Analysis of the Nursing Shift Handover Practice and the Development of a Structured Format for Handover to Improve Communication and Patient Safety

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Declaration

I declare that the work described in this dissertation is, except where otherwise stated, entirely my own work, and has not been submitted as an exercise for a degree at this or any other university.

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Abstract

Introduction: Nursing shift handover is a vital part of the clinical care where communication of relevant patient information takes place accurately and precisely, to ensure continuity of care and promote patient safety (WHO, 2007). Poor communication and lack of structured format has been identified as a contributing factor in adverse incidents where patient care is put at risk.

This study analysed the nursing shift handover, wherein the handover was carried out verbally with support and assistance of note taking, and to contribute to the development and implementation of a computerised structured format for nursing shift handover using the ISBAR^3 communication tool for handover to improve communication. (In accordance with the recent recommendations of: National Clinical Guidelines (2014) for communication (clinical handover) in Maternity Hospital Services in Ireland.)

Methods: Ethnographic Research design was used. A gynaecology specific ISBAR^3 audit tool was developed and used for observation. An ISBAR^3 computerised nursing handover template specific to gynaecology was developed, incorporating recommendation of national clinical guidelines for maternity services in 2014, with the existing good practises and highlighted areas of improvement. The staff feedback was procured and gathered to assess their perception, which showed the template was indeed appropriate and fit for purpose.

Results: The gynaecology ward had 15 staff and handover takes place at 2 shifts at 07:30 and 21:10. 20 observations each for pre and post-implementations were carried out. A significant improvement in overall handover practice was observed during post-intervention period. The mentioning of following data subsets*, Category* [9 (45%) vs. 17 (85%) $p < 0.05$], *Time of admission* [12 (60%) vs. 19 (95%) $p < 0.05$], *Social issues* [11 (55%) vs. 19 (95%) $p < 0.05$], *Anaesthesia* [6 (30%) vs. 16 (80%) $p < 0.05$], *Estimated Blood Loss* [11 (55%) vs. 19 (95%) $p < 0.05$], *Risks {safety pause}* [7 (35%) vs. 17 (85%) $p < 0.05$] all demonstrated significant improvements upon use of computerised ISBAR^3 template. The time taken for handover was reduced by 4 minutes/handover. As every

minute is valuable for patient care, 4 minutes for 5 staff in each shift amounts to 20 minutes in total in a shift or 40 minutes/day, which is equivalent to 20 hours/month and 240 hours/year of nursing time. Use of a computerised structured format replaced the traditional way of handover to a systematic, precise, accurate, relevant mode of updated communication in a very short period of time.

Conclusion: As this was the first study with gynaecology speciality audit tool and the ISBAR^3 handover format, this study contributed a solid base for further research, audits, and its potential practice developments in other hospitals. Successful implementation of the ISBAR^3 handover tool with e-technology in gynaecology supports the roll out of this mode of communication to extend and furnish to other nursing and maternity services in the hospital.

Implementation of the ISBAR^3 handover tool enhanced communication, reduced the risks in patient safety and considerably reduced the ever-valuable time taken for handover.

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Abbreviations	
ADOM	Assistant Director of Midwifery
BNO	Bowel Not Opened
BO	Bowel Opened
BSO	Bilateral Salpingo-Oophorectomy
EBL	Estimated Blood Loss
FBC	Full Blood Count
GA	General Anaesthetic
GDG	Guideline Development Group
GOPD	Gynaecology Out Patient Department
H/O	History Of
Hb	Haemoglobin
HBQI	HealthCare Benchmarks and Quality Improvement
HDU	High Dependency Unit

HIQA	Health Information & Quality Authority
HSE	Health Service Executive
ICU	Intensive Care Unit
IDC	Indwelling Catheter
IMEWS	Irish Maternity Early Warning System
IMIA-NI	The International Medical Informatics Association-Nursing Informatics in USA.
IOM	Institute of Medicine
ISBAR^3	Identify, Situation, Background, Assessment, Recommendation, Responsibility, and Risks.
IT	Information Technology
IUD	Intra Uterine Death
IV	Intravenous Fluid
IV cannula	Intravenous Cannula
IVDA	Intravenous Drug Abuse
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
JCIA	Joint Commission International for Accreditation

NACL	Sodium Chloride
NCEC	National Clinical Effectiveness Committee
NCG	National Clinical Guidelines for Communication
NHS	National Health Service
NKDA	No Known Drug Allergy
NND	Neonatal Death
NSW Health	The New South Wales Ministry of Health
OD	Once Daily
OPD	Out Patient Department
P	Parity
PCA	Patient Controlled Analgesia
Physio	Physiotherapy
Post-Op	Post-operative (After Surgery)
PP	Private Patient

Pre-op	Pre-operative
PV	Per Vagina
Rh	Rhesus
SA Health	Department of Health (South Australia)
SBAR	Situation, Background, Assessment, Recommendation
ISBAR[3]	Situation, Background, Assessment, Recommendation/Responsibility/Risks
SCSS	School of Computer Science and Statistics
SPC	Semi Private
SPSS	Statistical Product and Service Solutions
TAH	Total Abdominal Hysterectomy
TBA	To Be Arranged
UK	United Kingdom of Great Britain
WHO	World Health Organization
USA	United States of America

Glossary of Terms

Terms	Description
Accountability	Staff have a defined responsibility within an organisation and are accountable for that. Accountability describes the mechanism by which progress and success are recognised, remedial action is initiated or whereby sanctions (warnings, suspension, deregistration, etc.) are imposed (HSE, 2010).
Adverse event	An undesired patient outcome that may or may not be the result of an error (WHO, 2009).
Analgesics	Analgesics are medicines that relieve pain.
Bilateral Salpingo-Oophorectomy (BSO)	The removal of an ovary together with the Fallopian tube is called *salpingo-oophorectomy***.** When both ovaries and both Fallopian tubes are removed, the term bilateral salpingo-oophorectomy (BSO) is used.
Clexane	Clexane injection contains the active ingredient enoxaparin, which is a type of medicine called a low molecular weight heparin. It is used to stop blood clots forming within the blood vessels.

Clinical Handover	Handover is "the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis" Australian Medical Association (2006).
Communication	Communication is a two-way process whereby a communicator must be clear in conveying information to a listener who must comprehend exactly what is being conveyed (Mascioli et al, 2009).
Data	Data is raw unorganised facts that need to be processed or organised. Data can be numbers, symbols, words, images and graphics that have to be organised or analysed (AIHW, 2007).
Data Set	Data Set represents the total amount of structural data measured on an observation site independently from their type (Damien Delvaux, 2010).
Data Subset	Data Subset is a portion of the total amount of structural data set, generally corresponding to a particular type of structure (Damien Delvaux, 2010).

Electronic Health Record (EHR)	An electronic record of health related information that conforms to nationally agreed interoperability standards, and can be created, managed, and reviewed by authorised personnel across healthcare locations, is known as an electronic health record (EHR) (U.S. Department of Health & Human Services (DHHS) Office of the National Coordinator for Health Information Technology, 2008).
Error	An occurrence where the intended actions or outcomes of a task are not achieved (South Australian Department of Health, 2009).
Failure	The breakdown of a system, the term failure is used to describe events where the desired state or goals of a system are not achieved (South Australian Department of Health, 2009).
Guideline	A principle or criterion that guides or directs action (Concise Oxford Dictionary, 1995).
Gynaecology	The branch of medical science that deals with the health maintenance and diseases of women, especially of the reproductive organs. Gynaecology normally means treating women who aren't pregnant.
Health Informatics	The application of information technology and computer science to healthcare (South Australian Department of Health, 2009).

Healthcare	Services of healthcare professionals and their agents that are addressed at (1) health promotion; (2) prevention of illness and injury; (3) monitoring of health; (4) maintenance of health; and (5) treatment of diseases, disorders, and injuries in order to obtain cure or, failing that, optimum comfort and function (quality of life) (WHO, 2009).
HIQA Report (October 2013)	The Patient Safety Investigation Report on Services at University Hospital Galway (UHG).
Hypertension	Hypertension is another term used to describe high blood pressure.
Hypothyroidism	Hypothyroidism (underactive thyroid) is a condition in which the thyroid gland doesn't produce enough of certain important hormones.
Information Technology	A system or systems made up of communicating nodes and transmission links to provide physically linked or wireless transmission between specified communication nodes (International Electrotechnical Commission (IEC), 2010).
Nursing Shift Handover	The nursing change of shift report or handover is a communication process that occurs between two shifts of nurses where the specific purpose is to communicate information about patients under the care of nurses (Lamond, 2000).

Parity	The total number of previous pregnancies experienced by the woman that have resulted in a live birth or a stillbirth (NPRS, 2014).
Patient	A person who is a recipient of healthcare (WHO, 2009).
Positivism	Positivism refers to the positive knowledge based on the natural phenomena and their properties and relations as verified by the empirical sciences (Creswell, 2014).
Pragmatism	Pragmatism is a research approach that arises out of action, situation, and consequences. Instead of focusing on one particular methodology, researcher emphasis is put on the research problem and uses all methods available to understand the problem (Cresswell, 2014).
Risk	Something that has the potential to do harm, risk is defined in both terms of patient safety, as well as in terms of efficiency, productivity, and the other goals of healthcare delivery (South Australian Department of Health, 2009).
Safety	Safety is defined as freedom from unacceptable risk of physical injury or damage to the health of people or damage to property or the environment (International Electrotechnical Commission (IEC), 2010).

The Productive Ward	Releasing Time to Care™ is a quality improvement initiative designed and licensed by the NHS Institute for Innovation and Improvement (HSE, 2013).
Vaginal Pack	Gauze is compacted into the vagina to absorb the blood and apply pressure on the arteries of the uterus. Vaginal packing can slow bleeding and sometimes stop bleeding that is due to vaginal lacerations or uterine bleeding.

Chapter 1 Introduction

"The greatest problem in communication is the illusion that it has been accomplished." George Bernard Shaw (Bill Creech, 1994, p320)

1.1 Introduction

This chapter will present a brief synopsis of the background, the study site involved in this research, the motivation for the study, the proposed research question, significance to the proposed study, purpose, research aims and objectives, an overview of the research, and the overview of the dissertation. The current nursing shift handover practice at the study site will be described, which uses the traditional verbal handover with note taking. The study will also highlight the importance of developing and introducing a computerised structured format for handover using the ISBAR^3 handover tool as per recommendation in the National Clinical Guidelines for Communication (clinical handover) in Maternity Hospital Services in Ireland (NCG, 2014). It will also focus on the significance of using the printed ISBAR^3 handover sheet with patient information for handover in an effort to streamline and improve communication and henceforth-patient safety.

In every healthcare facility, on a daily basis, the accountability for the care of patients is communicated and transferred between health care providers. The communication of patient information to continue the patient care as planned or in other words, transferring the authority, accountability and responsibility to the next care provider is known as 'handover' (Tregunno, 2009). Clinical handover is fundamental to patient care. Australian Medical Association (2006) defines clinical handover as "the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis".

Clinical handover is a high-risk situation for patient safety with the dangers of discontinuity of care, adverse events and legal claims of malpractice. According to Australian Council for Safety and Quality in Health Care (2012), Communication

breakdowns are the primary cause of over 70% of sentinel events (JCAHO, 2006). The Irish National Clinical Guidelines for communication for clinical handover (2014) also reaffirms that the vast majority of hospitals/units (93%) reported that they considered clinical handover to be a high-risk activity.

Athwal, Fields, & Wagnell, (2009) point out that handovers have occurred in different ways traditionally, and it also varies depending upon the healthcare personnel's roles, hierarchies and circumstances. Continuity of patient care will not be attained unless the incoming staff understand and act upon the information given.

According to Clark et al, (2009), shift handovers have been identified as the most high-risk areas and failure of efficient communication has been identified as contributing to delays in treatment, medication errors, perinatal mortality and morbidity, patient falls and wrong-site surgeries. Standardising the handover process ensures relevant and accurate communication. The opportunity for clarifications has also been identified as a priority for improving patient safety (Nadzam, 2009).

While handovers occur between every healthcare personnel and at every level of care, the focus of interest for this study is the handover that occurs at nursing shift handover. The Irish National Clinical Guidelines for communication for clinical handover (2014) in maternity services in Ireland recommends that shift clinical handover should be conducted using the ISBAR^3 communication tool (Identify, Situation, Background, Assessment, Recommendation, Responsibility, Risk) as a structured framework, which outlines the information to be transferred. The research analyses the shift handover processes among nurses in the gynaecology ward of a large teaching maternity hospital in Ireland, where verbal reports with note taking have played an essential role traditionally.

New technologies at present are reshaping information management. Concentrating on this a computerised structured shift handover tool based on ISBAR^3 will be developed, so as to have a printed handover sheet. This guides the staff to share concise, focused information effectively and assertively, reducing the need for repetition, which in turn will improve communication and patient safety (WHO, 2007).

The study site is a large academic teaching maternity hospital in Ireland, one of Europe's largest maternity hospitals, with a bed capacity of 200 plus and a total of 440 nurses and midwives work here. There is 8 emergency care rooms, 1 antenatal ward, delivery ward, 3 postnatal wards, 3 theatres, 4-bedded recovery, 2-bedded HDU, 1 gynaecology ward and 1 neonatal unit including neonatal ICU. Additionally there is gynaecology, obstetric and neonatal outpatient departments. The hospital mainly provides a 24-hour, 365 days obstetric, gynaecology and neonatal services. The gynaecology unit also treats over 9,000 patients annually.

This study will be conducted in the 18-bedded gynaecology ward. Often postnatal mums are also admitted here whose babies are in the baby unit or mums who had intra uterine death or neonatal death. The gynaecology unit has 15 nursing staff altogether, and the handing over report usually takes place in the morning at 7:30 and at night at 20:10 on daily basis.

1.2 Background and Significance of this Study

Clinical handover is a vital part of clinical care, performed in a variety of ways, in all healthcare settings, every day. It is more than just a transmission of information. It is the transfer of responsibility and accountability to maintain the continuity of patient care. Effective transmission of information at clinical handover is important for improving patient safety and reducing medical errors. Clinical handover practices remain an issue for quality improvement internationally. It has been delineated that the quality of handover has a direct effect on the standard of care during the subsequent shift (Thurgood 1995).

Poor communication at clinical handover has been identified as a contributing factor in adverse incidents where patient care is put at risk. Overall, the causes of most errors are from communication problems and the World Health Organization (WHO, 2007) identified that "twofold times of adverse incidents causing harm to patients results from poor communication rather than incompetent skills of the healthcare personnel".

The Institute of Medicine (IOM, 2001) has reported that safety fails first often in inadequate handovers.

During nursing shift handover the communication occurs between two shifts of nurses, and the explicit purpose of nursing shift handover is to transfer information about patients under their care (Lamond, 2000). A detailed analysis of nursing handover by Sexton et al, (2004), revealed that several handovers stimulated confusion and did not contribute to patient care.

The Joint Commission (2006) identified the significance of developing a standardised approach to handover communication by designating it as a National Patient Safety goal (Arora & Johnson, 2006). Mistakes made during shift clinical handover may lead to negative effects in the subsequent shift (Horwitz et al, 2008).

Standardisation of handover will ensure effective, concise and complete communication and make sure the most critical clinical information is handed over which facilitates the best care delivery. Numerous studies support the use of standardised tools for handover (Australian Healthcare and Hospitals Association, 2009; Holly and Poletick, 2014; Australian Commission on Safety and Quality in Health Care, 2013). HIQA (2014) Patient Safety Investigation Report into Services at University Hospital Galway, Dublin, Ireland, in the findings and recommendations of the Savitha Halappanavar case (Cullen, 2014), highlights the need for a structured tool for communication.

The advanced development in Health Information Technology assists the clinical handover by using structured computerised handover tools for communication. Computerised tools can assist the nursing team in the fundamental functions of handover and contribute to competent and reliable handover practice, provided the details of patients are updated in every shift.

This study focuses on nursing shift handover, which is the process of exchanging relevant patient information accurately and precisely, to ensure continuity of care and promote patient safety (Maxson et al, 2012). As mentioned earlier, the study takes

place in a gynaecology ward in a large academic maternity hospital in Dublin. There are midwives and nurses from different nationalities and backgrounds, providing direct and continuous patient care. The usual nurse patient ratio is one nurse for six patients. Day shift has 5 nurses and night shift has 2 nurses on duty.

The usual location of handover is the nurses' station which is central ward hub office, where a lot of disruptions can occur from doctors coming in and out of the room, phone calls, patients and relatives coming with enquiries. At the moment, there is no tool or standardised format used for handover. The daybook maintained in the ward with patients name, diagnosis and minimum clinical details are used as the guide for handover.

The absence of a structured format and diversity of practical backgrounds makes the handover process inconsistent. Moreover, appraisal and significance placed on handover varied among staff, so some nurses may give relevant, accurate information in short time, where as others can give vague, irrelevant details which result in unnecessary deviation from topic and consumes more time.

Standardising the structure of handover will minimise the demand on recalling the memory especially after a long tiring shift. This avoids omission of pertinent information and the need for repetition and henceforth communication breakdown. Coincidentally, while the discussion of the study was going on, the National Clinical Effectiveness Committee published the National Clinical Guideline for Communication (Clinical Handover) in Maternity Services (NCG, November 2014), which recommended the use of ISBAR^3 communication tool for handover. The researcher decided to follow this guideline in the present study.

In order to evaluate the need for a structured format, an initial observation is performed, where the current handover uses the traditional verbal handover with note taking. After the analysis, this study seeks to develop and introduce a computerised structured format using ISBAR^3 for nursing shift handover. The assigned nurses can enrol and update the patient's appropriate information using the template

in the computer and the printout can be used for handover; this in turn can avoid omissions, unnecessary deviation from topic and promote patient safety.

1.3 Motivation

Transfer of information and accountability about patient care during handover is a safety-critical phase of a patient's journey (Tregunno, 2009). Shift handovers are essential to good nursing communication and impact directly on the delivery of care and ward productivity. Structured handover sketches the general and specific measures of information relating to the patient's condition, communicated in a clear and focused way, which improves patient care delivery and patient safety (Randell et al, 2011). The findings of a systematic literature review study done by Holly and Poletick (2014), regarding the transfer of information during handover time, demonstrated that exchange of information was unsystematic and flexible, inconsistent and contrasting, imprecise or lacking and they suggest that a standardised framework or guideline may provide a formula for an optimal shift report.

As a result of the maternal death of Savitha Halappanavar in October 2012 (Holland 2014, Cullen, 2014), the communication and handover practice in the gynaecology ward of Galway University Hospital was a major topic of discussion. This gave me the motivation to examine the communication practice, particularly the handover reports in gynaecology wards in maternity hospitals. The study aimed to analyse if these practices can be improved using a computerised structured format for handover with ISBAR^3 and thereby improve the communication process.

Using information technology can also be an effective method for improving quality, efficiency, and costs. The use of a computerised structured format provides a prompt for critical information, and helps to make sure information is not missed. It will also provide guidance for additional piece of information, such as the set of tasks to be completed, people to be contacted and reports to be followed up.

This study analyses the current nursing shift handover, where the handover is by verbal report with note taking, in a gynaecology ward in the maternity hospital. There

are many types of interventions that focus on improving clinical handover, but with the recent advances in health information technology, the use of technology to support handover has been of increasing significance (Pickering et al, 2009). The raised awareness from the analysis, coupled with implementation of the structured ISBAR^3 communication tool, in order to have a printed handover sheet with patient information for handover, should result in improved standard in communication and patient safety.

1.4 Research Questions

1. What are the good practices of communication in the current handover practice, and potential barriers that cause a gap in the information during handover in an inpatient gynaecological care setting?

2. Whether using a computerised structured format with patient information, printout sheet, for nursing shift handovers, improves communication and patient safety?

1.5 Purpose

The purpose of the study is to analyse the nursing shift handover practice in the inpatient gynaecological care setting, where the handover is by verbal report with note taking. And also the development of a computerised structured format using ISBAR^3 for shift handover, which is the recommended National Clinical Guideline for communication (Clinical Handover) in maternity services in Ireland. Using this printed handover sheet with patient update for handover, in turn, will lead to improved communication and patient safety.

1.6 Research Aims

The aim of this research is to analyse the current shift handover in a gynaecology care service, where the handover is by verbal report with note taking. Also to contribute to the development of a computerised structured format for nursing shift handover using the ISBAR^3 communication tool for handover to improve communication.

1.7 Research Objectives

- To review relevant literature to identify best practice for clinical handover between nurses/midwives.
- To analyse the current practice of nursing shift handover in an inpatient gynaecological care setting, where the current handover is by verbal report with note taking.
- To identify existing best practices, problems associated with communication and potential barriers that may cause a gap in the information during handover.
- To develop a structured format for handover from the results of observation, literature review and using the recommendations of National Clinical Guidelines for communication (clinical handover) in Maternity Hospital Services in Ireland [ISBAR^3].
- To pilot the developed computerised structured ISBAR^3 format to evaluate the feasibility.

To utilise the ISBAR^3 printed handover sheet with patient update for the shift handover and analyse if the identified gaps in communication have been eliminated, which in turn improves communication

1.8 Overview of the Research

- A detailed literature review.
- Development of a research question.
- Observation of the existing nursing shift handover care, where the handover is by verbal report with note taking.
- Analysis of the observation to identify the need for a structured format, using descriptive statistics.
- Development of a structured format based on the ISBAR^3 communication tool for handover.
- Development of the staff questionnaire.
- Introduction of the computerised template of ISBAR^3 for handover.
- Obtain feedback on the template of structured ISBAR^3 communication tool for handover via questionnaire.
- Appropriate inclusions/exclusions made to the format according to the feedback for the development of a final structured format.
- Pilot study conducted by distributing the template to the expert group.
- Changes made to the daybook (hard copy) template to ISBAR^3 communication model for accuracy and consistency.
- Individual training given to staff and computerised template implemented.
- Final observation of handover with the computerised ISBAR^3 handover tool.
- Analysis of the observation using descriptive statistics.
- Review of the findings in light of the published literature.

1.9 Outline of Dissertation

Chapter 1 has presented the motivation for the research, the research question and objectives and an overview of the research.

Chapter 2 provides the literature review. It first addresses the fact that good communication in clinical handover improves patient safety and then looks in detail at research on the use of a structured format, which aids good communication and prevents adverse events.

Chapter 3 presents the design of the research study, which uses an ethnographic method to observe the existing handover practice. It describes in detail implementation of the standard format and how the observed data are analysed and compared. The chapter also explains the rationale for using this design to answer the research question.

Chapter 4 presents the detailed results of the study, identifying and quantifying differences in the timeliness and quality of an existing combined handover verbal with note taking handover, and the developed computerised structured ISBAR^3 handover tool.

Chapter 5 discusses the results, how they address the question, the significance of the results, and limitations of the study.

Chapter 6 concludes the dissertation, makes recommendations for hospitals to plan the implementation of the computerised ISBAR^3 handover tool in all the wards, and identifies possible future research work in this area.

1.10 Summary

The Irish national survey commissioned by the Guideline Development Group identified that the vast majority of hospitals/units (93%) reported that they considered clinical handover to be a high-risk activity (NCG, 2014). Often absence of a structured format is a barrier for effective clinical handover and leads to poor communication and thereby affects patient safety. This study aims to analyse the current handover

practice and to develop and implement a computerised structured ISBAR[3] format for nursing handover. Having provided the background and significance of the study in Chapter 1, Chapter 2 will now review the relevant literature in this area.

Chapter 2 Literature Review

2.1 Introduction

Conducting a literature review helps in demonstrating the author's knowledge about a particular field of study; according to Randolph (2009), literature review allows the discovery of important variables related to a specific topic, informs the influential researchers and research group in a specific field, and rationalises the research significance.

Casey et al, (2011) stated that communication is central to human interactions; without it, people cannot relate to those around them, make their needs and concerns known, or make sense of what is happening to them. Efficient interpersonal communication among healthcare workers is the fundamental key for safe patient care. As a result, if vital information is missed, communication become ineffective, which engenders deterioration of the patient's clinical condition or even can cause death (Friesen et al, 2008).

Efficient and effective communications among nurses deliver high quality care to patients. Nurses depend on the accuracy of a shift report, which is the foundational information tool for continuity of care and make appropriate clinical decisions and prioritise the patient care plan. Ideally, the goal of the handover process is to accomplish safe, accurate, effective and high quality communication, congruent with patient status is conveyed when the patient's care is transferred from one nurse to another.

Not only is it becoming progressively ostensible that, in the healthcare system, the breakdown in communication system, compromises the patient safety (Jefferies et al, 2012); but also, ineffective handover can potentially trigger detrimental consequences for both patients and staff (Manser & Foster 2011). Moreover, even if problems in communication were not the primary reason, they often substantiate to be the root causes in patient safety incidents (Dunsford 2009). However, as a matter of fact, being

a threat to patient safety, communication is also a tool to reduce patient safety incidents (Sandars & Cook 2009).

Interventions to improve communication, aimed at structure or process, will probably have a more far-reaching and enduring effect on patient safety (WHO 2007). Matic et al (2011), points out that the handover process in general is disorganised, informal and lacking structure. Several studies have been reported, highlighting the need of standardising the handover using a structured format (Matic et al, 2011; Tucker & Fox 2014). Through standardising the handover process, gaps in the flow of information can be reduced, and as a result patient safety will be improved. The internationally used ISBAR^3 reporting method is one of the widely studied standardised protocols for reporting. In the healthcare field it is the most widely used concise communication method to convey the most crucial and relevant information.

The advances in Health Information Technology open a myriad of technological solutions to improve communication in clinical handover. One of the benefits of utilising technology includes supporting the verbal shift report by gathering all relevant timely patient information. Moreover, it supports the transmission of complete, accurate and efficient information of patient information, which in turn recuperates patient safety.

The intention of this study, as stated in Chapter One is to develop and implement a new computerised handover communication tool (ISBAR^3) for nurses during the change of shift, mainly to improve the current handover in the interest of patient safety.

In this chapter the literature review examines the following key areas:

- Search strategy
- Communication In healthcare
- Clinical shift handover
- Types of clinical handover

- Nursing shift handover- When, Where, What & How
- Structured format for nursing shift handover
- International focus
- National focus
- Tools for handover
- SBAR
- ISBAR^3
- Key reasons for using ISBAR^3 for handover
- Strategies to improve handover communication
- Challenges for good communication and effective handover
- Health Information technology in handover
- Conclusion

2.2 Search Strategy

With regard to the handover process, extensive searches were made from electronic databases including websites, where a range of published and unpublished pieces of literature was explored. The search strategy used to collect literature was using keywords such as, nursing handover, handoff, nursing report, handover tools, handover communication, handover report, change of shift report, nursing shift report. The databases that were utilised include Cochrane Library, Google scholar, MEDLINE, PubMed, Science Direct, Scopus, Web of Science.

2.3 Communication in Healthcare

Communication is defined as interchanging information among people especially via speech or symbols (Duden 2014). According to Manning (2006), communication is a complicated phenomenon and it encompasses cognition, skill, value, and emotion. Communication is a process in which facts, attitudes, opinions, ideas and feelings are exchanged between two or more persons.

In the healthcare environment, effective communication is a reliable and unceasing flow of information between the healthcare members, and is vital for the quality of care, to prevent patient safety incidents and for the effective patient outcome (Hu et al, 2012). It includes knowing what to say, when to say and how to speak. In other words, good communication requires knowledge, skill and empathy. Ensuring consistency and continuity of information flow ensures patient safety (Matic et al, 2011). It includes the ability and confidence to convey the message and to recheck if the message conveyed has been received correctly.

Communication skills need to be learned and practiced so that the message is conveyed in a clear, concise and appropriate way. It depends on healthcare personals ability to listen, gather, adopt, differentiate, elucidate and share information in an incessantly alerting system (Manning, 2006). The results of a study conducted by the WHO Collaborating Centre for Patient Safety Solutions (2007) reports that in an “effective communication”, exact, unequivocal information is transferred in a face-to-face situation.

As highlighted in the previous section, in healthcare settings, failures in communication are the most significant causes of unintended patient safety incidents (WHO 2009). Several factors influence communication among healthcare workers, such as cultural background, the hierarchy of the working community, education, stress, tiredness after long shift work, time of the day, language proficiency, handwriting, memory, distractions and interruptions (Boaro et al, 2010).

Human factors, lack of knowledge, amount and quality of information being given, gaps in the flow of information and the time limitations are some of the known factors

causing problems in effective communication (Matic et al, 2011). Equally important are individual backgrounds, educational levels, experiences, roles, cultures, values, beliefs, language, viewpoints, working environment relationships and social dynamics (Matic et al, 2011).

The United States Joint Commission on Accreditation of Healthcare Organizations (JCAHO) reported in 2004 that communication errors were the key contributory factor in over 70% of all sentinel events. While emphasising the seriousness of this problem, the JCAHO noted that 75% of patients affected by these events died. JCAHO Executive Director Richard Croteau reported that, while exploring all the sentinel events in the database (1,747 sentinel events) and at the patterns of root causes, the most frequently identified cause is a breakdown in communication (Healthcare Benchmarks and Quality Improvement [HBQI], 2002).

Patients deserve the efforts and time on the healthcare person's part to prevent any harm that may occur due to poor communication or incomplete endorsement. Ineffective handoff communication is recognised as a critical patient safety problem in healthcare (JCIA 2013). Ineffective communication as reflected by Matic et al, (2010) in their study has the capacity to affect the care given to the patient, clinical decisions, and consequently patient safety. Communication in short is a multifarious phenomenon and is very susceptible to errors.

2.4 Clinical Shift Handover

Clinical shift handover is an essential and critical feature of healthcare and it is the key tool in ensuring continuity of care. Yee et al, (2005); Turner et al, (2009) and Yonge (2008) have indicated that clinical handovers involve a complex set of dynamic processes. There has always been very little awareness of the high-risk nature of clinical handover and there is contentment with the existing practices. Horwitz et al, (2009) points out that the process of handover is influenced by organisational factors, including the design of the coverage schedule, the information technology infrastructure, and the organisational culture. Handover offers an occasion to reflect on the previous shift and it needs to be focused (Randell et al, 2011). According to

Alvarado et al, (2006), handovers are one place where information accuracy can decline and ineffective handovers of patient information have been associated with delays in treatment that can have detrimental effects in seriously ill patients and adverse medical events for patients.

The incoming and outgoing persons construct a shared foundation for the next step of care cooperatively, so as to ensure that all relevant information, responsibility and accountability are shared to ensure a proper continuation. It is a challenging effort jeopardised by experience, confidence, time pressures, volume, urgency and credibility. Poor clinical handover communication or inadequate transfer of information can have significant consequences related to safety, quality in health care and will be the vital contributor to adverse events (Jorm, White, & Kaneen, 2009).

The nature of communication and the amount of information handed over depend on who is involved in the handover. For instance, an oncoming member of staff who knows and has previously cared the patient does not need as much information compared to a member of staff who doesn't know the patient (Kerr 2002). Omission of detailed patient information can lead to communication errors. Approximately 44,000-98,000 people die each year due to medical errors (IOM, 1999). Insufficient communication and reporting skills results in the gaps in the flow of information during clinical handover.

The content of handover, the method of handover, type and characteristics of handover and strategies used for handover all play a significant role in the effective handover. The place of handover has also got a potential impact. Australian Council for Safety and Quality in Healthcare, (2005) has drawn attention to the need to improve clinical handover in order to reduce errors, improve patient safety and respond to the increase use of information technology.

In spite of a marked increase in the literature on clinical handover there is still a lack of agreement regarding the most effective method of handover. To achieve effective handover, accurate, timely and understandable information must be communicated and received from one another among healthcare professionals of varying skills. An

authentically synchronised national approach based on common set of principles should be used.

2.4.1 Types of Clinical Handover

Handover takes place when the accountability and responsibility for patient care changes because of a change of caregiver or change of patient location. The different types of clinical handover are as follows:

- Inter-professional handover.
- Inter-departmental handover.
- Inter-hospital handover.
- Shift to shift medical handover.
- Shift to shift nursing handover.
- Handover to and from on-call and night staff.
- Hospital to community (secondary to primary care) handover.
- Community to hospital (primary to secondary) handover, i.e. referrals.
- Transfers within primary care.
- Ambulance to emergency department handover.

This study focuses on the shift-to-shift nursing handover.

2.5 Nursing Shift Handover

Exchanging information and communication are essential parts of nursing practice. Even though nursing communication can take place any time during the day, the nursing shift handover that occurs between two shifts of nurses is the most common form of communication among nurses. In the modern healthcare environment, nursing handover process is considered to be a crucial part of providing quality care (Pothier et

al, 2005). Handoff reporting is the period at the beginning of a shift, which is an integral part of a nurse's shift that is used to plan care, identify any safety concerns and facilitate consistency of information. According to Lamond (2000), nursing change of shift report or handover is a communication that occurs between two shifts of nurses whereby the specific purpose is to communicate information about patients under the care of nurses. Shift handovers are pivotal to the delivery of quality nursing care, which ensures good nursing communication, continuity, consistency and impact directly on the delivery of care and ward productivity (Hoban, 2003).

Staggers et al, (2012) perceptively states that handovers have been identified as a "ritual" that involves complex, cognitively intense activities which are influenced by the background and culture of the unit where the nurse works. The process is flexible even within organisations across nursing units. Handover is a real-time, interactive process of passing accurate patient specific information; that is to say, the off-going nurses exchange with the oncoming nurses the situation of each patient, and any changes that have happened to the patient during the shift (Tregunno, 2009).

Gathering complete information about the patient and interacting that information in a manner that is clearly understood by the recipient are two vital steps in any nursing handover. The purpose is to summarise individual patient's clinical information, current status, any changes or complications, on-going treatment plan, progress, report admissions, discharges, transfers and death (Matic et al, 2011).

Handover reports, which should be congruent with the patient status, serve as an informational foundation, which allows the nurse to prioritize the work for the upcoming shift and collaboration with other departments. This emphasises the connection between many key aspects such as patient information exchange as an input, impact the patient safety as desired and leads to better continuity of care in handover process outcome. Cohen & Hilligoss (2010) indicate that presenting succinct and relevant information in the handover increases the efficiency of the actions taken by the receiving party as they assume responsibility for the patient's care.

Changes in healthcare have influenced handover reports in numerous ways. Nursing has become more multi-faceted and time constrained. Meanwhile, patient expectations have increased vividly. Information specified during handover affects the delivery of care for the whole shift, so to ensure efficient continuity of care, the handover must triumph equilibrium between comprehensiveness and proficiency (Curie J, 2002). Any oversights or exclusions made during the handover process can result in dangerous consequences (Pothier et al, 2005).

Incompetent handover may result in a situation where the nurse taking over the care does not have extensive knowledge of the episode of care, and henceforth interventions may be missed, misinterpreted or not appreciated creating the potential for errors (Gephart et al, 2012). Research over 20 years shows that handover report could threaten patient safety. Patterson & Wears, (2010) state that poor communication handovers have resulted in redundancies that impact efficiencies and effectiveness, delays in treatment, adverse events, low patient and healthcare provider satisfaction, and more admissions.

Given the high patient turnover and time restraints, communicating the nursing care is a difficult task as nurses has to exchange more information in a shorter time period (Catchpole et al, 2007). Consequently, safety can be compromised, as perilous pieces of information concerning patients are not conveyed. Communication is the fundamental element for safe, high quality teamwork in diverse systems. Lingard (2012) noted that, without effectual interaction, competent individuals transform to an incompetent team.

Significant problems identified by Richard (1988) include the omission of essential information and the sharing of information incongruent with patients' actual conditions. The communication handover observed by Laxmisan et al, (2007) in an emergency department demonstrated that interruptions were predominant and varied; and that gaps in the exchange of information were created by multi-tasking and shift changes (Laxmisan et al, 2007).

The European Nurses Early Exit Survey (Meißner et al, 2007), which investigated the working conditions of nurses and variables influencing nursing retention, noted interesting findings regarding communication handover. The survey was a single closed ended question “Are you satisfied with staff handovers when shift changes?” The survey was distributed in 10 European countries and had a 51% return rate representing 22,902 registered nurses (Meißner et al, 2007). The responses showed dissatisfaction that ranged from 22% in England to a high of 61% in France. Main reasons cited most frequently were, “too many disturbances” followed by “lack of time” ”(Meißner et al, 2007).

A pilot study conducted by Pothier, et al, (2005) examined different types of handover methods and loss of imperative data during nursing handover, in which the result showed that vital data is lost during the nursing handover. The varying attitudes to handover, a busy and stressful environment, patient complexity, distractions, increased noise levels, lack of consistent handover methods, by and large affects the effective communication during handover.

There are several factors to be looked into for ensuring safe and effective handover. This literature review explores into WHEN, WHERE, WHAT & HOW should the handover occur.

2.5.1 When?

- Ideally handover must take place at a fixed time, at each transition of care, i.e. shift change over. E.g. 7.30 or 19:30 hrs.

- The main handover must take place in the morning, which includes the update about the overnight progress of the patient, new admissions and plans for the day. However, there should be an intermediate report to update the days work, preferably at 3pm or 4pm depending on each unit.

- All staff should know the handover period and they must try and avoid as many distractions as they can, except for emergencies

2.5.2 Where?

- The venue should be within the working unit.
- The venue must have enough space to comfortably accommodate all personnel attending the handover.
- The venue should be free of noise and distractions.
- The venue should have access to clinical information, telephones and internet.

2.5.3 What?

- It should include patients' current status and situation, clinical information, any changes or complications, care plan, the current and ongoing treatment, as well as any social and psychological issues of the patient (Matic et al, 2011).
- All relevant and timely data should be communicated precisely, clearly, in a concise manner, which engenders the continuity of care.

2.5.4 How?

The way information is transmitted and recorded has a major impact on the handover process. In healthcare settings, there are a myriad of handover techniques used. Different methods are used at different levels. None of the handover practice has been identified as the best method of handover communication. According to M^{c}Kenna (1997) in Sexton et al, (2004), different factors can influence the methods used for nursing shift handover, for instance, number of patients, dependency and staffing levels.

There are different methods of nursing shift handover in practice.

- Memory.
- Verbal only.
- Verbal with note taking.

- Verbal with technology assisted.
- Nonverbally using electronic reports.
- Handwritten notes.
- Computer printouts.
- Written report.
- Face to face.
- Audiotape recorded.
- Bedside.
- Electronic.
- Mobile apps.

According to Allen (1995) and reinforced by Pearson (2006), handover, delivered in a verbal format, remains the main source of patient information among nurses. In the shift handover, the most common styles are verbal and written handover report, as well as different kind of combinations of these two.

Various studies have shown that verbal only method is insufficient and is liable to significant data loss. While the use of careful note taking during handover vastly improved the amount of information retained, the use of a pre-printed sheet containing important patient details almost entirely eliminated data loss during handover, but this process could be time consuming (Royal College of Physicians 2011, Quinn et al, 2009, Bhabra et al, 2007). Verbal handover supplemented with a pre-prepared handover sheet will avoid the loss of pertinent information that may result in serious patient morbidity or mortality (Pothier et al, 2005).

Taped handover is not the best practice and considered to be incongruous; it needs to be replaced with timely verbal clinical handover, written clinical handover or both (NSW Health 2009, SA Health 2010).

There is no evidence to show the most effective method of handover, however, the extensive literature review suggests using a standardised approach to handover communications, including a chance to ask and respond to questions works best (Matic et al, 2011; Royal College of Physicians, 2011; Tucker & Fox, 2014). The implementation of standardised methods for handover communication has been agreed on internationally and recommended by WHO and Joint Commission International (WHO, 2007).

2.6 Structured Format for Nursing Shift Handover

One of the fundamental focuses around handover is standardisation. Human factor science explains the limitations of human memory with the effects of stress and fatigue, threats coupled with interruptions and distractions and the limited ability to multitask confirm that even experienced, competent workers can go erroneous. The complexities of medical care, paired with the innate limitations of human performance substantiate that a standardised communication tool needs to be used for handover. Numerous studies have shown that handover communication is unstructured and error prone, with no standard or formal procedures for handover (Bomba & Prakash, 2005; Matic et al, 2011; Pascoe et al, 2014).

Structure can be developed and implemented using simple checklists. In general the nursing handover using the verbal reporting is unstructured. Several studies support the use of standardised tools for handover (Matic et al, 2011; Royal College of Physicians, 2011; Tucker & Fox, 2014). A lack of explicit structure can result in misperception (Sexton et al, 2004). If there is a lack of structured format, it can lead to a loss of important information that nurses need to know about the patients they will be taking care of.

This is true especially in acute situations, where the time pressure is a big challenge that can cause a risk of poor quality communication. Glen (1999) discussed that having a structured handover process will lead to an enhancement in the quality of care delivered. Whereas the non- standardised practice is usually time consuming, and it has great possibility for errors. Kerr (2002), on the other hand reports that if there is a

structured handover process, the nurses will have a full understanding and knowledge about the patients and importantly quality of care is promoted. Wacogne & Diwakar (2010) point out that, with the help of a structured handover tool, the information will become clearly standardised, reporting will become more reliable, errors will be reduced, and patient safety will improve notably.

Moreover, handover time will be reduced markedly. Every hospital must implement a standardised tool, which should clearly state what elements must be communicated. This should be modified according to the unit needs and to the type of handover. Standardised scripts or cues in communication are available to assist in communication and documentation as seen in Australia (NSW Health, 2009, SA Health, 2010). This helps to perform the handover in a consistent way. Effective communication with a well-structured plan can greatly reduce the chances of unavoidable errors that could endanger patient safety. It is like creating a situation in which individuals speak and express, common precarious language to alert the team members.

Using a structured tool facilitates the time distribution to all the patients equally, whereas, without standardisation, the first patient discussed frequently receives the bulk of discussion with subsequent patients receiving decreasing time. Standardisation of handover will ensure effective, concise and complete communication and make sure the most important clinical information is handed over which facilitates the best care delivery.

McCann et al, (2007) showed that staff involved in handover highlighted the importance of a standardised handover sheet, a set location, and training related to handover. Jorm et al, (2009) has emphasised significant progress in the handover of outstanding jobs and inclusive patient data with the introduction of a standardised pro forma. Structured formats have a great possibility of improving the quantity and quality of information conveyed during shift handover (Flemming et al, 2013). A study conducted by Ahamed et al, 2012 stressed that implementation of a standardised structured handover template and training improve compliance to established standards, foster quality of care, and protect patient safety.

Joint commission (2008) stated that healthcare organisations should implement a standardised approach for handover, including an opportunity to ask and respond to questions to attain the goal of patient safety. A systematic review of literature on the transfer of information during nurse transitions in care by Holly and Poletick (2013) also suggest a reliable guideline or outline may provide a blueprint for an optimal shift report. The Joint Commission (USA, 2007) identified that timely, accurate, complete and unambiguous information that is understood by the receiver reduces errors, which in turn results in improved patient safety.

Researchers have proved that patient safety improves when a written or an electronic form or structure that support handover are available (Petersen et al, 1998; Bates & Gawande, 2003; Australian Council for Safety and Quality in Health Care, 2005; Chaudhry et al, 2006). Meester et al, (2013) states that better and accurate patient observation and interpretation of abnormal vital signs was achieved by implementing a standard observation protocol incorporating the modified early warning score (MEWS).

Standardisation sets a common language when exchanging patients' information. It harmonises practice and helps to clarify the content of handover, which reduces confusion. This approach makes it easy to use and it can be easily taught and recalled (Jorm et al, 2009, NSW Health, 2009). Standardisation ensures confident and competent handover by all staff. Standardisation of handover will ensure effective, concise and complete communication and make sure the most important clinical information is handed over which facilitates the best care delivery.

The National Clinical Guideline developed in November 2014, talks also about the structured format for communication (clinical handover) in maternity services in Ireland. It recommends that shift clinical handover should be conducted using the ISBAR^3 communication tool (Identify, Situation, Background, Assessment, Recommendation, Responsibility, Risk) as a structured framework, which outlines the information to be transferred. The tool may be available in written format and preferably electronically.

2.7 International Focus

Handover has been an area of interest worldwide. Internationally there has been a considerable amount of research in the handover communication process, both among nursing and medical staff. The World Health Organization has identified communication during client handover as one of nine patient safety priority areas (World Health Organization Collaborating Centre for Patient Safety Solutions, 2007). The rituals and customs surrounding handover have been examined by many healthcare facilities and have redesigned and implemented guidelines, strategies and structures for effective communication in handover and patient safety.

In USA, a survey among trainees suggested that 15% of errors, near misses or adverse events involved handover (Jagsi et al, 2005). The JCAHO (Joint Commission On Accreditation Of Healthcare Organizations), in it's National Patient Safety Goals, calls for a standardised approach to handover communication SBAR tool is recommended, to help nurses focus their communication efforts (JCAHO, 2006).

In UK, a survey of junior doctors discovered that 83% of them believe that handover processes were poor; written handover was rarely conducted, accounting for only 6% of all handovers (Roughton & Severs 2014). In UK, an improvement initiative called 'The Productive Ward' was launched in 2007; with nursing shift handovers as the key module, which was recognised to be able to diminish communication breakdowns protect patient safety (Roger, et al, 2008). Since its launch in the UK in 2007, 'The Productive Ward' has been introduced in Australia, New Zealand, the United States, Canada, the Netherlands, and Denmark.

In Canada, Hamilton Health Sciences identified concerns regarding the effectiveness of handover, henceforth, 'transfer of accountability' project was established and standardising the approach was found to improve coordination, efficiency and openness of information communicated (Alvarado et al, 2006).

A survey of Australian doctors revealed that 95% believed that there were no formal or set procedures for handover (Bomba & Prakash, 2005). Another Australian study of emergency department handover without structured format found that in 15.4% of

cases, not all required information was transferred, resulting in adverse events (Ye K et al, 2007). Then in 2005, the Australian Council for Safety and Quality in Health Care, commissioned a report on Clinical Handover and Patient Safety, and the recommendations were as follows: the systems to establish protocols, guidelines and safe staffing numbers were to be developed; the organisations were to provide effective communication tools; and individuals should be given handover training and promote liability within an encouraging learning environment (Australian Council for Safety and Quality in Healthcare, 2005).

In New Zealand also, the report on 'Safety of Patients in New Zealand Hospitals' reviewed the 21 District Health Board responses and it was unanimously identified that it is needed to standardise handover (Seddon, 2007).

2.8 National Focus

It is vital that we discover international and national experiences and learn from them in order to avoid encountering the same miscommunications, errors and adverse events within our own hospital setting. Bauer & Mulder, (2007) states that these incidents need to be explored rather than ignoring, so that cause and effects are identified and pertinent changes are implemented to enhance patient safety.

'Productive Ward' was launched in Ireland at the end of 2011 by the HSE. Facilitating a timely and effective handover was the priority of the programme. The institutions like Midlands Regional Hospital, Tullamore, which commenced the usage of computerised templates and prompt cards as the handover tool showed huge improvements in the handover process and time. Sligo General Hospital was winners of Lean Healthcare Academy Productive Series International Award Winners for 2013 (HSE 2013).

In response to the HIQA Patient Safety Investigation Report into Services at University Hospital Galway (2013), The National Clinical Effectiveness Committee was requested by the Minister for Health to commission and quality assure a number of National Clinical Guidelines. The National Clinical Handover Guideline was launched in November 2014 as one of these guidelines. The aim of this National Clinical Guideline

is to describe the elements that are essential for timely, accurate, complete, unambiguous and focused communication of information in maternity services in Ireland. The expected outcome is that all communication (clinical handover) between healthcare staff in maternity services will be conducted using a structured communication tool, promoting standardisation of practice and minimisation of variability, thus reducing risk for patients. The guideline recommends the use of ISBAR[3] mnemonic for use at handover and also highlights the need to ensure that there is a mandatory protected time for handover.

2.9 Tools for Handover

There are different tools used for handover, like checklists and mnemonics, which were developed to improve and facilitate the handover process. Manning (2006) familiarises handover tools that may help in the exchange of information and in avoiding patient safety incidents: daily patient goal sheets, nurse shift report at the bedside and patient safety briefings. These were some of the methods mentioned for standardising the handover process. However, the SBAR method has been evidently accepted as the best communication practice in acute situations (Manning 2006; Boaro et al, 2010) and reinforced by National Clinical Guideline for handover (2014).

2.9.1 SBAR

The internationally used SBAR communication method is the widely used standardised protocol for exchanging the most vital information briefly in large organisations. SBAR is a structured method for interacting important information that requires immediate attention and action. Initially, the SBAR method was developed by the United States military for use in nuclear submarines, to standardise the flow of information. It has also been used in the airline industry. Subsequently this method has been adopted to use in the healthcare field, as it is designed to reduce risks caused by the communication of incomplete and inaccurate information.

Currently, many healthcare settings all around the world use this method as it has proved to be the most suitable tool for reporting in acute situations requiring rapid

action (Rogers 2007). SBAR is an easy to remember, specific mechanism useful for framing any conversation. It gives a structure for exchange of information and allows a focused way to set expectations for what will be communicated and how.

Mikos (2007) reports in a paper on the use of the SBAR technique in combination with phone recordings of nursing handover at a US Hospital Medical Centre, that there is an improvement in patient safety and quality of care since the implementation of the system. SBAR can communicate in a more consistent and predictable manner. It also promotes critical thinking (Groff & Augello, 2003); improve situation awareness (Haig et al, 2006). For shift reports, SBAR (Figure 1) will lead to a greater report consistency, improved quality of information, reduction in use of paper forms and shorter report times (Cornell et al, 2014). It improves communication, effective escalation and increased safety.

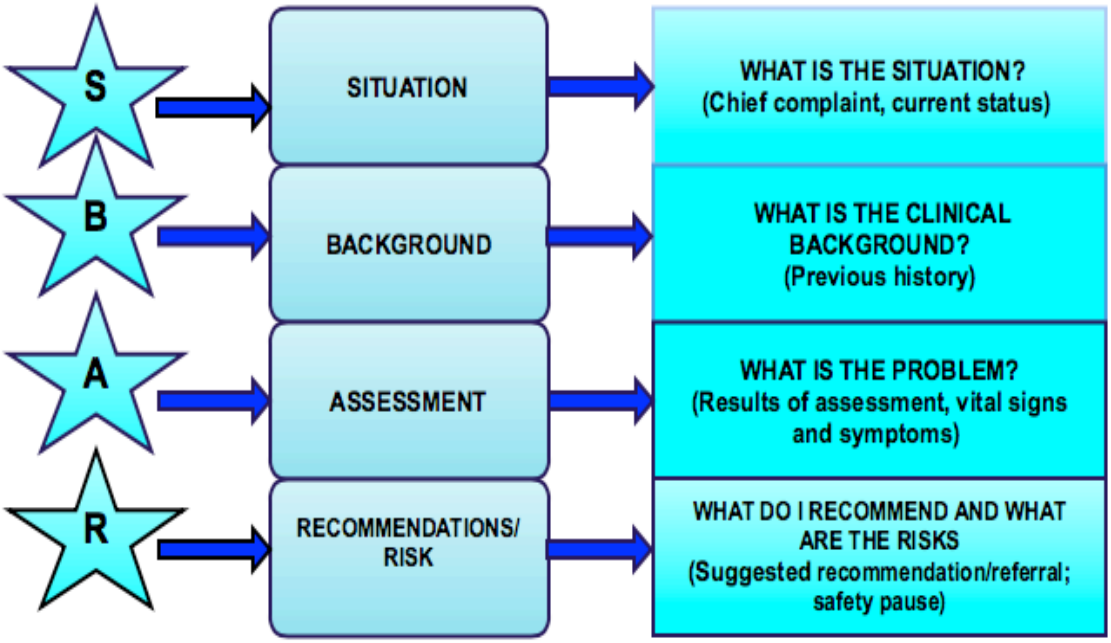

Figure 1: SBAR Communication Tool, (adapted from Manning 2006, 270)

2.9.2 ISBAR[3]

ISBAR[3] (Identify, Situation, Background, Assessment and Recommendation) is the mnemonic (Figure 3) created to improve safety in the communication of vital information by providing a framework for communication. It originates from SBAR (Manning, 2006), the most frequently used mnemonic in health and other high-risk environments such as the military. The add-on "I" in ISBAR[3] is to ensure that accurate identification of the patient and of those participating in handover is established.

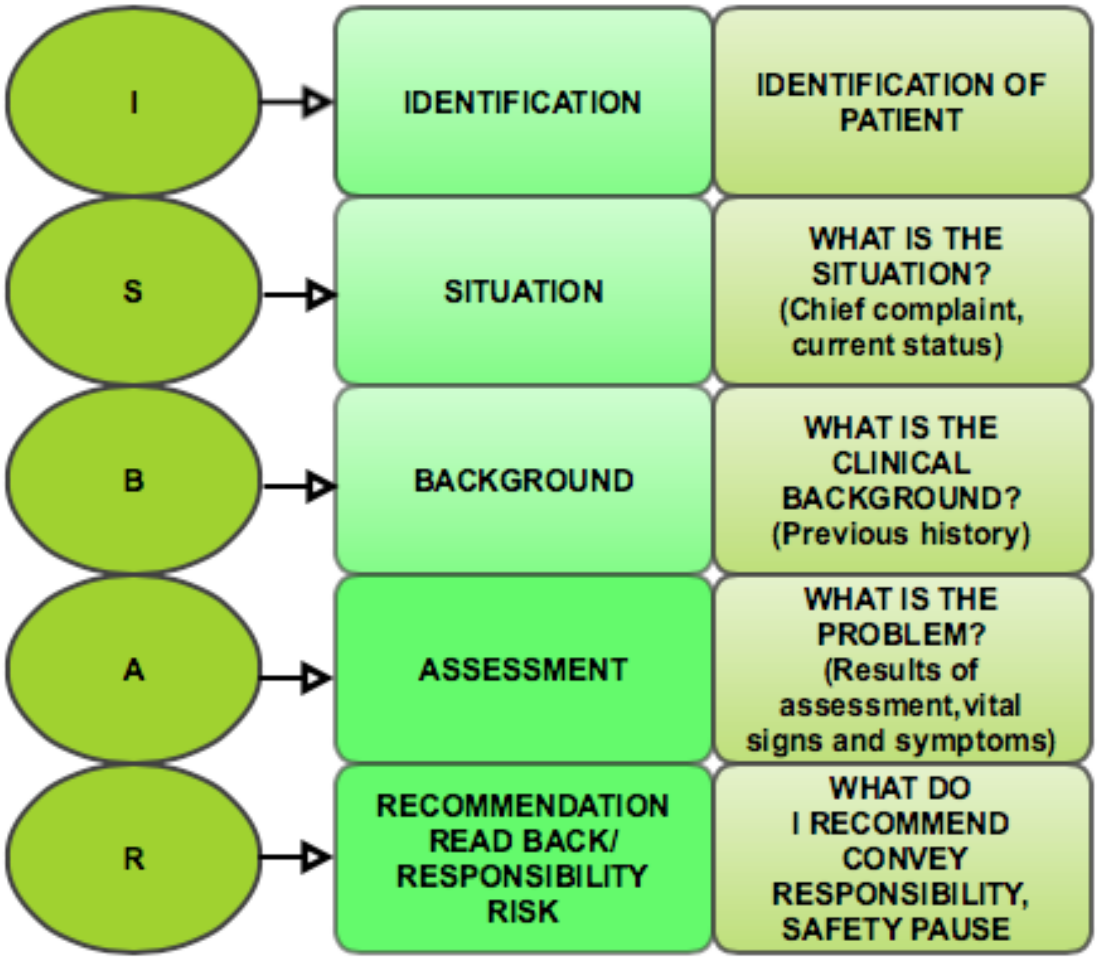

Figure 2: Elements of ISBAR3 (Lanyard Card Adopted From SA Health, 2012)

2.9.3 Key Reasons for Using ISBAR^3 for Handover

ISBAR^3 ensures a standardised approach in handover. By providing a template, it generates a clear picture of the patient's clinical issues and defines outstanding tasks and issues (Horwitz et al, 2008). It aids completeness of information as there is an expected pattern of communication and it reduces the likelihood of missing data. According to Haig et al, (2006), ISBAR^3 is an easy to remember mnemonics and has shown to reduce adverse events.

ISBAR^3,

- Is portable, easy to use and memorable.
- Can be used to present information in a clear, concise and focused manner in any given situation.
- Can give clear and professional recommendations.
- Give guidance and helps to organise what you are going to say.
- Give confidence in communication.
- Focuses on the problem itself, not on the people communicating.
- Reduces repetition by giving the right level of details.
- Gives a sequence of flow.
- Can reduce the time spent on patient handover.

2.10 Handover Mnemonics

There are a variety of handover mnemonics in use. Some of the common mnemonics in use apart from SBAR AND ISBAR^3 are shown in table 1.

Table 1: Variety of Handover Mnemonics (adopted from Riesenberg et al, 2009)

ANTICipate **A- Administrative data** **N- New clinical information** **T- Tasks to be performed** **I- Illness severity** **C-Contingency plans/CODE**	**I PASS the BATON** **I- Introduction** **P- Patient** **A- Assessment** **S- Situation** **S- Safety** **B-Background** **A- Actions** **T-Timing** **O-Ownership N-Next**
iSoBAR **I- identifies yourself and the patient.** **S-situation.** **O-observation.** **B-background.** **A-assessment.** **R-recommendations.**	**SHARED** **S-situation.** **H-history.** **A-assessment.** **R-request.** **E-evaluate.** **D-document.**
PACE **P- Patient /problem.** **A-assessment/actions.** **C-Continuing/changes.** **E-Expected tasks to be done.**	**SOAP** **S-Subjective information.** **O-Objective information.** **A-Assessment of the condition of patient.** **P-Plan of what has or should be done.**

Even though there are a variety of mnemonics in use, ISBAR is used most frequently and has been associated with improved transfer of information and overall clarity and organisation of communication (Marshall et al, 2014). Numerous studies have shown that quality of handover can have substantial improvement by using ISBAR[3] (Alem et al, 2008; Marshall et al, 2014; SA Health, 2012; McCrory et al, 2012; Meester et al, 2013).

2.11 Key Points to Improve Handover Communication

An American study in Boston Children's Hospital showed that effective handover process cause a remarkable reduction in medical errors and prevent adverse event (Starmer et al, 2013). The key points identified through literature review for a good handover are listed below (BMA, 2004; AMA, 2006; SA health, 2012; NCG 2014):

- Be face-to-face to facilitate interaction, aids in seeking clarification, enables questioning and verification, identifies omissions or inconsistencies.
- Use a common language, terminology, firm, but pleasant voices, speak clearly, keep all remarks as objective, suitable facial expressions and maintain good eye contact, which ensures better understanding.
- Standardise whenever possible (develop supporting tool where appropriate), to be simple to reflect the best practice.
- Should allocate sufficient time.
- Cover patient details in a standard order to avoid repetitions and omissions.
- Cohesive approach - one without gaps.
- Avoid use of abbreviations, jargon, acronyms and terms that can be misinterpreted.
- Include complete (relevant information), clear, concise, timely and factual information.

- Avoid judgmental statements.
- Encompass updates on individual patients and the plan of action for the shift.
- Better coordination of available resources and updating information regarding support services.
- Use technology to enhance communication and improve information availability through information technology.
- Train individual care providers, institute an induction programme to new staff and supervise the junior staff.
- Limit interruptions.

2.12 Challenges for Good Communication and Effective Handover

There are several challenges and barriers that could impede the effectiveness of good handover (Currie 2002, Hoban V 2003; AMA Clinical Handover Guide 2006; Friesen et al, 2008; Wilson & Galliers 2011). For easy understanding, it is grouped here to Time; Practice; Distractions/interruptions and Management.

Time

- People are busy and no one likes to do more work.
- Time consuming to plan good handover.
- Time of handover e.g. after night duty.
- Fatigue.
- Time pressure for patient care and other responsibility.

Practice

- Difficult to summarise complicated cases briefly.
- Lack of shared understanding.
- Need practice and experience to plan a good handover.
- Lack of standardisation.
- Resistance to change.
- Staff shortage.
- Lack of training.
- Cultural difference.
- Incomplete or unclear communication.
- Errors from content omissions.
- Language (use of abbreviations and jargon).
- Large turnover.
- Advances in technology.

Distractions/interruptions

- Distractions include telephones, bleeps, call bells.
- Interruptions include patients, relatives, other nurses and doctors coming in and out with enquiry.

Management

- The effects of hierarchy and power (defensive handover).
- The current complexity of healthcare.
- Lack of information technology infrastructure and interoperability.
- The cost of implementing the new process.
- Failure of good leadership initiative.

Bowers B (2011) argues that nurses appear to have an inborn resistance to change and interrogates whether they are in a situation to effect change.

2.13 Health Information Technology in Handover

Technology can play a major role in supporting handover. The International Medical Informatics Association-Nursing Informatics in USA (IMIA-NI) defines, Nursing informatics in science and practice integrates nursing. Its information and knowledge and their management with information and communication technologies promote the health of people, families and communities worldwide (Topaz M, 2013). Support for clinical handover remains as a challenge for Health Informatics.

As clinical handover is very much a complex and an error prone area, any software-supported approach should have excellent usability. A survey by Hannan et al, (2010) into the sustainability of medical morning handover showed a strongly positive result since integrating the morning handover meeting using IT facilities. E-technologies appear to have a strong positive effect on handover.

The implementation of ICT to support electronic clinical handover systems must be considered in the context of a standards based approach. Bhabra et al, (2007) &

Piscioneri et al, (2011) pointed out in their studies that complete information transfer and retention are less effective with verbal handovers or verbal with note taking than printed handouts with relevant patient information.

The main areas of change related to the introduction of electronic clinical handover systems was in accuracy and in the scope of the information that was handed over, and a reduction in the time for handover to occur. Existing research suggests that technology should be utilised to support the verbal report, rather than replacing it (Randell et al, 2011).

Mobile devices can also be used for handover to utilise the structured format or to take notes, where it can ensure that complete information is handed over. There are different kinds of mobile applications available for the handover of the patient. ISBAR^3 application (Figure 3) and Ranesys ISBAR^3 (Figure 4) patient handover is available to download from the mobile application stores in Ireland now and can be easily used for handover.

Figure 3: ISBAR Mobile App for Patient Handover

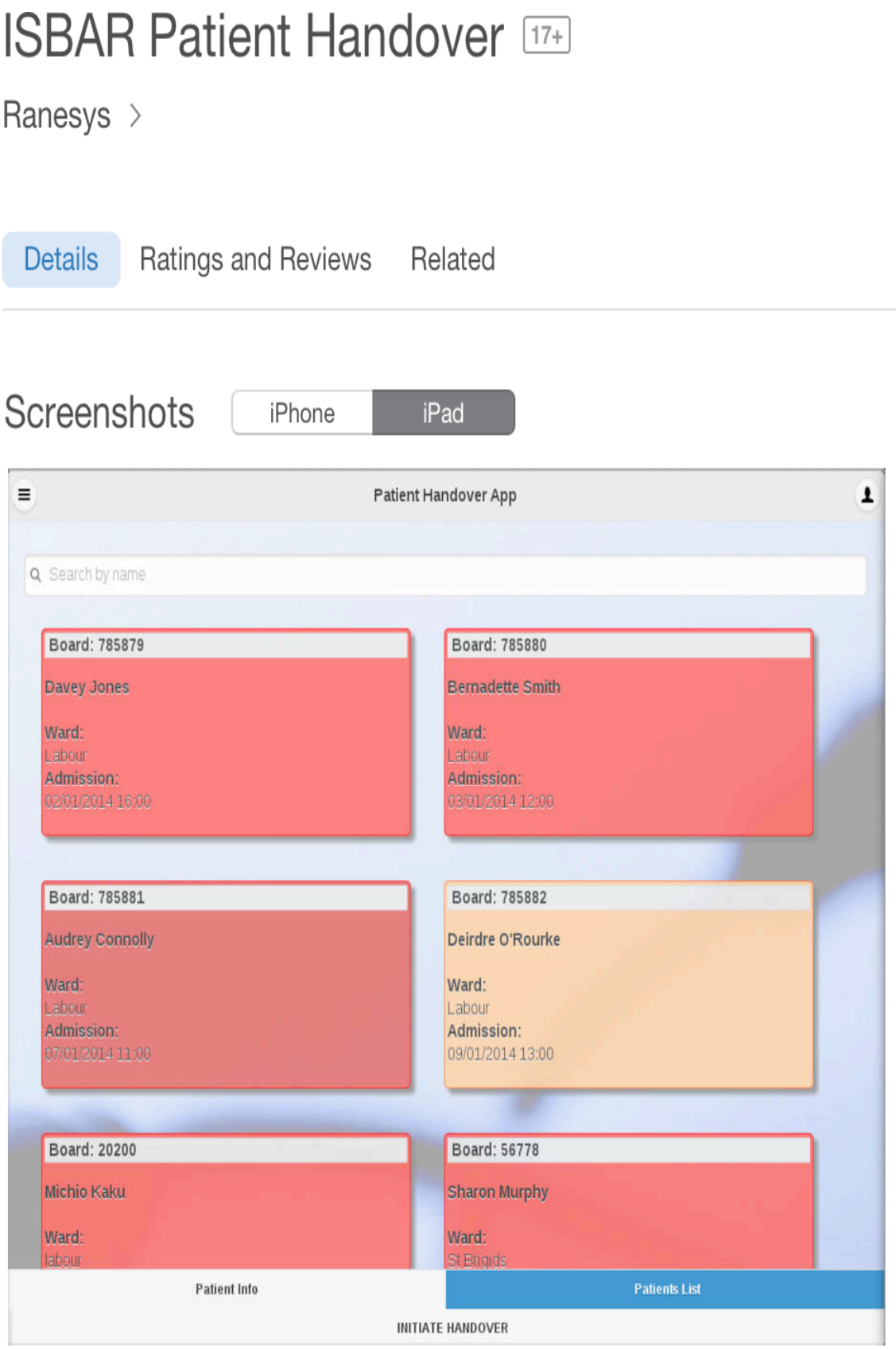

Figure 4: Mobile App Ranesys ISBAR3 Patient Handover

2.13.1 Advantages

- Facilitate the timely and accurate exchange of information.
- Can minimise duplication.
- Can limit the need to go to various sources for data.
- Reduction in time.
- Exchange accurate, clear, concise and timely information.

2.13.2 Disadvantages

- Incorrect or omitted patient information
- Outdated information if the patient details are not updated.

2.14 Conclusion

Literature review helps to demonstrate why the current study is needed and to show where it fits in terms of the wealth of knowledge already gathered on the topic (Parahoo, 2014). The aim of the literature review is to establish that the implementation of the ISBAR^3 standardised tool by healthcare organisations will enhance accurate and precise exchange of information, which leads to improved patient safety.

Nursing shift handover is an area of profound importance in nurse-to-nurse communication, facilitating adequate and accurate exchange of patient information and transfer of professional responsibility. It ensures good continuity of care and has significant and irreversible effect on patient wellbeing (Wong & Yee, 2008). Improving patient safety and preventing reoccurrence of adverse events is fundamental to all healthcare organisations.

Errors or omissions in information exchange can result in consequences that affect patient safety. Loss of patient data can significantly reduce by compiling handover processes (Pothier et al, 2005). Standardised formats aid in delivering data in an

accurate and consistent manner, reducing the potential for clinical error. Use of standardised communication tools like ISBAR^3, together with specific training, improves communication and hence patient safety. By using a structured format like ISBAR^3 shift handover becomes a positive experience for outgoing and oncoming nurses; also it avoids common pitfalls and saves time.

Having identified an appropriate area of research, it is necessary to select the relevant research methods. The next chapter will outline the research methodology used in this study to meet the study aims and objectives.

Chapter 3 Research Design and Methodology

3.1 Introduction

This chapter outlines the design and methodology used to assist in answering the research questions.

3.2 Statement of The Problem

Analysis of Nursing Shift Handover Practice and the Development of a Structured Format for Handover to Improve Communication and Patient Safety.

Nursing change of shift handover is the vital moment of nurse-to-nurse communication, enabling transfer of professional responsibility and exchange of patient information, thereby improving the accountability. It promotes continuity of care by transferring the care to a competent, qualified nurse so as to meet the therapeutic goals. According to Wong et al, (2008), delivering handover in an inappropriate manner can put the patient safety at risk through break in continuity of care and the possibility for adverse events. When the handover is inadequate it results in a situation where the nurse taking over the care does not have complete knowledge of the care plan, and consequently interventions may be omitted, engendering the potential for errors (Gephart et al, 2012).

One of the vital issues around handover is standardisation. Standardising the process by developing guidelines, tools and templates provides opportunity to ask, respond to inquiries and ensure that all salient information is systematically included. Gore et al, (2015) reported the use of structured, standardised tools helps to ensure that orderly thought is conveyed in a concise and thorough way to uphold patient safety.

Use of mnemonics such as ISBAR^3 (Identification, Situation, Background, Assessment and Recommendations) promotes consistency during handover while transferring the

patient's information. The ISBAR^3 tool will improve handover by providing a framework, which gives a clear understanding of the patient's clinical condition while also delineating outstanding tasks and issues. The template aids in the transfer of information in an expected pattern so that the good communication improves patient safety by avoiding or reducing omissions and errors (Thompson et al, 2011).

3.3 Purpose of The Study

The purpose of the study is to analyse the nursing shift handover practice in an inpatient gynaecological care setting and the development of a computerised structured format using ISBAR^3 for shift handover, which is the recommended National Clinical Guideline, for communication (Clinical Handover) in maternity services in Ireland. Using this printed handover sheet with a patient update in turn will lead to improve the communication. The result is derived from a 3 months ethnographic study.

3.4 Research Questions:

1. What are the good practices of communication in the current handover practice, and potential barriers that cause a gap in the information during handover in an inpatient gynaecological care setting?

2. Whether using a computerised structured format with patient information in a printout sheet, for nursing shift handover might improve communication?

3.5 Research Approach

The main research paradigms are:

- Post positivist (and positivist), which aligns with quantitative methods of data collection and analysis (experimental strategy, pre-and post-test measures);

- Interpretivist /constructivist underpins qualitative methods predominantly, although quantitative methods may also be utilised (ethnographic design, and observation of behaviour, narrative, open-ended surveying;

- Transformative based on qualitative methods with quantitative and mixed methods;

- Pragmatic that underpins qualitative and/or quantitative methods may be employed (Mackenzie 2006).

Gaining knowledge about these paradigms helps the researcher in deciding regarding the conduct of research. Methods are selected according to the specific questions and purpose of the research.

As this study uses ethnographic design and observation of behaviour, the Interpretivist /constructivist approach fits well with the aims and objectives of this study.

3.6 Research Design

Research designs are plans and the procedures for research, which aids in decisions of broad assumptions to detailed methods of data collection and analysis. The research design is based on the research question, the researcher's personal experiences, and the onlookers of the study (Creswell, 2013).

The three principal types of design methodologies are Quantitative, Qualitative and a compounding of both called Mixed Methodology (DePoy & Gitlin, 2011).

- Quantitative Research is a means for testing objective theories by examining the relationship among variables (Creswell, 2013). The purpose of Quantitative research according to Burns & Grove (2005) is to develop and refine knowledge, to explore new ideas and describe situations, to examine relationships, and to determine effectiveness of interventions.

- Qualitative Research is subjective, a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2013).

- Mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms. It encompasses the usage of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research (Creswell & Plano Clark, 2007).

Qualitative observational research is a systematic inquiry into the nature or qualities of observable group behaviours in order to discover what it means to be a member of that group. It gives continuous updated accounts of observations on multiple levels of group interactions that occur on both a temporal and continuous basis simultaneously (Morgan et al, 2012). The researcher's goal is to observe and describe group patterns, similarities, and differences as they occur.

Reeves et al, (2008) defined Ethnography as 'the study of social interactions, behaviours, and perceptions that occur within teams, organisations, and communities'. According to Fetterman (2010), Ethnographic studies typically gather participant observations and survey; through using the methods ethnographers can immerse themselves in settings and can generate rich understanding of the social activity that occurs. Streubert-Speziale and Rinaldi Carpenter (2011) noted that nurse researchers have used ethnography to gain a better understanding of societal issues that affect nursing practice.

Ethnography is a highly useful methodology for addressing a range of research questions within the health professions. Ethnography has demonstrated its probability and approval as a tool to provide nursing a direction for practice and insights into the context, the people and the interactions of practice (Wilson, 1989).

Participant observation is a key element of ethnographic research (Atkinson & Hammersley, 1998). The researcher is a participant in, and accepted as part of, the culture that is under observation (Trochim, 2006). Participant observation is the

process enabling researchers to learn about the activities of the people under study in the natural setting through observing and participating in those activities. It provides the context for development of sampling guidelines and survey guides (DeWALT & DeWALT, 2010).

A Participant observer takes part in the activity while also documenting the observations. It allows for insight into contexts, relationships and behaviour. Documentation of participant observation data is records of what the observer experienced, and learned through interaction with other people, and what one observed.

Literature Review relates a study to the larger, on-going dialogue in the literature, filling in gaps and extending prior studies (Marshal & Rossman, 2014). It provides a framework for establishing the importance of the study as well as a benchmark for comparing the results with other findings. (Creswell, 2008).

Observation in a multi-method design that can be combined very creatively with other methods. Observation might be carried out concurrently with other data collection approaches or sequentially either before or after other methods is used. (Ritchie et al, 2013).

3.6.1 Research Design of This Study and Justification for Choice:

In light of the discussion of the various research designs outlined in section 3.6, this study is based on the *ethnographic research design*, as the study was conducted in the context of a healthcare organisation in which the culture, language and subjective experience of the participants is vital to achieve the research objectives. In summation, the researcher is a participant observer in this study.

Good ethnographies also include some reflection by the researcher on the influence his or her own background has had on research plans, as well as on the impact of the research in the setting (Madden, 2010). The ethnographers commonly triangulate (that is, compare and contrast) survey and observation methods to enhance the

quality of their work; this technique is important as what people say about their behaviour can contrast with their actual actions.

The need to use observation in a multi-method design to achieve the study aims and objectives outlined earlier, indicate the appropriateness of this methodology. In this study participant observation was used to observe the current practice of nursing handover. After analysing the observations, existing good practices and gaps in communication were identified and a structured format was developed with literature support and National Guidelines. The feasibility, accuracy and consistency of the format were measured using a questionnaire feedback with open ended and Likert scale questions. Two different data collection methods were used (participant observation and questionnaire feedback), to facilitate and complement each other. Each method will generate different kinds of knowledge and perspectives regarding the issue under investigation as described by Burns & Grove (2005).

3.7 Research Methods

The research proposes various forms of data collection, analysis and interpretation in order to answer research questions. These are called research methods (Creswell, 2008).

This study analysed nursing shift handover practice in an inpatient gynaecological setting and developed and implemented a structured format for handover.

The gynaecology unit is an 18-bedded ward with 15 staff altogether and the handing over report usually takes place in the morning at 07:30 and at night 20:10. A total of 20 handovers each were observed pre-implementation and post-implementation. Out of 20 observations 10 were done concurrently while on duty as a staff nurse, and 10 observations were undertaken while on off duty without having any active responsibilities in the team. It was difficult in the beginning to maintain the audit tool and concentrate on the responsible task while on duty, but later the researcher got used to it. The observations during the off duty were done the very next day after the duty so that the patients are still known to the research observer. No difference in

observation noted between the notes taken during on duty and off duty. The study was done within 3 months duration.

I. **Audit Tool:**

An extensive literature review is initially conducted (as outlined in Chapter 2) to identify data items that may be relevant to the clinical setting. Aveyard (2014) defines a literature review as a comprehensive study and interpretation of literature, that relates to a particular topic. Applying the findings of the literature review, a handover observation audit tool (Appendix A) was developed in consultation with the senior nursing staff to measure handover practice. The data subsets, which were mentioned in handover, were counted and were given a score of 1, and for those items not mentioned a score of 0 was given. The comments made by the staff during handover were also noted. The time taken for handover and the number of patients handed over were noted.

II. **Observation:**

The purpose of the initial observation is to identify the existing good practices and identify the potential barriers that cause gap in the information. Observation was done initially on the existing handover practice where the handover took place in the nurses' station. The current handover is verbal reporting and the daybook register maintained in the ward is used as a guidebook for patients' concise details. The person giving the handover reads out the patient name and concise details from the daybook, and will verbalise any additional interventions performed and to be done. During handover the staff receiving the handover makes a written hand note of the name, diagnosis and the needed details for care which the nurse feels appropriate, on a piece of paper.

20 handover were observed during the morning and evening shifts with the observation audit tool and obtained a baseline data. The researcher was a participant observer. The existing good practices and potential gaps in communication were analyzed. The data subsets, which were mentioned in handover, were counted and

were given a score of 1 and for those items not mentioned a score of 0 was given. The comments made by the staff during handover were also noted.

III. **Handover Template:**

Based on the findings of initial observation, the identified factors were incorporated with the framework of the National Guidelines for Communication in Maternity Hospital Services in Ireland (NCG, 2014) in the formation of a structured ISBAR^3 handover template specific to gynaecology patient. The ISBAR^3 (Identification, Situation, Background, Assessment, Recommendation/ Responsibility/Risk) mnemonic is a conceptual framework specifically developed for multidisciplinary patient related information sharing and communication. The format helps nurses to structure their communication in a logical sequence, facilitating rapid comprehension, henceforth reducing the length of handover. It enables them to clarify what information should be communicated, and how. It permits the staff to communicate assertively and effectively, reducing the need for repetition.

At first the format was piloted to the senior nursing team and necessary corrections were made according to the ward setting. The template of the format was then introduced to the staff, which was on the computer in "Word" format and each staff can enroll or update their patients' details towards the time of handover. The details were not saved in the computer for confidentiality and data protection. So it was deleted once the patient was discharged. The daybook (Appendix B) maintained in the ward, which is used as the base for verbal handover, also was changed according to the ISBAR^3 template to maintain accuracy and consistency.

IV. **Questionnaire Feedback:**

A questionnaire (Appendix C) feedback was then distributed to staff to determine ease of use and to examine the perception and attitude of nurses towards the use of a new computerised print-out with structured format for handover practice. The feedback findings were used to refine the template. Appropriate inclusions and exclusions were

made to finalise the format. The ISBAR[3] format (Appendix D) was then implemented for the ward handover.

V. **Training:**

Training was given to the staff individually to update their computer skills and to ensure that all staff know how to use the computerised ISBAR[3] format appropriately. Staff members enter their patient's appropriate information as per the format. Staff were encouraged and made aware of the importance of timely update of their own patients towards the end of the shift. The updated print-out was handed over to incoming staff before handover. As confidentiality is a matter of utmost concern and protected, shredding of the document after use was emphasised and recommended.

After that, a final observation was performed to assess if the computerised structured format had made any difference in the communication, and elimination of the gaps identified in the initial observation.

3.8 Study Duration

The study took place from 10th February to 9th May 2015. Data Collection was based on 4 weeks information in February-March (Pre-implementation) and a further 4 weeks in April-May. The gynaecology specific ISBAR[3] template was developed and piloted during March-April.

3.9 Sampling and Setting

Selective sampling occurs where the researcher decides to pursue particular types of people or sample in a particular location. A sample that is purposely chosen by using a sampling plans that display data with certain features and/or selects only data with other relevant features (McNaughton & Wilkinson, 1997). Therefore, selective sampling method was used in this study, as that was the most effective means in deciding the group to observe.

The study was conducted in an 18-bedded gynaecology ward in a large teaching maternity hospital in Ireland. Postnatal mums are also admitted at times to this ward. Their babies are in the baby unit or mums who had intrauterine death or neonatal death. The gynaecology unit has 15 staff altogether and the handing over report usually takes place in the morning at 07:30 and at night 20:10. A total of 20 handovers each were observed during duty shift and off duty pre-implementation and post-implementation of the format.

3.9.1 Number of Participants

Presently there are 15 staff working in the gynaecology ward. This study also included staff that worked in gynaecology ward in the last 2 years. It was considered on advice from the supervisor that these professionals were selected representatives of the population needed, and data saturation was achieved within this sample size.

3.9.2 Recruitment Method

Letters/e-mails were circulated through relevant managers to disseminate in their team to obtain voluntary participation. The Director of Midwifery & Nursing and the Ward Manager were contacted and permission was obtained to conduct this study. Ethical approval was obtained both from hospital (Appendix F) and the Research Ethics Committee of the School of Computer Science and Statistics (SCSS) Trinity College, Dublin (Appendix E). All the staff who are working in the gynaecology ward and who have worked in this ward in the last 2 years were invited. 100% agreed to participate. All participation was voluntary. An information leaflet (Appendix G) about this research study was given to all the staff working in the gynaecology ward. Participants gave informed consent (Appendix H). The participants were 18 years old or older and should be competent to supply consent.

3.9.2.1 Inclusion Criteria

All the staff who are working in the gynaecology ward and who had worked in this ward in the last 2 years were invited to participate.

Justification:

As this study is specific to the nursing shift handover in the gynaecology ward, only those professionals who were currently working and had worked in this area were informed of this study.

3.9.2.2 Exclusion Criteria

Any staff that have not worked in the gynaecology ward were excluded.

Justification:

Professionals who have not worked in the gynaecology ward were of little benefit to the study.

3.10 Data Collection Methods

A combination of data collection methods (participant observation, questionnaire feedback) was employed. Initially the current shift handover practice was observed; the existing good practices and the gaps in the information was identified. An extensive literature review was initially conducted (as outlined in Chapter 2) to identify data items that were relevant to the clinical setting. Applying the findings of the literature review, a handover observation audit tool (Appendix A) was developed and piloted with expert senior nursing staff to measure handover practice observations were performed using the handover observation audit tool.

Personal memos from observations were written in the field notes. A structured format was then developed using literature review, which was introduced in the ward handover and feedback was collected from staff using a questionnaire. Participant information leaflet (Appendix G) and informed consent (Appendix H) was obtained prior to the study. Appropriate inclusions and exclusions were made according to the feedback and the final ISBAR^3 template was implemented. After that, a final observation was performed.

3.10.1 Development of Data Collection Instruments, Purpose & Use

3.10.1.1 Handover Observation Tool:

A handover observation tool was developed after literature review and it was then piloted with the senior midwife managers in the ward and appropriate inclusions and exclusions were made.

The purpose of the observation tool was to assess if all the appropriate data elements in the handover have been used in the communication of patient information. This contributed a baseline in achieving the research objective 2 and developing the structured format.

3.10.1.2 Computerised Handover Template

This specifies a framework for standardising shift-to-shift handover. The template uses the ISBAR^3 system (see below), a communication format recommended in the National Clinical Guidelines for communication (clinical handover) in Maternity Hospital Services in Ireland(2014). Gynaecology specific data subsets were used while developing the template. The ISBAR^3 acronym provides an easy-to-remember structure for giving required information in a logical sequence. ISBAR^3 is used as a communication tool in clinical handover particularly in relation to the National Early Warning Score (National Clinical Effectiveness Committee, 2014).

It can be used by staff preparing for handover as a reminder of the required information under each heading of ISBAR^3. They provide prompts for the exchange of information and can diminish the opportunities for omissions (NHS, 2009).

3.10.1.2.1 ISBAR3

I-Identification: Name, age, consultant, date of admission, parity

S-Situation: Brief summary of current status, admitting problem/reason for admission,

chief complaint

B-Background: What is the relevant clinical background? Allergies, previous medical, surgical, obstetrical history

A–Assessment: What is your clinical assessment of the patient at present?

R^3 -Recommendation, Responsibility, Risk:

- *Recommendation*: Specify your recommendations/plan for the day.
- *Responsibility:* Recipient(s) to confirm handover information and responsibility
- *Risk:* Include the safety pause to identify possible risks

A 'Safety Pause' provides the opportunity to identify or highlight specific safety issues that may arise and is best practice for handover (HSE 2014).

The purpose of the computerised handover template is that it guides the speaker to give information in a standardised sequence, thereby establishing a routine that also enables receivers to note whether any information is omitted.

3.10.1.3 Questionnaire

A questionnaire is composed of a structured set of questions that enable the collection of information in a standardised manner which, when gathered from a representative sample of a defined population, allows the conclusion of results to the wider population (Jones & Johnston, 1999). Nurse researchers use questionnaires to measure knowledge, attitudes, emotion, cognition, intention or behaviour (Rattray & Jones, 2007). The main benefits of questionnaires are they are relatively quick to complete and are usually easily analysed (Bowling, 2014). The absence of the interviewer effect, where participants may respond as they think the researcher wants (Dockrell and Joffe, 1992) is eliminated in self-administered questionnaires resulting in more meaningful data. In addition, the advantages of using a questionnaire are increased confidentiality and anonymity (Parahoo 2014). This is predominantly important in the current study as the researcher is a participant observer and is part of the study. One of the disadvantages of questionnaire is that it could be misunderstood (Cormack, 2000), which could be reduced through proficient reviews.

The purpose of this questionnaire is:

a) To enable participants to offer feedback on the structured computerised handover template (perceived usefulness and perceived ease of use).

b) Gain information relating to the experience of participants with the utilisation of structured handover and their degree of cognisance of the ISBAR^3 communication tool for clinical handover.

c) To examine the attitudes and perceptions of the nursing staff to the use of new computerised print out with structured format for handover practice.

Guidelines for questionnaire designing and testing (conceptualisation, questionnaire design, questionnaire testing, revision) will be followed (Dillman, 2000). Closed-end questions; open-ended free text questions and Likert scale, which is a 5-point response scale used in questionnaires [very dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, very satisfied (Bowling, 2014)] along with numerical scales (scale of 1-5 where 1= very dissatisfied and 5 indicates very satisfied) will be included. A numerical value will be assigned to each response ranging from 1 – 5 which implies a hierarchy of order with the lowest value 1 = very dissatisfied and the highest value 5 = very satisfied for the most positive response.

After developing, experts including senior managers piloted the questionnaire to determine the appropriateness of the questionnaire items, ease of completion and usability. Feedback received from the questionnaire was benefited to improve the template prior to use in the study. The questionnaire was distributed to participants, once the template of the handover format was introduced. Necessary inclusions and exclusions in the ISBAR^3 clinical handover communication tool were made before implementing.

3.10.1.4 Pilot study

A pilot study is a small study for helping to propose a further confirmatory study (Arian et al, 2010). It helps the researcher to evaluate the feasibility, time, cost, adverse events and statistical variability and improve the study design prior to the initiation of the real study.

Some associates and colleagues who are not taking part in the study did the informal testing (European Commission grant agreement- European statistical system, 2006) of the observation audit tool, computerised structured format and the questionnaire. Necessary changes in design and erroneous structure were changed accordingly. Further expert group (European Commission grant agreement- European statistical system, 2006) piloting was done by distributing to the Assistant Director Of Midwifery and Nursing, the Clinical Midwife Manager In the gynaecology ward and to a staff midwife who had previously worked in gynaecology ward within the last 2 years. The salient responses were looked into and employed necessary changes in design.

3.11 Data Analysis Methods

Analysis begins after completing the first observation (Strauss, 1990), and this sequential approach to data collection and analysis allows a researcher to identify relevant concepts, follow through on subsequent questions, and listen and observe in more sensitive ways (Corbin & Strauss, 2014). Ethnographic research involves a detailed description of the setting or individuals, followed by analysis of the data for themes or issues (Stake, 1995). Data analysis is conducted to reduce, organise and give meaning to the data (Burns & Grove, 2005). It refers to the process of bringing order, structure, and meaning to the mass of collected data. Data analysis gives validity, credibility, transferability, dependability and conformability to the study.

The first formal analytical step is documentation. It offers a means of developing and outlining the analytic process; and it encourages on going conceptualising and strategising about the text.

Descriptive statistics were used to organise, interpret, summarise and present data quality for completeness, concordance and timeliness pre and post-implementation. De Vaus (2001) recommends the use of descriptive statistics to measure the relationship between two or more sets of data. During the handover, the data subsets, which were mentioned, were given a score of 1 and for those items not mentioned a score of 0 was given. Relevant comments made by the staff were also noted.

The observational data were analysed using Microsoft Excel and comparisons were done. The compared results were illustrated in statistical tables, pie charts and side-by-side bar charts to indicate the relationship between the two groups. In addition, the results were analysed using the statistics software SPSS for Chi square analysis to examine the significant improvement in the communication using the structured computerised ISBAR^3 handover tool. A significant level of $p < 0.05$ was calculated.

3.11.1 Hypothesis Testing

A hypothesis is a statistical procedure that is designed to test a claim (Rumsey, 2011).

The null hypothesis (H_0) is a hypothesis, which the researcher tries to disprove, reject or nullify. The alternative hypothesis (H_1) is the opposite of null hypothesis (Shuttleworth, 2008).

Significance test generate 95% or 99% likelihood that the results do not fit the null hypothesis, then it is rejected, in favour of the alternative (Shuttleworth, 2008).

H_0 There is no significant difference between pre-implementation and post-implementation of ISBAR^3.

H_1 There is significant difference between pre-implementation and post-implementation of ISBAR^3.

A p-value of < 0.05 was considered significant.

3.12 Ethics & Ethical Approval

The majority of research projects in healthcare organisations require research governance, consent and an ethical review prior to commencement (Watson, et al, 2009). As ethnographic research requires observation and interaction with group, (Miles and Huberman, 1994), ethical issues should always be considered when undertaking data analysis.

The ethical principles of autonomy (right to self-determination), beneficence / non-maleficence (doing good and avoidance of harm) and justice (Beauchamp & Childress, 2009) and the Data Protection Act 2003 (Government of Ireland, 2003) were adhered to throughout the study. Ethical approval to conduct the study was sought and approved by the Research Ethics Committee of the School of Computer Science and Statistics (SCSS) Trinity College Dublin (Appendix E) and by the Clinical Research Ethics Committee at the study hospital prior to the commencement of the study (Appendix F). The participant information sheet (Appendix G) and participant consent form (Appendix H) requested by the Clinical Research Ethics Committee at the study hospital were drafted, provided and approved for use in the study.

Measures were taken to ensure that patient information was appropriately and respectfully managed and was compliant with ethical considerations, laws and regulations. The actions taken are listed as follows:

- Data Protection (Amendment) Act 1988 and 2003 and HSE 2013 Guidelines were strictly adhered to at all stages of the study.
- The data was obtained and processed fairly, and kept safe and secure.
- Computer access to the study details were strictly limited and stored on an encrypted password protected computer.
- There was no identifiable data at the time of analysis and reporting.
- The data was used only for the purpose of the study and was not retained for longer than the study required.

3.13 Methodology Overview

- A detailed literature review.
- Development of a research question.
- Development of gynaecology specific ISBAR^3 handover audit tool.
- Observation of the existing nursing shift handover care, where the handover is by verbal report with note taking.
- Analysis of the observation to identify the need for a structured format, using descriptive statistics.
- Development of gynaecology specific ISBAR^3 handover tool.
- Development of the questionnaire.
- Introduction of the computerised template of ISBAR^3 for handover.
- Obtain feedback on the template of structured ISBAR^3 communication tool for handover via questionnaire.
- Appropriate inclusions/exclusions made to the format according to the feedback for the development of a final structured format.
- Pilot study was conducted by distributing the new format template to the expert group.
- Changes made to the daybook (hard copy) template to ISBAR^3 communication model for accuracy and consistency.
- Individual training given to staff and computerised template implemented.
- Final observation of handover with the computerised ISBAR^3 handover tool.
- Analysis of the observation using descriptive statistics.
- Review of the findings in light of the published literature.

3.14 Expected Outcomes

Recommendation of a new computerised structured form of handover in gynaecology setting from the results of observation, literature review and based on the ISBAR^3 communication tool for handover recommended by the National Clinical Guidelines for Communication (clinical handover) in Maternity Hospital Services in Ireland [ISBAR^3] and the use of these printed handover sheet with updated information of patients for handover.

3.15 Conclusion

This research design / methodology chapter covered all the rudiments involved in the planning of the research study and included the approach to the research, design, methodology, sampling and setting, data collection and analysis. The methodology overview and steps to be taken were described. Finally, ethical considerations and expected outcomes were outlined. The next chapter will introduce the proposed computerised structured format on the ISBAR^3 communication tool for handover, and it will highlight the good practices and gaps in communication identified, summarising findings and conclusions.

Chapter 4 Results

4.1 Introduction

This chapter will describe the results of the observation and questionnaire organised by the steps of the methodology. Handover data were collected when nurses attended the change of shift handover in a gynaecological setting. A total of 20 observations each were done pre and post-implementation of computerised ISBAR^3 template. To assist the data collection, the ISBAR^3 based audit tool was used. Under each category of ISBAR^3 (Identification, Situation, Background, Assessment and Recommendation), 36 gynaecology patient specific data subsets were used respectively.

Out of 20 observations 10 were done concurrently while on duty as a staff nurse, and 10 observations were undertaken while on off duty without having any active responsibilities in the team. It was difficult in the beginning to maintain the audit tool and concentrate on the responsible task while on duty, but later got used to it. The observations during the off duty were done the very next day after the duty so that the patients are still known to the research observer. No difference in observation noted between the notes taken during on duty and off duty.

The data subsets, mentioned were counted and given a score of 1 and for those items not mentioned a score of 0 was given. The comments made by the staff during the observation periods and as answers in survey questionnaire were also noted and stated below.

The findings of the study based on the observations of the handover done before and after introduction of the ISBAR^3 structured format is highlighted. The percentage of findings of data subsets under each category of Identification, Situation, Background, Assessment and Recommendation is represented in the respective figures and tables.

4.2 ISBAR³: Identification

The data subsets of ***Identification*** is shown in table 2.

Table 2: Identification Data Subsets

No.	Identification data subsets
1	Name of the patient
2	Age of the patient
3	Category (public/private/semi-private)
4	Date of admission
5	Day post surgery
6	Doctor
7	Elective /emergency admissions
8	Time of admission
9	Para (no: of pregnancies)

The figures documented below are calculated in terms of percentages retrieved and not as individual units. The staff verbally stated the following description in the matrix during handover.

In all the handover, patient's name was mentioned along with the bed number. Age was mentioned 90% (n=18/20) prior to introduction of the ISBAR^3 template and 100% achieved after introduction.

The mentioning of category to which the patient belonged, (public, private or semi private) nearly doubled after the introduction of ISBAR^3 template; 45% (n=9/20) prior and 85% (n=17/20) after, with a significant difference (*p<0.05).* The increase in percentages was observed, while emphasising the date of admission after the implementation of ISBAR^3 template, 65% to 85%.

Day post surgery are classified as day 1, day 2, day 3 and figures showed a variable 10% increase from 85 to 95% post-implementation. 10% increase resulted in 100% in the section of stating Dr.name, with the structure format.

An increase to higher level of percentage (70-85%) observed in the case of highlighting the classification of elective or emergency. A huge invaluable increase in statement of time of admission was noted from 60%(n=12) to 95%(n=19), which is highly significant (*p<0.05)* with the use of ISBAR^3 template. 100 percent result achieved for this section of mentioning Para from 85% after the introduction of template.

Two of the nurses stated, *"we didn't feel the need of mentioning the 'category' in handover before this format was implemented." (Participant 1).*

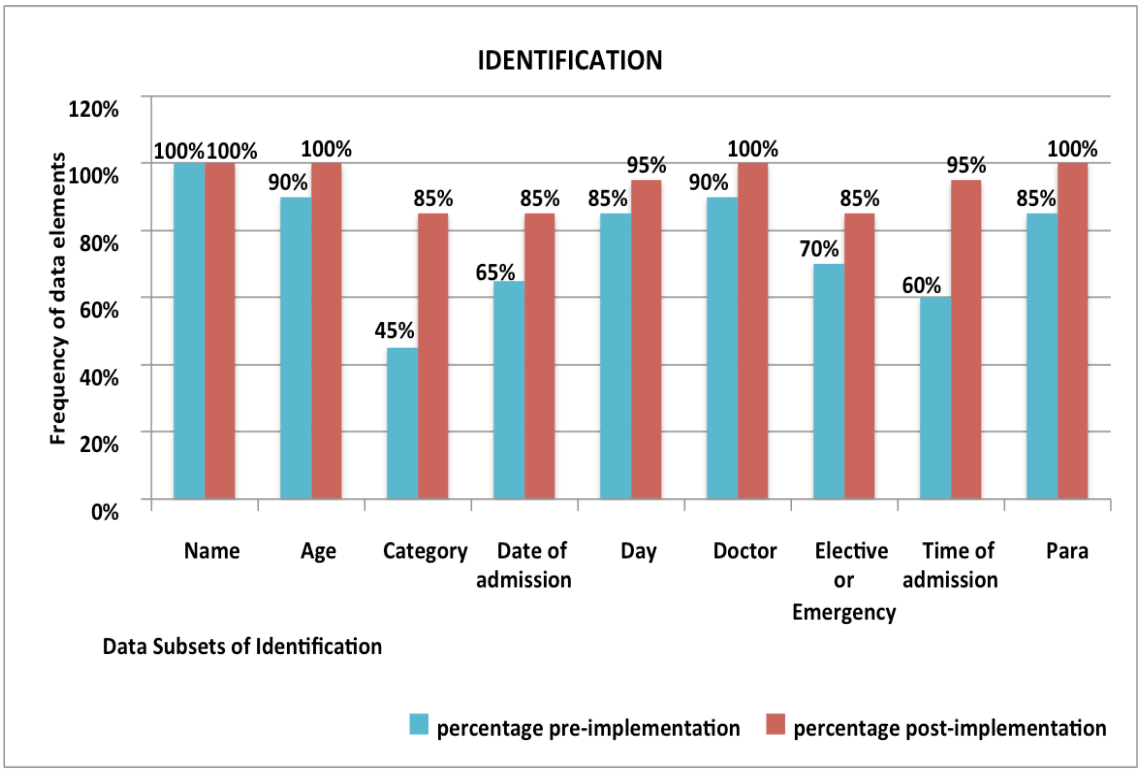

Figure 5: Percentage of Patient Data Transferred in *'Identification'* Pre/Post-implementation.

The side-by-side bar graph (Figure 5) shows the percentage of communication of all the data sub-sets of Identification used in handover before implementation and after implementation of ISBAR^3 handover.

4.3 I**S**BAR^3: Situation

This study identified following data elements to be included in the category of ***Situation*** in ISBAR^3:

- Reason for admission to hospital.
- Current issues.
- Diagnosis.
- Mode of delivery, date and time.
- Name of the surgery/ operation done.

It is evident from the current study that all the data elements remained at 100% before and after implementation (Figure 6). Therefore, this category of Situation was identified as one among the existing best practices.

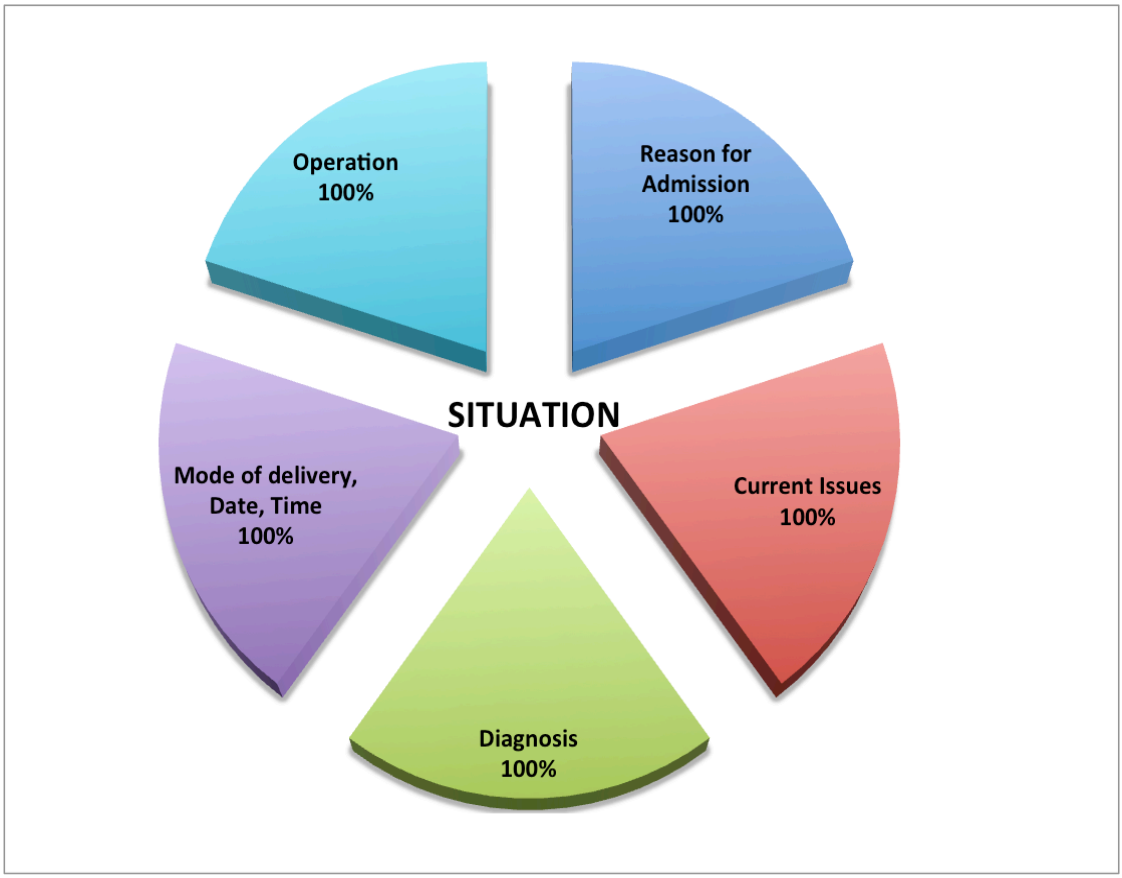

Figure 6: Percentage of Patient Data Transferred in '*Situation*' Pre/Post-implementation.

4.4 IS**B**AR³: Background

Data subsets in ***Background*** encompassed relevant medical history, relevant surgical history, allergies, medications and relevant social issues.

Three categories (Medical History, Surgical History and Allergies) increased to 100% and medications showed small but very significant increase to 95% (Figure 7). Stating the relevant social issues increased substantially from 55%(n=11/20) to 95%(n=19/20). Analysis found a significant difference ($p<0.05$).

"I haven't given much of a relevance about mentioning social issues all along."(Participant 2).

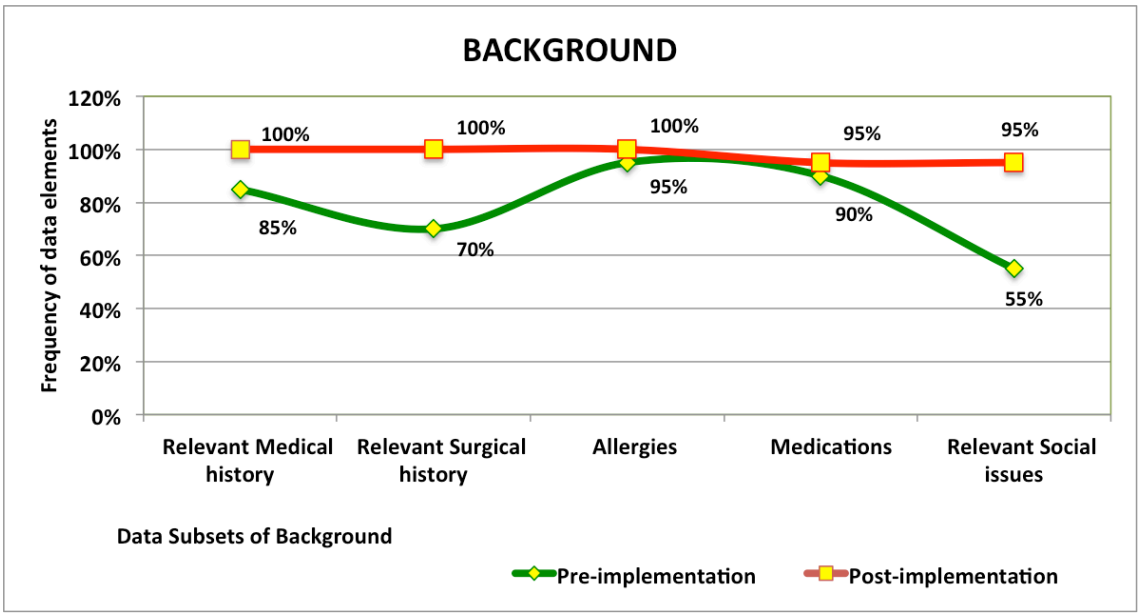

Figure 7: Percentage of Patient Data Transferred in '*Background*' Pre/Post-implementation

4.5 ISBAR³: Assessment

Dwelling into the data collected for ***Assessment***, provided evidence that lab results, vitals and baby information's endured previously and after at 100%. These were also identified as the existing best practices.

A positive increase of 5% for I.V, diet and pain, 10% for void/BO and wound status, 15% for rhesus and rubella, 20% increase for mobility were obtained respectively to attain 100%. The other categories like IDC and drain 10%, baby's feed 15%, anxiety 25%, EBL 40%, skin 45%, anaesthesia 50% (n=6/20 to n=16/20; $p<0.05$), exhibited significant positive hike but never showed a tendency to reach the much wanted 100%.

"This gave me an insight into what are the specific points to be highlighted during handover, which avoids omission." (Participant 3).

The data subsets of assessment and pre-implementation and post-implementation results are illustrated in the following table 3.

Table 3: Percentage of Patient Data Exchanged in '*Assessment*' Pre/Post-implementation

No.	Assessment Data Subsets	Percentage of handovers in which data subsets were reported Pre-implementation	Percentage of handovers in which data subsets were reported Post-implementation	Percentage changed
1	Anaesthesia	30	80	**50**
2	Skin	50	95	**45**
3	EBL	55	95	**40**
4	Anxiety	70	95	**25**
5	Mobility	80	100	**20**
6	Rh, Rubella	85	100	**15**
7	Feed	75	90	**15**
8	IDC, Drain	85	95	**10**

9	Wound (Pack, PV loss)	90	100	**10**
10	Pain	95	100	**5**
11	Diet	95	100	**5**
12	I.V	95	100	**5**
13	Void/BO	90	100	**10**
14	Medication	95	95	**0**
15	Lab Results	100	100	**0**
16	Baby	100	100	**0**
17	Vitals	100	100	**0**

4.6 ISBAR^3: Recommendations

The main data subsets explored in ***Recommendations*** included:

Plan for today, referrals to be done, investigations to be performed, responsibility, and risks (Table 4).

Table 4: Data Subsets of Recommendations

No.	Data Subsets of Recommendations
1	Plan for today
2	Referrals to be done
3	Investigations to be performed
4	Responsibility
5	Risks

Under the group of Recommendation, the data subsets such as plan for the day, responsibility and investigations revealed 100% during the initial observation. No deviation was identified while using the structured format (Figure 8). Therefore it can be concluded that these data subsets are indicators of existing good practices. Highlighting the need for referrals increased from 65 (n=13/20) to 100% (n=20/20), whereas, emphasising the risks (safety pause) increased from 35(n=7/20) to 85%(n=17/20), which indicated a significance of $p<0.05$.

"The introduction of 'safety pause' has helped to keep an eye on the high risk area from the beginning of the shift itself." (Participant 4).

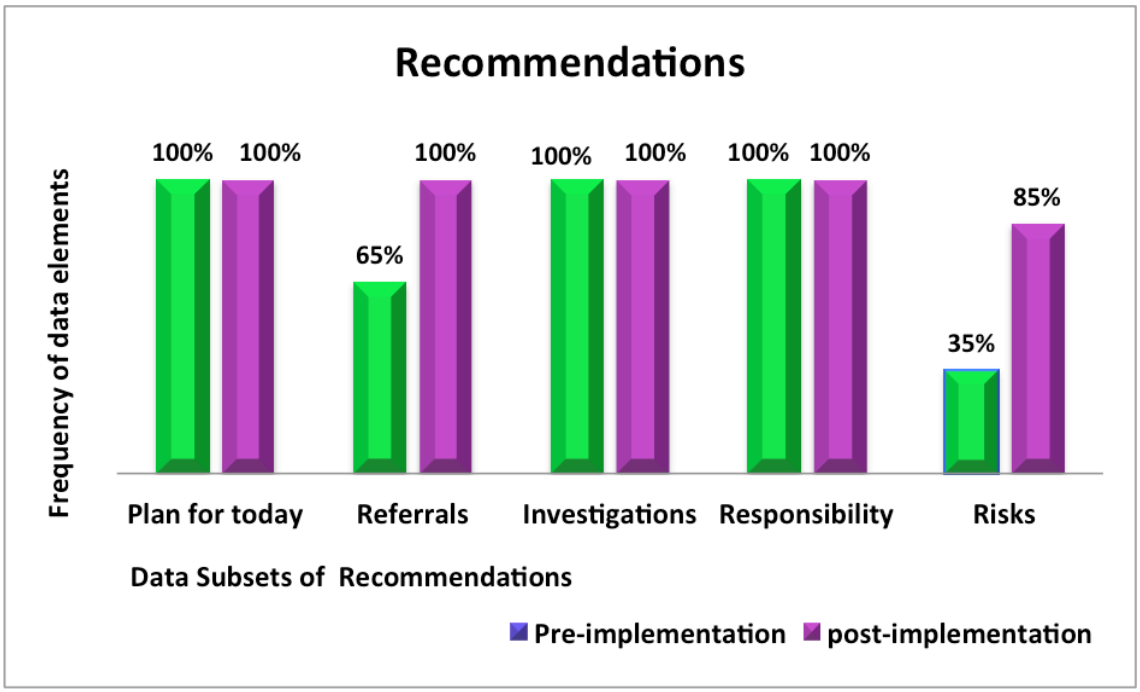

Figure 8: Percentage of Patient Data Transferred in '*Recommendations*' Pre/Post-implementation

4.7 Feedback and Perception of Staff on the ISBAR³ Template

A questionnaire was given to all staff with a total of 9 questions, which included 4 closed end questions (Yes/No), 3 likert scale questions (Very Dissatisfied 1, Dissatisfied 2, Neither satisfied nor dissatisfied 3, Satisfied 4, Very Satisfied 5), 1 multiple choice and 1 open ended question. Questionnaires were given to the same group of 15 staff whose handovers were observed. The feedback was as follows:

All the 15 (100%) staff articulated that, all the appropriate data elements has been included in the structured format, no suggestions were made for any additional data elements to be included in the structured format.

Regarding excluding the data element, 13.33% (n=2/15) staff commented to exclude the '*admission time*' and 6.67% (n=1/15) participant remarked there was no need to mention *'category'* in the handover report. They were informed that the awareness of *admission time* and *category* are specific elements essential for the finance management. Remaining 86.67% (n=13/15) people expressed there is no need to exclude any of the data items mentioned in the ISBAR[3] template.

All except 2 (13.3%) participants verbalised that the proposed use of each of the data items in the structured format is explained clearly. 2 (13.3%) persons voiced trepidation on mixing up *'assessment'* and *'recommendations'*. This should improve by practice and familiarity.

Concerning the satisfaction on the printed structured format (Figure 9), 66.67% (n=10/15) staff stated they are satisfied and 26.67% (n=4/15) staff vented that they were very satisfied and 6.67% (n=1/15) participant was neither satisfied nor dissatisfied.

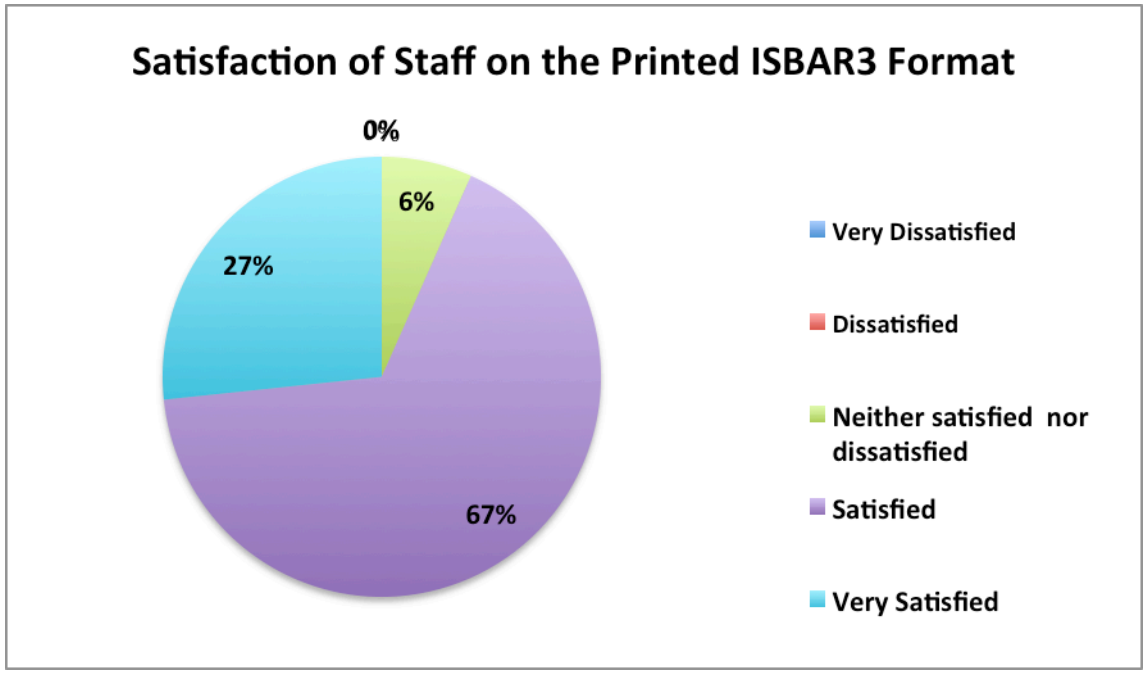

Figure 9: Staff Satisfaction on Printed ISBAR[3] Handover

53.33% (n=8/15) staff expressed their dissatisfaction on current location of handover due to distractions and interruptions, while 46.67% (n=7/15) people suggested as there was no other place within the ward location, perhaps it would be advisable to put a note on the door '*Handover in progress, please do not interrupt*' to reduce interruptions and distractions.

Next question was 'How satisfied are you with the time allocated for handover in a scale of 1-5?' The current handover takes 30 minutes at present. 80.00% (n=12/15) of participants aired that they were very satisfied and 13.33% (n= 2/15) people revealed satisfaction and one person was dissatisfied.

Developing communication skills should be a key domain in nursing training (Collins, 2013). In this study, among the 15 staff, 10 (66.67%) staff acknowledged that they learned to do handover as a student, while 5 (33.33%) affirmed that they learned to do handover both as a student and as a staff. However, no one mentioned that nursing handover was taught in the curriculum. This suggests that for professionals to handover effectively, competently, confidently and in a coordinated manner, handover should be part of the nursing curriculum.

This was even more stressed by the answers for the last question, which was an open-ended question. Staff opinion was asked on how they think the handover should be taught. Different viewpoints were expressed, out of which the most common was about giving the training as a student nurse. One staff suggested, "to give confidence to students, handover should be taught in college along with communication and interpersonal skills and also by practicing it in placement".

One staff hinted that, "students should get the idea that handover is giving a 'mental picture' of patient and condition". Ineffective handover can compromise patient safety (Wong et al, 2008; World Health Organization, 2007), so Healthcare organisations expect the graduate nurses to communicate skillfully to promote patient safety. Some of the staff recommended that, "during training, a nursing student should be taught that handover should be accurate, precise, concise, to the point with all relevant

information". Few staff suggested teaching the handover with the use of structured format/ computerised template/ISBAR[3] tool that aids as an easy to remember tool.

They also mentioned that after using the ISBAR[3] template, "we now know that it really helps to give both the person giving and the person receiving the handover a clear picture on what information needs to be shared and the actions that need to be taken". One other staff mentioned that, " student and novice nurses should watch, listen and participate in handover to learn effective handover".

4.8 Barriers in Communication Identified

Some of the barriers identified which lead to the gap in communication include the delay in starting handover in time, interruptions/distractions, language proficiency/audibility, omission of critical data and level of interaction between staff members.

- ***Starting the handover on time***: Delays in starting handover often leads to rushing to finish the handover in time, and often overlooked important information. A structured format helped in preventing those errors as the information was already in the printed sheets, which helped the incoming staff to raise clarification. There was a slight decrease in percentage of starting handover on time when compared to before and after due to high influx of patient turnover and emergency situations.

- ***Interruptions /distractions*:** This was always considered to be a part and parcel of the handover, where noise levels contributed as one of the important factors, mainly due to the location of handover. Telephone calls, doctors coming in and out, patients and family making enquiries all contributed to these interruptions.

"Handover given at the nurses station is very prone for interruptions." (Participant 5).

"Doctors coming in and out, phone ringing, family coming to enquire and most of the time the nurse is interrupted while we are handing over." (Participant 6).

"We should be using 'handover in progress notice' in front of the door to avoid interruptions." (Participant 7).

- ***Language proficiency/audibility*****:** Considered to be one of the detrimental factors that would lead to inaccuracy in the scope of information that was handed over and quality of information transferred.

- ***Clinically important issues and omission of critical data*** that were handed over have a direct and indirect impact, which reciprocate near-miss events and adverse effects.

- ***Level of interaction between staff members*** for clarifications, even though they aided in making the point clear, but often contributed to unnecessary explanations and deviations.

4.9 Time Taken for Handover

A total of 20 handovers were observed pre-implementation and post-implementation. In pre-implementation, a total of 151 patients were handed over, in 263 minutes (4 hours and 38 minutes). Maximum time taken was 27 minutes for 12 patients and minimum time taken was 6 minutes for 3 patients.

In post-implementation, a total of 211 patients were handed over in 321 minutes (5 hours 35 minutes). Maximum time taken was 30 minutes for 18 patients and minimum time taken was 5 minutes for 7 patients (Figure 10). When the number of patients was more the time taken for the handover also increased, but ISBAR^3 helped to relay concise, relevant, consistent and complete information, with equal distribution of time.

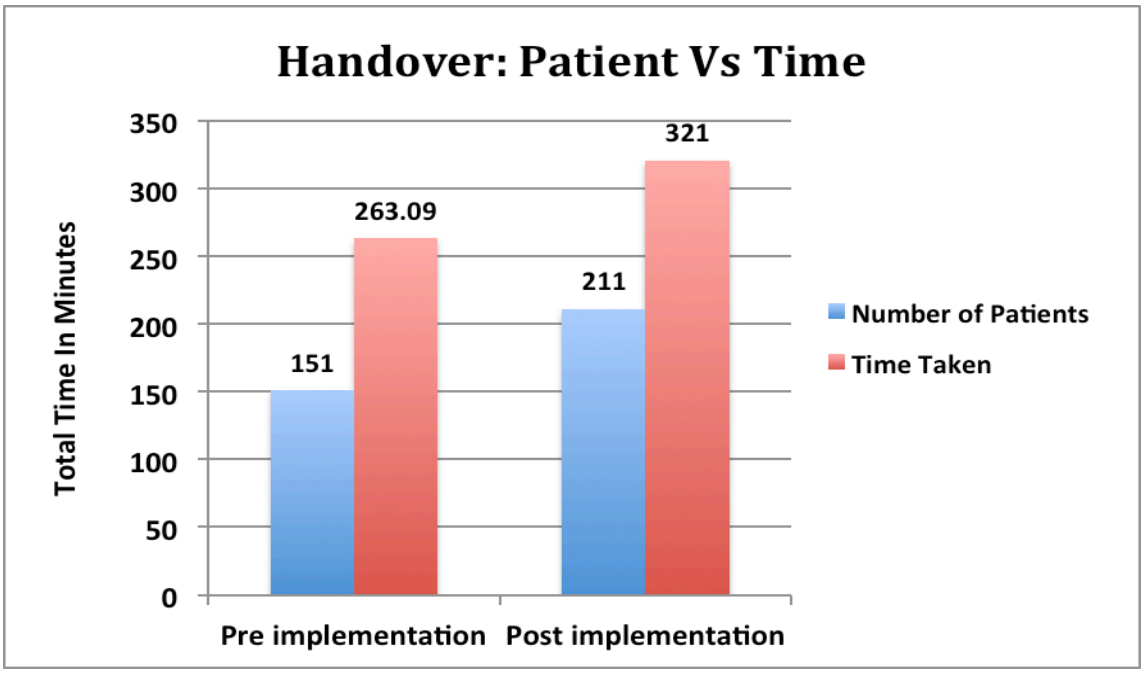

Figure 10: Difference in Time Taken for Handover Pre and Post-implementation Patient vs. Time.

The time taken for handover has reduced in an average from 31 minutes to 27 minutes (1.7 minutes to 1.5 minutes per patient), in one handover (Figure 11), that is 4 minutes in each handover. It is equivalent to 8 minutes in a day, since there are 2 nursing shift handover.

As every minute is valuable for patient care, 4 minutes lost for 5 staff in each shift will result in 20 minutes/shift and 40 minutes/day, which in turn is 20 hours of working time for a month. Calculating that for a year, will find it mind-boggling 240 hours of nursing time. This was considered as one of the greatest achievements of this study, as in spite of covering all the relevant information using the structured format, time used for handover was even reduced.

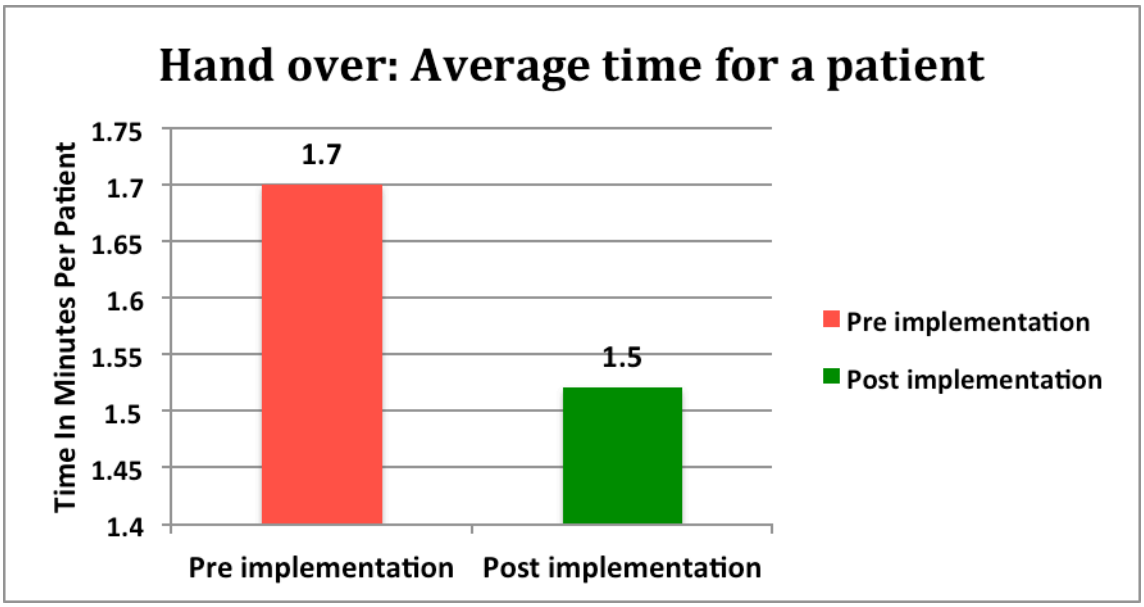

Figure 11: Average time difference for one patient handover pre and post-implementation.

4.10 Workflow Challenges

- One of the concerns raised by the staff was the non-accessibility to the ISBAR[3] document to update while other people were using the computer for multiple needs. The I.T. department was contacted and new software was installed onto all the computers. This facilitated the staff to update their own patient status in the ISBAR[3] handover tool, where everyone can update onto the same document from different computers.

- To give training sessions, for the new format to roll out and to gain the accuracy of the observations, a number of visits were made by the researcher towards the beginning and end of shift during the off duty.

- Initial resistance was identified among some experienced nurses, but this has dispersed as the benefits of the computerised ISBAR[3] handover became apparent.

The following are few of the quotes of staff regarding the new computerised ISBAR[3] structured handover:

It was, *"this is an extra work, this is not going to work here!"* at first, then 3 weeks later, *"Gee, it's so helpful once we got used to it."*

'*Good idea, good reminder of important points to call out during handover'.*

'*Help me to do handover without missing critical data when I am tired at the end of the shift.'*

'The feeling of "did I forget to handover anything…?" has vanished.'

'The number of phone calls from home after duty with, "oh, I forgot to mention…" has reduced.'

'This is really good framework for students and new graduates.'

Chapter 5 Discussion

5.1 Introduction

Clinical handover is fundamental to continuity of patient care. It depends on the accurate and precise information exchange, which leads to patient safety (WHO, 2007). Chapter 4 presented the findings of this study on analysis of nursing shift handover practice and the development of a structured format for handover to improve communication. This chapter will discuss those results in light of the achievement of the research objectives and the literature review with a synopsis of the impact of the study presented. The chapter will conclude with a discussion of the limitations of the work as well as suggestions for future work relating to this area.

5.2 Nursing Shift Handover

Handover is the formalised form of nursing communication. The handover served as a venue to exchange information between incoming and off going staff, debrief and as a time for social talks that was emotionally and socially important for nurses (O'Connell & Penny, 2001). The 5 elements, Identification, Situation, Background, Assessment, Recommendation/Risk/Responsibility had 36 gynaecology specific data subsets respectively. The ISBAR^3 computerised handover helped to guide the exchange of information in a clear and concise way.

The first element in ISBAR^3 template was *'Identification'*. Naturally the first method of identifying a person that flashes through our minds would be the "name". As this was preliminary and undoubtedly the only method used in the category *'Identification',* it possibly reflected traditional knowledge systems in existence in use in nursing handover. It was highlighted by Makic et al, (2014) also that, much of nursing interventions practiced are often based solely on tradition and also showed that similar ways were used in the exchange of information carried out over the years.

The other data subsets in '*Identification'* like age, category, date of admission, time of admission, day post surgery, name of the treating doctor, elective or emergency, parity

were not possibly given much importance, which could be why the data element "name" gained a 100% in pre observation. The implementation of structured format helped other data subsets grow in stature to acquire the much-coveted 100%.

Subsets belonging to the category *'Situation'* never fluctuated to left or right and was mentioned 100% pre and post-implementation of ISBAR^3. This could very well be due to a pattern evolved and carried over by many generations. The pattern of information that was conveyed from lip to lip would be due to the regular usage of traditional pattern of handover and daybook that acts as a catalyst to follow suit. Therefore after pre-implementation observation the daybook pattern was changed to the ISBAR^3 format to obtain uniformity and guideline for handover.

In the next category *'Background',* data subsets such as medical and surgical history, medication routinely received high importance, which was missed on a few occasions that could influence or impinge patient safety. A more critical and vital piece of information is the "allergy status of a patient", which was missed on one occasion and could directly lead to adverse events. The introduction of ISBAR^3 structured format helped recover from consequential events that could arise and showed a much-improved confidence gained by personnel to propel the unit percentages to 100.

Opening the category *'Assessment',* the specific element involved in the pattern of information was usually conveyed but generally important elements of patient care found to be suppressed in majority of pre-observation, but post-observation led to notable elevation. This proved consistent information was passed in a timely and coordinated manner through the structured format.

Moving on to the next data element '*Recommendation'* which *showed* pointers, risk and referrals that were overlooked but other data subsets voiced a mention. This could be due to the routine ward pattern but never emphasised the dangers and possible patient specific risk in handover. Introduction of a 'Safety Pause' with ISBAR^3 handover heightens safety awareness and alerted personnel to automatically switch over their mind to emphasise it as part of the handover.

While developing a new system/method it is worthwhile and informative that the current process is scanned so as to identify the existing good practices. Here the study could read through the current existing good practices and identified unplugged gaps in communication leading to a bottleneck, which portrayed the barriers of information exchange.

The identified variables are explained in detail in Section 5.2, 5.3 and 5.4. Therefore the identified factors were incorporated with the framework of the National Guidelines for communication in Maternity Hospital Services in Ireland in the formation of a structured ISBAR^3 format. As the recommendations in National Guidelines are for maternity services, gynaecology patient specific data subsets of ISBAR^3 (Identification, Situation, Background, Assessment and Recommendation) were developed with the help of literature review and staff feedback.

Customisation was ensured to meet the needs of the gynaecological patient care. This was emphasised by Johnson et al, (2012) conferring that each specialty requires particular data subsets specific to their needs. e.g. maternity needs to specify type of birth and feeding approach.

The format in the daybook had to be reshaped and transfigure with ISBAR^3 and the introduction of a far-reaching step in the process called the “safety pause”, which certainly were two milestones that were achieved with the study.

The icing on the cake was the automatic reduction of time taken in the process with the implementation of ISBAR^3 format. The introduction of ISBAR^3 funnelled a general traditional way of handover to a systematic, precise, accurate, relevant mode of updated communication in a very short period of time. The handover time was reduced by 4 minutes/handover in each shift. 4 minutes for 5 staff in each shift amounts to 20 minutes in total in a shift or 40 minutes/day, which is equivalent to 20 hours /month and 240 hours/year of nursing time. This was achieved by identifying certain overlooked critical factors, for example communication of irrelevant information and deviation from the specific topic to another resulting in apparent omission of vital relevant information. The introduction of a structured format helped

to revive and reduce the impediment and thereby gained valuable time which would have otherwise been lost in the congested traffic of communication and also helped in the use and guidance of what came next. Various studies have showed variations in reduction of time but this could well be due to the difference in patient specific information and high patient turnover numbers. Here, ISBAR^3 helped relay concise, relevant, consistent, integral undocked and entire information, with equal distribution of time.

A template would never be the end result if it were not updated with recent changes of information and facts obtained. So staff were encouraged and made aware of the importance of timely update of their own patients towards the end of the shift. NCG (2014) also recommends the need of updating information promptly to ensure that the IT infrastructure ensures effective communication.

As confidentiality is a matter of utmost concern and protected, shredding of the document after use was emphasised and recommended.

This study was conducted in a gynaecology ward in a maternity hospital. Due to the success enjoyed in one ward reviewed by the hospital, the management now have decided to roll out this structured ISBAR^3 format in handover to all nursing and midwifery departments in the hospital.

It's a great honour and I would be proud to say that the present study is the first of its kind and one among the many studies to be carried out nationally, in a gynaecological backdrop and environment.

It is also worthwhile to recommend that this gynaecology specific ISBAR^3 handover tool could be used as an effective surrogate development and value added benefit to gynaecological departments of other hospitals nationally which is supported and recommended by national guidelines too.

5.2 Existing Good Practices

This study identified a convincing account of approximately 12 existing good practices. In the pre-implementation observation, data subsets such as name of the patient, reason for admission, current issues, diagnosis, mode of delivery, date and time of birth, operation/surgery performed are the major themes identified as good practices. However, name of the patient was the only data subset mentioned in all the handovers under *Identification* headings of ISBAR[3].

Contrary to this, all the subsets under *Situation* where good practices, such as reason for admission, current issues, diagnosis, mode of delivery, date and time of birth, operation/surgery performed in all the handovers observed.

When considering 17 data sub sets, relevant lab results, vital signs and specifying the gender of the baby were the only 3 data subsets specified under the category of *Assessment* in all the handovers.

On the other hand, the category of *Recommendation* had 5 data subsets, out of which 3 were plan of action for the day including the investigations and responsibilities to be carried out that shift was always mentioned.

Printed sheet method is the most effective method of retaining information, and standardised proformas, which promote filling of relevant fields, promote data transfer between shifts promptly and reduces the potential for clinical error (Ferran et al, 2008). Internationally, Australian Institute of Health and Welfare (2007) has highlighted the importance of identifying the existing data sources and good practices for the usefulness for data development in structured formats.

There is a growing body of evidence that demonstrates handover improves after developing and implementing a structured tool incorporating the available technical resources (Jacox and Cole, 2012). Due to this fact the predominant good practices were absorbed and transcribed for the development of the structured format.

5.3 Gaps in Communication Identified by Possible Variability

Gaps could have been previously identified by the staff, but could have been avoided deliberately due to extra effort or work needed to perform. They might appear in the form of relevancy of information for practice, equipment and resources, time needed for handover and other activities. Few examples that could be visualised in the study relate to exchanging information on allergy status, age, parity, time of admission, relevant social issues, type of anaesthesia received, estimated blood loss, diet plan, bowel and bladder pattern, wound status, pain, feeding approach, skin integrity, risks, etc. The above mentioned showed an increase in percentages and never once dipped.

These gaps are inversely proportional to the time of activity conducted and directly proportional to the unintentional forgetfulness of information (e.g. fatigue after the long shift). The Australian Institute of Health and Welfare (2007) emphasised the need to conduct a feasibility study to identify information gaps and data that could be problematic in acquiring accurate information. Welsh et al, (2010) and Weiss et al, (2013) as cited by National Clinical Guidelines No: 5 (2014) point out that nursing staff had suggested that a shift handover with a structured layout or using a checklist would improve the completeness of information transferred and the quality of handover.

5.4 Barriers in Information Exchange

A bundle of barriers could present itself in the form of:

- Starting on time.
- Interruptions and distractions.
- Language proficiency.
- Miscommunication.
- Accuracy of information via absence of vital clinical information masked by poor quality of information provided.

- Level of interaction between staff, which sometimes leads to unnecessary explanation, and deviations from the actual desired topic.

Regular distractions and interruptions were part and parcel of all the handover observed with examples such as telephone calls, doctors and nurses interrupting handover, relatives approaching the nurses' station, etc. Regular distractions can reduce the attention span of those listening and those delivering handover (Aase et al, 2007). Communication between the team members directly affects the quality of care and the patient outcomes.

As a possible rectification to the gaps and barriers so far identified, a structured format with ISBAR^3 was developed based on the recommendations of national guidelines incorporating the existing good practices. National Clinical Guidelines (2014) quality assured by NCEC and published by the Department of Health recommends that a clinical handover system should be developed in line with the guidelines for use in healthcare organisations in Ireland (HIQA 2015). It emphasises that ability to complete and print ISBAR^3 communication tool, which will provide structure to communication.

It is generally agreed that adopting a standardised approach can improve handover. A computerised structured format thus developed would be of immense value, and recommends a smooth and coordinated progress of the information exchange in a timely manner. According to Raptis et al, (2009) as cited by Ryan et al, (2011) handover could be more enhanced if it was computer driven as it provides better continuity of care than paper based handover.

A few brief training sessions were provided irrespective of computer literacy of the staff so as to keep the staff aware of the importance of usage of template in the appropriate manner. According to Mukhopadhyay et al, (2015) nursing staff need guidance in order to make use of the computer for a smooth transition from a paper based to an electronic handover system. Therefore training and education of staff was imperative and was provided.

5.5 Benefits

If the pre-template era masked details that could lead to vital information exchange, the post-template era unveiled this information and canvassed them into a structured format. This in turn zoomed in on a variety of attributes that portrayed a number of critical information seldom conveyed. The end result thereby made it possible to achieve 100% for 27 categories when compared to the 12 categories pre-implementation.

Traditionally, the handover practice was to make handwritten notes during verbal communication. This mechanism was far from ideal as ample information could sweep away while consistency and legibility could put the patients quality of care at risk. The conversion of handover procedure to computerised printed document vastly improved the legibility of information communicated and completeness of handover information. Similar findings were found in a study done by Mukhopadhyay (2015), that the use of a computerised structured format aids in good information exchange between nursing staff in a standardised language and it provides a mutual understanding of given and planned care.

The risk assessment that was done less frequently has been improved since the implementation of a 'Safety Pause', which is part of ISBAR^3 handover. Patients' safety issues that need to be made aware off on that particular shift were recommended. It heightens the safety awareness and helps the staff to be pre-emptive about the challenges they could face in giving safe and better care. Report of the Quality and Patient Safety Clinical Governance Development Initiative HSE, (2014). Introduction of a 'Safety Pause' as part of recommendation/responsibility and risk became an added benefit in ensuring the anticipation and decline of risk incidences.

Time taken for handover significantly reduced from 31 minutes to 27 minutes, where the saved time could be used for patient care, and it was very much possible to convey every single detail which was relevant in the specified time limit. Reducing interruptions and using a better structure will make handover safer, more effective and time saving (Gage W 2103). As every minute is valuable for patient care, 4 minutes

for 5 staff in each shift amounts to 20 minutes in total in a shift or 40 minutes/day, which is equivalent to 20 hours /month and 240 hours/year of nursing time. In spite of covering all the relevant information using the structured format, time used for handover was even reduced.

Template usage by the staff during the study period provided valuable data that pointed towards the improvement of communication and patient safety (WHO, 2007) without any doubt. This was supported by HIQA (2015) that introduction of a computerised handover system will increase accuracy, efficiency, scope of information handed over, and reduces the time taken for handover.

The huge impact, which was generated on the traditional handover pattern, was made possible by way of changes in the daybook even though challenges remained. It boosted the recollection of memory in a systematic manner to emphasize the relevant vital information and move on promptly to the next patient information symmetrical to the time gained.

Placing an appropriate notice on door with a clear and legible message *"Handover in progress, please do not interrupt*", imparted immense help in reducing the amount and magnitude of distraction.

5.6 Questionnaire Feedback

The questionnaire feedback gained an equivocal approval, without any addition or subtraction needed to the template. A study on nurses' perception on the use of a computerised tool for shift handover by Oroviogoicoechea et al, (2013) highlighted a positive response and also acknowledged the pivotal role of computerisation.

Few staff highlighted that the place of handover caused a major distraction and interruption. Changes of handover location were suggested, but due to the limited space within the current environment a reasonable counter-measure was suggested to hang a note on the door mentioning '*handover is in progress, please do not interrupt*' which would pass a message that vital information would be jeopardised, if disturbed.

The importance of the handover procedure and the exact way to learn how to carry out handover was a topic of hot discussion during the implementation of the template. The procedure, which was usually carried out as a ritual, now turned out to be very effective and proactive. This was due to the specific nature of the template, which was received with accolades as most staff voiced an opinion that procedures such as these should be given greater importance while being taught in nursing school. Incorporation of such templates into the curriculum boosted by practical exposure would benefit the students as well as provide confidence in relaying critical vital information. Scovell, (2010) pointed out that effective handover should not only be taught in the nurse training but also should be cultured in the ward.

5.7 Achievement of the Study Objectives

5.7.1 Research Objective 1: *To review relevant literature to identify the best practice:*

Extensive literature review was done and the best practices and recommendations all around the world for nursing shift handover was looked into.

5.7.2 Research Objective 2: *To analyse the current practice of nursing shift handover:*

The current nursing shift handover practice in the gynaecology ward of a large maternity hospital was carried out by observation. 20 handovers each were observed in total, both from morning and evening shifts.

5.7.3 Research Objective 3: *To identify the existing good practices, to identify gaps in communication and barriers in information exchange:*

An audit tool (Appendix A) was developed based on the ISBAR^3 communication tool and was used for the observation. This helped to identify the existing good practices, gaps in communication and potential barriers in information exchange.

5.7.4 Research Objective 4: *To develop a structured format for handover:*

The observation results highlighted the existing good practices, and areas for improvement. These good practices and gaps were incorporated with the national guidelines to develop a computerised structured format using ISBAR^3 communication tool. Questionnaires (Appendix C) were used to collect the feedback on the ISBAR^3 handover format from the staff. This was also enhanced to gain information on the perception of staff on the ISBAR^3 communication tool for clinical handover. The ward daybook format was also changed to the ISBAR^3 format for uniformity.

5.7.5 Research Objective 5: *To utilise the ISBAR^3 printed handover sheet with patient update for the shift handover and to analyse if the communication is improved:*

The computerised ISBAR^3 handover format was implemented for handover after providing training sessions to staff. The respective staff recorded their updates of assigned patient details on the template employing the help of a computer. Towards the end of the shift, printouts of the updated ISBAR^3 handover sheet was taken and it was given to all the incoming staff.

All staff were reminded about the importance of updating patient details for the effective use of the ISBAR^3 handover sheet and also emphasised the responsibility of shredding the handover sheet at the end of their shift. Once they got used to the use of computerised format a further 20 observations were done to analyse if the communication could be improved.

The analysis of the results showed that change of nursing shift handover from a verbal communication with notes, to that of working to a computerised structured format using the ISBAR^3 communication tool improved communication. It alleviated the identified gaps and barriers of communication, improved the quality of information exchanged during change of shift, and facilitated in maintaining the continuity of care.

The use of the ISBAR^3 communication tool also reduced the time taken by 4 minutes/handover. 4 minutes for 5 staff in each shift amounts to 20 minutes in total in

a shift or 40 minutes/day, which is equivalent to 20 hours /month and 240 hours/year of nursing time, which in turn could be utilised for patient care.

5.8 Positive Impact of the Study

Implementing the computerised ISBAR^3 communication tool for handover provided a framework and support for exchange of relevant information in a prioritised, timely and consistent manner.

As the use of a computer became a necessity, workflow changes were made by installing a second computer and both machines connected to the same drive where simultaneous observations could be posted and viewed without wastage of time. HIQA (2015) suggests that there should be accessible computer terminals, computer learning algorithms and software driving the system should be developed to provide 100% data transfer.

For the effectiveness and uniformity of the use of ISBAR^3 communication tool, the daybook structure was also modified with a printed format in conjunction with this tool. Information technology has the potential to offer innovation in improving quality, safety and standardisation of care for patients (HIQA 2015).

The successful completion of the study has made it possible for the hospital to look into further expansion of implementation throughout every ward.

The gynaecology specific audit tool was developed, as this was the first study to be conducted on ISBAR^3 handover in gynaecology setting. Now that the National Guidelines recommended ISBAR^3 handover tool to be used for all handovers in maternity services, this gynaecology specific audit tool and ISBAR^3 format may well be used with confidence in gynaecology departments in other hospitals too Nationally and internationally.

5.9 Challenges

- A successful implementation of computerised handover is composed of multiple factors that provide new opportunities but also involve new challenges. Nurses' willingness to change was the primary challenge, but was able to be overcome with time.

- While implementing any programme, the initial paradigm would certainly point to the workflow change. Next to keep in mind would be the time taken to familiarise and habituate with any new programme proximately followed by the computer literacy of the staff, which was out of scope of the study. This was attained and improved by giving training to all staff concerned to get acclimatised with the format so as to reduce time in fixing errors and getting used to the format.

- Changing the daybook format was a task subject to resistance as well as tedious. Inserting a few gynaecologic specific requirements essential to the ward practices were made before staff could come to terms with the present format.

- It is easy to attain a target but envisaging the key factors that could sustain it now becomes the highest priority. Sustainability is a key challenge for any innovation. This fact is supported by the Bowers (2011), as engaging every member of staff in these actions is essential to sustain improvements in practice.

5.10 Limitations of the Study

With the positive and conclusive gains in the study a certain encounter of encumbrance of the study was also visible. The sample rate was relatively small and covered only one ward. Studies with larger samples will give greater weightage to the findings of the present study.

Another limitation was the lack of gynaecology specific guidelines for handover.

Finally, the 3-month time frame was inadequate to truly measure sustainable change. Six to 12 months would allow for greater application of knowledge into practice and a true measure of permanent change.

5.11 Recommandations for Future Works

A number of areas were identified for future research.

1. A longer period of evaluation is essential, including consideration of patient outcomes, in gaining confidence among staff members and successful proactive communication with ease.

2. Web-based electronic software systems or applications that could be derived from the electronic health record should be looked into for future development. Once the electronic health records have been implemented, usage of the mobile application of ISBAR^3 for handover with handheld devices is a thought for recommendation.

3. This study contributed to an increased understanding of nursing handover and implementation of e-health solutions in clinical practice. Further studies should address implications of electronic handover in maternity services including the economic impact for implementing, impact on quality of patient care, patient satisfaction, impact on how information is shared across departments and organisational boundaries.

4. The future of this study is bright with options for integration with other variables to determine depth of clinical effects in regards to quality indicators such as patient safety, medication errors, and other sentinel events.

5. No precedent study has been published in a gynaecological setting or framework nationally on the ISBAR^3 handover. So this tool could be used as a base to continue future studies in other general hospitals.

5.12 Reflection

In its infant stages the study originally proposed to carry out a structured format by observation of current practices. But as progress and unfolding impetus gained in the study, IT helped expand the study with the change of practice, development and performance of modus operandi. The change in the traditional style of the daybook was never part of the plan, but it made sense that it too needed a refurbishment of information template.

Resistance is always part and parcel of the trend in any change with usual routines people are used to. This study was no exception. The changes involved presumably were thought of as an extra work that needed to be carried out. But with time the staff were delighted to receive and embraced it cheerfully as the ISBAR^3 structured format transfigured the entire handover perception and equally it suited them perfectly.

Undertaking the observation and following the Guidelines required time and effort, but a raised awareness about the improvement in communication and practical safety provided encouragement. The involvement in developing the audit tool and gynaecologic specific ISBAR^3 handover were challenging, but rewarding on the other hand with the knowledge that this contribution is appreciated and welcomed in its usefulness in setting standards for change. The immense satisfaction gained with the development of the study now encourages me to look forward to continue involvement in standard development projects in future.

5.13 Conclusion

This chapter identified and discussed the key emergent themes from the findings of the research in light of the literature. Limitations of the research were highlighted and potential future work relevant to the study was identified and proposed. The next chapter will provide the study conclusions and a summary of the research.

Chapter 6 Summary and Conclusion

6.1 Summary

Establishing an effective and acceptable good handover practice is integral to the delivery of high-quality care. The literature review and reflection highlighted the increase in use of structured format incorporated with e-health and the need to recuperate effective communication to manage the risks to patient safety and adverse events (WHO, 2007).

The tragic maternal death of Savitha Halappanavar (Holland, 2012, Cullen, 2014) that happened in the gynaecology ward of Galway University Hospital provided an instigation and motivation to look into the communication practices in gynaecology wards.

Additionally, the National Guideline recommendations for maternity services were published during the course of the study in November 2014 based on the same case. This gave a foundational guidance to progress with the ISBAR^3 communication tool for handover in gynaecology. A patient specific ISBAR^3 analogous to gynaecological handover was developed along with the same lines in daybook to address the patient safety risks from improper communication.

Evidence has shown from numerous studies that implementations of structured format with the use of compulsive technology contemplated as a key for more effective and standardised communication (Bhabra et al, 2007, Quinn et al, 2009, Royal College of Physicians 2011, Oroviogoicoechea et al, 2013). The research sought to address this issue. The aim of this study was therefore to analyse the nursing shift handover, where the handover previously carried out by verbal communication with the support and assistance of notes set against a contrasting environment in working with a computerised structured format using the ISBAR^3 communication tool which improved communication.

The **Research Question** asked:

1. What are the good practices of communication in the current handover practice, and what are the potential barriers that cause a gap in the information during handover in the inpatient gynaecological care setting.

2. Whether using a computerised structured format with patient information printed out for nursing shift handover could improve communication and patient safety?

To summarise,

- A gynaecology specific ISBAR^3 handover audit tool was refined and developed where initial observations were performed.

- The identified good practices, gaps and barriers were incorporated with the national guidelines for the development of a gynaecology specific ISBAR^3 handover template.

- The staff feedback was procured and gathered to assess their perception, which showed the template was indeed appropriate and fit for purpose.

- The feedback highlighted the strengths and weakness, which promptly instituted appropriate changes fabricated and shaped accordingly.

- The final template was implemented, to be used in handover in the form a computer printout, where personnel would be able to input information on the computer about any new patients and update their existing patient details towards the end of the shift (A stylised sample handover sheet is given in Appendix J).

- Training was provided to all personnel and the daybook (Appendix B) was changed.

- Staff were provided with substantial time to get acclimatised to the changes and the technology innovations.

- The post-implementation observations demonstrated that the computerised ISBAR^3 handover tool improved communication. The technological innovation aided in legibility and consistency in the information conveyed (A stylised sample handover is given in Appendix K).

- The 'Safety Pause' introduced as part of the 'Recommendations' in the ISBAR^3 enlightened the staff to be vigilant with anticipated risks.

- Also the structured format reduced the time taken for handover by 4 minutes in a handover, which was an added advantage. As every minute is valuable for patient care, 4 minutes for 5 staff in each shift amounts to 20 minutes in total in a shift or 40 minutes/day, which is equivalent to 20 hours /month and 240 hours/year of nursing time.

- The developed audit and handover tool can be recommended for it to be used in other departments and hospitals, as well as serve a fundamental base for future studies.

6.2 Conclusion

Clear, concise, timely and efficient handover is important to improve communication and patient safety (WHO, 2007). The National Clinical Effectiveness Committee launched clinical guidelines for communication (Clinical Handover) in Maternity services in November 2014. But an interstice was identified in the gynaecological area. In order to improve communication and patient safety, an ISBAR^3 structured format was required in the gynaecological area. This was identified through an observation of the existing practice of nursing shift handover. The study analysed the good practices and a fair share of gaps and barriers in nursing shift handover within a gynaecological setting. They were then incorporated along the lines of National Guidelines, which contributed to the development and implementation of technology assisted

gynaecology specific ISBAR^3 handover template. This is indeed fit for purpose and can be extensively used in any hospital department setting.

The most successful part of the concept is the introduction and successful implementation of the structured format in a gynaecological setting. This improves communication, which encourages the hospital management to roll out the newly created structured format based on the ISBAR^3 handover tool with e-technology contribution to all the other nursing and midwifery areas in the hospital.

The introduction of a 'Safety Pause' as part of the element '*Recommendation*' heightened the safety cognizance, and helped to anticipate and be proactive for the challenges ahead from the beginning of a shift.

The gynaecology specific audit tool with ISBAR^3 was developed as part of this study, as the literature review identified it is the first of its kind in Ireland, indeed in Europe where there was none already published in existence. It is possible for the healthcare organisations to assess review and improve communication in handover by adopting these audit tools for future studies and audits in their areas. Future masters studies possibly could be carried out with practice development in other areas and transpirational direction in the information exchange across departments and organisational boundaries.

The **Key benefits** of the study were:

1. The pre-implementation observations pointed out or displayed the areas of improvement in relation to communication in handover.

2. By addressing these areas for improvement through the computerised ISBAR^3 handover tool, shaped the nursing handover with a structure and order, which enhanced communication and importantly reduced the time taken for handover.

3. Reduction in time by 4 minutes/handover could be utilised differently for patient care. 4 minutes for 5 staff in each shift amounts to 20 minutes in total

in a shift or 40 minutes/day, which is equivalent to 20 hours /month and 240 hours/year of nursing time.

4. Another additional advantage gained was the reduction in the number of phone calls stating, “I forgot to mention…” from the staff reporting from their residence forgetting to record and convey the relevant observation while at work. Staff has remarked that ‘forgot to mention’ phone calls has reduced. This in fact shows that the structured format was able to exchange almost all complete and relevant information promptly, which even reduced the stress level of the staff of being fearful, “Did I forget anything?”

Even though it was out of scope of this study initially, the main response from the participants after successful implementation of the new handover practice was of immense satisfaction when words of appreciation echo that you have done a good job, and staff convey that this work is acknowledged as it helps them reach their goals and target without having to look back to the old traditional handover with note taking.

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Appendices

Appendix A: ISBAR^3 Audit Tool

Data Elements And Data Subsets	Mentioned	Not mentioned
IDENTIFY • Name		
• Age		
• Category		
• Date of admission		
• Day		
• Doctor		
• Elective or Emergency		
• Time of admission		
• Para		
SITUATION • Reason for admission		

• Current issues		
• Diagnosis		
• Mode of delivery, date, time		
• Operation		
BACKGROUND • Relevant Medical history		
• Relevant Surgical history		
• Allergies		
• Medications		
• Relevant Social issues		
ASSESSMENT • Lab Results		
• Vitals		
• I.V		
• IDC, Drain		

• Anesthesia		
• EBL		
• Void/BO		
• Diet		
• Mobility		
• Pain		
• Wound (pack, PV loss)		
• Anxiety		
• Medication		
• Baby		
• Skin		
• Rh, Rubella		
• Feed		
RECOMMENDATIONS		

• Plan for today		
• Referrals		
• Investigations		
• Responsibility		
• Risks		

Other Relevant Factors	**Yes**	**No**
Did handover start in time?		
Detection of incorrect care due to miscommunication		
Patient harm		
Interruptions/ Distractions		
Noise levels		
Language proficiency/audible		
Accuracy in the scope of information that was handed over		

Missing demographic data (consultant info, time of admission)		
Clinically important issues that were not handed over		
Omission of critical data		
Near miss events and adverse events		
Quality of information transferred (clarity, brevity, and thoroughness)		
Other topics discussed at handover		
The level of interaction between staff members		
Unnecessary explanations and deviations		

Time taken for handover	
No. of patients handed over	
Dates of handover and shift (am/pm)	

Appendix B: Daybook in ISBAR^3 Format Page 1 (Left Side of Note book)

SAFETY PAUSE @ AM :							**PM :**	
							IDENTIFY	
O Emergency Equipment	**EA**	**TIME IN**	**DOA**	**CAT**	**DAY**	**DOCTOR**	**NAMES**	**AGE**
○ DDA's:							R53	
CMM2:								
							R1	
CMM1:							R2	
							R3	
ROOMS:							R4	
							R5	

ROOM 6:							**ROOM 6**		
							1		
							2		
ROOM 7:							3		
							4		
							5		
HCA:							6		
							ROOM 7		
RELIEF:							1		
							2		
							3		
							4		
PRE–OP ADM:							5		

							6		
							7		

Daybook in ISBAR^3 format page 2 (Right side of note book)

SITUATION	BACKGROUND			ASSESSMENT & RECOMMENDATIONS		
PROCEDURE	ALLERGY	MEDS.	HISTORY	HB	RH	

Appendix C: Questionnaire

QUESTIONNAIRE

Analysis of Nursing Shift Handover Practice and the Development of A Structured Format for Handover to Improve Communication and Safety.

Each question is optional. Feel free to omit a response to any question; however the researcher would be grateful if all questions are responded to. Please do not name third parties in any open text field of the questionnaire. Any such replies will be anonymised. In the extremely unlikely event that illicit activity is reported I will be obliged to report it to appropriate authorities.

1. Have all the appropriate data elements been included in the structured format?

   Yes □

   No □

2. Would you suggest any additional data elements to be included in the structured format?

   Yes □ if yes, please list out the elements.

   No □

3. Would you like to exclude any of the data elements listed?

   Yes □ if yes, please comment

   No □

4. Does the data items in the structured format clearly explain the proposed use of each of the data items?

   Yes □

   No □ if no, please suggest improvement.

5. How satisfied are you with the printed structured format on a scale of 1-5?

Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied
(1)	**(2)**	**(3)**	**(4)**	**(5)**
☐	☐	☐	☐	☐

6. How happy are you with the current location of handover on a scale of 1-5?

Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied
(1)	**(2)**	**(3)**	**(4)**	**(5)**
☐	☐	☐	☐	☐

7. When did you learn to do handover?
   a) As a student
   b) As a staff
   c) Both
   d) Other

8. How do you think handover should be taught?

   Ans:

9. How satisfied are you with the time allocated for handover in a scale of 1-5?

Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied
(1)	**(2)**	**(3)**	**(4)**	**(5)**
☐	☐	☐	☐	☐

Appendix D: ISBAR[3] Handover Template

Date: **Bed. No.**	**Identify**	**Situation**	**Background**	**Assessment**	**Recommendations**
	Name, Age, Para, Admission (Elective /Emergency)Time in, Category, Dr, Day	Reason for admission, Current issues, Diagnosis if known, Mode of delivery (date, time), Operation	**Relevant** history, Allergies, Own Medications Social issues (E.g. smoker, alcohol, IVDA etc.)	**Relevant** Lab results (Hb, rhesus, rubella). Vitals & O2. Lines-I.V/ IDC, Drain (amount, color). G.A/Spinal. E.B.L/ Void/B.O/ Diet. Pain- analgesia, PCA. Wound-pack, P.V. loss. Current Medication. Baby.	Nursing care pathway (e.g. removal of IDC, pack, drain; FBC, bloods etc.), Referrals/Pending tests/Investigations, Discharge plans. Tasks to be completed. **Responsibility**- Assign tasks. **Risks**- Safety Pause
53					
1					
2					
3					
4					
5					

6.1					
6.2					
6.3					
6.4					
6.5					
6.6					
7.1					
7.2					
7.3					
7.4					
7.5					
7.6					

Appendix E: Research Ethics Committee of the School of Computer Science and Statistics (SCSS) Trinity College Dublin

From: Sara Gutierrez Llaneza > Hide

To: Molly Vinu TCD >

Cc: research-ethics@scss.tcd.ie >

FW: Application form for ethical committee approval

18 February 2015 09:07

Dear Molly,

Thank you for your application. It has been reviewed and approved by the Research Ethics Committee. You may proceed with this study.
We wish you success in your research.

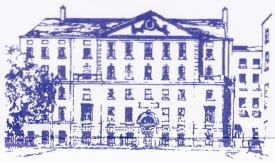
Kind regards,
Sara

Appendix F: Clinical Research Ethics Committee, National Maternity Hospital

An tOspidéal Náisiúnta Máithreachais
The National Maternity Hospital
Founded in 1894

Sráid Holles, Baile Átha Cliath 2 • Holles Street, Dublin 2.
Telephone: (01) 6373100. Fax: 6766623. Web: www.nmh.ie

Máistir/ Master: Dr. Rhona Mahony



9th February 2015

Ms. Molly Vinu
14, Latchford Square
Castaheany,
Dublin 15

Re: Analysis of nursing shift handover practice and the development of a structured format for handover to improve communication and safety

Dear Molly

The above project has been approved by the Ethics Committee.

Kind Regards

Yours sincerely

Dr. John Murphy
Consultant Paediatrician
Chairman
Ethics Committee

Appendix G : Participant Information Leaflet

PARTICIPANT INFORMATION SHEET

You are invited to participate in a Research Project that is explained below. Thank you for taking the time to read this Information Statement. It is 2 pages long. Please make sure you have all the pages.

Title of the Research Project

Analysis Of Nursing Shift Handover Practice And The Development Of A Structured Format For Handover To Improve Communication And Safety.

Introduction

Clinical handover is fundamental to patient care. Effective communication lies at the very heart of good patient care. Effective handover is pivotal to the safety of patients. 'Any errors or omissions made during the handover process may have dangerous consequences' (Pothier et al, 2005). The communication and handover practice in the gynaecology ward of Galway University Hospital was a major topic of discussion in October 2012 relating to the tragic maternal death of Mrs Savitha Halappanavar. This gave me a motivation to examine the shift handover in the gynaecology ward in the maternity hospital, with the aim of analysing if these practices can be improved using a structured format for handover with ISBAR^3.

Who is conducting this study?

The researcher is a staff nurse continuing further education as second year M.Sc. Health Informatics in Trinity College, Dublin.

Who is organising and funding this study?

A second year M.Sc. Health Informatics student in TCD is carrying out this research. This research is not being funded by any third party and will not yield any financial gain for the researcher.

Why this study is important?

This study is examining the handover practices in the gynaecology ward, with the aim of establishing practices that could be improved and thereby improve communication processes among nurses during handover between shifts. This study will also identify and recommend a structured format for use in the gynaecology ward from the results of observation, literature review and using the National Clinical Guidelines for communication (clinical handover) in Maternity Hospital Services in Ireland [ISBAR^3].

How can I contribute?

As part of the study, the researcher is conducting a series of non-participant observations of clinical shift handover in the gynaecology ward. The purpose is to explore the everyday experiences and practices of communication during the shift handover and identify any potential barriers that cause a gap in the information during handover. The researcher is also conducting a survey to collect the feedback from the staff about the recommended structured format. You are invited to and can contribute by agreeing to take part in the non-participant observation and survey.

What do I have to do?

You will be invited to participate in the data collection for the study, in the non-participant observation and survey. If you are willing to take part in the study, you will be asked to sign a consent form prior participation. You will not be required to provide any personal data and all survey will be anonymous.

Who will be conducting the data collection?

The Health Informatics student who is a staff nurse under the supervision of Dr Bridget Kane will do the data collection.

What are the possible risks taking part in this research study?

There are no foreseeable risks to you in taking part in this study.

What are the benefits in taking part in this study?

While there are no immediate benefits to you, your participation will provide important and vital information on the shift handover process in the gynaecology ward in maternity services. Other benefits are:

- To identify any potential barriers that causes a gap in the information during handover.
- The format helps the staff in sharing concise and focused information in a structured manner and allows staff to communicate assertively and effectively, reducing the need for repetition.
- Structured formats have a great potential in improving the quantity and quality of information transmitted at changes of shifts and reducing the communication errors.
- A clear expectation of what is to be dealt with during handover and the manner of conveying that information can help to produce effective transfer of knowledge and reduce communication errors, which stands between saving a life or unnecessary implication later on.

These are the benefits in bringing up a recommendation for a new structured form of handover from the results of observation, literature review and using the National Clinical Guidelines for communication (clinical handover) in Maternity Hospital Services in Ireland [ISBAR^3].

What will happen after the data collection is completed?

The researcher will analyse the data in order to provide a descriptive understanding of the data.

How will be the information stored and used?

The information will be stored in digital form in a password-protected computer and as written transcripts in a locked filing cabinet in the National Maternity Hospital.

How will the information be used?

Once analysed, the information from the aggregated study results will be used in preparing a final thesis and will be submitted to a university (Trinity College Dublin). A poster presentation will be prepared to disseminate the findings from this study.

Has the study been approved by an ethical Committee?

The Ethical committee of National Maternity Hospital, Holles Street, Dublin, Ireland, has approved the study.

Where can I get further information about the study?

For further information, please contact:

Molly Vinu: email: vinum@tcd.ie

Appendix H: Consent Form

Consent Form

Analysis Of Nursing Shift Handover Practice and the Development of A Structured Format for Handover to Improve Communication and Patient Safety.

I hereby consent to participate in a non-participant observation and survey for the study “Analysis Of Nursing Shift Handover Practice And The Development Of A Structured Format For Handover To Improve Communication And Safety”. I have read the accompanying information sheet and understand the purpose of non-participant observation and survey.

Conditions of participation:

My participation is entirely voluntary. I am free to withdraw my consent without prejudice and discontinue my participation at any time, either prior to or during the non-participant observation and survey.

As a part of this research project, a survey will be collected and my name will not be identified in any use of these records.

The information that I provide will be stored securely in the manner indicated in the information sheet and will be used solely for the purpose stated.

Name (Block Capitals) ----------

Signature ----------

Date--/--/----

Appendix I: Participant Invitation Letter

Invitation Letter To Participant

Date:

Title of the study: ***Analysis Of Nursing Shift Handover Practice And The Development Of A Structured Format For Handover To Improve Communication And Safety.***

Principal Investigator: Molly Vinu

Faculty Supervisor: Dr. Bridget Kane

I, Molly Vinu, 2nd year student of M.Sc. Health Informatics, Department of Computer Science, Trinity College Dublin, invite you to participate in a research project entitled Analysis Of Nursing Shift Handover Practice And The Development Of A Structured Format For Handover To Improve Communication And Safety.

The purpose of this research project is to

- Observe the current practice of nursing shift handover in the inpatient gynaecological care setting.
- Identify problems associated with communication and potential barriers that cause a gap in the information during handover.
- Develop a structured format for handover from the results of observation, literature review and using the recommendations of National Clinical Guidelines for communication (clinical handover) in Maternity Hospital Services in Ireland [ISBAR^3].

Should you choose to participate, you will be as part of the observation during handover and will be asked to complete a questionnaire. The expected duration is about half an hour.

This research should benefit by:

The structured format developed as a result of this study would give a clear expectation of what is to be dealt with during handover. The manner of conveying that information can help to produce effective transfer of knowledge and reduces communication errors, which stands between saving a life or unnecessary implication later on. This study would benefit the hospital staff by providing a much-needed framework with which nurses can report to each other and pass on relevant information. This would also benefit the staff in sharing concise and focused information in a structured manner and allows staff to communicate assertively and effectively, reducing the need for repetition.

If you have any questions, please feel free to contact me.

Thank you,

Molly Vinu

2nd year student of M.Sc. Health Informatics,

Department of Computer Science,

Trinity College, Dublin.

Email: vinum@tcd.ie

This study has been reviewed and received ethics clearance through National Maternity Hospital Ethics Board.

Appendix J: Stylized Sample Handover Sheet

Date: **Bed. No.**	**Identify**	**Situation**	**Background**	**Assessment**	**Recommendations**
	Name, Age, Para, Admission (Elective /Emergency)Time in, Category, Dr, Day	Reason for admission, Current issues, Diagnosis if known, Mode of delivery (date, time), Operation	**Relevant** history, Allergies, Own Medications Social issues (E.g. smoker, alcohol, IVDA etc.)	**Relevant** Lab results (Hb, rhesus, rubella). Vitals & O2. Lines- I.V/ IDC, Drain (amount, color). G.A/Spinal. E.B.L/ Void/B.O/ Diet. Pain- analgesia, PCA. Wound-pack, P.V. loss. Current Medication. Baby.	Nursing care pathway (e.g. removal of IDC, pack, drain; FBC, bloods etc.), Referrals/Pending tests/Investigations, Discharge plans. Tasks to be completed. **Responsibility**- Assign tasks. **Risks**- Safety Pause.
1	**Mrs X** 55Yrs, $P^{3,}$ Elective Admission DOA: 28.04.15 @ 14:00 OPD Dr. Y **Day 1**	TAH BSO for Menorrhagia.	NKDA H/O: Hypertension, Hypothyroid. On medication: Diovan 10mg OD Eltroxin 100mg OD No Social Issues	Hb-12.7 Anaesthesia- GA, throat pain, Vitals- Normal, IV fluid-NACL 80 ml/hr, I.V cannula-1, Sips of water, IDC-clear urine, good amount, BNO, EBL-500 mls, On PCA, Analgesics, Clexane, Wound- Dry	For FBC mane, Removal of IDC, PCA and IV cannula mane, Commence light diet, For Physio, Appointment-GOPD 6 weeks TBA **Responsibility:** Staff Z to mind Mrs X today **Risks (Safety Pause)** 2 patients with the Surname name X

Appendix K: Stylised Sample Handover

Good Morning Friends.

Identification: Room 1: Mrs X, 55 year old, Para 3, Elective admission on 28th @ 2pm. She is OPD of Dr.Y.

Situation: Mrs X is day 1 today post TAH BSO for Menorrhagia.

Background: No known drug allergy reported. She has a history of Hypertension and Hypothyroidism and she is on Diovan 10 mg OD and Eltroxin 100 mcg OD for that. No social issues reported.

Assessment: Her pre-op Hb is 12.7. She had a general anaesthetic and so has reported a throat pain from the tubes. Vitals are within normal range, on sips of water and I.V fluids Normal Saline 80 mls/hr on flow through IV cannula on right dorsal hand. IDC in situ, draining clear and good amount of urine. Bowels not opened. EBL was 500 mls. She is on PCA, analgesics and Clexane. Wound is clean and dry. No ooze noted.

Recommendations:

- For post-op FBC mane.
- For removal of IDC mane.
- To stop PCA.
- To commence light diet, stop IV fluid and remove IV cannula.
- For physiotherapy review.
- GOPD appointment to be arranged for 6 weeks.

Responsibility: Staff Z, do you mind to go into Mrs X today?

Risks (Safety Pause): Finally, friends please be careful, as we have 2 patients today with the same surname X. So don't forget to check date of birth and armband for every procedure.