other hospital wards. The delivery of care in the ICUs requires the presence of highly trained, skilled and motivated personnel who can apply modern techniques and interventions appropriately, to provide the highest quality of care. Irrespective of the type of ICUs and their geographic locations, all ICUs have the responsibility to provide services and personnel that ensure quality care to patients (Wunsch H. et al 2008). This study too highlights the importance of three elements: Quality, ICU and Nursing. Institute of Nursing (ION) USA states ‘ICUs can be better if ICU nursing personnel development and quality initiatives focus on nursing outcomes’. Defining nursing staff in ICU, their training requirement, structuring staffing logistics and identifying quality measures is essential. The ION has the following to say in regards to ICU nurses, Quality Nursing Measures and Nursing Quality Indicators for ICU: Process Parameters (Alspach J.A. & American Association of Critical Care Nurses 2006) -

ICU Nurses- The lack of adequate staffing of nurses leads to delays in weaning patients, higher infection rates, increased readmission rates, increased medication errors and increased length of stay. Excessive nursing workload as defined by “hours per patient days” or “nurse/patient ratios” is associated with increased mortality in critically ill patients. Staffing pattern for nurses should take into account patient load and case mix. The gold standard for staffing should be one nurse for each critically ill patient. Inadequate house staff leads to poor emergency care and poor continuity of care; adequate staffing pattern should be taking into account depending on patient load and acuity of care.

Quality Nursing Measures- Quality Nursing Measures in the ICU are predominantly nursing outcomes, but since the ICU provides service to relatives and friends, ICU personnel, the hospital and the society, other parameters must also be used. These include structural outcomes, psychosocial and ethical and environmental outcomes.
Institutional outcomes like nursing staff satisfaction and turnover rate are important measures of Quality in the ICU, related to personnel. Higher rates of nursing turnover leads to increased costs, increased training time, decreased morale and increased stress on the remaining nursing staff, leading to decreased quality of performance and worse nursing outcomes. Each ICU must measure and control regularly the efficiency of the use of nursing manpower evaluating the Work Utilization Ratio (WUR) by recommended scoring tools. Measuring staff satisfaction is an important Quality initiative. Staff retention rates should be obtained from personnel records and data of job satisfaction should be obtained from questionnaires or exit interviews. Days or hours of training should be monitored to ensure quality of personnel development. A multidisciplinary approach with adequate ICU personnel and staffing pattern combined with ongoing training and need based skill development and measurement of institutional outcomes is necessary to provide quality critical care.

Nursing Quality Indicators for ICU: Process Parameters.

The Critical Care Service in a modern hospital has a vital role to play in delivering prompt, appropriate and adequate care to acutely ill patients. Acutely ill patients can present with a variety of pathophysiological derangements which need rapid repeated interventions with constant monitoring and further interventions based on results of the monitoring process. These interventions involve multiple components – all of which need to be seamlessly integrated to optimize outcome. In a study in which engineers observed patient care in ICUs for 24-hour periods, it was found that the average ICU patient required 178 individual interactions per day. These included a range of interventions from physical maneuvers (such as positioning the patient) to medication administration.

Quality and Safety are two facets of a system designed to deliver optimum care. The terms have been separated as two components by referring to Quality as errors of omission and Safety as errors of commission. Quality of Care is an important issue because the cost of non-Quality in any enterprise is more expensive than investing in Quality. Quality of Care is defined as the degree of correspondence between goals set and goals achieved in relation to patient care without excessive use of financial resources. Hence, Quality is the ratio of standard achieved / expected standard. It is 1.0 if all standards are achieved (Frojd C et all 2011).
Nursing Quality in Processes is significantly important as -

1. Critical care nursing services should employ best evidence practices, such as those described in ‘care bundles’.
2. Patients requiring critical care nursing are entitled to the care given by dedicated, highly skilled, multidisciplinary teams.
3. Critical illness has great impact on the lives of patients and their families.

However, besides the above, the study also wants to direct nursing error detection and nursing error resilience.

Nursing Error Detection is when Nurses make decisions in a highly complex environment by negotiations and compromises as they trade-off between competing goals. In order to characterize the systemic causes of error in such environments, we need to identify the pressures (e.g. fatigue, workload, policy, and lack of resources) that push nurses towards these boundaries, and then make efforts to counteract pressures.

Nursing Error Resilience is when a realistic approach to recognize that human error cannot be eradicated, but the negative consequences of that error can be controlled. A nursing error resilient system should have the following targets:

• Control the propagation of human error towards accident occurrence.
• Reduce adverse events.
• Correct / Recover from error.

Such an approach will ensure that the solutions implemented will not squander resources or blind us to the adverse effects of interventions (Lynn M.R. et al 2007). In this study the researcher wants to study the primary step, to quantify nursing incidents and errors through an identification policy for nurses.

The inability to translate top quality research into nursing practice is a major problem in healthcare. Published best practice guidelines do not by themselves reliably improve patient care. Continuing nursing educational programs, use of nursing Quality Indicators and feedback are important elements of the strategy to deliver the best evidence based care to the bedside. Checklists have been found to be effective in implementing evidence based management bundles. They help in two ways: with memory recall and with making explicit the minimum expected steps in complex processes. An average ICU patient requires multiple individual nursing interventions per day. Checklists help in establishing higher standards of baseline performance. Even the simple strategy of having doctors/ nurses make their own checklists for what
they thought should be done each day improves consistency and quality of care (Peters M.A. et al 2002). Quality Indicators in Critical Care and Nursing Outcome Parameters have direct implications to the outcome and inability to consider them can be more expensive than investing in Quality.

In order to choose Outcome Parameters in any enterprise, the mission goals must be clearly defined. In the critical care setting, nurses should work to preserve meaningful life--in this context “meaningful life” refers to a quality of life valued by the patient--and provide specialized care to patients in order to sustain, protect and rehabilitate them during their treatment for a critical illness or injury. “Specialized care” implies care in an environment where it is possible to provide real time monitoring of vital parameters along with the ability to intervene rapidly when necessary.

As Shortell S.M. et al (1998) has recommended, the researcher has studied all the facts related to nursing quality in the ICU which have a direct or indirect effect, thus understanding that it is significantly important to possess an attitude which goes beyond establishing mere nursing standards to establish nursing quality standards.

1.2 NEED OF THE STUDY

Nurses are equipped with professional qualifications and possess skills to provide a wide range of nursing services. Nursing services encompass autonomous and collaborative care of individuals in hospitals, home and community.

The present nursing education system emphasises development of nursing abilities in context to knowledge, skills and attitude. A nurse has the ability to practice what she has learned. As stated by the Quality Council of India (Donabedian,1996) she needs to apply this to the Quality concept. An ICU is the epitome of nursing care. In addition to critical care nursing protocols, if a critical care nurse emphasises Quality based protocol to ensure patient safety in her unit (Bhandarkar, et al, 2011), the quality of care improves.

Major nursing interventions are implemented successfully when a nurse is provided with adequate space to carry out her implementations effortlessly, Bhandarkar, et al (2011) found that nurses experience inability to perform medical or/and surgical procedures efficiently if the unit space is insufficient and visibility is poor. The nurses
have expressed that it leads to errors or failure to follow scientific principles (Mathew Thompson, 2000). These research studies pose individual questions towards multiple nursing and medical practice adequacies. Hence the researcher decided to assess the practices nurses follow towards supporting selected parameters essential in the ICU.

Nursing Care in general has grown phenomenally since its inception during the Copenhagen Poliomyelitis outbreak in 1952. Few specialties have grown with that much pace as Intensive Care in such a short period. It is an intentionally planned intensive care that saves lives which otherwise would not have been possible. It is contributing with precision towards the future course of disease and instituting remedial measures well ahead of time when patients require critical care therapies. Nurses form the core of the ICU team. They focus on intense monitoring, target preventive nursing processes and continuous curative implementation at very steep levels of complexity which are significantly important for patient care outcomes (Aiken L. H.et al 2012). The researcher explores the emphasis given to ensure that a system essential to the quality of nursing care imparted is focused upon, through this study.

Target oriented therapies and bundles in Nursing are becoming the preferred modalities for bettering outcomes. There are definitive indications that such therapies are helpful. Intensive therapy outcomes are constantly improving notwithstanding the variations in deployment of processes, resources, drugs, consumables and techniques in different ICUs. While disease outcomes are relatively easy to appreciate and accounted for, the same is not true for intensive care nursing outcomes because of the nature of the units and the way it is practiced, particularly in India, with a large number of open, very few semi-closed and even fewer closed units. In order to develop the right kind of unit and practice optimum therapies for providing the best treatment to our critically ill patients, appropriate key Nursing Quality Parameters are needed, which reflect aspirations of patients and relatives and support medical therapeutics (Cleary P.D. 2003). The study closely deals with this point to give it the due importance.

The key Quality Parameters need monitoring, auditing and improving. This is a dynamic process that requires standardization, improvement and innovation – the three arms of any improvement process, may it be in industry or in service. Standardization means removing the outliers, i.e. reducing the standard deviation. Improvement
denotes gradual bettering of a parameter from the previous level with a degree of irreversible consistency. Innovation in nursing is sporadic and often requires a thinking cap, which, while maintaining the speed of standardization and improvement, quickly takes the parameters to a new level (De Vos M. et al., 2007).

**Categories of Nursing Quality Indicators as stated by Keith Young (2005).**

Quality of nursing care is a complex process that can be monitored at three levels:

1. **Structure:** This includes architectural design, physical parameters, staffing, nurse-patient ratio, bed occupancy and all components of structure related to Quality.
2. **Process:** Refers to the current practice of care delivery, hand washing and implementation of other nursing practices and guidelines.
3. **Outcome:** Indicators of outcome such as nosocomial infection rates, mortality stratified to severity of illness and other outcome measures are the most valuable and readily recognized indicators of Quality.

This study supports Kline Young (2005), to say that a beginning has to be made and established. In any study, small improvements through Small Group Activities (SGAs), previously known as Quality Circles, are central to any improvement in a unit and brings about pride and involvement amongst the nursing staff in an ICU. While isolated improvement activities are important to making the members engaged to start with, institutionalizing these activities is the ultimate goal of the unit, for only that will ensure a complete irreversibility of the process. The latter is possible if the problems are constantly identified in the process/procedure and improvement initiatives are taken to address those. Striving for results is extremely important and for that the team needs to identify and take care of the vital few problems leaving the trivial many, something like triaging in mass casualty parlance.

Co-relating the improvement of the process/outcome parameter with the improvement activities is important; if it does not match, then either one has not chosen the parameter properly, or the parameter needs further development in form of precision and complexity or the vital few problems have not been properly identified. A constant engagement with the improvement process is necessary. The parameter needs to be emphasized, validated and revalidated in the same unit and in different units among
similar and dissimilar case mixes before it is finally accepted (Larsson G. & Wilde – Larsson B., 2010).

Nursing Efficiency of a healthcare unit is judged by its nursing Quality Indicators. In India, monitoring outcome through Quality Indicators is not yet institutionalized because of many reasons including the fact that a majority of ICUs are run as open or semi-closed with unaccountable custodians. Dependency on KPIs as practiced in developed countries becomes inevitable wherever some degree of a total quality management system is being adhered to (Wafer M.A. 2005). It is generally seen that a few of the hospitals in India attempt to evolve their own parameters either taking ideas from the established parameters or from their own experiences in other Indian hospitals. Selecting definitive and sensitive Quality Indicators and forming a database at the unit level is therefore required.

**Nursing Parameters:** Common performance parameters are certain basic parameters selected to find out Quality Indicators in nursing. Each Indicator explains for ease of understanding and uniformity of practice what leads to an established nursing process. The approach by an ICU nursing team includes that these should be guidelines and by not a complete or closed list. Once the parameters are put in place, monitored and audited at predetermined intervals, one would surely find some improvement in the KPIs. By no standards should those alone be construed as a successful exercise. The approach should be to minimize standard deviation while improving the KPIs. It will be appreciated that the whole unit’s involvement is essential to find out the bottlenecks in the process or functional areas of any parameter and take remedial action through SGAs and Self-Initiated Projects(SIPs). One would see a lot of Plan-Do-Check-Act (PDCAs) on the way to evolution of a parameter (Alexander J.A. et al, 2006).

**Critical Care Unit** - The critical care environment has undergone countless changes since its inception. Historically, nurses have experienced times during which patients were placed in critical care merely to be watched more closely. Today, patients are placed into the critical care environment because of life-threatening conditions and/or the need for complex interventions and treatments. The critical care patient from years past is now treated on general medical-surgical units, and most of today’s critical care patients would not have survived in the past.
Numerous words have been used to describe the critical care environment. These include dynamic, complex, stressful, vulnerable, unstable, high-tech, and fast-paced. These same words can be used to describe today's critical care patient. In the face of increasing complexity of both the environment and the patient is the fact that globally we are experiencing one of the worst nursing shortages in recorded history. In addition, patients are more educated than ever before. The patient and family are demanding a safe healthcare environment, positive patient outcomes, and quality care. The efficient nurse plays a primary role in meeting these demands. To retain talented and nurses with clinical expertise at the bedside, a positive healthcare environment must be achieved. This emphasizes the need for the nurse leaders to assure that the best patient care outcomes through a Quality derived nursing is practiced in the critical care unit. The need of defining and exercising Quality parameters is mammoth. The fact that it is not a recognized policy decision unless decided so makes it more relevant (Angwood P. et al, 2010).

The study points out parameters of structure, process and outcomes based on facts stated by renowned Quality experts. These have been isolated to categorize the foundation of this study. The parameters may be stated as follows-

PARAMETERS OF STRUCTURE

Indicator – Space
Description - Common ICU deficiencies in medical and nursing therapies are related to inadequate, inappropriate or ill-defined space for the patient, nurses, equipment, functional activities or medical/para/non-medical personnel.
Rationality - Critically ill patients are at high risk for complications due to the severity of medical conditions, complexity of treatment, poly pharmacy and technology based interventions. Space constraints can contribute to the complications caused by any of them. Nearly all ICU patients suffer from potentially harmful events. Nearly 15% of the events related to space are preventable.
Formula for calculation- Adverse events/ error rate related to space = (no. of error /no. of bed days) x 1000.
Patient population- All ICU patients.
Source of data - Medical records.
Type of parameter- Safety (patient).
Benchmark- The rates per 1000 patient-days for all adverse events related to space are preventable events (Rothschild J.M. et al, 2005).

PARAMETERS OF STRUCTURE
Indicator – Light
Description - Common ICU deficiencies in medical and nursing therapies are related to inadequate, inappropriate or ill defined light for the patient, nurses, functional activities or medical/para/non-medical personnel. This is further specified as events resulting from inability to observe critical nursing factors, events resulting from inability to perform certain nursing procedures, and events resulting from inability to assist for certain medical procedures due to inadequate light, as well as events resulting in delayed patient recovery due to no natural light in the cubicle when recommended.
Rationality - Critically ill patients are at high risk for complications due to the severity of medical conditions, complexity of treatment, poly pharmacy and technology based interventions. Light constraints can contribute to any of these. Nearly all ICU patients suffer from potentially harmful events. Nearly 18% of these, related to light inadequacies, are preventable.
Formula for calculation- Adverse events/ error rate related to light inadequacy = (no. of error /no. of bed days) x 1000.
Patient population- All ICU patients.
Source of data - Medical records.
Type of parameter- Safety (patient).

PARAMETERS OF STRUCTURE
Indicator – loud noise,
Description - Common ICU deficiencies in medical and nursing therapies are related to loud noise in the patient cubicle.
Rationality - Critically ill patients are at high risk for complications due to the severity of medical conditions, complexity of treatment, poly pharmacy and technology based interventions. Loud noises can contribute to any of these. Loud noises are disturbing
to conscious and unconscious patients. Nearly all ICU patients suffer from potentially harmful events. Nearly 0.5% of these events are preventable.

Formula for calculation- Adverse events/ error rate related to loud noise = (no. of error /no. of bed days) x 1000.

Patient population- All ICU patients.
Source of data - Medical record.
Type of parameter- Safety (patient).


PARAMETERS OF STRUCTURE
Indicator – Atmospheric cleanliness.
Description – Deficiency in atmospheric cleanliness is described as an active source present in the atmosphere that can lead to a primary or secondary infection to the patient or personnel in the unit.
Rationality - Critically ill patients are at high risk for complications due to the severity of medical conditions, complexity of treatment, poly pharmacy and technology based interventions. Atmospheric cleanliness may be maintained through an established protocol of a routine air disinfection process followed by a monitoring schedule. An atmospheric infectious source can contribute to any of these. Nearly all ICU patients suffer from potentially harmful events. Nearly some 18% of these are preventable.

Formula for calculation- Adverse events related to atmospheric cleanliness = (no. of error /no. of bed days) x 1000.

Patient population- All ICU patients.
Source of data - Medical record
Type of parameter- Safety (patient).
PARAMETERS OF PROCESS
DECUBITUS (PRESSURE) ULCER:
Indicator- Decubitus (pressure) ulcer
Description - Decubitus ulcer and pressure sore are synonyms. Decubitus is derived from the Latin word *decumbere*, means, “to lie down”. Since a pressure sore can develop from other positions, it is called “pressure sore”. Prolonged uninterrupted pressure over bony prominences causes necrosis and ulceration. Depending upon tissue damage, ulcers are classified into four stages. Stage 1 indicates superficial color change, Stage 2 represents partial thickness skin loss, Stage 3: full thickness skin loss, and Stage 4 denotes deep and extensive tissue damage involving muscle, tendon or bone. Hip and buttock sores represent 67% of all pressure sores.
Rationality- Annual cost of treatment in the US exceeds $1 billion. Implementation of pressure sore prevention measures as a policy increases the prevention index by 22%. Use of a pressure sore prevention surface for a vulnerable group of patients decreases development by 18%. Change of positions in these patients decreases development by 11%, use of a barrier by 14% and taking measures to better circulation by 7%.
Ambulating a patient from bed to chair decreases the incident of bedsores by 14% and using of a mechanical device to assist mobilizing of these patients increases use of ambulation protocols by 38%. Having a reporting policy increases the preventive measures taken by the nurses to 39% and assessment using a predesigned scale prevents bedsores in a potential patient by 78%.
Formula for calculation - Number of pressure ulcers / Number of cases x 1000.
Patient population - Critically ill.
Source of data - Hospital records.
Type of parameter - Morbidity, Safety of patients.
Benchmark – 11% 22.71 / 1000 cases
HUMAN RESOURCE
Adequate and competent staff can ensure delivery of quality oriented service. Therefore, adequacy of human resource and its development are important issues. The unit should pay attention to monitor attrition rate. Leader of the team should interact with internal, external agencies and ICU staff to ensure delivery of pre-decided standard of care. Positive culture to encourage innovation, autonomy, empowerment, safety, ethical standard and staff satisfaction, should also be developed to achieve the goal of the unit and the organization. Overall employee satisfaction is advocated in this report. (Pronovost P.J. et al 1999 and US Department of Health and Human Services. Agency for Healthcare Research and Quality (AHRQ), National Guideline Clearinghouse Guideline Index.)

NURSE – PATIENT RATIO;
Indicator – specific nurse-patient ratio.
Description – This depicts the number of patients nursed by one nurse at any given time.
Rationality – An ICU nurse needs to concentrate her abilities on minimum patients thus enabling her to give maximum patient care outcomes in the most critically ill phase. The nurse-patient ratio needs to be stated by defining the types of patients in terms of their medical illness like patients suffering from multi-organ failure or who have undergone a major surgery that needs intensive monitoring and interventions in the post-operative phase. It also needs to be defined for patients who are on a ventilator or on the ventilator with multiple complications. The nurse-patient ratio for various shifts too has to be stated as a part of the protocol.
Retention - rate remains high with a better nurse-patient ratio and employee satisfaction too is improved.
Formula for calculation- The nurse patient ratio (for a specific status) = (no. of patients /no. of nurses) x 1000.
Population - Staff working in the unit.
Source of data - Employee record survey.
Type of parameter- Human resource.
Benchmark- 1:1/2 is the best ratio.
PARAMETERS OF OUTCOME

PATIENTS’ FALL RATE

Indicator - Patients’ Fall Rate.

Definition - An untoward event which results in the patient coming to rest unintentionally on the ground or another lower surface. Rationality Fall could be accidental, anticipated physiological or unanticipated physiological. This is a safety issue for a patient in ICU. Accidental fall could lead to morbidity, prolonged stay and customer dissatisfaction. A hospital policy of reporting falls and planning action and implementation to decrease the falls brings down the incident by 33%. Reporting falls allows an individual institute to specify the origin of the fall and thus segregate action designed to be applicable to the hospital.

Formula for calculation - fall rate = (no. of falls/no. of bed days) x 1000.

Patient population - All patients.

Source of data - ICU records.

Type of parameter - Safety and morbidity.

Benchmark - 8.46 falls per thousand bed days with an injury rate of 12.85% in 2000-01 Norton Hospital USA, 2008 Norton.

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MEDICATION ERROR
Indicator - Medication error.
Description - Medication error could be due to wrong prescription, dosing or communication gap (verbal or written).
Rationality - Medication errors occur at a mean rate of 19% in hospitalized adults. The need for assessing ICU medication error frequency is highlighted by the finding that 78% of the serious medical errors that occurred in the ICU were attributed to medications. More than 235,000 medication errors were reported in 2003 in USA. At least 2% of these errors caused significant patient harm (eg. injury requiring treatment, prolonged hospital stay, and death.) Patient harm in medication errors if the drug is given through a central line is 24% more evident as the drug specifications of most of the drugs is complex. The hospital policy allows emphasis on prevention by diligently following the prevention protocol. This may include specifications of checking, for eg the physicians order, or following a verbal order policy, drug specifics as the drug name, dose, route, expiry date and the batch number in a check/counter-check policy. A check protocol may be verbal or written and can decrease the errors through central line by 41%. A knowledge policy where the nurse needs to be knowledgeable before giving the drug and providing knowledge like via an online drug handbook or reference manual can decrease errors by 19%.
Formula for calculation: Medication error rate = (no. of error /no. of bed days) x 1000.
Patient population- All patients in ICU.
Source of data - ICU records.
Type of parameter- Patient safety.
Benchmarks
1. Medication errors range from 1.2 to 947 per 1000 patient-days (median of 105.9 per 1000 patient-days) in adult ICUs and median of 24.1 per 1000 patient days in neonatal/pediatric ICUs [1].

MEDICATION ERRORS as ADVERSE EVENTS
Indicator – Medication Adverse Events.
Description - Common ICU errors are related to carrying out medication orders, reporting or communication, and failures to take precautions or follow protocols.
Rationality - Critically ill patients are at high risk for complications due to the severity of medical conditions, complexity of treatment, poly-pharmacy and technology based interventions. Nearly all ICU patients suffer from potentially harmful events. Nearly half (45%) of the adverse events are preventable. Central line related untoward events are major events amongst all. A process policy through a procedure protocol stating dilution protocols through a chart and the nurse following it further decreases the error margin by 18%. Base line care protocols like checking the central line position, following aseptic technique and flushing protocol allows for patient safety protocols to be followed along with prevention of medication error thus enabling a comprehensive guideline and decreasing other untoward incidents by 12%. Creating an error report allows a study of the error pattern and take corrective actions to decrease the error rate. A hospital protocol with a predesigned error reporting format for wrong drug administration, wrong dose administration, wrong time or wrong route or wrong method decreases the rate of errors. Similarly sending the wrong patient for surgery or requesting for a wrong blood investigation, too, if reported, analyzed and correctly acted upon brings down the error rate. A decrease in the rate from 4% - 16% may be noted for varied subjects respectively.

Formula for calculation- Adverse events/ error rate = (no. of error /no. of bed days) x 1000.

Patient population- All ICU patients.
Source of data - Medical records.
Type of parameter- Safety (patient).
Benchmark- The rates per 1000 patient-days for all adverse events, preventable adverse events, and serious errors were 80.5, 36.2, and 149.7, respectively. Among adverse events, 13% (16/120) were life-threatening or fatal; and among serious errors, 11% (24/223) were potentially life-threatening. (Attree M. 2001, Cline D.D. et al 2011 and Jakobsson L. 2012).

Parameters – Safety and morbidity.
Indicator – Perioperative errors.
Description - Common errors associated with surgical procedures may be simple to complex in nature leading to mild/moderate/severe/life threatening effects. A precaution or a policy to check it may go a long way to better patient outcomes.
Rationality - Critically ill patients are at high risk for complications due to the severity of medical conditions, complexity of treatment, poly pharmacy and technology based interventions. A perioperative error, which may be preventable in nature, can assist a patient during a crucial perioperative period. A checklist certifies and enlists that all necessary precautions are being taken and allows for the medical personnel involved to recheck and ensure if necessary. A protocol of documenting using a checklist decreases errors in this category by 44% and a protocol of reporting the inability to follow the checklist increases the implementation by 21%.

Formula for calculation - Adverse events/error rate related to perioperative periods = (no. of error /no. of bed days) x 1000.

Patient population - All ICU patients going for a surgical procedure.

Source of data - Medical records.

Type of parameter - Safety (patient).

Benchmark - the rates per 1000 patient-days for all adverse events related to perioperative events, are preventable events.


Quality in critical care nursing promotes patient safety and attempts to prevent errors. Focus should be both on safety of both patients and care providers. Rothschild, J. M. et al, (2005), reported that adverse events in ICUs occur at a rate of 81 per 1000 patient-days and that serious errors occur at a rate of 150 per 1000 patient-days, supporting the findings of an earlier study indicating that nearly all ICU patients sustain potentially harmful events. According to another study conducted in an Israeli ICU, errors were observed to occur in 1% of all the activities performed each day and incidence was higher with physicians than nurses. Nearly half (45%) of the adverse events were deemed preventable in the Critical Care Safety Study. Medical errors and hospital acquired complications often lead to disability, large costs and mortality. In USA, 27,000 to 98,000 preventable deaths/year had been reported due to medical errors, a matter of great concern. The situation is not expected to be better in other countries. Common ICU errors are treatment and procedure related. Medication errors result in more than 770,000 injuries and deaths each year at a cost of up to $5.6 million per hospital, depending on its size, in USA. In the Indian context hospitals do not readily publicize error data, hence it is difficult to find and quote rates in the local context. Communication failures, while ordering prescriptions or carrying out medication
orders and compliance to protocols, are often the important causes of errors. A more disturbing fact is the denial by physicians and nurses that the error was committed by them. In one study, one-third of ICU nurses and physicians denied having erred in the ICU, whereas at the same time they said that many errors are neither acknowledged nor discussed. Errors could be due to various reasons. Shortage of manpower, deficiency of trained manpower, injudicious work pressure, inadequate infrastructural and equipment support, lack of protocol, and personal issues are a some other important causes of errors. These factors should be addressed before blaming a person. A complacent attitude and lack of commitment could also be responsible for certain errors though they are infrequently observed in a sensible unit. Most errors are not caused by individual inadequacies but are products of defects in the system of care. Therefore, before conducting an error surveillance, ambiguity of practice in offering various services should be eliminated. Care providers must know what is expected from them. Guidelines, protocols, systems and processes developed locally with reference to national/international guidelines and recommendations should be in place. Protocols should be in written form and adequate training should be given to those expected to follow them. Development of local guidelines/processes, etc., should be done in consultation with the stakeholders to break the resistance and to create a sense of ownership. This exercise should be done in piecemeal and training should be imparted as the systems and processes are being developed and implemented. Noncompliance to monitoring and record-keeping should be audited regularly to find out the magnitude of problem and areas of concern. Writing protocols is relatively easy but its implementation and compliance monitoring are difficult to accomplish. Non-adherence to established standards of care has been related to poor outcome. Only 50 to 70% of Americans receive the care that is recommended for their condition and 20 to 30% receive inappropriate medical interventions. (Ray B. et al. 2009.) Parameters should also be selected to ensure that care providers are not exposed to undue risk. Audit can also be done at prefixed intervals by internal and external agencies to find the safety standard of the unit. Corrective measures can be taken accordingly. In the authors’ view, error documentation and analyses is expected to pay rich dividend in quality oriented and matured units where acceptance of deficiency is not considered a failure but is viewed as an improvement opportunity. A reporting and analyzing protocol goes a long way in collecting relevant facts which may be further analyzed to create a corrective action plan to better outcomes.
Introspection drives for error documentation and analyses can be given priority when the unit is ripe enough to accept the deficiency without being defensive about it. (Ray B. et al. 2009).

Selection and Action Plan for Implementation of Indicators.
Selection: It is practically not possible to select all parameters. Therefore, while selecting performance measures, certain basic principles (as per Muntlin, A. et al, 2006) should be kept in mind.
1. Evaluate varieties of parameters that cover the dimensions of ICU nursing performance.
2. Select performance measures that are the primary objective of the unit.
While selecting parameters focus should be on the ultimate outcome of the patient. Mutual understanding between doctors, nurses, other staff and ICU directors is also important for embarking on an error reporting exercise. During error reporting, it is imperative to understand that despite the potential relationship of errors/adverse events with morbidity, mortality and cost, all events do not lead to clinically relevant consequences. Adverse events should always be monitored due to their direct linkage with morbidity.

Trend Analysis: A Score Card should be prepared to accommodate vital parameters based on the monitored parameters. A Score Board should depict overall performance of the ICU. This helps in the systematic collection of data, monitoring of important parameters at a glance and analysing trends. While selecting a parameter, whenever possible the desired parameter (numerator) has to be correlated with another parameter (denominator) to make it more meaningful. For example, the number of adverse events (numerator) can be expressed as the rate of events by dividing the absolute number with a denominator like an aggregate number of at-risk patients, patient-days, etc.
Irrespective of the data type, care must be taken to collect a sample size that is large enough to allow reliable statistical comparisons. Suppose monthly tracking shows that a particular parameter fluctuates between 0 and 6%, then while doing the trend analysis over a period of time a difference in the parameter within the acceptable limit should not be considered as deterioration in service. It is important not to over-interpret short-term changes in performance measurements while evaluating.
Frequency of data analyses is therefore important. Short term analysis can show wide variation in the parameters. Standardization and accuracy of data.
collection is also important for subsequent analysis and comparison.

Continuous Improvement Towards Nursing Quality in the ICU: Data collection directs the delivery of Quality Nursing Care because it facilitates and ensures predefined care and process modification/corrective actions taken for continuous improvement. Analyzed data indicates the direction the care provider takes to bring a positive change. The PDSA cycle (Plan, Do, Study, and Act) brings a qualitative change in performance. This cycle is repeated after achieving the desired goal and while setting new goals. Common tools used while following the PDSA cycle are: brainstorming, drawing cause and effect diagrams, prioritization of the ‘vital few’ causes, corrective action, and monitoring of impact. (Pogorzelska M. & Larson, E.L., 2008).

Quality Indicators act as the yard stick to measure the level of care offered in a unit over a period of time. Variation in care in the unit and among different units with similar case mix can only be done if Indicators are compared regularly. Quality of care in an ICU depends on the complex interaction between patient, machine and care providers. Process driven and protocol based management should eliminate ambiguity and ensure better outcomes. Such an approach is not possible unless the care provided is quantified and the gap between the current and desired levels is assessed, followed by improvement initiatives taken to bridge the gap. Selection of Indicators and monitoring them should, therefore, be considered the most vital and challenging task to bring continuous improvement in the performance level of the unit. (Akin S. and Erdogan, S., 2007.)

1.3 STATEMENT OF THE PROBLEM
To study the selected Quality Control Nursing Parameters existing in critical care nursing units and the outcome on selected aspects of nursing care practiced, leading to prevailing nursing quality assurances.

1.4 CONCEPTUAL FRAMEWORK
A framework for research helps to organize the study and provides a context for the interpretation of the findings. Conceptual framework helps explain the relationship between concepts. According to Polit and Hungler (1995), a conceptual framework refers to interrelated concepts of abstracts that are assembled together in some rational scheme by virtue of their relevance to a common theme. (Polit & Hungler, 1995)
The concept of Quality is universal and applicable to all parameters of life in general. As healthcare personnel, our concern is more towards health and a large amount of our representations include application of healthcare reforms concerned with nursing in India. A conceptual frame for Quality in India is dictated by the Quality Council of India (QCI) whose mission is - “to lead a nationwide Quality movement in India by involving all stakeholders for emphasis on adherence to Quality standards in all spheres of activities primarily for promoting and protecting interests of the nation and its citizens”. Healthcare is one of its concerns and nursing forms a major foundation in the healthcare. ICU nursing is a part of Nursing Healthcare Quality. (Ray, B., et al, 2009).

The National Accreditation Board for Hospitals (NABH) and Healthcare Providers is a branch of QCI that initiates quality concepts in health and nursing. Nursing Excellence Standards is a division of NABH that conceptualises Nursing Quality Standards. NABH is an institutional member of the International Society for Quality in Healthcare (ISQua) and the Asian Society for Quality in Healthcare (ASQua). ISQua has now conceptualised with WHO multiple measures towards patient safety including nursing care (Kvist T et al 2007).

Quality standards in the USA are similarly conceptualised by the Agency for Healthcare Research and Quality (AHRQ) governed by the U.S. Department of Health and Human Services for the USA. The Joint Commission International (JCI) recognises AHRQ Quality Indicators and follows ISQua guidelines and concepts. This allows JCI to authorise Global Certifications of Quality which are considered Gold Standards by healthcare professionals and are recognised as a global benchmark. (Burhans, L.M. and Alligood, M.R., 2010).

This study has used the prime concepts of various national and internationally recognised bodies to formulate a base and explore the key elements of Nursing Quality in critical care. The base line inputs of ISQua make the core conceptual frame. The concept here shows the relationship between the four elements of Quality in an ICU, namely Environment, Personnel and Nursing, strategies identified in the ICU as a policy for nursing staff in all the cadres and nursing practices in the ICU. All the elements have potential to be directly or indirectly related to or resulting in potential errors. Similarly all the elements are directly or indirectly related to an outcome, which may be favourable or unfavourable. The study uses this concept to initiate a guideline and check if quality nursing practices are initiated positively in a ICU.
ISQua, considered nationally and internationally as a recognised body of knowledge, has tried the concept to initiate practices and is also instrumental in developing further research based guidelines for healthcare personnel inclusive of nursing personnel of all cadres. (Burhans, L.M. and Alligood, M.R., 2010)
1.5 OBJECTIVES OF THE STUDY

The objectives of this study are:

1. To study the selected Quality Control Nursing Parameters (QCNP) existing in a critical care unit as relevant to the nursing care focus.
2. To study the implication of Nursing Quality Assurances in the critical care unit in the following aspects:
   a) Environment of the patient,
   b) Maintenance of nurse-patient ratio,
   c) Nursing practices performed,
   d) Notification of common errors.
3. To study the correlation between the selected QCNP and the implication of nursing care outcomes in the critical care unit on them.
4. The relationship between the selected QCNP with selected variables such as qualifications and ICU experience.

1.6 OPERATIONAL DEFINITIONS OF TERMS USED

In order to make clear the title and the objectives of the research the main terms used in the title and the objectives are defined as follows:

- QUALITY – Means excellence, superiority, class, or eminence depicted in its true form.

- QUALITY - In this study Quality means nursing excellence identified in the nursing care of a patient in the ICU as compared with the standards identified by the Quality Council and graded as an achievement of 75% and more.

- QUALITY PARAMETERS; Means KPIs that specifically indicate a direct or indirect forbearing to a healthcare outcome.

- QUALITY PARAMETERS - In this study Quality Parameters means:

  ➢ ENVIRONMENTAL FACTORS-- which are as follows:
PATIENT UNIT SPACE: the space dedicated to each patient in his/her unit and termed adequate to perform basic procedures plus an additional procedure. If the unit does not have this it is termed as inadequate.

a. VISIBILITY OF DAYLIGHT:; that is the facility available for a patient to visualize daylight from his bed which, if present, is considered as favorable.

b. LOUD SOUNDS:; are the sounds which the ICU patient can hear and interprets as disturbing when he is conscious or unconscious in reference to the bed the patient is placed on. This if measured on a decibel meter it would be seen on at level of 65 decibels and above.

c. CLEAN AIR: is the air which circulates in the ICU and is reported by the nurse as safe for the patient. This is interpreted by the nurse as that which is safe for the patient by having no source to transmit an infection.

• NURSE-PATIENT RATIO: Average number of patients each nurse nurses at any given time in 24 hours.

In this study it means:

• NURSE PATIENT RATIO- The number of nurses nursing patients in various pathological / therapeutic statuses. It is depicted as the number of nurses for a number of patients at any time in the ICU.

• NURSING CARE OUTCOMES - In this study are end outputs, as verbally reported by the nurses, resulting after selected nursing practices as verbally reported by the nurses.
NURSING PRACTICES: In this study it means:

- Nursing measures implemented by a nurse to prevent bedsores, like the use of a predesigned scale to assess the tendency to develop bedsores, use of appropriate bedsores prevention mattress, change of positions, use of a barrier cream, taking measures to better circulation and report on a bedsore occurrence.
- Use of a preoperative checklist by a nurse to ensure the patient has undergone all preoperative preparation,
- Following the right technique to administer medication through central venous lines, by a nurse
- Following a routine of ambulating the patient from bed to chair,
- Following a policy to report common errors that are detected while performing any nursing care activity like giving medication, sending patient for surgery, requesting a blood investigation.

- QUALITY CONTROL PARAMETERS: In this study means all monitored parameters related to the patient’s environment and nursing practices mentioned above which are monitored.

- INTENSIVE CARE UNIT (ICU): A hospital unit containing special equipment and specially trained personnel for the care of seriously ill patients requiring immediate and continuous attention. Also known as critical care unit (CCU).
- CRITICAL CARE UNIT (ICU): In this study means the same as quoted above.

- QUALITY ASSURANCE: Quality Assurance is a formal methodology designed to assess the quality of nursing services provided in the ICU by nurses and authorized by the Quality Council.

- QUALITY ASSURANCE; In this study it is measured by using an inventory checklist and the scores obtained would then be graded against a standard to find if they are 75% and above.
1.7 RESEARCH VARIABLES
The research variables in this study are classified as
   a) Quality Parameters.
   b) Nursing Practices.
   c) Qualification of nurses

1.8 RESEARCH QUESTION
The Research question asked by the researcher is as follows
Do nurses practice QCNP in the ICU and does it better the Nursing care patient outcomes?

1.9 ASSUMPTIONS:
The study is based on the following assumptions:
   a) The Quality Council provides Quality standards that may be used to facilitate Quality Assurance Parameters (QAPs) against a benchmark.
   b) (QAPs) are measurable.
   c) Nurses working in an ICU follow quality based nursing practices.
   d) Patients’ environment and local nursing practices practised by the nurse enhances quality of care hence the patient will benefit.
   e) Nursing practices as verbally reported by the nurses are dependable.

1.10 DELIMITATIONS:
   a) The study is limited to a selected number of parameters of Quality control.
   b) A few parameters depicting Quality Nursing Assurances were selected instead of all parameters.
   c) The study was limited to the ICU set up only and could not be reflected towards other nursing care clinical fields.
   d) Quality Assurances recommended by the Quality Council of India were considered hence the study is limited only to Indian settings only.
   e) Only those nurses confirmed to work in the ICU were considered and were a part of the study.
   f) The Quality Parameters were obtained through the verbal responses of the nurses.
1.11 SCOPE OF THE STUDY

- The findings of this study will be able to define the practices of nurses in the ICU through a Quality perspective. This will enable a nurse to identify means of relating Quality of Nursing Standards to her existing knowhow and ability, which will in turn better nursing care in the unit.

- The findings of this study will also establish that quality of nursing care has a relationship to patient and healthcare outcomes. This is directly concerned with a social responsibility to a patient who comes to the ICU with an expectation of a positive end result. A Quality practice strategy will enhance patients’ and relatives’ experience for the better.

- The findings of this study will also explore an attitude to increasing the Quality Parameters quantitatively and include many more to the existing parameters to expand the current base.

- The scope of this study also includes a hindsight into various abilities of nurses related to the educational base, of nurses which will help in leading to an attitude and focus on nursing education whilst selecting nurses for ICU.

1.12 SUMMARY

The research study carried out for this Ph.D. work has been presented in this thesis. The study addresses the issue of Quality in Nursing Practices practiced in an ICU. It entitled “Study of Selected Quality Control Nursing Parameters Existing in Critical Care Nursing Units and the Outcome on Selected Aspects of Nursing Care Practiced, Leading to Prevailing Nursing Quality Assurances.” The practices are assessed within the framework of a recognized perspective with the aim of understanding competitive relations to better patient care.

This chapter deals with the background of the concept, need of the study, the conceptual frame work, applied objectives of the study, definition of terms, research variables in the study, assumptions, delimitations of the study and within the scope of the study.
REFERENCES


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