



Faculty of Medicine

Department of Clinical Nursing

**Post-operative Observations; Ritualised or Vital in the
Detection of Post-operative Complications**

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requirement for the degree of Doctor of Philosophy**

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Statement of Originality

This work contains no material that has been accepted for the award of any other degree or diploma in any other university or other tertiary institution. To the best of my knowledge and belief, it contains no material previously published or written by another person, except where due reference has been made in the text.

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Abstract

The nursing practice of monitoring patients in the post-operative (PO) phase upon returning to the general ward setting has traditionally consisted of the systematic collection of vital signs and observation of other aspects of the patient's recovery. For the most part the primary focus of this monitoring has been the detection of post-operative complications. There is a need for more substantive evidence to support an appropriate frequency of post-operative observation. The aim of this research was to identify if the current practice of PO vital sign collection detects PO complications in the first 24 hours after the patient has returned to the general ward setting.

Due to the complex world in which nurses practice the research was undertaken using a combination of methods within a triangulated approach to collect data. A survey of 75 hospitals providing a surgical service enabled a description of the current models of PO monitoring as found in policy documents to be made. The majority of hospitals (91%) described a variety of regulated regimens for the collection of PO observations, with the most common for vital sign collection (27%) as hourly for the first four hours and then four hourly. An observation of 282 patient hours in two surgical wards identified the current practice of PO monitoring involved nurses collecting vital signs hourly for the first four hours, three hourly for the next eight hours and then every four hours. This was despite the existence of different models being described in the policies. The records of 144 patients were audited to identify what, if any, nursing interventions detected changes in a patient's recovery and to determine whether a relationship existed between vital sign collection and the detection of complications. It was found that the complications that occurred were minor in nature, occurred infrequently, and did not have a relationship with changes in vital signs.

This research found that there was no relationship between the frequency of the collection of vital signs and the occurrence or detection of complications. PO observations were collected by nurses based on traditional patterns, were collected routinely, were ritualised and were not determined by individual clinician expertise or the needs of the individual patient. Recommendations are made regarding the need for a systematic program of research and alternative models of patient observation that focus on patient need rather than organisational need and that provide more efficient and effective practice in monitoring PO patient progress.

Publications arising from the material presented in this thesis.

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Chapter 1

Introduction

“Good practice is dependant upon sound theoretical knowledge and in no profession is this more self-evident than in that of nursing, that most practical of all callings.” (Rose 1960:2)

Nursing is considered to be a dynamic, practice-focussed profession; a central figure in a rapidly changing health care system. The provision of nursing care revolves around the assessment, treatment, and co-ordination of patient care. Timely and comprehensive patient assessment provides the foundation to determining the plan of care. This assessment involves a combination of subjective and objective observations and measurements to identify the physiological, psychological, social and spiritual needs of patients. One component of physiological measurement is the collection of a patient’s vital signs. This collection of vital signs is an aspect of patient assessment (Walsh and Ford 1991; Hwu, Coates and Lin 2000) used frequently by clinicians in their every day practice in a variety of different clinical settings (Hirsch 1990). In particular the use of vital signs as an integral component of patient assessment (Scharff 1991) is evident in the early phases of patients’ post-operative recovery.

This chapter provides an overview of research undertaken that investigated the collection of post-operative vital signs in the initial 24 hours after a patient returned to the general ward from surgery. Aspects discussed

include the current issues relating to the nursing practice of vital sign collection, the limited support that evidence offers practitioners, the purpose of the research and an overview of the research design. This chapter ends with a synopsis of the chapters presented in this thesis.

The Research Problem

Initial exploration around the topic of the measurement of vital sign collection uncovered a cluster of issues that surround the practice. What was apparent was a strong association between the collection of vital signs and other aspects of patient monitoring usually, included in the broader use of the term 'observations'. This changed the researcher's focus from vital sign collection in isolation to an investigation focusing on nursing observations inclusive of vital signs. Whilst more detail relating to the definitions of the terms surveillance, monitoring, vital signs and observations are presented in the glossary, for the purpose of this thesis vital signs refers to the measurement of a patient's temperature, pulse, respiration and blood pressure (Evans, Hodgkinson and Berry 1999a:15; Hwu et al. 2000) and observation refers to the collection of vital signs and the assessment of other aspects of care, for example, presence of pain, wounds, drains and intravenous therapy (Evans et al. 1999a:2; Botti, Williamson and Steen 2001).

The conundrum facing the researcher was, why on one hand, are nurses recording so many post-operative observations and on the other questioning the relevance of the practice. The literature is not particularly helpful as it

presents mostly discussions relating to the nursing time involved in intensive post-operative monitoring in the general ward setting (Davis and Nomura 1990; Schumacher 1995; Beyea 2000; Simon and Clark 2002). Whilst there is a belief that observation collection has an important role in the detection of post-operative complications, clinicians and editorials (Hanney 1992; Allen, Byrne, King, Steelman, Weemering and Beyea 2002) have questioned the intensity of vital sign collection. However there is little research evidence to assist clinicians in determining the best practice in relation to vital sign collection.

A comprehensive review of the literature, on the practice and use of vital signs in the post-operative setting, revealed diverse projects, with studies focussing on the occurrence of post-operative complications and compliance with observation recording. The specific nature of the research projects that have been undertaken appear to have resulted only in local changes to practice (Davis and Nomura 1990; Schumacher 1995; Long, Dahl, Hogan Miller and Cassibo 1998).

The literature does highlight five broad issues and these are the following:

- The most effective and efficient way of monitoring patients post-operatively is not recorded in the literature;
- There is a need for more evidence to support an appropriate frequency of post-operative vital signs including looking at larger populations and patients undergoing major surgical procedures;

- There is a need to identify the relationship between when complications / adverse events occur, and how they are detected in the post-operative phase;
- Describing what constitutes the current practice in relation to post-operative observations and how vital signs are utilised in current practice;
- Changing nursing practice that is currently based on tradition, to practice based on evidence and individual patient need.

Whilst the focus of the literature is on the physiological impact of vital sign collection in relation to frequency, complications and patient outcomes, wider reading and discussions revealed that the practice of collecting vital signs could not be separated from the context in which nurses practice. Vital sign collection as a mechanism for monitoring patient progress and detecting potential complications is a nursing practice that appears to be grounded in tradition and routines rather than based on patient outcomes or scientific sources of evidence. The collection of post-operative observations is directed by policies and procedures rather than nurses making clinical decisions based on experience and patient need. It appears that previous research is propelling nursing practice towards a gold standard of practice, a one size fits all approach “Ritualistic practice appears to have taken over from thinking rational care” (Walsh and Ford 1991:51). The collection of post-operative vital signs is based on tradition and experience underpinned by

prescriptive policies that have little or no relationship to the occurrence of post-operative complications.

There is a serious gap in research evidence about the optimal frequency of monitoring patients post-operatively, more importantly their role in the detection of post-operative complications. There is a need for rigorous research into determining the appropriate frequency of vital sign collection for patients post-operatively to provide an evidence-base for practice. What remains unclear is the relationship between vital signs, as a component of patient observation, and patient outcomes. Current research findings do not provide results that have general applicability to the variety of unique settings in which nurses practice.

This research examines the role of vital sign collection in the monitoring of patient progress with a view to illuminating the best practice for post-operative surveillance that meets the needs of the organisation, the clinicians and most importantly leads to improvements in patient outcomes.

Aim of the Research

The aim of this research was to identify if the current practice of post-operative vital sign collection detects post-operative complications in the first 24 hours after the patient has returned to the general ward setting.

To determine this it was important to

- Establish what the policies were in relation to post-operative vital sign monitoring,
- identify who formulates policy in relation to vital signs monitoring,
- describe the current practice of post-operative observation,
- ascertain whether nurses follow policy,
- and discover if vital signs collection has any impact on the detection of adverse events.

This was achieved by describing the current models and frequencies of post-operative observations, as presented in practice and in hospital policy; how policies are determined; the identification of nursing interventions that detect changes in a patient's condition; and to determine if a relationship exists between vital sign collection and the detection of post-operative complications. The findings are then situated in the contemporary issues that envelop nursing practice.

Research Design

It became clear that a singular linear study would not adequately examine even one of the multiple issues being considered because there were various issues relating to the practice of vital sign and observation collection. It was determined that the use of a triangulated approach to explore the complexities of practice in post-operative patient monitoring using a variety of research methods would facilitate meeting the aim of the research.

A series of phases were undertaken. One aspect of the research examined current policies in relation to patient post-operative observations in a variety of surgical units via a survey. This was followed by non-participant observation of nursing practice to describe the current practice of post-operative monitoring, with a view to identifying what is written regarding practice and what nurses are doing in the clinical setting in relation to patient post-operative observations. A review of medical records was undertaken to establish the frequency of post-operative complications and any relationship recorded between nursing observations and patient complications. These results were integrated with the literature providing a comprehensive collection of information, literature and discussion on the issues surrounding post-operative observations and nursing practice in the 21st Century.

Thesis Overview

The research is presented in the chapters of this thesis as summarised in the following overview.

Chapter Two: provides the background to the research with an overview of the history of the integration of vital signs into clinical practice, the context in which post-operative vital signs are collected in current clinical settings, and the theory / practice gap that exists between the literature and the real world of practice. This includes a discussion on the nature of vital sign collection as a traditional practice lacking substantive evidence to support the practice as evidenced in journal literature and the textbooks that support practice.

Chapter Three: The research design is presented with an overview of the research structure and the research process. The research was undertaken in three phases, using survey, observation and audit techniques for data collection. This chapter includes details about the different methods used and the important role triangulation played in drawing the various components of the research together. Highlighted are the overall ethical aspects considered and the limitations that arose from the mixed method research approach chosen.

Chapter Four: The method, results, preliminary discussions and specific limitations relating to a survey of hospital policies that describe / support the practice of post-operative vital sign collection is presented. The purpose of the survey was to describe the practice of post-operative monitoring as written in policy documents and the processes by which the policies were developed and ratified.

Chapter Five: presents the method, results, preliminary discussions and specific limitations resulting from an observation of nursing practice. Non-participant observation of the nursing practice of monitoring patients post-operatively upon their return to the general ward setting occurred at two different hospitals to describe what is the current practice of post-operative observation collection at these two participating sites.

Chapter Six: Identifying the rate of post-operative complications and any links between complications and changes in patient observations was the

purpose of the phase of research presented in this chapter. A medical record audit was undertaken on the medical records of post-surgical patients cared for on two different surgical wards. The method used, the results uncovered, a preliminary discussion and specific limitation relating to the audit are provided.

Chapter Seven: is a synthesis of the phases of the research, situated within the issues that surround contemporary nursing practice. It draws together the research findings and current literature whilst acknowledging the context of the real world of nursing practice.

Chapter Eight: commences with a summation of the research then presents the limitations of the research, the recommendations regarding future developments in relation to post-operative monitoring and other aspects of post-surgical care along with areas for future research projects.

The conclusion of the thesis includes a summation of the findings of the research, the implications for nursing practice and evaluates the success of the research in relation to the research problem and aim of the research.

Whilst the vision of this researcher was to change the practice of post-operative vital sign collection, in reality, the goal became the contribution of a different understanding based on new evidence, new knowledge of the context in which the practice occurs and the drawing together of current literature relating to the practice of vital sign collection. There is a need for more substantive evidence to support an appropriate frequency of post-

operative observation collection including investigations into the relationship between when complications occur, and what nursing practices are detecting changes in a patient's condition during the post-operative phase. This thesis addresses these issues in the context of the reality of practice and provides recommendations for the future practice post-operative monitoring.

Chapter 2

Background

“‘Doing the obs’ is one of the great time-consuming tasks of the nursing day.”
(Walsh and Ford 1991:50)

Introduction

Whilst one of the foci of the health care industry is uncovering evidence to support care delivery many aspects of nursing practice have not as yet been under close scrutiny in relation to their function, relevance and efficacy in the current health care context. One aspect is the collection of vital signs. Post-operative vital signs, as a mechanism for monitoring patient progress and detecting potential complications, are a traditional component of clinical nursing. Although it has been reported that the monitoring of vital signs is important in avoiding and limiting medical problems (Postoperative Disorder 2000), practicing nurses have questioned the value of this practice with others suggesting that routine vital sign monitoring appears to be based on tradition (determined by hospital policy or routine) rather than evidence. In many practice settings vital signs are not usually collected in isolation from observing other aspects of patient progress and hence the term ‘patient obs’ has evolved. The role of vital sign collection and the assessment of other aspects of a patient’s recovery remain unclear.

The critique of pertinent literature for this research revealed three distinct but related issues that have emerged in relation to the tradition of vital sign collection. These are:-

- Vital signs as a traditional focus versus evidence-based nursing practice.
- Vital signs as routine and ritualised nursing care versus care directed by clinical judgement.
- The relative merit of diversity of care delivery versus the need for a gold standard based on a one size fits all mentality.

These three issues provide a framework for a contemporary discussion on the relative merits of vital sign collection. This chapter explores these issues, and provides an opportunity to discuss the context of the practice of vital sign collection through a historical account of the integration of vital signs into nursing practice supported by a thorough examination of the current literary reviews available on related topics.

To assist the contextualisation of this research, it is important to understand where the practice of observation collection originated.

History of Vital Signs

Patient observation is an integral component of nursing practice, however vital signs have not always been the domain of nursing. The integration of vital signs into nursing practice has evolved over a long period. A historical

overview provides insight into the development and integration of vital signs into clinical practice

Hippocrates, considered the Father of Medicine (400BC), is credited with separating early witchcraft and medicine based on scientific methods of diagnosis and treatment. He is also credited with first mentioning the use of pulse, instituting “for the first time, a careful, systematic, and thoroughgoing examination of the patient’s condition, including the facial appearance, pulse, temperature, respiration”(The Amazing World of Medicine 1961:97). Hippocrates is quoted as saying “by all means, when taking the pulse, have your hands warm rather than cold, lest the touch of cold hands upset the warm pulse and make it impossible to determine the true condition” (Adams 1939). Hippocrates also discusses the use of respiration in the detection of pain and inflammation (Adams 1939).

It was not until some time between 1593 and 1597 that the invention of the thermometer was attributed to Galileo with the first description in print, in about 1625 by Saanctorius of Padua. The clinical application was not until the late 1850’s by Wunderlich who established a scale of temperature (Garrison 1929; Tierney, Whooley and Saint 1997).

Clinical sphygmomanometry was first described in late 19th Century (Tierney et al. 1997). Whilst blood pressure by palpation was first described by Scipione Riva-Rocci in 1896, it was not until 1905 that Korotkoff related the

sounds occurring on deflation of the cuff to systolic and diastolic pressure (O'Brien, Fitzgerald and O'Malley 1985).

The origins of vital sign measurement in the medical literature are well documented, but the transition of the skills into nursing practice is unclear. Florence Nightingale's 'Notes on Nursing' written in 1856 (Nightingale 1969) refers to thirteen areas of care, the last section is 'observation of the sick'. However there is no reference to any form of vital sign monitoring. She emphasises observation as looking and listening to the subjective and objective information the patient provides. Chronologically this is supported by the work of Strong (Strong 1935; McGann 1992) who, when describing nursing work in 1867 found that training nurses did not take temperature. Then in an autobiographical account Mary Roberts Rinehart, as a new nursing recruit in 1893, on night duty, states "at 4 o'clock temperatures were taken" (Rinehart 1931).

A review of old nursing texts uncovers some inconsistency in dates but a general trend emerges. In Toronto, Hampton (Hampton 1893) refers to temperature, pulse, and respiration (TPR) but no reference to blood pressure (BP) collection. This was also the case in 1934 in Australia (Armstrong 1934). Whilst Burbridge (Burbridge 1935) and Eliason (Eliason 1940) referred to TPR and BP, Pugh (Pugh and Pugh 1945) only discusses the use of TPR. Textbooks published in the 50's and 60's incorporate all four vital signs (Doherty 1956; Rose 1960; Smith and Lew 1968).

Verbal recollections from nurses recall a similar integration of vital signs in clinical practice. One nurse working in England, between 1937 and 1946 recalls no vital signs being collected but when war commenced nurses undertook TPR and BP (Tonkin 2001). In Australia in 1949, another nurse recalls nurses undertaking TPR and in 1957 when she moved interstate BP was incorporated to monitor midwifery patients (Rolley 2001). Another nurse remembers recording temperature and pulse in a paediatric hospital in 1954 and when entering midwifery in 1957 recording blood pressures (McDonald 2001).

It appears that the integration of vital sign collection into nursing practice occurred over a period starting from the late 1800s with temperature recording through to the middle of the 20th Century with nurses recording TPR and BP. Nursing text books reflect this change in practice (Burbridge 1935; Eliason 1940; Doherty 1956; Smith and Lew 1968). Contemporary nursing procedure textbooks continue to describe the collection of vital signs and more specifically the observations required for patients post-operatively.

Current Reviews of the Literature

Two systematic reviews and a research review provide a broad overview of the literature available on vital sign collection, peri-operative nursing care and observations for patients post-operatively.

The most detailed is provided by The Joanna Briggs Institute for Evidence Based Nursing and Midwifery (Evans et al. 1999a). The authors undertook a

systematic review of literature relating to vital signs generally. A substantial amount of the literature reviewed relates to technique and measurement rather than issues surrounding frequency. In addition to this review they have developed a Best Practice Sheet on Vital Signs.

Their findings suggest that:

- vital signs are limited in terms of detecting changes in patient physiology as evidenced in a small number of studies;
- surveys of nurses demonstrate nurses undertake vital signs as a routine procedure irrespective of patient needs;
- there is no evidence supporting an optimal frequency of patient observations.

This review rated the level of evidence on vital sign collection as level IV, expert opinion. Whilst this review uncovered research that focussed on specific components of patient observation, including accuracy of measurements, there was little evidence that focussed on "the most effective and efficient way to monitor patient progress" (Hanney 1992; Evans, Hodgkinson and Berry 2001:646).

Another review of 97 scientific studies dealing with peri-operative care (referring to the three operative phases, pre-, intra-, and post) was undertaken by Leinonen and Leino-Kilpi (1999). Focussing on adult patients it included studies over a 10-year period and ultimately the authors limited

the search to articles appearing in three journals. Articles on the post-operative phase focussed on –

- 1) recovery and adaptation,
- 2) pain,
- 3) body temperature (4 articles relating to measurement and maintenance of normo-temperature) and
- 4) nursing activities (one on wounds and three in the Intensive Care setting).

No research in this review addressed frequency of observation collection. They highlighted shortcomings in the research related to small studies, single hospitals, insufficient definitions and short follow-through times.

The second systematic review, on post-operative observation, was undertaken by the Centre for Applied Nursing Research (Centre for Applied Nursing Research 1998) with a focus on the optimal frequency of observations for patients in the post-operative period. The review included six studies divided into two groups. One group (four studies) focussed on the patients and adverse events and the second (two studies) on nurses' beliefs and rationales for vital sign collection.

In summary this systematic review stated that:

- current research tends to focus on low-risk patients undergoing minor surgical procedures;

- current practice of post-operative observations is based on tradition (hospital policy or routine) rather than evidence;
- adverse effects most often occur within 2- 2.5 hours on return to ward setting;
- all studies reviewing adverse events recommended a reduction in the frequency of observations to varying degrees;
- future research into optimal frequency of post-operative observation needs to include patients undergoing more significant procedures.

Having explored the nursing practice of observation collection from a historical perspective and the literary content as reviewed by other authors, it is appropriate that there be a focus on the contemporary nursing practice of 'obs' collection. The following review and critique of the literature is situated within a framework of three themes that highlight a disparity between the literature and current nursing practice namely;

- Vital signs as a traditional focussed practice versus evidence-based nursing practice
- Vital signs as routine and ritualised nursing care versus care directed by clinical judgement
- The relative merit of diversity of care delivery versus the need for a gold standard.

These themes originated in the current literature and whilst they are not new they represent a dichotomy of thought on contemporary nursing practice.

Vital signs as a traditional focussed practice versus evidence-based nursing practice

The evidence-based versus tradition-focussed practice debate is prevalent in modern nursing literature (Madjar 2002; Taylor 2002). There is a plethora of discussion about the role of evidence-based practice (EBP), and more specifically evidenced-based nursing (EBN) within the profession. This is portrayed in the current health care literature and in the establishment of evidenced-based organisations, conferences, journals and seminars. There has been a belief that EBP is the way of the future for nursing in improving better patient outcomes and the provision of best practice (Beyea 2000). Pressure is increasing from a legal and ethical duty of care, regulatory authorities, colleagues and the community for the provision of the best practice. This in turn has been interpreted from within the nursing profession that there is a need for EBN because the adoption of EBN will result in best practice being achieved.

However, there is a lack of clarity in relation to what EBP really means. At least 14 definitions of evidenced-based practice are described by French (2002), with authors traditionally describing EBP as the process of using the best available evidence to support clinical decision making (Beyea 2000; Higgs, Burn and Jones 2001; Allen et al. 2002) with more descriptive definitions explaining EBP as the making of clinical decisions based on available evidence, clinical expertise and patient need (Flemming and Cullum 1997; Mulhall 1998; Rycroft-Malone, Harvey, Kitson, McCormack, Seers and Tichen 2002). Ultimately, the value of EBN is to underpin the

provision of nursing care, based on research, clinical expertise and the needs of the patient, to achieve best possible care delivery, within the contextual constraints of the setting where the care is provided. The concept that evidence-based practice arises from taking into consideration available research, clinical expertise and patient needs to underpin practice decisions is central to the process.

Nursing knowledge has developed from both the practice of nursing and from the research of practice. Nurses in clinical settings “use a broad range of practice knowledge, much of which is experientially based rather than research-based” (Estabrooks 1999:279). The literature cites many examples of non-evidence-based practice and myths that surround and determine practice. This appears to be true of vital sign collection. It is “one regimen in nursing supported more by tradition rather than empirical evidence” (Schumacher 1995:142). An example in the literature is the lengthy discussions about the time a thermometer should be left in place (Walsh and Ford 1991). Closs examined the recommendations in 27 nursing textbooks and found

times ranging from 1 to 10 minutes suggested by the various authors, only one of whom based the time on research. This subjective approach to measurement of such a vital sign is a very depressing symptom of much of nursing mythology. When standard textbooks perpetrate myths, it is difficult to be too critical of staff whose care incorporates myths (Walsh and Ford 1991:52).

A study on the reliability of vital sign measurements was undertaken in an emergency department (Edmonds, Mower, Lovato and Lomeli 2002). It was found that measurement of vital signs is subject to significant inter-observer

variability and there is limited reproducibility. Edmonds et al. (2002) suggest that vital signs are limited in the information they provide regarding patient condition and that these measurements may be inconsistent with broader assessment findings.

Allen et al. (2002) discuss the frequency of post-operative vital sign collection as an aspect of practice that nurses should develop an evidence base for when identifying practice issues in the peri-operative area. They suggest questions regarding the practice that need to be answered include origins of the practice, opinion or evidence based, and the relationships between vital sign collection and complications. A post-operative regimen described by Hanney (1992) suggests that the rationale for the practice was based on clinical experience and knowledge of the potential risk of developing complications.

Perpetuating the problem of non-evidenced based clinical practice embedded in tradition is that as “problem / solution patterns present with some degree of consistency, they are increasingly viewed as ‘fact’.” (Cox Dzures 1998:53). An example of this myth-based practice is the description of post-operative observation collection patterns described in nursing textbooks.

Nursing Textbook Accounts of Practice

To gain insight into the foundations of the practice of post-operative observation, Davis and Nomura (1990) undertook a review of six major nursing textbooks to determine recommendations in relation to the

frequency of recording post-operative vital signs. They found only one text recommended a frequency for assessment of the patient post-operatively with no supporting evidence. A replication of this review 10 years later by the researcher, in 2000, uncovered four more recent editions of the same texts (Phipps, Long and Woods 1987; Luckman, Black and Matassarini-Jacobs 1993; Nettina 1996; Smeltzer and Bare 2000) and a new text by one of the groups of authors (Saxton, Pelikan and Nugent 1990). Table 2.1 provides a summary of all the textbooks described by Davis and Nomura in 1990 and the researcher (Zeitzy) in 2000 that are referred to in this discussion of textbook accounts of practice.

Of the more recent texts one provides a definitive, albeit, traditional frequency model for vital sign collection (Smeltzer and Bare 2000). Two describe 'monitoring frequently', one stating approximately every 15 minutes (Saxton et al. 1990; Nettina 1996), and the text that previously recommended a frequency for vital signs now makes no mention of frequency (Phipps et al. 1987), neither does Luckman, Black and Matassarini-Jacobs (1993). In addition a review of medical / surgical related texts, prescribed to pre-registration nurses from two South Australian Universities, found three texts, (Black and Matassarini-Jacobs 1997; Crisp and Taylor 2000; Lewis, Heitkemper and Dirksen 2000) of which Crisp and Taylor (2000) recommend vital sign monitoring hourly for four hours then four hourly, Lewis et al (2000) recommends 15 minutely to 2-4 hourly and Black and Matassarini-Jacobs (1997) has no recommended frequency.

Of the eight texts reviewed in 2000, four recommend a frequency of post-operative observation but none of the texts could support their discussions with evidence from rigorous research (Phipps et al. 1987; Luckman et al. 1993; Nettina 1996; Smeltzer and Bare 2000).

Nursing practice textbooks espouse a variety of different patterns for the collection of vital signs and frequency of observation and research that has been undertaken focuses more on the technique of measurement.

Botti, Williamson and Steen (2001:139) suggest that there “is little empirical evidence for existing regimens and wherever regimens are recommended in the literature, the suggestions appear to be based on current clinical practice”.

Authors of Texts	Title of Text	Text cited in Davis & Nomura 1990	Texts reviewed by Zeitz 2000	Recommendation
Brunner & Suddarth	Textbook Medical-Surgical Nursing	1982	2000 Smeltzer & Bare	BP&R 15 minutely for 2 hours then 30 minutely for 2 hours, T four hourly for 24 hours
Brunner & Suddarth	Lippincott Manual of Nursing Practice	1982	1996	Monitor frequently until stable
Luckman and Sorensen	Medical- Surgical Nursing A Psychophysiologic Approach	1980	1993 Luckman, Black, & Matassarini-Jacobs	No recommendation for frequency of observations
Phipps, Long, Woods	Medical Surgical Nursing Concepts and Clinical Practice	1979	1987	1979 – Recommended frequency 1987 - No recommendation for frequency of observations
Saxton, Pelikan, Nugent, Hyland	Same authors different book. 1990 excludes Hyland.	1983 Manual of Nursing Practice	1990 Mosby's Comprehensive Review of Nursing	Assess P&BP at frequent intervals approximately every 15 minutes.
Diekelmann Bennet et al	Fundamentals of Nursing	1980	No recent edition found	
Lewis, Heitkemper, Dirksen	Medical Surgical Nursing Assessment & Management of Clinical Problems		2000*	15 minutely to 2-4 hourly
Black Matassarini Jacobs	Medical-surgical nursing: clinical management for continuity of care		1997*	No recommended frequency
Crisp & Taylor	Potter and Perry's Fundamentals of Nursing		2000*	Hourly for 4 hours then four hourly

* 2001 Pre-registration recommended text

Table 2.1. Summary of textbooks

Evidence available to provide a scientific basis for the practice of observation is scant (Toms 1993). Uncovering a similar situation was Long, Dahl, Miller and Cassibo (1998) regarding the monitoring frequency of post-anesthesia care vital signs being routine or based on clinical judgement using scientific evidence. They undertook a retrospective chart audit consisting of 450 cases from four different surgical units, identifying when post-operative complications occurred in the first 24 hours after a patient returned from theatre and nurses' compliance with post-operative observation policy. They described the occurrence of post-operative complications in patients post-operatively having undergone a variety of surgical procedures. Vital sign collection compliance with policy closely mirrored complications / symptom patterns and data showed nurses took vital signs less frequently than the policy indicated. A new policy was developed reducing vital sign frequency by 56% from 18 - 8 sets. Unfortunately only an abstract has been published on this research and limited information on method, subject selection, definitions of terms and discussion of results was available from the researchers.

Other studies focussing on the use or frequency of vital sign collection in practice can be divided into two groups, the first group of studies focus on vital signs and post-operative adverse events and the second group of studies focus on nurses and their practice.

Setting a benchmark for research into the appropriate frequency of post-operative vital signs are Davis and Nomura (1990) who are referred to by most other researchers in the area. Their research questioned whether the frequency with which nurses assess patients post-operatively was appropriate to the patient's needs. They assumed that the frequencies specified in protocols governing the collection of vital signs varied "considerably from hospital to hospital apparently because they are based on tradition rather than scientific data" (Davis and Nomura 1990:28-29). The study involved a retrospective chart review of 250 adult patients in the first 24 hours after surgery. This period included time spent in recovery and on the surgical ward. They targeted patients having simple surgical procedures without a risk factor profile, investigating the occurrence of vital signs outside normal parameters and of abnormal signs and symptoms nurses might observe in the first 24 hours. The post-operative events recorded included 7 vital signs outside normal parameters and 25 abnormal signs and symptoms. In describing the occurrence of events over the 24-hour period they also found that altered vital signs accounted for 40.8% and abnormal signs and symptoms 48% of the total sample. The most common alteration in vital sign was bradycardia (n=14) and abnormal sign and symptoms were nausea and vomiting at 31% (n=78). This study recommended the reduction of the frequency of vital sign collection, in their local setting, from 11 sets to 8 sets (Davis and Nomura 1990). Whilst alterations in vital signs in recovery were not consistent once the patient arrived on the ward, application of these findings to other settings is difficult as the patients' post-operative period

included the time spent in recovery whereas the majority of other studies are ward based. Davis and Nomura's (1990) study has focussed subsequent studies to include alteration of vital signs as a post-operative 'event' rather than focus only on abnormal signs and symptoms that the patients' experience as indicators for potential problems.

Preceding Davis and Nomura was a study by Hann and Ross (1987) who also used a post-operative complication criteria that included alterations in vital signs as indicators of complications. They undertook a review of four patterns of observation and the commencement of feeding (ranging from 1 hour to 4 hours) and the timing of complications. A survey of 408 adult female patients undergoing minor gynaecological surgery was undertaken to determine an optimal pattern of post-operative observation and feeding regimen. This survey resulted in the identification of 107 patients suffering a complication with, 60% of all complications occurring within the first 2 hours after returning to the ward and being of a 'visible' nature i.e. not requiring vital sign recording for detection. Vital sign observations "revealed few post-operative sequelae" (Hann and Ross 1987:308). Nausea, vomiting, abdominal pain and headache were the only complications occurring after this time. Their definition of complication referred to only those events that required some form of intervention. It was difficult to uncover the method of data collection in that they used terms 'survey' and 'questionnaire' but it was unclear what form they took.

Evaluating the effects of reducing the frequency of post-operative vital signs on identification of complications was undertaken by Schumacher (1995). A reduction in the frequency of post-operative observations from 27 sets in 24 hours to 14 sets in their practice setting resulted from the work of Davis and Nomura (1990). Seven hundred and sixty six patients were followed during the first 4 hours after returning to the surgical unit to determine the rate and timing of complications. This resulted in the identification of post-operative complications (including alteration in vital signs from normal parameters) in 5 patients (0.65%) with all these being alterations in vital signs (hypotension occurring most frequently). It was found that most patients transferred to surgical wards were stable and “do not require vital signs monitoring as frequently as practiced in the past” (Schumacher 1995:144). Schumacher indicates that the reduction in frequency did not alter the number of nursing staff but the additional time made available “added flexibility to prioritize other necessary nursing interventions” (Schumacher 1995:144). Limitations of this research report included unclear patient selection criteria and a lack of description relating to the process of data collection.

Another unpublished report of a study identifies the fact that nursing care of the patient post-operatively “has remained largely unchanged in the light of surgical and anaesthetic advances” (Harley and Tsmassiro 1997:3). Harley and Tsmassiro (1997) undertook a pilot study into the frequency and timing of reoccurring vital signs outside normal parameters and the development of any ‘abnormal’ signs and symptoms. This was instigated due to a lack of

policy establishing a standard regimen of post-operative monitoring but an evident consistency of practice amongst nurses in one hospital. The criteria for these were again modeled on the work of Davis and Nomura (1990). A retrospective chart audit on low-risk factor profile patients undergoing a low-risk, general surgical and gynaecological procedure was undertaken. Patients who had more than one occurrence of vital signs outside normal parameters resulted in one hundred and twenty subjects being included in the study. What is not clear from this report is whether subjects also had to have more than one abnormal sign / symptom to be included. The first four hours after the patient returned to the ward were reviewed with 30.8% (n =37) of patients having altered vital signs on more than one occasion, with a high rate of bradycardia (41%) and low rate of nausea & vomiting (6%) with nausea alone at 14%. The authors suggest that if complications did not occur within the initial 2.5 hours they were unlikely to occur in the first 4 hours.

Nurses' views on post-operative observations were investigated by Botti and Hunt (1994:52) to establish if "nurses routinely carry out post-anaesthetic observations and if they believe that routine observations are part of ward procedure or hospital policy". This study arose from the authors' concern regarding the impact of routine observations on individualised patient assessment (Botti and Hunt 1994). A total of 50 structured interviews with registered nurses in general surgical settings were undertaken. All nurses "perceived that ward convention or hospital policy prescribed half hourly observations" (even though this did not exist in directives of the study

hospital) (Botti and Hunt 1994:55). Fifty percent of nurses believed observations were routine, 80% believed they were necessary for their patient, with 20% stating they were unnecessary for their patient but continued observations anyway. It was found that 88% of the sample complied with a regimen, which was not documented, even if it was not indicated for the patient (Botti and Hunt 1994:56). Nurses' compliance despite an identified need interfered with "professional judgement and autonomous nursing action" (Botti and Hunt 1994:56). The authors explain that this practice constitutes a waste of nurses time and resources and that "nurses must feel that they work within a system which clearly supports and encourages judgements about individual patient management" (Botti and Hunt 1994:57).

The issue of reliability of vital sign measurement as highlighted by Evans et al. (1999a) and Edmonds et al. (2002) has also been found in a subsequent study by Botti, Williamson and Steen (2001) studying post coronary angiography observations in a patient base of 1075. They found a lack of evidence supporting the practice of observation collection frequency. The focus was on the occurrence of femoral artery bleeding and the relationship of this with observation protocols. In total they found bleeding resulting from a direct artery puncture occurred at a rate of 5.1% and vital signs were not reliable indicators of prospective bleeding (Botti et al. 2001:144). Patients were a primary source in relation to the detection of bleeding along with frequent puncture site observation and these aspects should have priority in

patient assessment. Botti and Hunt (1994:53) suggest that “the absence of research studies which guide the frequency of post-operative vital sign assessment indicates that existing protocols are based on tradition rather than research findings.”

A lack of information to guide the frequency of vital sign collection was also found by Dempsey, Conroy-Hiller, O’Neill and McCutcheon (2002) in a study reviewing vital sign collection in a gastrointestinal investigation unit. This descriptive study was based on information recorded in patient records. The recovery protocol consisted of four sets of observation over a 60-minute period with further observations being determined by the nursing staff. It was found nurses take observations in accordance with the protocol. Of the 457 patient records reviewed 17.2% developed a complication (respiratory depression, pain, hypotension, vomiting, and bradycardia) and of these 24% required overnight admission. It was suggested that patients do not need as many observations as indicated in the protocol, as there was no association between the occurrence of complications, the timing of the observations or the alterations in vital signs.

These eight studies provide the evidence base to a practice central to clinical nursing, however the studies are limited in terms of scope and applicability. Seven studies (Kilgour and Speedie 1985; Hann and Ross 1987; Davis and Nomura 1990; Botti and Hunt 1994; Schumacher 1995; Harley and Tsmassiro 1997; Long et al. 1998) have previously been undertaken in an attempt to provide a scientific framework for a tightly held traditional practice. These

studies focussed on the occurrence of post-operative complications and compliance with observation recording. Some of these studies have used small sample sizes, (Schumacher 1995) some lacked completeness in their descriptions of methods (Hann and Ross 1987; Long et al. 1998) and sample populations (Schumacher 1995) and two studies remain unpublished. (Harley and Tsmassiro 1997; Long et al. 1998) Three studies recommended a reduction in the frequency of observation collection, and these studies have recommended varying levels of change to practice that have been adopted within their own practice setting. (Davis and Nomura 1990; Schumacher 1995; Long et al. 1998) The local nature of the change may be due to the specific nature of the research projects and the small and specific samples used.

Some of the studies are small, using fit patients undergoing minor surgical procedures with limited generalisation to other populations (Centre for Applied Nursing Research 1998; Pearson 2002).

The push for evidence-based practice should not be seen as an excuse to discount the validity of experientially acquired practice but there is scope to introduce scientific underpinnings to this practice (Higgs et al. 2001). Evidence is not the only determinant of practice, but “practice based on sound research affects outcomes positively” (Estabrooks 1999:277). Application of evidence without understanding the human element of nurse and patient interaction is not realistic (Madjar 2002). One cannot ignore that most of nursing is a dynamic process between the nurse and the nursed. In

this context freedom needs to be available for clinical decision-making (Estabrooks 1999). One acknowledges that there are many aspects of traditional practice that are appropriate however unless we have evidence that supports the continuation of such practices then the basis for the practice and potential benefits to the patient are questionable (Kitson 1997; Di Censo and Cullum 1998; Higgs et al. 2001).

Mussallem (1979:89) asking the question “Is the practice of professional nursing ritualized, routinized or research-based?” answers her own question with diplomacy by stating for most areas of nursing practice all three aspects are present. Ritualised practice is epitomized by nursing practice that is more important to the nurse or the institution outcomes rather benefiting a patient and the routine taking of temperature pulse and respirations is often cited as an example (Mussallem 1979:90).

Routine and ritualised nursing care versus care directed by clinical judgement

There are strong links between practice with a traditional base and ritualised aspects of practice. The section above has demonstrated a lack of evidence to support post-operative monitoring and as highlighted by Mussallem (1979) vital sign collection is a good example of ritualised practice. “Ritualistic practice appears to have taken over from thinking rational care” (Walsh and Ford 1991:51). More specifically that the appropriate frequency of vital sign collection to monitor patients post-operatively is based on ritual rather than evidence (Hanney 1992). Two terms often used relating to the frequency of

observations are regulated and routine. A definition of routine in relation to observations are those “that are considered necessary because of the patients’ diagnosis, treatment, or existing hospital or ward policy and applied to patients in that category irrespective of assessed need” (Burroughs and Hoffbrand 1990:371). Routine refers to the frequency of patient observations, based on patient diagnosis as determined by policy – albeit doctor specific, ward practice or hospital procedure manual. The value in these ward routines in assisting “nurses accomplish and maintain the proper order of things...The things that get included in routines are the ‘taken for granted’, almost invisible aspects of nursing work, the ‘basic patient care’” (Latimer 2000:40). Vital signs were found by Latimer (2000) to be ‘routinised’. Regulated is regarded as the recording of patient observations on a predetermined time scale i.e. hourly or four hourly, unrelated to individual patient condition, but based on diagnosis. According to Mitchell (in Kilgour and Speedie 1985:39) measurements of blood pressure pulse and respirations “frequently become routine observations made on the basis of a time schedule rather than on the basic cues from the patient.”

Ritual action implies “carrying out a task without thinking it through in a problem-solving, logical way,”(Walsh and Ford 1991:ix) which has no empirical base (Philpin 2002). Ritual action is often associated with a perception that this is the way it has always been done. The collection of vital signs uses a large resource (Toms 1993; Beyea 2000) and that nurses waste time by taking unnecessary observations (Burroughs and Hoffbrand

1990:371). It is a procedure with a long tradition for which there is often no logical basis (Mussallem 1979; Burroughs and Hoffbrand 1990). Furthermore there is an "ingrained belief of many nurses in the value of routine observations" (Burroughs and Hoffbrand 1990:371). Nurses operate in a system that values the completion of tasks to prescribed timeframes and the completion of these tasks may provide protection for nurses from being guilty about not attending to the extra components that constitute care (Binnie and Tichen 1998).

Burroughs and Hoffbrand (1990) surveyed trained nurses in one health district about their practice and attitude towards clinical observations. Achieving a 59% response rate they analysed the current practice of 80 nurses in medical and surgical settings. Results indicated that nursing observations are "made largely as a routine procedure, unrelated to the perceived need of the individual patient." (Burroughs and Hoffbrand 1990:371). They discuss the process whereby activities that are 'habit' become 'tradition' and then are looked upon as 'policy'. Issues highlighted included nurses' belief that routine observations contribute to patient care (even when observations have been stable), fear of medico legal implications, that observations recorded are accurate, the definition of normal observations and actions to be taken when there are deviations from normal.

Investigation of blood pressure frequency was undertaken by Kilgour and Speedie (1985) who articulated the issue of routine nursing care rather than clinical judgement. They asked "has the recording of blood pressure become

one of a routine' group of nursing activities, rather than an activity based on clinical judgement?" (Kilgour and Speedie 1985:39). Their research focussed on the cessation of blood pressure recordings and data were collected from a structured interview / questionnaire, supported by chart audit, of 36 patients post-operatively. The sample was fit adults undergoing elective surgery with a normal base line blood pressure, who were not on blood pressure altering medications. They suggest that the use of blood pressure monitoring is based on routine and blood pressure recording should be based on individual patient condition, rather than traditional models of practice (Kilgour and Speedie 1985).

Routines and rituals may be ingrained in the culture of nursing and help nurses get through their day but do they improve patient outcomes? It has been said, "nurses are the conductors of care. Yet they are not free to decide what care should be given, or how" (Latimer 2000:50). In addition Botti and Hunt (1994:53) suggest the use of routines "preclude the use of independent nursing judgement" and that nurses are not problem solving for individual problems. Examples cited by Walsh and Ford, (1991:55) include taking a patient's blood pressure

A moment's thought would indicate that on an average 30-bed ward, if two-thirds of the patients were on frequent blood pressure readings, some 2-3 nursing hours will be spent recording blood pressure each day. ...this excessive frequency of observation and possible waste of nursing time.

The literature is clear that the use of routines limits the potential for nursing practice, how then does this view compare to the views held by practitioners?

The Clinician's Perspective

The literature presents a variety of discussions questioning the practice of post-operative vital sign collection (Hanney 1992; Beyea 2000; Allen et al. 2002). In addition clinicians are now questioning the practice. Nursing staff responding to a survey to identify clinical practice topics that could undergo a systematic review identified, as a priority, the frequency of post-operative observations (Centre for Applied Nursing Research 1998). On a web based discussion page nurses have sought assistance to determine the best practice of post-operative monitoring (Vital Signs 2000). Anecdotally it appears that nurses feel they are undertaking too many routine regulated vital signs based on tradition rather than patient need, or, as suggested earlier, based on scientific sources of evidence. In an attempt to extrapolate from clinicians current issues relating to the collection of observation for this research, a small group of clinicians were brought together to discuss the role of post-operative vital sign monitoring. These clinicians were selected for their current clinical experience and expertise in the surgical setting. This group indicated that they were strongly in favor of regulated routine vital signs and reluctant to change current practice. What they did highlight was what they believed the purpose of vital signs to be, including

- the detection of patient complications,

- a means to make sure staff 'check' on patients
- assisting less experienced staff to comprehensively assess patients
- serving as a medico-legal safety net.
- the provision of a legitimate reason to interrupt patients

These sentiments were quite different from those articulated informally by clinicians on a day-to-day basis. It is possible that this group represented a 'management' perspective that was protective of the institution, or perhaps their ideas arose from a lack of understanding about current bedside practice, as it is possible that they may have been removed from periods of continued practice.

There is a need to find a balance between ineffective rituals and helpful routines and a need to base practice on clinical reason as well as evidence and patient preference rather than the way it has always been done.

In studying nurses' expertise in surgical and intensive care settings King and Clark describe the decision making of four levels of expertise of nursing staff. Expert nurses were nurses who were confident decision- makers, followed by proficient nurses who were able to view a situation and fine tune the information they required to make a decision, and competent nurses using routines to guide care and felt confident making decisions in situations that were familiar. Finally the authors described rituals as clearly supporting the practice of advanced beginner nurses who focus on undertaking routine tasks and have limited knowledge to detect subtle changes in patients (King,

and McLeod Clark 2002). Clinical judgement is referred to by Higgs, et al. (2001) as a process of considering the evidence relating to the clinical situation, the current clinical context and practitioners own knowledge to inform decision-making. This level of decision making would describe expert nurses using Clark's descriptors (King and McLeod Clark 2002). In the reality of practice there is limited middle ground. Rituals and routines do support less-experienced staff but the systems do not support a progression to practice based on clinical judgement as nurses become more experienced.

Various authors (Burroughs and Hoffbrand 1990; Botti and Hunt 1994) believe that the systems and policies the nurses work within are limiting the possibilities for individualised nursing care. The problem for vital sign collection is that nurses in general have lost "sight of the goal for which a routine has been established and are concerned instead with the form of the routine" (Philpin 2002:149). It has become a ritual. There is a sense that EBN promotes standard practice and nurses adopt one size fits all monitoring practices.

Diversity of care delivery versus perceived gold / single standards.

Individualised care conjures up images of differences and alternatives. When looking at evidence based practice there seems to be a goal of standardised practice. Are these two elements then producing a conflict in practice? Diversity in nursing practice is essential for quality care and evidence may not necessarily produce a gold standard. The focus for evidence should be in

providing clinicians with facts upon which to base clinical choices to assist them to provide “high quality, effective, efficient, and affordable” care (Higgs et al. 2001:483).

Nursing has been described as “precisely local and specific, not standardised, and nursing can be many things” (Latimer 2000:3). As described by McMurray (1989) the planning of nursing care should not be based on a prescriptive position but comes from the context in which the care is to be delivered. Theorists and researchers who strive to standardise nursing by continually reaching for standards, norms or “practice recipes” (Bliss 2000) seem to miss the point (Higgs et al. 2001). Nursing practice is dynamic and the essence is the interactions between people, therefore it is difficult to standardise these interactions. Clinical judgements need to be made to address patients’ unique needs, taking into account what is considered best practice in given circumstances (Higgs et al. 2001).

Differences in nursing practices worldwide have been well documented in the literature (Pearson 2002). In a column in a nursing magazine from the United Kingdom (Waters 1991) a patient association wants minimum standards set for frequency of post-operative observations. They believe no such standards are set. The Royal College of Nursing responded by stating

professional judgement must be used to make individual assessments even though staff shortages may mean that qualified nurse are unable to check patients’ recovery as often as they should...the skill was not in taking the observations but in having the expertise to interpret them (Waters 1991:4).

This does not appear to be the case in the real world of practice. Policies, rituals, and traditions prescribe practice.

There is strong opinion (Davis and Nomura 1990; Botti and Hunt 1994; Schumacher 1995) that if nurses' time is spent recording superfluous observations, they are using time that could be spent in other patient activities. When attempting to uncover evidence to support practice, what must remain paramount is that in a profession such as nursing, where patients are the focus there is no one way of going about practice. Evidence needs to provide nursing with knowledge that assists with informed decisions about appropriate care for patients on an individual basis. Whilst research provides evidence that guides practice it may not in itself always be the standard by which to practice by.

Summary

The focus of the literature is on the physiological impact of vital sign collection in relation to frequency, complications and patient outcomes. There is support for the sense that nurses believe that observation collection has an important role in the detection of post-operative complications. Wider reading and discussions have revealed that the practice of collecting vital signs could not be separated from the context in which nurses practice. Vital sign collection as a mechanism for monitoring patient progress and detecting potential complications is a nursing practice that appears to be grounded in tradition and routines rather than based on patient outcomes or scientific sources of evidence. The collection of post-operative observations is directed

by policies and procedures rather than nurses making clinical decisions based on experience and patient need. Finally previous research appears to be propelling nursing practice towards a gold standard of practice, a one size fits all approach. The collection of post-operative vital signs is based on tradition and experience underpinned by prescriptive policies that have little or no relationship to the occurrence of post-operative complications.

This exploration of the literature on the practice of vital sign has revealed that nursing is contextually complex. The collection of vital signs has slowly infiltrated nursing practice over a lengthy period to a point where it is now a central component. Whilst reviews have been undertaken on the available literature relating to vital sign collection, peri-operative nursing care and more specifically post-operative observation collection, there is still no definitive research evidence that nurses can use to underpin their practice. The literature reveals in-congruencies between what is known and what is practiced. The practice of vital signs is based on tradition rather than a sound evidence base, they are routine and ritualised. The diversity of care delivery can be limited by empirical based singular standards and has the potential to limit the possibilities of care that is directed by clinical judgement.

Conclusion

The discussion has highlighted a need for more contemporary literature that can inform practice. There is a need for rigorous research to inform nurses' practice, and more specifically, to inform the practice of post-operative observation collection. Important foci for research should be larger

populations, greater methodological integrity, less specific sample selection criteria i.e. patients with higher risk and more significant surgical procedures providing more representative samples. There is also no comprehensive collection of data, information and insight into the many facets surrounding the issues of vital sign collection as a component of post-operative patient monitoring. Limited understanding exists about why nurses continue to measure such intensive frequencies of vital signs in the initial 24 hours after a patient returns to the ward from surgery.

In addition there is a need to change the culture of nursing practice that is supportive of nursing decision-making processes based on individual patient needs rather than tradition, habit or policy.

The next chapter provides an overview of the research design utilised to explore the practice of post-operative observation collection. Research that provides more substantive evidence regarding the practice of observation collection viewed from the reality of the context of care delivery.

Chapter 3

Research Design

Introduction

Research into aspects of nursing practice based on historical and traditional influences is challenging. As such any research in this area requires a design that will meet the challenges presented. Being troubled by the notion of vital sign collection in nursing practice, and having reviewed the disparate and diverse literature available, a dynamic approach to research design was required to identify if any relationships between vital sign collection and post-operative complication detection existed.

The research involved a combination of methods underpinned by the technique of triangulation. This chapter presents the research design that guided this research including the methods and techniques used and an overview of the research design showing how the methods formed a matrix for data collection. The chapter differs from the traditional methodological section in a nursing thesis, because there is no single theoretical perspective underpinning the research.

Design Determination

The research design evolved with the discovery that there appeared to be a plethora of related issues regarding vital sign collection. These issues helped to refine and focus the research. The issues included: -

- What is the purpose of vital sign collection?
- What is the economic cost of collecting regular vital signs?
- Whose responsibility is it to determine the frequency of vital sign collection? Traditionally medical officers determined frequency but are they really interested in the results?
- Are nurses determining frequency, or are Hospital Procedures and / or Policies?
- Who is using the information generated?
- Is the information gathered linked to the rate of complications?
- What current models of vital sign collection are being utilised?
- What is the most effective and efficient way to detect and monitor patient complications?
- Are there alternative clinical models for vital sign collection?

The literature and clinicians' attitudes sent mixed and confusing signals about the perceived best practice of vital sign collection. In addition it was

acknowledged that there were multiple influences on individual practice such as education and training, cultural setting, institutional control and personal experience. To add to this was a strong association of vital sign collection with other aspects of patient monitoring usually included in the broader use of the term observations. All this supported the notion that a singular linear study would not adequately challenge / examine even one of the multiple issues being considered. These issues changed the focus of the research from vital sign collection in isolation to an investigation focusing on nursing observations inclusive of vital signs. Taking all of this into consideration, it was identified that the link that was unclear was the relationship between vital signs as a component of patient observation, and patient outcomes.

The other defining factor was that observation collection occurs in a variety of different clinical settings. Each setting has its own set of unique issues. Intensive care units could predictably provide multiple opportunities to investigate the relationship between complications and vital sign collection. Unique aspects of intensive care settings include the fact that the majority of patients are nursed individually so the intensity of vital sign collection is less evident, and that patients have a high degree of technological monitoring which presents different issues, including the value of manual versus technological recording. Considering a setting at the other end of the hospital spectrum was day-surgery units with a high turn over of patients and an assumed dependence on stable vital sign results to facilitate early discharge.

The patient population undergoing day surgery is selected due to the low risk factor profiles of the patients and the procedures they are experiencing, providing limited opportunity for investigating links between observation collection and complication detection. The one setting where observations are frequently collected, are perceived to be labour intensive and where there is a real possibility for complications to occur because of a higher risk factor profile of the patient and the procedures, is in the immediate post-operative phase, after the patient returns to the general surgical ward / unit setting from a post-anaesthetic recovery area. General surgery in the context of this research, refers to patients belonging to general surgical units (i.e. gastrointestinal units) rather than surgical patients in general.

Having identified the clinical setting to explore differing aspects of nursing observation collection, the period of time needed to be defined. Anecdotal experience and literature suggests that the most intense frequency of observation and vital sign collection occurs in the initial 24 hours after the patient returns from recovery and so this period was adopted. Other clinical aspects needed defining as well.

Consideration was given to incorporating pain as a component of this research. Whilst pain management is a large component of post-operative care, pain management was not considered a focus for data collection for this research. Firstly, due to the fact that pain and post-operative pain have been well researched over the past 20 years (Huang, Cunningham, Laurito and Chen 2001; Manias, Botti and Bucknall 2002; Twycross 2002). In addition pain

is a “complex and multidimensional phenomenon” (Manias et al. 2002; Twycross 2002:705) reflecting the unique and personal experience of pain and it was considered out of the scope of this research.

To maximise the research potential and to provide more insight into the issues identified, multiple methods of investigation were adopted (see figure 3.1). Using triangulation as the framework to draw together a variety of data from differing research techniques, together with current knowledge on post-operative observations and more specifically vital signs, this research as described below, will provide a comprehensive picture of nursing practice in relation to post-operative observations.

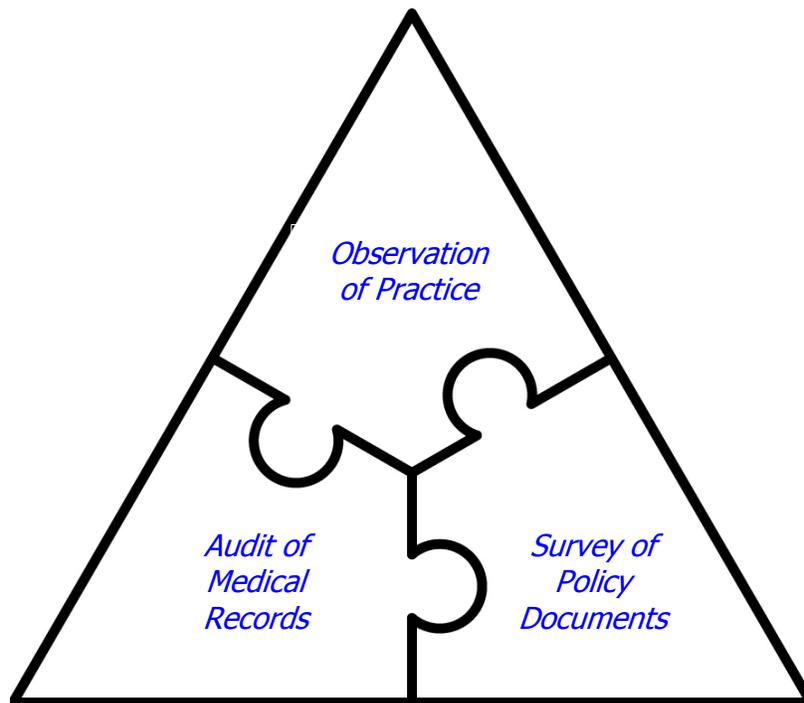


Figure 3.1. Triangulated approach to undertaking research into post-operative vital signs

Research Design

The purposes of this research was to determine what is currently happening in relation to the collection of post-operative observations, both in practice and in hospital policy, how policy is determined, to identify which nursing interventions, if any, are detecting changes in a patient's condition and to determine if the monitoring of vital signs detects post-operative complications. This resulted in a three-phase research project.

The first two phases collected data on the relationship between hospital policies and guidelines that describe and direct post-operative care in the first 24 hours on return to ward, and what is happening in practice. The data generated in the third phase focussed on rate of complications and mechanisms that detect changes in the patient's physiological status.

Phase one: The policy / procedures that drive the frequency of observation collection.

This phase was designed to determine what is current documented policy in relation to post-operative observation collection, which inform practice, in a wide variety of surgical settings. In addition to identify how the content of policy documents was determined. A review of all surgical units in South Australia (rural and metropolitan) was undertaken using a survey approach to gather information on post-anaesthetic observation policies currently in place. The focus was on what is written as hospital / unit policy in relation to post-operative observations, and who is determining the content of the

policy with a view to exploring who and what is determining the frequency of post-operative observations.

This then lead to the observation of what nurses were actually doing when undertaking post-operative observations in the initial 24 hours after patients returned to the ward.

Phase two: The current nursing practice of post-operative monitoring.

In an attempt to describe the current practice of post-operative observation a non-participant observation of patients' post-operative monitoring was undertaken in two clinical settings where different models of post-operative surveillance were used. Patients were observed during the post-operative period to identify the nursing monitoring they receive in the first 24 hours after returning to the ward from surgery.

A comparison will then be made with data from Phase 1 (what is written in policy) with data from Phase 2 (what nurses do in reality).

Phase three: The relationship between observations (including vital signs) and post-operative complications.

The central concern of this phase was to explore the rate of post-operative complications and the role patient monitoring post-operatively has in contributing to the detection of these complications.

The identification of the rate of post-operative complications is important in exploring what aspects of nursing practice detect complications. The purpose

of this stage was the identification of the rate and type of patient complications, and the relationship with post-operative observations collected, more specifically alterations in vital signs. Using information in the medical records and interviewing nurses, this stage sought to identify any relationship between changes in observations and the presence of a complication. It also attempted to identify what practices and triggers assisted the nurse in identifying that a surgical complication had developed or had a potential to develop. This process involved a review of medical records using an audit tool modeled on one previously used by Long et al. (1998). This phase focuses on the links between nurses recording a set of observations, changes in vital signs and identification of post-operative complications.

Links, if any, will be identified between the different components of patient observation and vital sign collection and their usefulness in monitoring patients, with a view to determining if the taking of vital signs detects post-operative complications. It will assist in comparing what nurses say they are doing with what they do, what is documented in notes and what is written in policy. These linkages will then be discussed in light of current evidence and the reality of practice.

The integration of different methods for the investigation of one phenomenon is known as triangulation. This technique underpins the methods used in each of the phases of this research, including theoretical

sampling, survey, observation, audit and content analysis which are discussed in detail in this chapter.

Research Technique - Triangulation

A case for multiple methods.

“The pursuit of truth is like picking raspberries. You miss a lot if you approach it from only one angle”. (Marlin 2001:76)

To add breadth and depth to the current knowledge in nursing practice relating to post-operative observations, a ‘raspberry picking’ approach is required. This research was not only about describing the practice of observation collection but also an exploration of issues, trends and relationships.

Exploration begins with a phenomena of interest; but rather than simply observing and recording the incidence of the phenomenon, exploratory research is aimed at exploring the dimensions of the phenomenon, the manner in which it is manifested, and other factors with which it is related (Polit and Hungler 1995:11).

The technique of triangulation assists in achieving this goal by providing a “multifaceted view” of practice as it is situated (Foss and Ellefsen 2002:243).

Historically, discussions regarding research that make use of multiple methods for data collection and analysis use the concept of triangulation to guide the integration of information uncovered. Debate continues regarding the difference between triangulation and mixed methods (Redfern and Norman 1994).

The sociologist Norman Denzin, an early proponent of triangulation, describes the concept of triangulation providing the framework to combine

“multiple data sources, research methods, theoretical perspectives and observers in the collection, inspection and analysis of behavior specimens” (Denzin 1989). The purpose of triangulation is to uncover differing aspects of the same phenomenon. The notion of four types of triangulation is described by Denzin (1989). They are data, investigator, theoretical and method triangulation. There are basic elements that separate each type.

- *Data triangulation* has its basis in different sources of the data not in differences in data collection. Denzin (1989) describes sub sources as time, space and person being interrelated and that data triangulation can occur on these three dimensions.
- *Investigator triangulation* incorporates the use of different researchers to collect data on the phenomenon under investigation, not just in the sense of dividing the workload but looking through different eyes and providing differing perspectives.
- *Theory triangulation* challenges the data to be synthesised from various theoretical viewpoints.
- *Method triangulation* is where different methods are employed to collect and analyse data. This can involve the same method generating different data or different methods to examine the same phenomenon.

Other authors have described an additional type of triangulation, analytical (Burns and Grove 1993; Redfern and Norman 1994; Thurmond 2001) where the difference lies in the use of multiple methods of analysing the same data

set. It can be interpreted that Denzin (1989) included data analysis as an aspect of method triangulation. He also went on to introduce interdisciplinary triangulation where differing disciplines can inform the processes of the research (Denzin and Lincoln 1994).

There is consensus in the literature with regard to triangulation being a process (Denzin 1989; Redfern and Norman 1994; Minichello, Sullivan, Greenwood and Axford 1999) and not just the result of using different methods. That for triangulation to occur “explicit links between the chosen methods” (Redfern and Norman 1994:42) need to be made. The issue of what makes triangulation different from the use of multiple methods seems to hinge on the purpose of the research. Denzin’s goal for the use of triangulation was *confirmation*, that in combining different data generation approaches the research had more rigour than where problems are tested with a single method (Redfern and Norman 1994). In other words a process “by which the same issue is investigated in a variety of ways so that different types of evidence are produced to support a particular finding” (Minichello et al. 1999:45). Redfern and Norman, (1994) put forward the notion that triangulation is more than a mixed method approach and they describe the purpose of triangulation as *completeness* with the aim that each source contributes a piece to the puzzle. They conceded this concept of adding pieces of a puzzle conflicts with the conceptualisation of triangulation evolving from it’s navigation and surveying roots where if you know two points then these “can be to plot the location of the third” (Redfern and

Norman 1994:41). It seems that the differentiation of mixed method research and triangulation is based on the depth of integration that is achieved by the researcher.

Some authors (Begley in Polit and Hungler 1995; Roberts and Taylor 1998)) interpret triangulation of methods only occurring when the methods come from differing research approaches (methodological triangulation) hence supporting the integration of qualitative and quantitative approaches. Others (Burns and Grove 1993) support the process described by Denzin (1989) (method triangulation) that does not specify that methods must come from different research traditions. It is noted that Denzin (1989) does describe examples from different approaches.

This last point is important when looking at the advantages of triangulation. The primary benefit of triangulation is that it has the potential to reduce bias that can plague traditional, single and narrow data collection methods. It has the potential to offset the limitations of one method with the advantages of another method. Other advantages listed by Redfern and Norman (1994) include increasing confidence in results, assisting with the validation of tools and process and providing a more complete understanding of the phenomenon under investigation. Triangulation is important for issues that are complex, facilitating a rich explanation using data generated from different sources and collected via different methods. It must be emphasised that triangulation does not guarantee “internal and external validity”, and can have the potential to exacerbate the sources of errors that are common in

singular forms of research, including wrong selection of methods or use with the wrong question (Redfern and Norman 1994:51). Triangulation cannot counteract researcher bias, can be expensive and does not always allow for easy replication.

In relation to this research, the purpose was to uncover aspects of nursing practice not previously investigated. The complex reality of practice requires multiple methods to explore and capture the 'real world' (Foss and Ellefsen 2002). Triangulation provides an umbrella for the processes of data collection via different methods, albeit from one research approach, and analysis to provide multiple layers of information adding more information about the research area (Foss and Ellefsen 2002). "In the evaluation of health and social care services documentary sources,... are likely to be used in conjunction with other sources of information rather than as a single source" (Phillips, Palfrey and Thomas 1994:46). The integration of the data generated leads to the new knowledge and insight providing a more complete picture of patient observation in the post-operative setting.

Research undertaken using the technique of triangulation requires vision and risk taking in relation to design. At different points during the research greater clarity can result and leads to refinement in subsequent stages. This research adopted a triangulation approach to explore the practice of observation collection by nurses from a variety of vantage-points, adopting data and method triangulation. The research uses multiple data sets that have been collected at differing times, in different settings involving people

from diverse experiences. The data collection and analysis occurred using more than one research method to “unravel the processes under study” (Denzin 1989:93). The use of the technique theoretical sampling facilitates the evolution of the research being undertaken as new awakenings occur.

Theoretical sampling

Uncovering new insights into the practice of post-operative observations requires a mix of data collection and analysis methods. The challenge for this research was in the focus of each phase of the research as continued refinement was appropriate as more information was gathered. A notion that assists in guiding data generation to fill in “conceptual gaps and holes” (Charmaz 2000) is theoretical sampling. Theoretical sampling, generally situated in qualitative approaches to research, provides a technique that enables the knowledge gained to inform the detail of subsequent stages in the research that no other method allows. This sociological technique was first described by Glaser and Strauss (1967:45) and enables the researcher to collect, code and analyse “data and decide what data to collect next and where to find them”. Theoretical sampling is frequently used in research that explores phenomenon rather than verifying and testing current thinking. Theoretical sampling complements the use of triangulation, as it is enhanced by the use of multiple methods and different samples (Glaser and Strauss 1967) and encourages data generation on a continuum.

The notion of theoretical sampling was adopted for this research because it supports a continuum of data generation and allows each stage of the

research to refine ideas, as they are uncovered. The development of initial steps in the process is informed by researcher knowledge, prior experience and for this research, the current literature. This then informs the refinement of each subsequent phase, allowing for provisional decisions to be made about the method of data collection and analysis “based upon general understanding of the area under investigation” (Cormack 1996:125). Whilst ‘representativeness’ was an important sampling consideration for each phase of the research the use of theoretical sampling enabled the identification of the relationships, context and outcomes of patient observations. The advantage of this technique is that it enables the researcher to ‘see around’ the topic of interest and not be ‘blinkered’ by a fixed predetermined course uninformed by new knowledge that emerges.

The practice of post-operative patient monitoring and observation was shrouded by sparse and diverse aspects of knowledge making it difficult to focus each aspect of the research until new information was uncovered. The use of theoretical sampling added strength and provided a template for data collection and analysis methods based on a continuum that no other method appeared to provide. An overall framework for the research was devised consisting of a series of phases exploring practice from differing perspectives. Theoretical sampling provided flexibility by enabling data generated in one phase to focus subsequent data collection towards the information sought.

Nursing is situated in a rich and vivid world of practice influenced by many elements. To explore and investigate these practices there is a need to utilise

different and creative ways of research. This research involved a variety of layers, generating information gathered via data collection and analysis, this then informed the process and aspects explored in the next stage, maximising the potential of the research. Survey was one of these techniques.

Survey

Decisions regarding the format of the initial phase of a research project are often influenced by researcher experience and textual exploration and frequently a survey is undertaken to assist in gathering pertinent information to guide subsequent aspects of the research.

Documentary evidence can be useful not only for providing answers to particular questions, but also in the preparation of further questions to be followed up by interviews, observations or questionnaires (Phillips et al. 1994:47).

Survey provides an opportunity to explore on an extensive rather than intensive scale and can take many shapes and forms, more commonly postal, face-to-face or telephone surveys with different foci i.e. market analysis, polling, information gathering, practice or policy information or satisfaction.

A postal survey was undertaken for this research to provide insight into current recommended standards; diversity and / or similarities of practice across multiple institutions and to provide a base line to measure the impact guidelines may have on practice. As with all research techniques there are type specific advantages and disadvantages and for survey these relate to

samples, response rates, design, implementation and quality of the responses. These aspects, in relation to postal surveys are discussed further.

Sample

Sample selection and technique are integral to the rigour of the survey and the research (Minichello et al. 1999). Importantly the sample needs to be representative of the population under investigation. Sampling errors are reduced in the ideal scenario where the entire sample population is surveyed providing equal chance of participation. Refusal bias is an important consideration as a potential source of information may be lost due to a similar group not responding. This may be a group of illiterate people in a sample or people from non-English speaking backgrounds. The impact of refusal bias or non-response error can be limited depending on the nature of the information sought and by achieving a high response rate (Minichello et al. 1999).

Implementation

An American scientist considered an expert of mail and telephone survey method is Dillman (1978). His technique, the total design method (TDM) provides a process to assist collection of meaningful information and increase response rates using a cost-effective manner. He describes five elements that assist in achieving high response rates from mail surveys.

1. Respondent friendly questionnaire
2. Four contacts by first class mail with an additional special contact.
3. Return envelopes with real first class stamps

4. Personalization of correspondence

5. Token prepaid financial incentives (Dillman 2000:150-1).

A survey provides efficient access to the information required across multiple sites and can provide a cost-effective way to gather substantial amounts of information. The process can be reasonably quick and time efficient for the researcher (Minichello et al. 1999). Each additional round of contacts (either by mail or telephone) with the sample often elicit more responses but there is a time where the number of responses is less productive than the effort involved. The researcher needs to balance the number of rounds of contacts (effort and cost) and the appropriateness of the response rate with the purpose of the survey (Dillman 1978).

Response Rate / Design

All researchers who use surveys hope for a high response rate. Response rate and design go hand in hand. Surveys can usually be described as experimental, descriptive, comparative, correlational, developmental or evaluative (Skodal Wilson 1985) and the purpose of the survey guides the design. Considerations in design include person, place and time. Person includes choice of samples and instrumentation development. Piloting may need to be considered to test the validity and reliability of the instrument. Place incorporates logistics including piloting, financial implications of methods chosen and congruence between data collected and subsequent analysis. Time covers decisions regarding the type of the survey for example longitudinal, cross sectional or prospective surveys. Careful consideration of

all of these factors is important as they all can impact on the quality of the response rate.

The TDM, when described in 1978, advocated that the four timed mail outs constantly produce 70% response rates. However, other authors contribute to the discussion on what is a good response rate. Smith (1993) believes a good response rate is critical if the samples are to be representative and that postal surveys have had the reputation of being plagued by low response rates, “(N)o single rate is considered the standard, however. In some surveys, between 95% and 100% is expected; in others, 70% is adequate” (Fink 1995:53). Using Dillman’s TDM an average response rate should be between 60 and 75% (Minichello et al. 1999:367). The response rate expected by Belson ranged from 90% on rare occasions and for some kinds of subject matter as low as 30% (Belson 1986:534).

Quality of the Responses

The links between design and the quality of the responses are clear. Poorly thought out design is one of the factors that can lead to poor data generation. Consistency between the information sought, the method of collection and the type of tools used are paramount. Consideration needs to be given to the type of tool, appropriate scaling of data and relevant questions that provide the depth of answer required. Completion of surveys relies on self-response. Therefore it is important that the depth of information required is collected, as often, with simple questions, data generated can be superficial despite obtaining a high rate of response (Skodal Wilson 1985). Instructions for

participants in this case must also be clear so that all relevant information is collected. Often postal surveys assure participant anonymity thereby obtaining a level of information that may not be provided if the participant feels threatened as in the case of an employer driven survey or face to face interview. Where anonymity is not imperative, opportunities may exist to follow up with participants for additional consultation to clarify missing elements. In some contexts this may be appropriate, in others it may bias the results. Quality of answer is also linked to data analysis in that one may have quality responses but if the answers are not congruent with the process of analysis the quality of the results will suffer.

Survey is an efficient and effective way to gather a breadth of information and is particularly useful as an initial step in a project to set the scene. The limitations of a survey process can be confined by well thought out implementation and design processes that are important to achieve an appropriate rate and quality of response (Minichello et al. 1999). The links between process and results can also be applied to other research techniques including observational techniques.

Observation

For the most part survey provides extensive information about a topic. However, observational techniques tend to facilitate more intensive data generation. Observation as a data collection method can result in the generation of both quantitative and qualitative data (Roberts and Taylor 1998). As Grbich states (1999:123)

it is a technique of unobtrusive, shared or overtly subjective data collection, which involves a researcher spending time in an environment observing behavior, action and interaction, so that he/she can understand the meanings constructed in that environment and can make sense of every day life experiences.

Observation of clinical nursing practice provides data that reflects the real world of practice as viewed by the researcher (Turnock and Gibson 2001).

Observational techniques are classified by the level of involvement of the observer in the setting under investigation (Roberts and Taylor 1998). The most common forms of observation are participant and non-participant, overt and covert observation. Where the observer is part of the culture under observation (i.e. working or living) and observing activities it is described as participant observation. The other end of the scale is where the observer is not involved in the activities and whose primary focus is on observation, this is non-participant observation. As their titles describe, overt observation occurs when the observed is aware they are being observed and also know the purpose of the investigation, while covert observation is the converse with the observed not knowing they are being observed and hence do not have an understanding of the study at hand (Roberts and Taylor 1998; Turnock and Gibson 2001).

One phase of this research used non-participant observation to generate data on the nursing practice of post-operative observations. Non-participant observation, first used as an anthropological technique, has traditionally been a sociological form of data collection (Sinclair and Dickson 1997). An exploration of nursing practice i.e. observation and vital sign collection

required the selection of data collection methods that are most compatible with the information required. Skodal Wilson, (1985) suggests two important criteria be used to guide the choice of method:

1. information adequacy – considerations included: What form of data? What type of information? What sample of population? How much data?
2. efficiency – factors to think about: What resources, human and material, are available? What time constraints are there?

Based on these two criteria, observation of practice was considered to be the most appropriate method to assist in gaining insight into practice and also provided the researcher with a cost effective mechanism for undertaking this research. Observation in the setting for this research allowed the identification of trends and patterns of monitoring patients post-operatively to be described. These have not previously been uncovered. Observation as a method of data collection highlighted not only the activity but also the non-verbal interaction that occurred between nurses and patients (Sinclair and Dickson 1997).

The literature provides information on many of the considerations that need to be taken into account when planning and undertaking an observation of practice and these will be used as a guide to discuss the technique of participant observation including timing and sampling, implementation and influences (Roberts and Taylor 1998; Grbich 1999).

Timing and Sampling

Event and time sampling are techniques used for quantitative observation methods, the limitation being that only a small number of participants or activities can be observed at a time (Grbich 1999). Consideration needs to be given to the data required, the observational periods and time available. Longer periods of time of observation may generate more data but researchers need to be aware of the impact of fatigue leading to observer error and observer drift (Fitzpatrick, While and Roberts 1996). This is particularly important where the setting being observed has a high level of activity, as the observer may get distracted by unrelated events, or be overwhelmed by the activity that they cannot physically record every activity adequately. To assist overcome these challenges it is useful to separate and limit the observation periods both physically and emotionally to reduce fatigue of the observer and maintain a clear focus on the activity under observation (Fitzpatrick et al. 1996).

Implementation

Gaining entry is an import aspect of undertaking observation (Grbich 1999:127). It is important settings under observation are supportive of the process and are comfortable with others accessing not only their world but also their private and personal space. Gaining entry involves obtaining permission from all the stakeholders both at a unit and organisational level to observe the setting. Informing all staff potentially involved in the research via a variety of mechanisms ensures participants are aware of the scope of

the research, what is involved for the participants, the role of the researcher and the time frames. Participants valuing the topic of investigation and the credibility of the researcher can facilitate the ease of entrée. There is debate about the value or otherwise of the observer being known or not in the setting, if familiarity allows greater acceptance or anonymity provides less bias (Fitzpatrick et al. 1996; Grbich 1999). Decisions regarding this relate to the topic under investigation and the type of data required. For the utilisation of non-participant observation for this research the researcher was unknown in the setting providing anonymity, however the researcher was familiar with the culture, which eased acceptance, and allowed insight into the practice being investigated (Reid 1991).

Identification of the central element under investigation is important to guide the observation and limit distractions. Pincombe, Brown, Ballantyne, Thorne and McCutcheon (2000) discuss the use of the term *the unit of care* to describe aspects of practice under observation. This concept assists to separate the activity from the observation of individuals (patient or nurses) who are performing the activity.

Logistical considerations for participant observation include duty of care issues for the observer, researcher interface with the environment, single or multiple observers and documentation of observation i.e. structured framework, audio recordings, journaling, timing of activities. Dress code needs to be considered when observing in the clinical setting (Reid 1991; Turnock and Gibson 2001). Dressing in uniform may facilitate acceptance but

may also cause misinterpretation of the role of the observer as researcher. Wearing plain clothes may ensure role definition but may make the researcher stand out in the ward setting.

Influences

The argument against the value of observation as a reliable technique is based on the influence of the observer on the data generated including the influences on the activity, on interpretation and outside influences (Sinclair and Dickson 1997).

The most obvious is the influence of the researcher on the activity under investigation (Sinclair and Dickson 1997). The quality of the results is influenced by the skill of the observer and his/her ability to gain and keep the confidence of those under observation. The aim of observation is to be as impartial as possible by putting aside your own values, attitudes and emotions. To investigate practice it was deemed important that the researcher was unknown to the setting to limit preconceived ideas about the subject and increase participant comfort at being observed. More objectivity could be achieved through non-participant observation rather than observing as a participant (Roberts and Taylor 1998). The effect of the non-participant observer on the participants can be described as a 'Hawthorne effect', (Swanwick 1994) where the presence of, in this case a nurse observer, can alter the phenomenon being studied. The objective for the researcher is to become as invisible as possible so that participants do not do what they think the researcher will want to see or hear. Direct observation assists reduce this

influence, when viewing actual events, it is more difficult for the participant to manipulate a situation, as it would be recalling an event for an interview. Non-participant observation or passive observation (Spradley 1980) can minimise the influence the researcher might have on the nurse's behavior whilst ascertaining an accurate reflection of what happens in practice (Skodal Wilson 1985).

The data generated may be influenced by the researcher's personal bias and interpretation of the activities under investigation (Sinclair and Dickson 1997). Misunderstandings of the language, misconceptions or omissions of observation can alter the meaning of the data being collected using non-participant observation. This can be minimized with observers who are familiar with the language and culture of the setting under investigation.

Lastly, researchers must acknowledge potential influences exerted by outside forces, for example being aware that participants, researchers and / or organisations may have vested interests in the results of the research and may exert undue influence on the data collection consciously or unconsciously e.g. increase in staffing.

Observation of nursing practice enables researchers to gain insight into the everyday life of nurses and patients. It is a technique that provides a wealth of information and assists in understanding the real world of practice. It is a technique that is congruent with research on the nursing practice of patient observations.

Audit

The final data collection technique used is an audit of post-operative patients medical records. Whilst audit is a mechanism used frequently for research and quality assurance purposes, it is not a technique discussed in the research literature at the same level as survey and observation. One could argue that audit is a process of survey as its purpose is in “describing characteristics, opinions, attitudes or behaviors as they currently exist in a population” (Skodal Wilson 1985:138). Or is it a process of observation where the data are collected “by observing and recording behaviors or activities of interest” (Polit, Beck and Hungler 2001:466)? References to the use of audit in current literature discuss it as *Clinical Audit* - a method of monitoring processes and outcomes to ensure best practice (Morrell and Harvey 1999). These discussions situate audit in the realm of clinical effectiveness rather than as a data collection tool. As a technique for data collection for this research, audit is considered as a mechanism for data generation through the systematic review of documents to record characteristics and activities relating to the topic of investigation, and not as a process of survey or an observation of an activity.

The discussions on clinical audit are useful in the descriptions of process that fit with the use of audit for measurement but also apply to it being used for knowledge development. Issues relating to audit as a data collection method are not dissimilar to survey and observation. Process issues include appropriate and representative sample selection and size. Careful

consideration needs to be given to the timeframe of the audit, to ensure the period selected will be representative. For example seasonal influences on data, such as down-sizing of service at Christmas time, or weather influences on patient presentations.

The quality of data collected is directly related to design of the instrument to record the information being collected. Preparation of an audit tool includes not only consideration of the data to be collected, but also the type of analysis it will undergo. Piloting a tool is necessary to test the type of information being or not being collected and the ease of use for the data collector. Auditor selection has strong links back to the purpose of the audit. Responsibility for the collection of data needs careful consideration, with a single auditor providing more consistency within the data, but a group of auditors providing a wider perspective. The type of information being sought will assist in determining whether the auditor/s should have an understanding of the culture where data collection is occurring, or if it is preferable that an outsider perspective is obtained. Audit is a relatively cost effective mechanism for generating data but it is labor intensive for the auditor. Quality of data generated will be affected not only by the instrument used and the auditors approved but also the influences of the aspect being audited, for example, with case note review will all the data required be in the case notes, will missing elements effect the final product?

Audit has the potential to provide a wealth of information, particularly when utilising case note review to explore practice. As with all data generating

techniques it has its own advantages and disadvantages. Successful audit hinges on the auditor/s and as with other techniques, successful audit relies on strong links between data collection and data analysis.

Analysis

It is imperative that there is strong congruence between data collection methods, such as survey and observation, and the analysis undertaken in generating meaningful results. A triangulated project using different methods may also use different forms of analysis. Data generated relating to the nursing practice of post-operative observations were analysed using descriptive statistics and content analysis. Analyses undertaken for this research are discussed broadly here with more specific detail, as it applies, in each of the subsequent chapters that present the different phases of the research.

Statistical Analysis

Statistical analysis in this research was applied to all the data collected. Statistical process provides the framework to “summarize, organize, interpret, and communicate” the data in a numeric fashion (Polit et al. 2001:331). Statistical analysis relies on the use of statistical software, facilitating the generation of descriptive statistics providing an overview and summation of data generated including frequencies, timings, types, similar and dissimilar aspects of the data content.

Two electronic spreadsheets were established for all the data sets using Microsoft Excel 97 SR-1 and Statistica for Windows version 5.5 1999 by Statsoft Inc. Microsoft Excel was used initially to simplify data entry, to become familiar with the data and to undertake descriptive statistics. Data were then transferred to the statistical software package for more detailed analysis to occur. The classification of the data i.e. measurement scale, determined the type of data analysis to be completed.

Data generated in each phase determined the types of statistical analysis required, but all data collected for each phase initially underwent statistical review. Data in general were nominal including gender, surgical procedure, form of anaesthetic and accommodation type. Interval scale data included alteration in vital signs and duration of nursing observation, with ratio measurement applying to data including age, anaesthetic time, and length of surgical time, being a few examples. Based on the scale of measurement, descriptive statistics were applied to analyse the data. With frequency distributions (percentages), measures of central tendency (mode, median, mean,) measures of variability (range, standard deviation) and measures of correlation (Pearson product) describing the data sets (Skodal Wilson 1985).

Inferential statistics allowed more powerful data analysis in addition to the descriptive summaries provided (Skodal Wilson 1985). Parametric tests were applied as they use summary (parameters) characteristics such as mean and standard deviation to compare groups. These tests rely on the sample being normally distributed in the population and require scales of measurement

that are interval or ratio level (Skodal Wilson 1985). They were used on the summative data to analyse group comparisons (Minichello et al. 1999) and included independent samples t- test. Non-parametric tests use nominal and ordinal data and are not based on any assumptions of the shape of distribution for the population being sampled. Non-parametric tests such as the Mann-Whitney U and Wilcoxin matched pair tests were used to ascertain differences between data (Skodal Wilson 1985).

Significance in statistical data analysis is achieved when the results are unlikely to have occurred by chance, at some specified level of probability (Polit and Hungler 1995). All data analysis in this research where a p value of 0.05 or less was obtained was considered statistically significant (Skodal Wilson 1985).

Content Analysis

To complement the descriptive statistics used for some components of the data analysis, content analysis was used. Considered a technique for both qualitative and quantitative data, content analysis enables the quantification of narrative text (Polit and Hungler 1995). It involves compiling and categorising the content of, in this case, written documents, to demonstrate similarities and differences in text (Skodal Wilson 1985). Difficulties can be encountered when analysing documents that have been written for a specific purpose e.g. policy documents informing practice, making it difficult to extrapolate why certain aspects have been incorporated or not included. Content analysis involves the identification of the unit of analysis and then

the development of codes and categories / themes, that relate to frequency and elements of, in this case, post-operative observation. It provides a systematic method for the exploration of the content of text and the description of patterns, utilising frequencies, percentages and significance (Grbich 1999:224). Content analysis complements data generated from the survey of policy documents and was used in conjunction with descriptive statistics to provide a more comprehensive description of the phenomenon under investigation.

The results of the various aspects of analysis, statistical and the content analysis will be drawn together to describe and explore the role of post-operative observation in practice.

Ethical Considerations

Every research project has broad ethical considerations as well as aspects that relate specifically to the individual research process. As the research design of this research involves different phases, the broad considerations will be discussed in this design chapter and specific ethical considerations that relate to each phase will be discussed in the chapters describing that component.

Generic ethical aspects include informed consent, confidentiality, anonymity and protection from harm (Oliver 2001). At the outset of the research ethical clearance was sought and approved by the University of Adelaide Human Research Ethics Committee and the Royal Adelaide Hospital Research Ethics Committee and subsequently Adelaide Community Health Alliance

(Appendix 2). These submissions covered mechanisms for protecting participants and management of the data.

Informed Consent

Nurses on the wards under investigation were informed about the research through individual letters, participant information sheets, and the opportunity to attend scheduled information sessions.

In the observation of practice, whilst the focus of the research was the activities of nurses, rather than patient responses, patient information brochures were also provided to patients, family / next of kin / guardian explaining the research. The nurses and patients on the ward during the research were free to not participate. Written consent was obtained from the nurses who were involved in the direct observation. The consent form emphasised that participation was voluntary and that participants were free to withdraw at any time during the research and that refusal to participate or subsequent withdrawal would be without prejudice to employment and whilst the information generated from the research will be published the individual will not be identified nor will personal results be divulged.

Confidentiality

Confidentiality was preserved for the identity of the patients, nurses and organisations and for the data collected. Restricted access to data was achieved with the researcher being the only person with access to the raw data. Patient identification numbers were used in place of specific identifiers

such as name or medical record numbers. All data collected during this research were kept in a safe and secure location. Data collection tools, electronic files, and back up copies were stored in secure locations in accordance with the University of Adelaide Guidelines and Rules for Responsible Practice in Research. On completion of the research all original data will be stored securely for a period of seven years at The University of Adelaide in accordance with NHMRC guidelines.

Anonymity

Anonymity and a right to privacy were assured to any individual or organisation that provided information to this research including patients and nurses. Data collected on data collection tools and electronic files were de-identified. This involved coding practices for the data with master lists held separately. Electronic files only consisted of summative personal data of the patients, such as age and sex so that no individual could be identified. No individual identifying markers of the nurses being observed were recorded. Results of the research are aggregated to maintain anonymity (Oliver 2001).

Protection from harm

No additional safety or ecological considerations were required for this research as the components of the research were undertaken in the clinical setting where occupational, health, safety and welfare procedures are already in place. Mechanisms were negotiated in the clinical settings should the researcher observe unsafe practice or where a patient was encountering difficulty, and this is reported further in the observation of practice chapter.

Limitations in Design

When embarking on a research project such as this there are grand thoughts of changing the practice. However, the realities and intricacies of nursing practice in today's environment make this more challenging. In designing this research to explore the nursing practice of post-operative vital sign collection there were many limiting factors. These included the obvious ones such as time and finances. More importantly the lack of existing evidence about the practice made it imperative for this research to focus on describing and explaining current practice before inroads could be made into changing the practice.

Attempts were made to reduce the 'Hawthorne effect', that is the perceived influence the researcher may have on the activity under investigation (Swanwick 1994). This not only related to the specific modalities of the research such as observation of practice but also the increased publication, promotion and questioning of this practice may prematurely influence sample populations in relation to their practice.

Specific limitations of the research design will be discussed in the proceeding chapters. Whilst the vision of this research was to change practice, in reality the goal became the contribution of a new understanding based on new knowledge that represents current practice and drawing together the current literature related to the practice of vital sign collection.

Conclusion

This chapter sets the scene for the research by describing the processes, techniques and strategies used to explore the practice of vital sign collection in the post-operative general ward setting. In describing the available information relating to a variety of research techniques, this has informed not only the research design, but also the phases of the research undertaken.

In setting the scene this chapter is a prelude to the following three chapters that present more specific details relating to the methods used for each phase of the research in conjunction with the results of each of the phases and discussion of these results in relation to nursing practice.

Chapter 4

Analysing the Policies that Underpin the Practice of Post-operative Patient Surveillance

Introduction

Patient observations and more specifically vital signs are components of patient assessment used by clinicians in their everyday practice. There is a belief that observation collection has an important role in the detection of post-operative complications. In most clinical settings, policies and / or procedures exist that direct the frequency, duration and type of observation. These policies are commonplace in directing the observations a patient post-operatively receives after returning to the ward from surgery. Policies appear to exist in isolation to the literature and irrespective of the evidence. There is a belief that the collection of observations is routine and that the frequency and type of post-operative patient surveillance is directed by hospital policy (Botti and Hunt 1994; Evans, Hodgkinson and Berry 1999b). If hospital policies are deemed to directly influence nursing practice, what is unknown is the frequency of observation collection that is recommended in hospital policies.

The aims of this phase of the research was to gain a comprehensive view of organisational documentation that guides the practice of post-operative

observation / vital sign collection; to identify similarities and differences in hospital policy documentation that underpins the nursing care of patients returning to a ward after surgery and in particular, practices relating to the frequency of observation / vital sign collection, what observations should be undertaken and what variation there is in practice between organisations. In addition who contributes to the content development and endorsement of these documents was identified.

All hospitals performing surgery in the state of South Australia (metropolitan and rural) were invited to participate. A survey was used to collect data on how the content of policy is determined and on documentation that directs the nursing practice of post-operative observation. The analyses were both statistical and on the content of the current available hospital policies in relation to post-operative patient observations in a variety of surgical units. This chapter overviews the method used for the survey, limitations and presents the findings, relating to the frequency of vital sign collection and other observations collected. In addition the factors influencing the development and endorsement of policy are presented.

Research Questions

The research questions for this phase of the research were

- what is the practice of post-operative observation and vital sign collection as described in hospital policy documents?
- what determines the content of policy documents?

Method

The focus of the survey was on what was written as hospital / unit policy in relation to post-operative observations, and who determined the policy at the hospital. The survey population was all hospitals in the state of South Australia that listed surgery as a service in the Hospital and Health Services Yearbook (Hospital and Health Services Year Book 2000). The survey involved the distribution of 75 letters to all hospitals providing a surgical service in South Australia. Letters were addressed to the Director of Nursing and requested copies of any documentation in their unit/s that described frequency, duration and type of post-operative patient care (appendix 3).

As the description of process can take many different guises in the clinical setting, included in the survey were generic hospital policies, specific ward and specialty guidelines including critical pathways, nursing care plans, or card index systems. Copies of documentation already in existence were requested rather than the completion of a specific questionnaire as it was felt this might not only reduce recipient workload in collating the relevant data but also reduce the potential for bias. The initial letter of invitation to participate, which was sent to the Directors of Nursing, suggested mechanisms that may facilitate the collection of information. Participating hospitals were also asked to provide information on how these policies were derived (e.g. the existence of policy and procedure committees). A follow-up letter was sent to non-responders and finally telephone contact was made to outstanding responders.

The process for the survey considered elements described by Dillman (2000:150-1) that assist in achieving high response rates from mail surveys. These elements include a respondent friendly questionnaire, supported by a pre-notice letter, thank-you postcard, replacement questionnaires, and a final contact. The survey for this research used a letter of invitation to participate which was personalised and addressed to the Director of Nursing and individually signed. The letter requested copies of documentation already in existence and suggested mechanisms that may assist in the collection of the information including a willingness of the researcher to visit the site to collect the information or the appointment of a person from the hospital, other than the director of nursing, as a liaison person for the researcher to contact. A follow-up letter to non-responders, and telephone contacts were made. Return envelopes were not felt to be required as all letters went to health organisations with centralised postal systems. Whilst the majority of responses were returned through the mail many were also faxed.

The impact of refusal bias in not collecting a representative sample was minimised due to the high response rate achieved. There was similarity between the responses received although some did support quite different practices. Two health-care sites were contacted to clarify some aspects of the data. Sampling error was reduced by sampling all health units in South Australia that perform surgery, thus providing an equal chance of participating (Minichello et al. 1999).

The variety of settings that were surveyed provided many different types of policies and / or guidelines that are believed to drive practice. Quantitative content analysis was undertaken on all information received relating to the nursing practice of post-operative surveillance. Initially all policies were reviewed, with data coded by:

- the pattern of frequency of post-operative vital signs and observations,
- what periods in the post-operative phase on the ward were observations made,
- the number of sets of observations taken and
- descriptors and terminology relating to vital signs and observations.

Data were coded so that a descriptive statistical analysis of the data could be undertaken (Minichello et al. 1999). Where elements were unclear verbal clarification was sought from the individual who provided the information. Where a policy did not specify anaesthetic type it was assumed to be for a patient recovering from a general anaesthetic. This was because in Australia alone approximately two million general anaesthetics are performed annually (Leslie 2001) and the majority of general surgical procedures discussed in the literature report high rates of general anaesthesia use (Norsidah and Puvaneswari 1997; Eno and Spigelman 2000). In policies that gave choices about the frequency of observations, the minimum number of observations required is recorded in the data to reflect the minimum number of observations nurses could be undertaking.

Secondly the documentation and any additional verbal descriptions of how policy was developed from within the hospitals was reviewed. Information was categorised relating to:

- the sources that lead to the initiation or review of a policy
- individuals and groups involved in the process to ratify a policy and
- who endorsed the policy for the respective hospitals?

Hospitals were categorised into 2 groupings due to the nature of their post-operative observation policy:

Group A: Hospital Units (n=52) with a policy for observations prescriptive for the first 24 hours after returning to the ward.

Group B: Hospital Units (n= 11) with no definitive policy for the total 24 hours or policies that allowed a larger degree of flexibility for determining the number of observations a patient would receive.

Data were analysed using both Microsoft Excel 97 SR-1 and the statistical package Statistica for Windows version 5.5 1999. Results are presented using descriptive statistics with means including the Student's t-test. A p value = 0.05 or less was considered statistically significant.

Ethical Considerations

As discussed in Chapter 3 - Research Design, research ethics approval was sought and granted. Three individual hospitals requested the researcher gain

ethics approval from their institution. Three new applications were made utilising local proformas with ethical approval subsequently being granted.

Results

Response Rate

Six weeks after sending the first letter 40% of hospitals had made contact (n= 30) at which time a reminder letter to non-responding hospitals was sent. Responses received took the form of the hospitals policy documents, refusal to participate letters, requests for ethics submission, calls for clarification and letters from the Director of Nursing appointing a liaison person. After 10 weeks, phone contact was attempted to 25 sites that had not responded resulting in 19 successful calls, all signifying a willingness to participate. At week 13, with a response rate of 87%, there was information on 35 hospital policies (46%). Whilst many agreed to participate over the phone or even by letter, getting the information took time and effort. A final summary of the different types of hospital responses is shown in table 1, with a response rate of 87% resulting in 47 hospitals (63%) providing policies. Reasons given for not wanting to participate included commercial reasons and being a small rural hospital directed by another hospital's policies.

Hospitals Responding Total Surveyed (n=75)	% of total population
Hospital Policies Received (n =47)	63%
Hospital Process for Policy Development (n=37)	49%
Hospitals with minor procedures or no surgery (n=14)	19%
Hospitals not willing to participate (n=3)	4%
Hospitals that provided insufficient information (n=1)	1%
Total Response Rate (n=65)	87%

Table 4.1. Summary of total responses to survey

Data collected relating to how organisations developed or reviewed policy were less extensive than the actual policy documents relating to practice. In all, 37 hospitals provided information on policy development for their institution.

Characteristics

Of the 47 hospitals that provided policy documentation 64% (n=30) were hospitals based in rural regions of South Australia, the remainder (n= 17) were metropolitan hospitals. Public hospitals accounted for 70% (n=33) of the sample population, 4% (n=2) were public / private facilities combined, with the reminder (n=12) being private organisations (see figure 4.1).

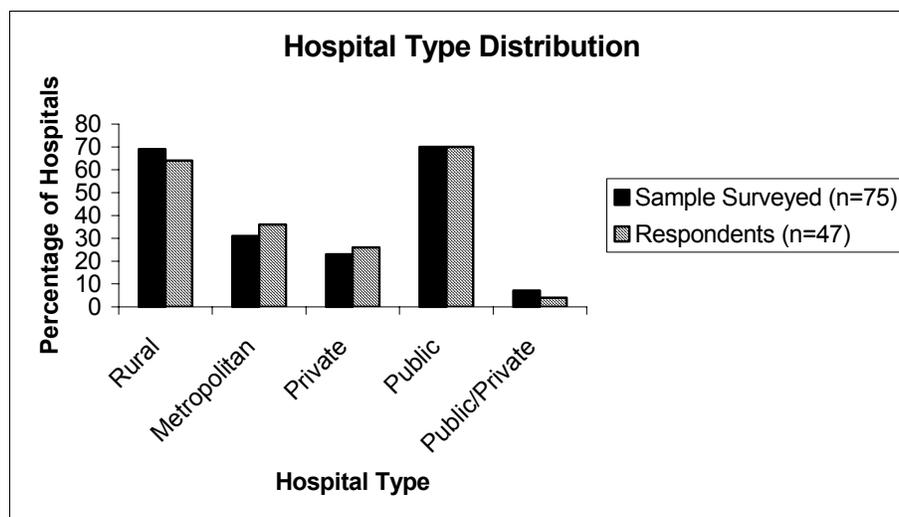


Figure 4.1. Distribution of hospital type for sample population and respondents.

Coding of the content of the 47 hospital policies received was undertaken. Whilst the majority of organisations had one policy on post-operative nursing care, 7 hospitals had different patterns for different categories of surgery or different units (i.e. major / minor, long / short term), providing 64 regimens for analysis. The amount of information in individual policies varied greatly. Some had outcomes, objectives, equipment lists, process standards, and procedures. Some had finite detail like 'strip and make the bed'. Some policies were unclear about ongoing observations or gave insufficient information.

Thirty six of the 47 hospitals that participated had a policy that incorporated a routine, regular practice, recommending a conventional pattern of monitoring patients post-operatively i.e. variations on vital sign collection hourly for 4 hours, two-hourly for 2 hours through to four hourly for 24 hours. These will be referred to as Group A (see figure 4.2). These 36

Group A - policies with traditional patterns covering 24 hours.

hospitals that provided information, resulted in 52 separate regimens when unit specific and separations for different classifications of procedures were taken into account.

Group B (n=11) consisted of seven hospitals that described traditional models but did not describe continued observations for the full 24 hours. Four hospitals had non-traditional patterns. One rural hospital's frequency of observation was determined individually by the medical officers, another two hospitals incorporated recovery time into calculation and one unit required 2 sets of observations in the first 60 minutes then it was left to the discretion of the registered nurse. Due to the small numbers, the diverse nature and the unique practices recommended in these policies no further analysis was possible on this group as a separate entity.

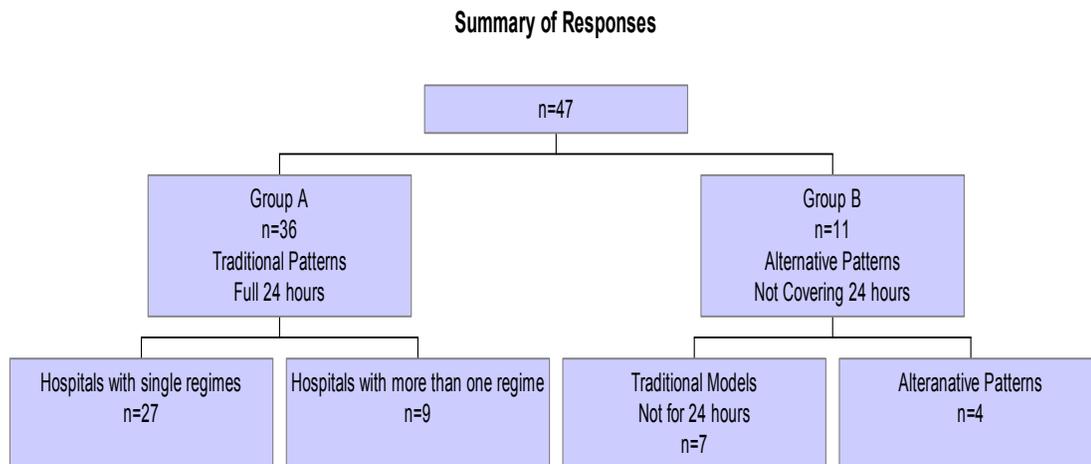


Figure 4.2. Summary of the patterns described in the responses

Terminology

The terminology in the documents was at times unclear with terms such as vital sign and observation not clearly defined. From the policies that were used throughout hospitals, 46 hospitals 89% (n=41) use the term 'observations', of these 32% (n=13) describe observations as temperature, pulse, respiration and blood pressure (TPR and BP) and other elements, 30% (n= 12) describing observations as TPR and BP and 15% (n=6) there was no definition given. This breakdown is represented in figure 4.3. The remainder of policies (n=10) use a variety of descriptors i.e. temperature only, or pulse and respiration only, or temperature and blood pressure or TPR and BP and oxygen saturations. Of the same 46 hospitals, 24% (n=11) use the term 'vital sign' with 54% (n=6) not defining the descriptor, 36% (n=4) describing TPR and BP and 10% (n=1) using the term to mean TPR and BP and oxygen saturation measurement. As the most frequent descriptions of the term vital sign and observation refers to a core of TPR and BP, supported by literary definitions discussed previously, it was considered that for the most part where the term 'vital sign' was not defined it meant all four vital signs: namely temperature, pulse, respiration and blood pressure.

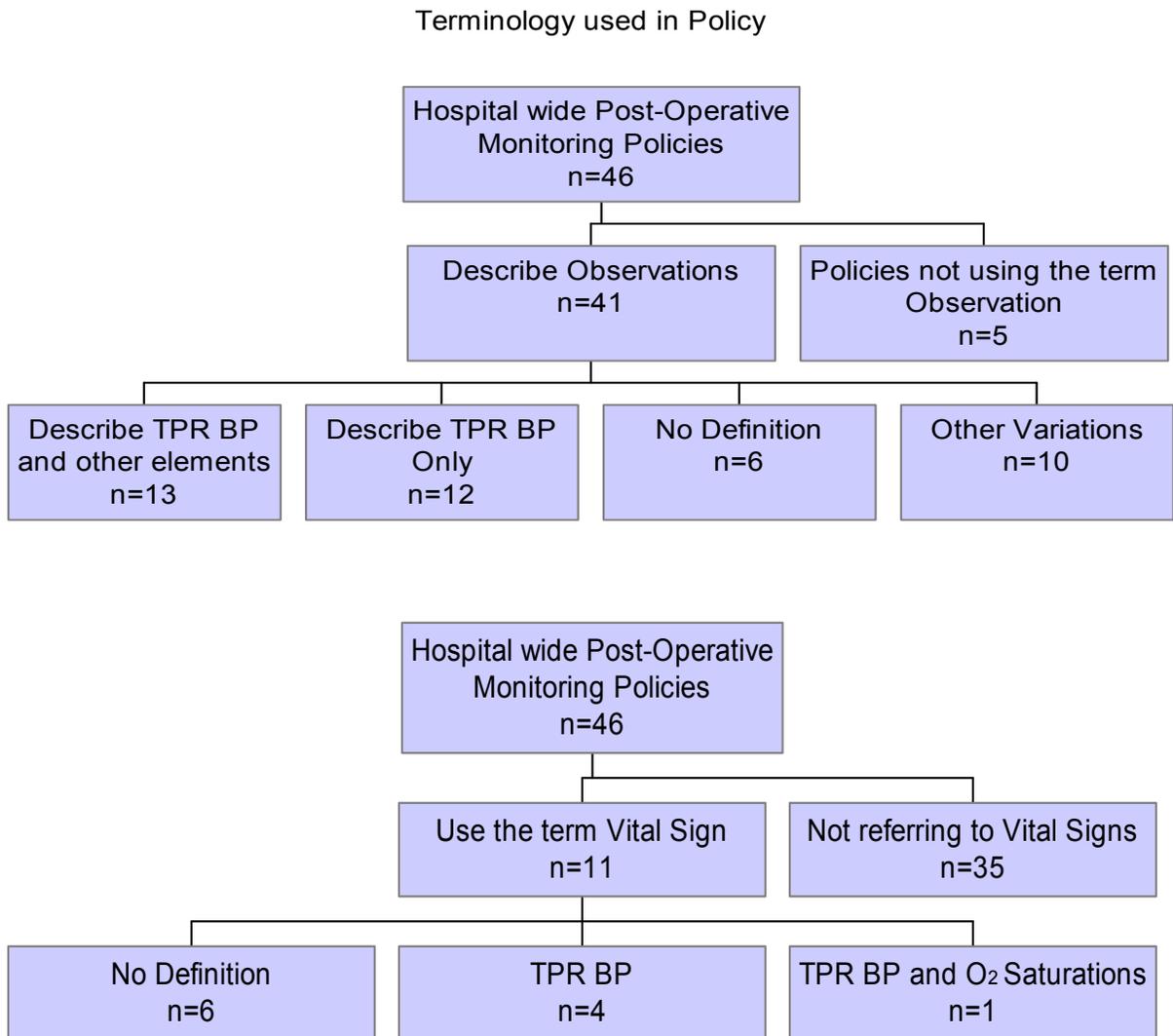


Figure 4.3. Terminology used in policy documents

Whilst the focus was on the collection of vital signs (temperature, pulse, respiration and blood pressure), data were also analysed in relation to the other observations that occur in conjunction with vital signs and finally the process of policy development and endorsement.

Practice of Patient Surveillance

Distribution of Vital Sign Collection in the first 24 hours

To assist with analysis of the policy documents a breakdown of the spread of vital sign collection was undertaken. For all hospital policies received, approximately half (46%) of all vital signs collected in the first 24 hours occurred in the immediate post-operative period 0-4 hours, 27% of observations were undertaken in the 5th -12th hour period and 27% in the 13-24-hour period. As a cluster of Hospitals in Group B did not provide information for the full 24 hours this was then calculated for Group A Hospitals (n=36) only. Extracting the hospitals that provided information that covered the entire 24-hour post-operative period and that had traditional patterns of vital sign collection, a similar distribution was found. In the initial 0-4 hour period 44% of the vital signs were collected, with 28% of vital signs collected in the 5th -12th hour and 13 -24th hour periods (figure 4.4).

Group A-policies with traditional patterns covering 24 hours.

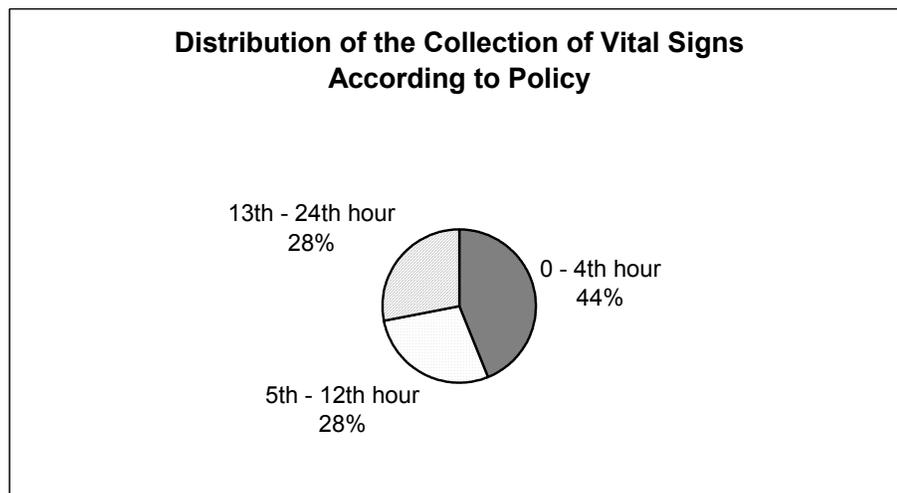


Figure 4.4. The distribution of vital sign collection by time for Group A.

Patterns of Vital Sign Collection

In discussing patterns of vital sign collection it was important to identify what was considered a normal regimen of collection in policy documents. Of the hospital units in Group A, whose regimens covered the first 24 hours following the patients return to the ward (regimens, n=52) there were 19 different regimens. The most common regimen occurred in 27% of the policies (n=14) being hourly vital sign collection for 4 hours, then 4 hourly. The next most common regimen occurring in 5 hospital units (10%) was vital sign collection ½ hourly for 2 hours, 1 hourly for 4 hours, then 4 hourly. Table 4.2 summarises the eight most frequently occurring regimens of vital sign collection.

Most Frequently Used Regimens of Vital Sign Collection	Number of times regimen used (n=52)
Hourly for 4 hours, then 4 hourly	27% (n=14)
½ hourly for 2 hours, then hourly for 4 hours, then 4 hourly	10% (n=5)
Hourly for 4 hours, then 2 hourly for 4 hours, then 4 hourly	8% (n=4)
½ hourly for 2 hours, then hourly for 2 hours, then 4 hourly	8% (n=4)
Hourly for 6 hours, then 2 hourly for 4 hours, then 4 hourly	8% (n=4)
Hourly for 6 hours, then four hourly	5.5% (n=3)
Hourly for 2 hours, then four hourly	5.5% (n=3)
½ hourly for 4 hours, then hourly for 4 hours, then 2 hourly for 4 hours then 4 hourly	5.5% (n=3)
Other regimen variations	22.5% (n=12)

Table 4.2. Number of times each pattern used by hospital units to collect vital signs.

The most intensive pattern was vital sign collection $\frac{1}{4}$ hourly for 1 hour, $\frac{1}{2}$ hourly for 2 hours, 1 hourly for 4 hours then 2 hourly for 4 hours before going to 4 hourly (16 sets in 24 hours). The least number of vital sign collection recommended in Group A was hourly for 2 hours then 4 hourly, 7 sets (used in 5.5% of the regimens).

The diversity in patterns of vital sign collection was evidenced when looking at one hospital that had individual policies described for each unit (n=11). Figure 4.5 shows that even within one hospital there were 7 different regimens being used.

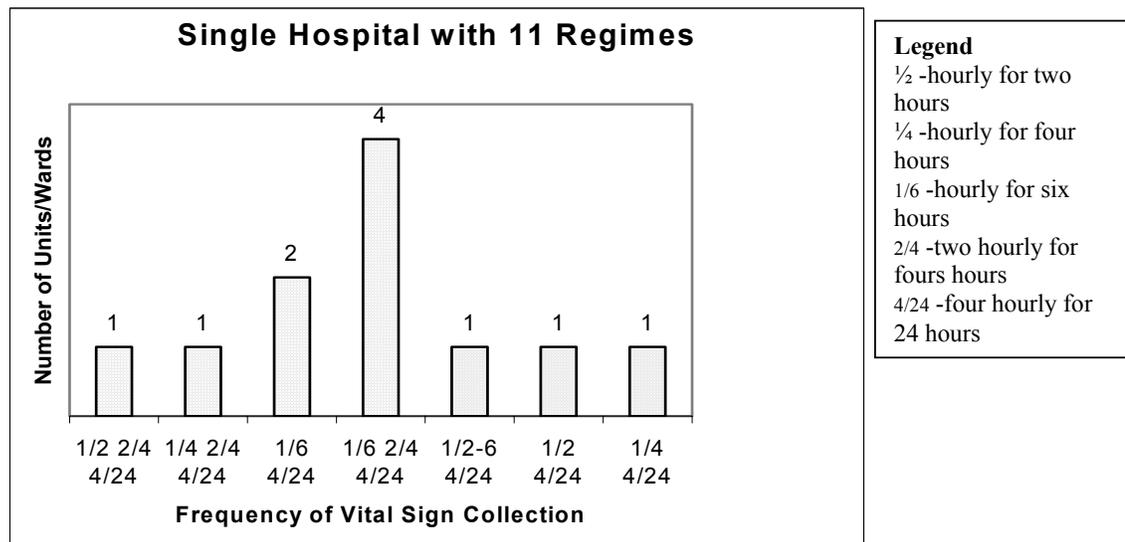


Figure 4.5. Regimens of vital sign collection at a single hospital

Base line Observation Collection

Specific categories, based on the time intervals, were developed to collate the data. Vital sign collection times were separated into base line collection and vital signs undertaken in the first 60 minutes. Whilst some organisations

specified base line observation on immediate return to the ward, many others described 'post-operative observations hourly for the first 4 hours'. Where a policy stated 'hourly for the first...' it was classified as occurring in the 0-1 hour category. Base line vital sign collection, or upon the patient returning to the ward from recovery, was specified in 15 hospitals. Of these, 13 policies involved base line collection of TPR & BP, with one hospital specifying TPR only and another describing a difference in the collection of BP based on the type of surgical case. Due to the lack of clarification regarding the collection of base line observations the subsequent results do not incorporate base line observations into the analysis.

What constitutes a set of vital signs?

For the entire population in Group A the vital signs of pulse and respiration were always documented to be undertaken as a minimum. However there were differences between TPR and BP collection over 24 hours. The biggest difference appears in the first four hours with fewer temperatures being collected, with other vital signs generally taken together (see figure 4.6). A set of vital signs appears to constitute pulse and respiration usually associated with blood pressure but not always with temperature.

*Group A-
policies
with
traditional
patterns
covering 24
hours.*

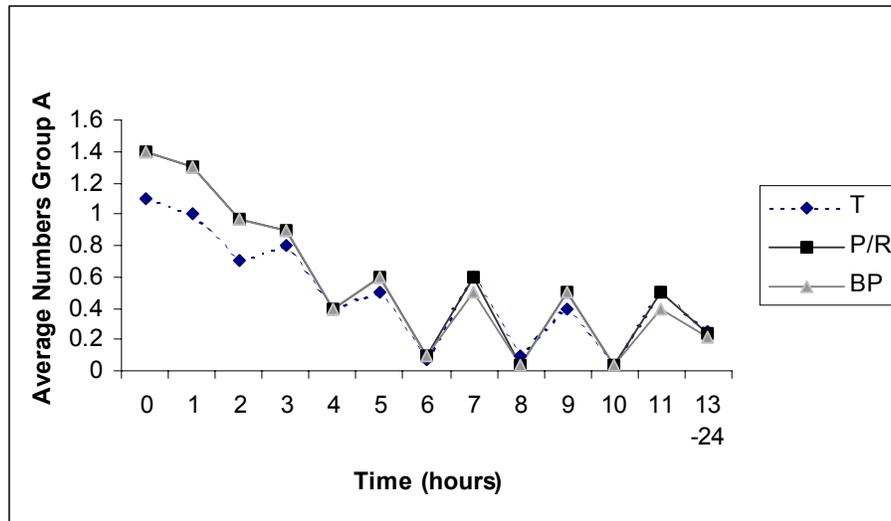


Figure 4.6. Difference between the collections of vital signs over 24 hours.

The frequency of pulse, respiration and blood pressure collection was almost identical in the first 12 hours, using a t-test it was found there was no statistically significant difference between the collection frequency of pulse / respiration and blood pressure over 24 hours ($p=0.92$). There does appear to be a difference between the frequency of temperature collection and pulse / respiration collection in the first four hours, but this was not statistically significant ($p=0.16$) using a t-test, nor was it statistically significant over the total 24-hour period ($p=0.59$).

Number of sets of vitals signs collected

The review of policy documents found that for all regimens of vital sign collection ($n=64$), the mean number of sets of vital signs was $9.38 \text{ SD} \pm 3.54$ and for Group A ($n=52$), the mean number of post-operative vital signs taken was $10.30 \text{ SD} \pm 2.57$ sets. The regimens from hospitals in Group A were then separated based on a classification in the policy documents describing regimens that applied to major / long and minor / short procedures.

Group A-policies with traditional patterns covering 24 hours.

Regimens to be used for patients undergoing longer or more major operations (n=8) had a mean of 12.40 SD \pm 2.87 sets of vital signs collected compared to minor and shorter cases (n=8) where patients were to receive a mean of 7.75 SD \pm 2.68 sets (see figure 4.7).

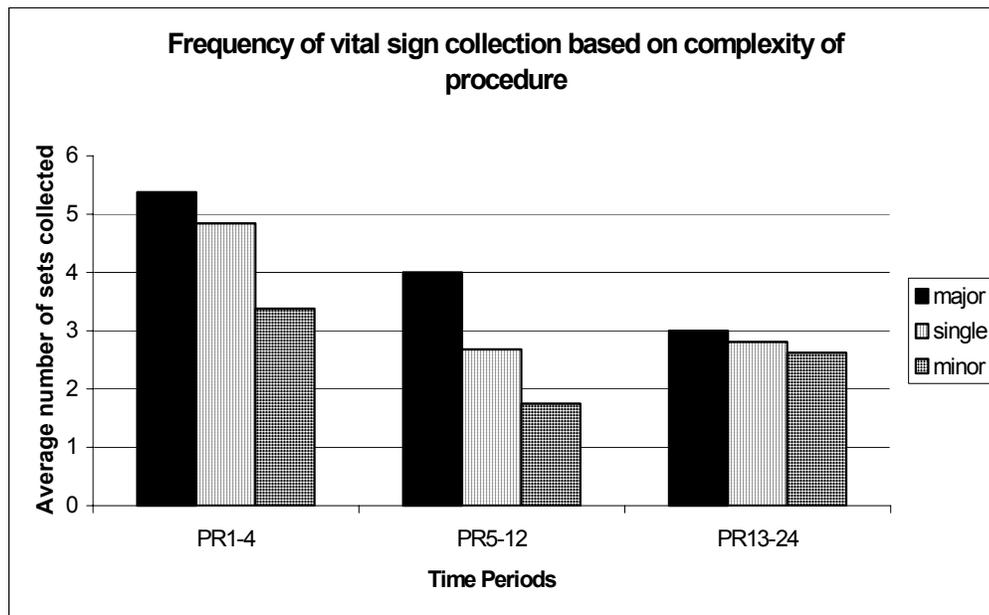


Figure 4.7. Difference between the frequency of vital sign collection (pulse and respiration) based on type of procedure.

A t-test was used to determine if there was a difference between the number of sets of vital signs collected for procedures identified as major compared to hospitals that only describe one regimen for all procedures. The result was not statistically significant ($p = 0.52$). Similarly there was not a statistically significant difference in the number of sets of vital signs to be collected where the policy described a regimen for minor procedures compared to policies that described a singular regimen ($p= 0.37$).

Impact of type of institution on frequency of vital sign collection

The analysis of differences in vital sign collection between types of organisation (rural / metropolitan figures 4.8 and public / private figure 4.9) was undertaken on regimens from Group A.

*Group A-
policies
with
traditional
patterns
covering 24
hours.*

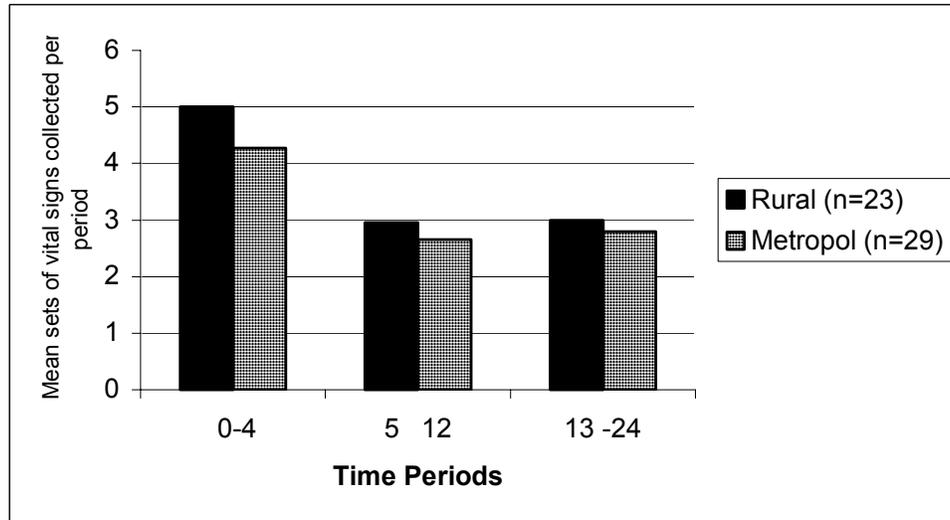


Figure 4.8. Mean number of vital sign sets per post-operative period for rural and metropolitan hospitals.

Rural hospitals (n=23 regimens) collected more sets of vital signs, mean 10.96 SD \pm 2.69 sets, in the initial 24 hours in comparison to metropolitan-based hospitals (n=29 regimens) with a mean of 9.72 SD \pm 2.39 sets. In public hospitals (n=38 regimens) a mean of 10.39 SD \pm 2.34 sets was collected, compared to private hospitals (n=16 regimens) with a mean of 10.00 SD \pm 3.03 (two hospitals were analysed in both groups as they were a combined public / private facility). Using the t-test to compare the number of sets of vital signs collected over the first 24-hour period, as portrayed by the collection of

pulse and respiration, there was no statistically significant difference between rural / metropolitan ($p=0.09$) or public / private hospitals ($p=0.61$). In separating out the first four hour cluster, where there appears to be the greatest difference, there remained no statistical significance ($p=0.07$) in the number of vital signs collected in rural (mean 5.00 SD ± 1.57) versus metropolitan hospitals (mean 4.27 SD ± 1.28).

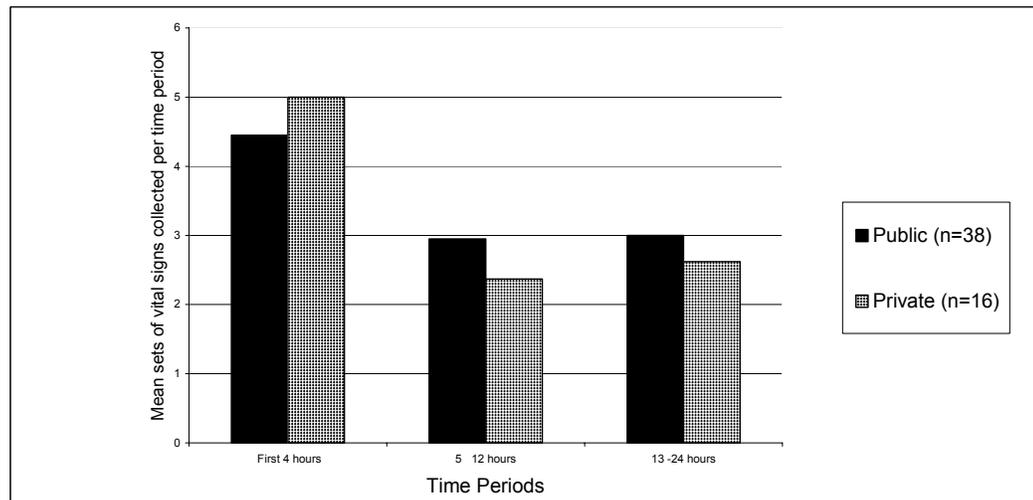


Figure 4.9. Mean number of vital sign sets per post-operative period for public and private hospitals.

A t-test was used to compare public and private facilities, to determine if differences occurred in the different time periods. In the initial four hours private hospitals recorded 5.00 SD ± 1.37 sets of vital signs and public 4.45 SD ± 1.45 . This difference was not statistically significant ($p=0.20$). The 5th -12th hours saw public hospitals (2.95 SD ± 1.11) recording more vital signs compared to private (2.37 SD ± 1.26), but was not statistically significant ($p=0.10$). In the 13th to 24th hour period public hospitals collected 3 SD ± 0 sets compared to 2.62 SD ± 1.02 for private hospitals and this was statistically significant ($p=0.02$). Whilst the frequency of collection has remained stable

over the 5th -24th hours in the public hospitals, it increased slightly for private organisations with the difference between the organisations for the 13th-24th hour statistically significant when using a t-test ($p=0.03$). Combining the periods for the total 24 hours the difference between the frequency of collection of sets of vital signs by organisations was not statistically significant ($p= 0.92$).

Non-Vital Sign Observations

When reviewing the policy documents, a list of 'other observations', in addition to vital signs, was also collated to ensure all aspects of patient monitoring were identified. Whilst all but one policy had some reference to frequency of vital signs, many had no reference to the frequency of other observations such as pain or wounds. Hospitals in Group A whose policies referred to frequencies for collection of 'other observations' totalled 33. Again there were vast differences between the practices described in policies. Some policies had scant details of 'other observations' to be undertaken, whilst others went into detail describing what observations were to be collected and how.

In setting up the categories, terminology proved a challenge. Some policies referred to checking comfort, or pain, or analgesia; others checked wounds, some checked dressings. To ensure all information was captured and to see if there were differences in practice, categories were set up for analgesia and pain so that statements such as 'offer analgesia' were considered separately to 'assess pain'. This also applied to 'checking the wound' recorded

separately from 'checking the dressing'. The initial review of the data involved an attempt to aggregate some of these. Pain and analgesia were combined for analysis as the analgesia category only attracted data for base line and 0-1 observations at 2 hospitals and all other data occurred in the pain category. Wound and dressings remained separate as a few sites stated the checking of both. Components that required checking as described in the policies are presented in table 4.3.

Observations Collated	
General Consciousness	Wound
Dressing	Drains
Pain	Analgesia
Nausea	Neurological
Intravenous (IV) access	Oxygen saturation
Colour	Neurovascular
Indwelling urinary catheters	Urinary output,
Airway	Nasogastric tubes
Vaginal / rectal loss	Blood loss
Swallow reflex	Skin

Table 4.3. Other observations documented to be undertaken in the first 24-hour post-operative period.

Frequency of Observation

Over the entire 24-hour period, for the hospitals in Group A that referred to the collection of other observations (n=33), wounds were required to be checked the most frequently at a mean of 7.18 (SD±6.25) times per 24 hours (mean 0.41 per hour). This was followed by drains at 6.12 SD±5.71 (mean 0.36 per hour) times per 24 hours, neurovascular checks at 6.67 SD± 8.01 (mean 0.35 per hour), monitoring intravenous access with a mean of 5.81 SD±5.74 (mean 0.34 per hour), and pain monitored 2.82 SD±4.99 times (mean 0.17 per hour). Figures 4.10 and 4.11 show the pattern of collection over the 24-hour

Group A-policies with traditional patterns covering 24 hours.

period based on the hourly frequency of collection, where 1 represents hourly and 0.5 represents ½ hourly.

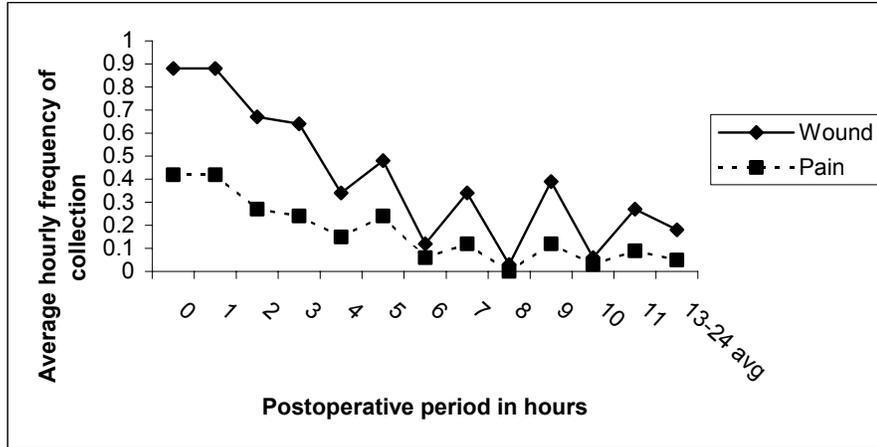


Figure 4.10. Comparison of documented collection of other observations – wound and pain.

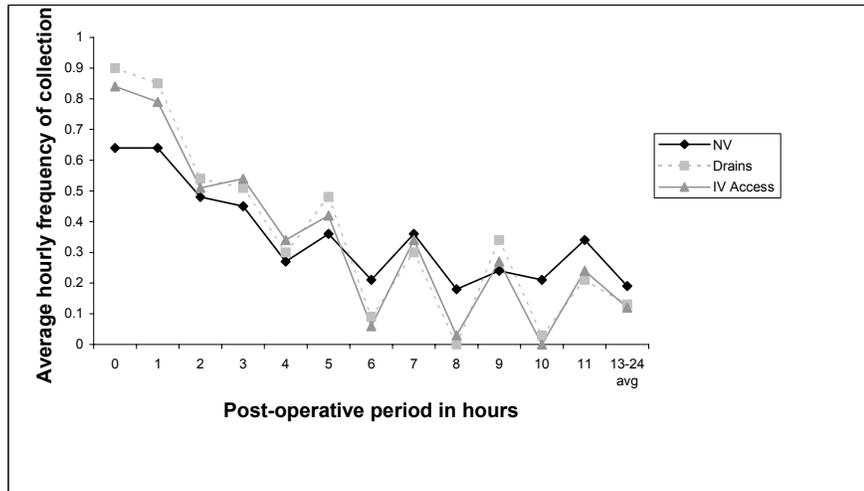


Figure 4.11. Comparison of documented collection of other observations – neurovascular, drains and intravenous access.

After the initial intensive monitoring period in the first four hours after returning to the ward, the saw-tooth pattern represents the regular collection of observations in a four hourly pattern distributed across the hospitals.

Development of Policy

From the sample surveyed (n=75), that is all hospitals in South Australia that described surgery as one of their activities, 60% of hospitals responding with policy documents (n=37) provided descriptions of how their policy was developed and ratified. Content analysis was undertaken on information from the 37 hospitals that provided documentation and verbal accounts of how policy was developed, reviewed and ratified. Of the 37 responses 62% (n=23) were from rural settings and 37% (n= 14) from the metropolitan region, 78% (n=29) were public hospitals, 19% (n=7) were private and 3% (n=1) a combined public / private facility. These figures are representative of the total sample surveyed.

The particular focus of the analysis was to identify who initiated the development or review of the policies, who contributed to a policy development and who endorsed practiced-based processes.

Who initiates policy?

Initiation of the development or review of policy in the most part is undertaken by clinical nursing staff (30%). Managers, being nurses classified at levels 2-4, i.e. clinical nurses, clinical nurse consultants or nurse managers, usually initiated the process of development or review of policy in 19% of the hospitals. A policy derived from consultation with another hospital with an existing policy was described as a reason in 16% of the cases. The development of polices occurs due to a variety of other precipitators and these are listed in table 4.4.

	Contributors	Occurrence (n=)
Who initiated the process for policy development or review?	Clinical Staff	11
	Managers (Level 2,3,4)	7
	Consultation other Hospitals	6
	Literature / Journals	3
	Identified Need	3
	Coroner	2
	Incident	2
	Other	1 each
	Legislation	
	Audit	
	Professional Organisation	
	Department Human Services	
	Committee i.e. Infection Control	
Medical Officer		
Other information		

Table 4.4 Initiators for the development or review of a policy.

Four hospitals indicated that the development of a new policy or the review of existing policies might result from a coronial finding or from a specific incident that had occurred.

Contributors to the review process

Once the process of development or review of a policy was commenced the analysis uncovered who contributed during the development / review process. Table 4.5 lists all the personnel and groups who contributed to the process of development or review with clinical based staff contributing (27%) in the largest number of sites. Whilst medical input rates highly (24%) in a number of organisations it should be noted that it was mentioned with a qualifier in respect to being 'where required' or 'where appropriate'. It was also noted that in 7 of the 37 hospitals (19%) their policies referred to the Johanna Briggs Institute either through the use of their practice manual

(Clinical Practice Manual 2002), or a hospital-based affiliation with the Institute established to look at evidenced-based research in health care.

	Contributor	Occurrence (n=)
Who contributed to the process of developing or revising a policy?	Staff Comment or Staff Meeting	10
	Medical Input / ratification (where required)	9
	Interim Committee	5
	Review by manager	4
	Quality Improvement Input	3
	Other	1 each
	Trial Expert panel	

Table 4.5. Contributors to the formulation of policies.

Endorsement of Policies

Finally information was extracted relating to who was involved in the endorsement of policies. There appeared to be a large group of hospitals (46%, n=17) that had an established group whose focus was on patient care and / or practice standards who, as a component of this, ratified policies. Nursing executive committees had a role to play in this process in 19% of the hospitals with only 8% of hospitals that specified that ratification occurred at ward level as shown in table 4.6.

	Contributions from	Occurrence (n=)
Who endorses procedures?	A patient care focussed committee or practice standards group	17
	Nursing Executive Committee	7
	Executive Committee / Board of Directors	4
	Department / unit or Clinical Manager	3
	Other	2 each
	DON	
	CEO	
Quality improvement committee		
Appropriate meeting / relevant Committee		

Table 4.6. Inputs into the development and ratification of policies

Policy document language

The use of language was discussed previously in relation to the descriptors used in the policy documents. It was interesting to note the diversity in the language used to describe the various committees or forums involved in the process of policy development, review and ratification. The differing terminology used is listed in table 4.7. From 17 hospitals describing patient care and nursing practice standards groups, reviewing policy documents, there were 12 different titles; some used in multiple sites. Some clearly have a nursing focus (n=6), others a care focus (n= 4) and practice, standards and patients all appear equally (n=2).

Titles of practice related committees and forums

Patient Care
 Nursing Practice
 Continuum of Care
 Nursing Care
 Patient Care / Nursing Service
 Nursing Practice
 Operation Review
 Standards Nursing
 Procedure Review
 Divisional Standards
 Clinical Review
 Nursing Policy

Table 4.7. Different Titles used to describe Clinical Practice related Committees.

Summary of Major Findings

There was a diverse array of policies obtained for this research. In summary they have revealed that

- The majority of hospitals describe traditional models for vital sign collection in their policies. These traditional regimens describe a wide variety of frequencies for collection.
- The most common pattern described is hourly for 4 hours then 4 hourly.
- These patterns highlight that nearly half of the vital signs were collected in the first 4 hours, with one ¼ collected in the 5-12th hour and the 13-24th hour periods.
- There was no standard use of the terms used in the policies provided. The terms 'vital signs' and 'observations' have no clear meaning but appear to have an implied meaning.
- Collection of base line observation, once a patient returns to the general ward setting, was not a consistent practice.
- Pulse and respiration measures were core components of a set of vital signs that usually incorporate blood pressure and to a lesser degree temperature, especially in the first 4 hours.
- The mean number of sets of vital signs collected in the 24-hour period was 10 sets.

- The difference in the number of sets for major and minor procedures with standard regimens was not statistically different.
- There was no statistically significant difference in the number of sets collected between different hospital types i.e. metropolitan / rural, public / private.
- Other observations collected in conjunction with vital signs were numerous and again not consistently described in the policy documents.
- Wounds followed by drains, neurovascular checks, intravenous monitoring and pain levels were the most common other aspects to be assessed during a patient's recovery.
- The policies were developed and reviewed at the initiation of nurses, clinical nurses followed by nurses in management roles.
- Clinically based nurses were the largest group contributing to the content of the policies, with medical staff on an 'as needed' basis.
- Patient care focussed committees, for the most part, endorsed policies.

Discussion

The survey of policy documents that underpin the practice of post-operative monitoring reveals of the diversity of practice, format, language and process. The results from this phase are discussed in light of the literature and the implications for practice.

Response

The survey process for this research produced results similar to Minichello et al. (1999:373) in their description of how to maximise response rates. They indicated that one should expect a response to the first mail out of 35%, to the first follow up a further 20-25% and the next follow up an additional 5-10%. This mirrored the response rates for this research with the initial response rate of 40%, increasing to 87% via series of follow-ups.

The high response rate and the fact that the sample represented the surveyed population in relation to public and private hospitals as well as rural and metropolitan sites provided a cross section of institutional types. Whilst the fact that three organisations did not want to participate was recognised, it was difficult to understand why one did not want to participate on the basis of 'commercial' reasons.

Issues

There are two broad issues that stand out from this phase of the research in relation to nursing procedures.

- There was great diversity and difference in relation to the type of observations and the frequency of observation between hospitals, units and potentially nurses.
- That nurses determine the policies in relation to the initiation of the process for development and have a strong presence in endorsing policy.

These two aspects are the focus of this discussion.

In attempting analysis on policy documents the different language was problematic as daily nursing practices such as vital signs and observation are not well defined nor was the intent of the terms described in individual settings. This was not only ambiguous in terms of interpretation for clinical staff but also has a direct impact on limiting the portability of nurses' practice between hospitals that support different individual policies in every organisation.

Whilst acknowledging there was diversity in practice, the focus of vital signs measurement and observations appears to occur based on documented predetermined processes rather than practices driven by patient need, anaesthetic time or surgical intervention, thus supporting the findings of other studies. Previously, Botti and Hunt (1994), found that nurses believed post-operative observations are determined by hospital policy and Burroughs and Hoffbrand (1990:371) believed that observations are "made largely as a routine procedure, unrelated to the perceived need of the individual patient".

The manner in which policy documents were written supports a regulated system of practice. Many of the policies used terms like 'up to the discretion of the RN', but minimum statements or a guideline always followed these. Frequently used terms included 'minimum', 'may be increased', 'then review', 'more frequently if required', 'where applicable', 'as required', 'if indicated', 'up to RN to determine type and frequency', 'guideline' and 'discretion of RN'. Many of these were being used as a disclaimer rather than encouraging nurses to use clinical judgement in determining the need for vital signs monitoring. Only one policy mentioned that observation frequency should be decided 'according to clinical picture'. It has been suggested that the determination of observations should be based on individual patient condition rather than traditional models of practice (Kilgour and Speedie 1985).

The pattern most commonly utilised for patient monitoring appears to be hourly for four hours, then four hourly. The variations in these regimens are great – there does not appear to be a consensus of practice. This diversity in available regimens suggests a lack of evidence directing best practice for post-operative patient surveillance. These differences in policy impact on the portability of nursing care from organisation to organisation and even from ward to ward. Diversity was also apparent in relation to the components of vital signs and other observations. Pulse and respiration are inevitably seen, as essential elements to 'a set' of vital signs but core elements of 'other observations' collected are not as easily identifiable. It was not just a matter

of determining a unit's policy on the collection of vital signs but also the frequency and type of other aspects of the patient that require monitoring. The inflexibility in policy appears to leave little room for nurses to determine appropriate patient care practices. Malangoni believes "The monitoring of patients should be predicated on patient needs, not locations." (Sentinel Event Alert 2000:1). One questions the validity of why one hospital could have seven different regimens for the collection of post-operative vital signs described in 11 different units. Whilst one might argue that the organisation may believe there is such diversity in the clinical settings there is a need for individual unit policy, it could equally be argued that each setting has just chosen a regimen that is a best fit based on experience and a sense that this is the way it has always been done.

The intensity of monitoring described in the policies has the potential to set nurses up to fail to provide the prescribed care required. By having monitoring frequencies at higher levels it makes it difficult for clinicians to achieve the set standard. One needs to question whether the policies have been designed to provide the organisation a level of medic-legal protection in requiring a certain number of measures to be undertaken rather than support the clinicians.

Patterns that allow for greater flexibility in collection patterns occurred in very few sites. For example, a policy of two sets of observations in the first hour then as determined by the registered nurses only occurred in one site. Alternate patterns that took into account the time spent in recovery

acknowledging the continuity of care that is required, were only seen in two rural hospitals, where there is greater integration of the recovery staff and the ward staff i.e. staff move more freely between areas.

The role of taking base line vital signs is unclear. This is evidenced by the differences in interpreting policy in relation to the collection of base line observation. Is there merit in recording a set of vital signs on the patient's immediate return to the ward if the patient has just had a set on leaving recovery? Greater integration between recording in recovery and the ward may assist in overcoming this dilemma, nevertheless, is worthy of comment in policy documents.

Clustering of vital sign collection into 0-4 hour, 5 -12 hour and 13-24-hour periods of a patient's journey through recovery, set a benchmark for comparison and influenced the way data were collated for analysis. The importance of this becomes more apparent in subsequent components of the research, for example, in relation to the analysis of the frequency with which nurses in the clinical setting collected vital signs. In addition it assists to identify trends in the nurse's daily workload. A high intensity workload was seen in the initial four hours, with almost half of the vital signs collected during the first 24-hours after a patient returns to the ward being collected in this period.

Overall, policies recommended a decreasing frequency of collection of vital signs over the 24-hour period. The difference in the collection of the elements

of vital signs was really only evident in the first four hours with temperature being collected initially less frequently, then being collected at the same rate as pulse, respiration and blood pressure. There are two sides to the debate on collection of post-operative temperatures. There is an argument that monitoring for hypothermia should occur in the initial post-operative phase and on the other hand that there is a lack of merit in monitoring for fever in the early post-operative phase. This debate will be explored more fully in the next chapter.

In defining a set of vital signs the policies reflect diversity in relation to the descriptors of terms used. Is a set of vital signs TPR and BP or a variation on this? The majority of the policies (89%) used the term observation compared to 24% who referred to the term vital sign. Observations (32%) and vital signs (36%) for the most part referred to TPR and BP. In 25% of the policy documents, where the terms observation or vital sign were used, there was no definition. Clearly there are assumptions (and differences) about what is a set of vital signs or a set of observations and whether this is reflected in practice is also explored in the next chapter.

The findings from this component of the research support previous research in this area regarding the number of sets of vital signs collected for patients in the initial post-operative period. The findings from a previous study resulted in a reduction in the number of sets of vital signs collected in the first 24-hours after a patient has returned to the ward from 11 to 8 sets (Davis and Nomura 1990) and another study evaluated a regimen that required 14

sets and then reduced collection to 9 sets (Schumacher 1995). These studies reflect similar frequencies to those reported in the policy documents for this sample population, which require the collection of a mean of 10.3 sets in a 24-hour period. The maximum occurred in one hospital with nurses being required to collect 16 sets of vital signs in the initial 24 hours. There was also a difference in the number of sets where the surgical case was determined to be major (12.4) versus minor (7.75). It appears that the frequency of initial post-operative monitoring has remained the same over the past 10 years since Davis and Nomura undertook their studies, but this is despite rapidly changing care of patients, e.g. as a result of shorter length of stay, day surgery, laparoscopic procedures. At no time in the documents were procedure classifications such as major / minor or long / short defined.

There were no differences in the number of vital signs to be measured based on the hospital type. Rural hospitals and public hospitals did collect more sets of vital signs but this was not statistically significant. Reasons for the differences between organisational type could be due to differing levels of support and the difference in the risk level associated with the procedures. Other factors may be the effect of staffing levels and patient risk profiles.

Reviewing the aspects of care that were collected in addition to vital signs, i.e. 'other observations', produced further challenges. This was largely due to the differing quality of how the policies were written and the undefined terminology. Again a diverse range was found in the practice recommended in the policies and the quality of the descriptions including up to 20 different

aspects of the patient that required checking. In general the frequency of 'other observation' collection was not specified in the documents. Aspects such as checking intravenous therapy were measured as they appeared frequently in the post-operative observation policies. One could argue that intravenous access / therapy could be removed as it is usually guided by a different procedure but the same could be said for neurological or neurovascular observations. This contextual difference may also account for the low occurrence of pain as it may also have other policies directing practice such as narcotic infusions and acute pain services. Not surprisingly wounds, drains, neurovascular observations, intravenous access and pain assessment were the aspects that required the most frequent monitoring.

The research did identify that policy and procedures in this population, which are the foundation of observation collection in nursing practice, are nurse driven and nurse endorsed. Whilst consultation does occur in the process of policy development, with a range of sources including other practitioners and the literature, the majority of input is derived from the clinical expertise and individual experience of the nurses. It would appear that nurses, in the most part, drive the policies that underpin the practice of post-operative nursing observations. The complexity and difference in language used within the texts even extends to the names of the bodies endorsing the policy! There are some limitations that need to be acknowledged in light of these disparate findings.

Limitations of Survey Phase

Limitations for this phase of the research relate to the type and quality of responses received. Whilst the response rate to the survey was high, participants were able to make decisions about what information they provided to the researcher. All documentation (i.e. care plans / maps / pathways, policies and individual ward documentation) was requested and in most cases policy documents were received with a few care pathways to support the policies. What remains unclear is if more local (i.e. ward-level) documentation exists in some organisations.

The quality of some of the policy documents did impact on the level of interpretation required by the researcher; some assumptions were made based on personal experience as a practitioner and a commonality between documents. Some organisations had policies that conflicted with each other: for example, a hospital policy that stated one regimen and a care pathway that described another. Another policy did not specify if the policy was describing sets of observations or hours between observations.

The issue of base line observations challenged the coding of data. Whilst some organisations specified base line observation on immediate return to the ward, many others described 'post-operative observations hourly for the first 4 hours'. What was unclear was when the first set of observations was to be taken. As discussed in the results section, for the analysis separations were made on the basis of the document specifying base line observations and for those that did not specify base line observation the first set of

observations to be collected was allocated to the observation undertaken in the first 60 minutes.

Not all hospitals that provided information on their policies for post-operative observations described how they developed policy. These were not specifically followed up as the 60% response rate provided a variety of responses.

Despite these limitations there still remains a large diversity in the policy documents that underpin the nursing practice of post-operative nursing observations.

Conclusion

This component of the research has uncovered an array of information not previously described. The survey phase of this research reviewed the policy documents that support nursing practice in a variety of hospital settings. This chapter has provided a comprehensive description of the content of policy documents from this diverse array of hospitals. It reveals that nurses drive the setting of clinical guidelines for patient care and there is a need to continue in this activity by supporting the decision making with evidence. There is great diversity in the documents that drive clinical practice, not only in relation to quality and language but also in relation to the practice described. But when this practice is analysed more formally it has been revealed that the majority of practice is modeled on routine regulated

regimens for collecting vital signs. There may be merit in this practice if there is evidence to support practice rather than opinion or tradition in isolation.

What remains unclear is if these policies are reflected in current practice. The description of the practice post-operative observation collection provides the background to the exploration of what is it that nurses collect in the clinical setting. This is presented in the next chapter.

Chapter 5

Observation of the Nursing Practice of Post-operative Surveillance.

Introduction

Whilst the content of policies that underpin the practice of post-operative observations has been revealed it is uncertain if this is reflected in practice. The actual nursing practice of post-operative observation, whilst central to the work of nurses, has not previously been analysed. Describing the current practice of post-operative monitoring is the precursor to identifying relationships between the practice and the detection of post-operative complications.

The purpose of this second phase of the research project was to observe and then describe the actual nursing practice of the surveillance the patient receives on the general ward after a surgical procedure, and to determine and use this information to inform the current nursing practice in relation to post-operative observations. This was achieved by observing nurses caring for patients post-operatively in two general surgical ward settings.

This chapter presents the phase of the research exploring the practice of routine observation collection. Described are the methods and the results of the non-participant observation. The results include demographics and

characteristics of the sample population, a series of measurements of time to undertake activities, profiling patterns of vital sign collection and types of other observations collected. The discussion section explores the meanings and implications of these results in the context of this phase of the research. This is all supported initially by an overview of the method used to collect and analyse the data.

Research Question

The research question for this phase of the research was

- what constitutes the current practice of post-operative surveillance in the first 24 hours a patient is in the general surgical ward setting?

Method

To gain a picture of what constitutes current nursing practice, in relation to post-operative observations, participant observation method was used to enable the researcher to gain insight into what is actually happening in practice. As a data collection method that provides a comprehensive snapshot of the daily activities nurses undertake, non-participant observation provided the primary source of data for this phase.

Undertaking non-participant observation enabled the researcher to observe and then describe the practice of post-operative monitoring. Allowing the observation of trends and patterns of monitoring patients post-operatively that have not previously been uncovered and highlighted, not only the

activity but also the non-verbal interaction between nurses and patients (Sinclair and Dickson 1997).

The focus of the observation was the timing of the post-operative observations and what nurses do to observe the patient. Two models of practice had previously been identified in the policy document survey of this research (Zeitz and McCutcheon 2002). These models were a traditional approach with observations predetermined for the first 24 hours after return to ward and the second model was based on nurses making clinical judgements about the frequency of observations. The clinical judgement model specified that two sets of observations were to be collected in the first hour after the patient returned to the ward then it was up to the registered nurse to decide the frequency of observation collection. Two hospitals using different models of post-operative surveillance were approached to participate and appropriate surgical units based on the relevant throughput of surgical patients were selected. Surgical units targeted were those where the predominant admission type was acute general surgical patients.

Whilst the hospitals used different models for post-operative monitoring they were also different in that one hospital was a private organisation and the other a major tertiary public hospital. As the hospitals used different dependency systems to measure workload, a review of the nursing staff rosters of the two units was undertaken to identify similarities and differences in staffing profiles that may contribute to the frequency and patterns of vital signs and observation collection. A one-week roster from

each unit that coincided with the observation period was analysed. Nurses on work rehabilitation, administration duties or annual leave were excluded.

In undertaking this phase of the research consideration was given to the ethical considerations and the rigour of the process.

Ethical Considerations

Ethics approval for the research was obtained from both hospitals' research and ethics committees. To facilitate informed consent for all participants involved in the research, all nursing staff on the participating wards were informed of the research. This consisted of the use of information sessions, individual letters and flyers. Emphasis was placed on the fact that the researcher's sole purpose was on the observation of frequency and type of nursing practice not individual differences in care. A participant information sheet was provided to nurses who were being observed with written consent being obtained and an explanation was provided to the patients and their relatives (see appendix 4). Prior to the individual observation sessions commencing, patients and, if present, relatives were informed verbally and in a written form by the researcher of the reason for the researcher's presence.

Data Collection

A structured observational method was used and this consisted of a planned system of data collection using a framework based on periods of time for observation and a data collection tool that assisted the collection of data

specific to this investigation. For each ward 16 periods of observation (64 hours) were possible (see table 5.1). This framework was selected to allow flexibility for the researcher to cover the 24-hour post-operative period. The maximum observation period of four hours per day was chosen to maximise the quality of data collected by minimising observer fatigue (Pincombe et al. 2000) and / or observer drift. (Fitzpatrick et al. 1996:355) It was decided that the observation periods would be staggered to ensure a snap shot of the 24-hour period of activities observed e.g. the initial 4 hours after returning to the ward, the 4th - 8th hour, through to the 20th - 24th hour of recovery. To maximise the data collection opportunities this changed to focus on patient hours. Each period allowed for the observation of a minimum of one patient, with more generally being observed, but was limited by local geography and patient allocations. Some periods were shorter as patients were discharged. All patient interactions between a nurse (including nursing students) and the patient were recorded and timed. The aim was to collect data that reflected the first 24 hours on return to the ward with a focus on the observations and vital signs undertaken per hour post surgery.

	Hospital A	Hospital B	Total weekly hours
Week One	4 hours for 4 days		16
Week Two	4 hours for 4 days		16
Week Three	4 hours for 4 days		16
Week Four	4 hours for 4 days		16
Week Five		4 hours for 4 days	16
Week Six		4 hours for 4 days	16
Week Seven		4 hours for 4 days	16
Week Eight		4 hours for 4 days	16
Total hours			128 hours

Table 5.1. Schedule of observation

Data were collected in relation to the frequency and type of observations, the practice of undertaking observations, the time taken and the detection of complications. A watch was used to record the length of activities in minutes.

Rigour

Documentation consisted of a structured framework (data collection proforma) recording demographic data of the patient along with the units of care supplemented by simple notes / journal and included a master chart. This tool was piloted during a trial observation period (appendix 5). The tool enabled the collation of relevant data and the only refinements required were formatting changes to the layout to facilitate ease of collection and the addition of an open section for additional notes. A master chart was used to ensure that observation occurred over the entire 24-hour phase of patient stay rather than the 24-hour nursing shifts.

A convenience sample was used to select patients to be observed based on their recent return from a surgical procedure and the availability of more than one patient located in the same proximity. Selection was undertaken in consultation with the senior nurse for the shift.

The researcher was the only data collector therefore ensuring that interrater variance was not an issue. It is reasonable to assert that using a single data collector enhances the reliability of the data and limits observer bias because error in such cases is usually systematic (Minichello et al. 1999). A single data collector also assists in providing invisibility as the staff became familiar with the researcher being present. As has been previously reported there was a decreased sensitivity in participants about being observed as they become more familiar with the researcher's presence (Manias et al. 2002).

It is debatable whether it is an advantage or disadvantage for the observer to be known or not by the staff in the research setting. Whilst the researcher was unknown to the majority of staff in both settings it is possible that being a nurse and being able to relate with them could have facilitated acceptance. This is described by Turnock and Gibson (2001:473) as a "researcher with practitioner knowledge". It is recommended in the literature that the researcher should be located where they have a line of sight of the activities under investigation. Consideration needs to be given to see if a single position is required to gain familiarity with the one section, multiple positioning to observe the activity in different settings or mobile positioning involving following individuals around as they participate in activities

(Skodal Wilson 1985:381). Positioning occurred in line of sight and range of hearing of the patient interactions. To decrease the influence of the observer on the nurses' actions, a 'fly on wall' approach was the aim of the observation. This was achieved by selecting an unobtrusive position, avoiding eye contact, ensuring thorough information sessions so all staff knew the research was being undertaken (so they did not need to ask) and reassuring staff the focus of the research was frequencies and timings not individual practice. The observer wore business dress and appropriate identification. Minimal interaction occurred between the nursing staff and the researcher and consisted of social pleasantries and information relating to the research of a generic nature. It was felt, as described by Marrow that the nurses became "so immersed in their work that they forgot my presence" (Marrow 1996:43; Manias et al. 2002). The difficulty was finding a place that was unobtrusive that allowed ease of observation and opportunity to listen to the interaction in busy surgical wards.

Observing practice can be stressful for the observer (Pincombe et al. 2000). Even as a non-participant observer they still have a "duty of care with regard to the patients being observed" (Pincombe et al. 2000:15). It was important to set up a process to guide the researcher if any situations are observed that could be harmful to the patient. This mechanism was negotiated with the Clinical Nurse Manager prior to commencing. If during the observation period a problem arose, including a patient emergency or the compromising of patient safety, the researcher would immediately report the problem to the

appropriate nursing staff. This may entail the nurse looking after the patient, the nurse in charge or the Clinical Nurse Manager. Only once did the researcher feel it was necessary to intervene when a patient started vomiting into their oxygen mask but in the end the relatives were quicker than the researcher.

In attempting to cover the 24-hour journey of the patient after returning to the ward the researcher undertook observation in four-hour blocks from 0700 until 2400. The majority of patients observed occurred in the initial 0-4 hour period. In discussion with the clinical staff it was felt observation during the early morning would not provide any additional information. Post-operative monitoring overnight consisted of the regular rounds observed from 2100 – 2400.

Data were analysed using Microsoft Excel 97 SR-1 and Statistica for Windows version 5.5 1999. Descriptive statistics were used in the analysis and presented as a mean and standard deviation. Student's t-test and Pearson Product Moment Correlation were used to determine differences in relationships between variables. A p value = 0.05 or less was considered statistically significant. Patient hours were aggregated for analysis into three periods that were identified from the previous phase, being the initial 0-4 hour period, 5th hour to the 12th hour, and the 13th hour through to the 24th hour.

Results

Characteristics

Observation in the two surgical wards resulted in 282 hours of patients' post-operative stay being observed. The sample consisted of 81 patients being observed, 20 patients being observed in two different periods i.e. a patient may have been observed from the 0-4 hour period on one day and on the following day observed during the 13-24-hour period. An overview of hours by hospital by patients is presented in table 5.2 with patient hours representing the number of hours individual patients were observed and hours of observation representing the number of hours the researcher was physically present.

Characteristics	Hospital A	Hospital B	Total
Patient Numbers	40	41	81
Patient Hours	130	152	282
Hours of Observation	64	59	123

Table 5.2. Summary of observation details

The majority of the patient hours (40%) that were observed occurred in the first four hours after returning to the ward however observation did occur for the total 24-hour journey of the patient rather than the 24-hours of nursing care. This is represented diagrammatically by figure 5.1.

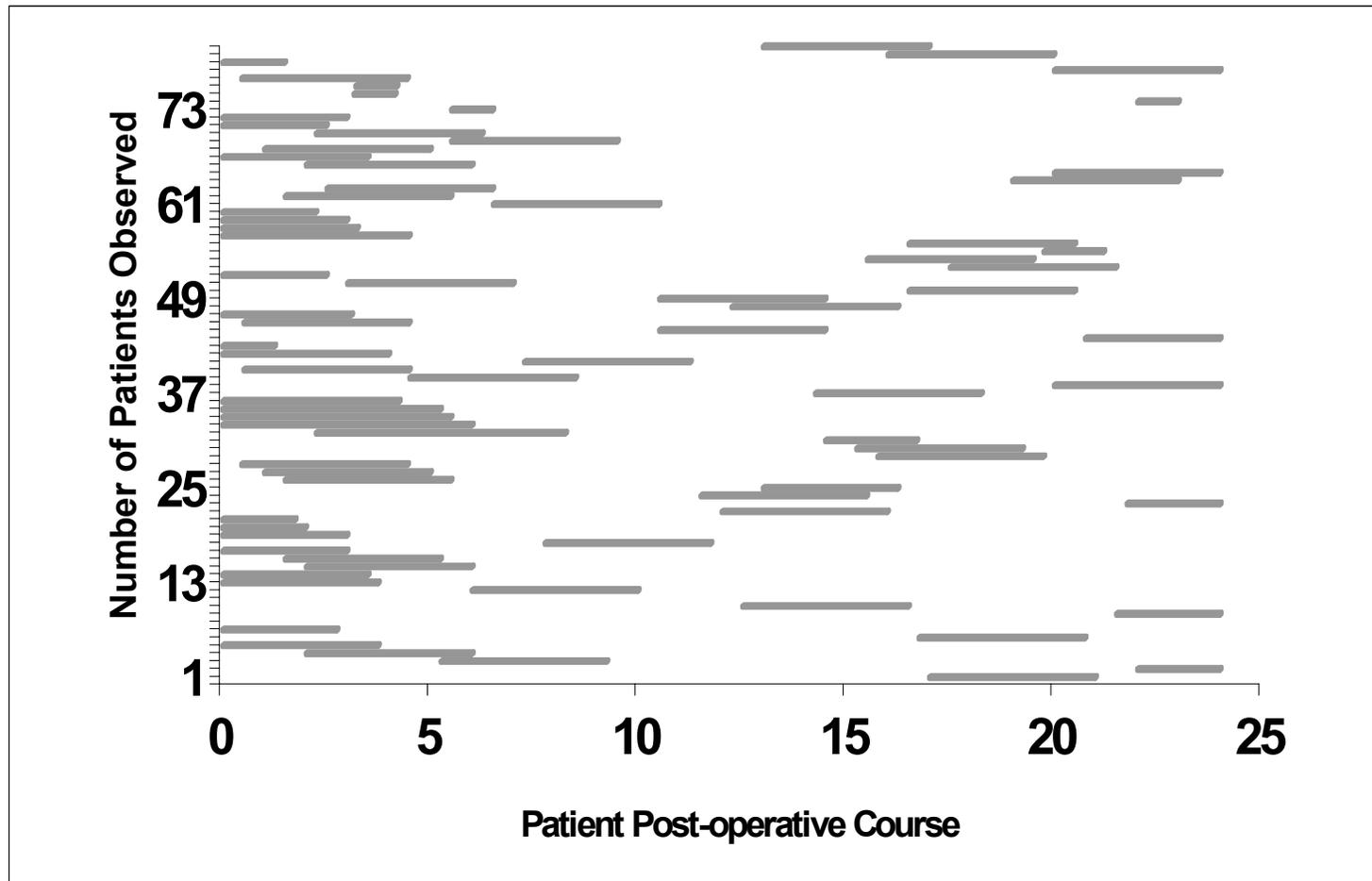


Figure 5.1. Distribution of the hours of observation over the 24-hour journey of the patient post-operatively.

The demographics of patient procedures and accommodation for the two hospitals are presented in table 5.3. The surgical ward in Hospital A (public) where the research was undertaken is a 26 bed Gastrointestinal Surgical Ward, comprising of the two specialty surgical units of the Professorial Oesophago-gastric Surgical Unit and the Hepato-biliary and Pancreatic Surgical Unit, geographically providing more share accommodation. This ward had a traditional regime based vital sign collection policy. The ward in Hospital B (private) is configured with more single accommodation and consists of a 32 bed specialty medical / surgical service including gastrointestinal, gynaecology, urology, ear, nose and throat and breast surgical specialities. The post-operative vital sign collection policy for this ward described the collection of two sets of vital signs in the first sixty minutes and then the frequency to be determined by the registered nurse. The spread of accommodation type was reflected in the accommodation of the patients observed, with more patients in Hospital A in share accommodation (80%) and more patients in Hospital B in single rooms (68%).

Characteristics	Hospital A	Hospital B	Total
Age (y)*	54± 18.3	56 ± 16.8	55± 17.5
Males (n=)	20	16	36
Females (n=)	20	25	45
Surgery Time (mins)*	111 ± 58	55 ± 31	83 ± 54
Length in Recovery *	101 ± 42	64 ± 21	82 ± 38
Single Room (n=)	8	28	36
Share or Bay (n=)	32	13	45

* Mean Value ± standard deviation

Table 5.3. Demographics of observation sample.

Similarities appeared in the population of the two units. The mean age of patients for both units combined was 55 years. More female patients were observed in Hospital B, and in Hospital A equal numbers of males and females were observed.

Analysis of the data collected indicated there was a relationship between the surgical time and the time spent in recovery and the difference in these times between the two units. The relationship between surgical time and recovery time was not statistically significant based on a t-test for Hospital B ($p=0.13$) nor at Hospital A ($p=0.35$). The difference in surgical time between hospitals was statistically significant using a t-test ($p=0.00$) and for the differences in recovery time ($p=0.01$). This aspect is explored in more detail in the subsequent chapter.

Range of Procedures

Patients underwent a range of procedures broadly classified based on the surgical descriptor used on the operative record and included examples such as appendicectomy, breast excision and cholecystectomy. In all, 25 categories were recorded on the operation sheet. The two most common general surgical procedures were herniorrhaphy in 20% of the patient population (n=16) and laparoscopic cholecystectomy in 26% of the patients (n=21). Table 5.4 lists the surgical procedures occurring at both hospitals.

Surgical Procedures	Hospital A	Hospital B	Total
Laparoscopic Cholecystectomy	15	6	21
Herniorrhaphy	6	10	16
Minor Surgical	5	5	10
Laparotomy	5	3	8
Gastric Banding		8	8
Open Cholecystectomy	4		4
Mastectomy		4	4
Other	5	5	10
Total	40	41	81

Table 5.4. Most frequently performed surgical procedures.

Interactions and Duration of Nurse Patient Contact

Interactions per hour were calculated on the number of separate visits a nurse made with a patient. The interaction describes contact between the nurse and patient, where multiple contacts related to one event it was counted as one i.e. a nurse who answered a call bell and left to get a bedpan was recorded as one interaction. The duration of the interaction per hour was

calculated from the total time in minutes (ttm) nurses spent with the patient divided by the hours the patient was observed (HO).

Equation for calculating nurse patient interaction

$$\frac{\text{total time in minutes (ttm)}}{\text{hours of observation (HO)}} = \text{duration of nurse contact}$$

A summary of the number of interactions and the duration per hour in minutes, over the three periods aggregated observation is provided in table 5.5.

Nurse Patient Contact	0-4 period (n=42)	5-12 period (n=32)	13-24 period (n=31)	Total
Interactions				
Hospital A (per hour) *	4.68±1.94 (n=22)	3.41±2.12 (n=14)	2.91±1.86 (n=15)	3.77±1.87
Hospital B (per hour) *	2.32±1.20 (n=20)	1.91±1.98 (n=18)	1.34±0.77 (n=16)	1.85±1.06
Combined	3.55±2.06	2.56±2.14	2.10±1.56	2.80±1.79
Duration				
Hospital A (mins) *	14.25±7.45(n=22)	7.87±4.08 (n=14)	9.64±7.06 (n=15)	11.33±6.84
Hospital B (mins) *	9.62±4.67(n=20)	9.28±12.00 (n=18)	3.66±2.65 (n=16)	6.90±4.74
Combined	12.04±6.63	8.66±9.30	6.55±6.00	9.09±6.24
* Mean Value				

Table 5.5. The number of interactions between nurse and patient and the length of time nurses spend with patients per hour by periods.

Over the entire 24-hour period for both hospitals a patient received a mean of 2.80 interactions per hour. This equates to 67 nurse / patient interactions per 24-hour period. When analysed by periods there were 3.55 interactions in the 0-4 hour period decreasing to 2.10 in the 13-24-hour period.

In the first 24 hours 48% of the total number of interactions between the nurses and patients involved a post-operative observation and 22% included a set of vital signs.

The mean time over the 24-hour period for both hospitals that nurses spent with each patient was 9.09 minutes per hour, equating to three and a half hours of nursing time per 24 hours. The duration of the interaction decreased over the 24 hours from 12.04 minutes at 0-4 to 6.55 minutes during 13-24-hour period. There was a strong positive correlation between the number of interactions per hour and the time spent with the patient ($r=0.80$).

The mean duration of contact at Hospital A (public) was 11.33 (SD±6.83) minutes and interactions at 3.77 (SD±1.87) per hour. For Hospital B (private) the length of duration was 6.91 (SD±4.74) minutes and the interactions per hour were 1.85 (SD±1.06). Analysis of these data using a t-test indicated a statistically significant difference for the two hospitals when comparing the number of interactions ($p=0.00$) and duration of contacts ($p=0.01$).

Of the 40 patients in Hospital A who were observed, eight patients had primary care delivered by student nurses equating to 21 patient hours. No students were present at Hospital B. Student nursing care time was included as it was the post-operative surveillance the patients received during the period of observation that was important not who delivered it. The mean time these students spent per hour with patients was 18.44 (SD± 9.16) minutes in comparison to qualified nurses (at the same hospital) who spent a

mean of 9.56 (SD± 4.86) minutes per hour. Students had a mean number of interactions at 5.44 (SD± 2.61) per hour where qualified staff visited 3.35 (SD± 1.40) times per hour.

Impact of Accommodation Type

Another area of interest was the difference between duration and number of interactions based on accommodation type. Data were stratified based on the allocation to a single room or in share accommodation. The mean nursing time was 9.09 minutes per hour for patients in both accommodation types, with 7.35 minutes (SD ± 5.07) per hour in single rooms and 10.48 minutes (SD ± 6.78) in share rooms for the total sample. This was also reflected in the frequency of interactions the nurse had with the patient in the first 24 hours post surgery. The mean number of interactions per hour for both types of accommodation of 2.80 per hour, with single accommodation at 1.98 interactions (SD ± 6.14) and for share accommodation 3.45 per hour (SD ± 1.95).

Nurse Patient Contact	Share accommodation	Single accommodation
Interactions		
Hospital A* (per hour)	4.06±1.93 (n=32)	2.59±1.00 (n=8)
Hospital B* (per hour)	1.99±0.94 (n=13)	1.80±1.13 (n=28)
Combined	3.45±1.95	1.98±6.14
Duration		
Hospital A* (mins)	11.92±7.11 (n=32)	8.00±5.34 (n=8)
Hospital B* (mins)	6.96±4.06 (n=13)	6.88±5.00 (n=28)
Combined	10.48±6.78	7.35±5.07
* Mean Value		

Table 5.6. Measuring nursing time with patients based on the type of accommodation.

Analysis of these data indicated that there was a difference in the amount of time nurses spent with patients in share accommodation compared with time spent with patients in single rooms (see table 5.6) using a t-test it was found that there was a statistically significant difference in the number of interactions per hour based on accommodation type ($p=0.01$) and duration per hour ($p=0.02$) for the total sample. For Hospital A there was a statistically significant difference in the number of interactions with patients in share accommodation compared to patients in single accommodation ($p=0.04$) but not a statistically difference in the duration of nursing time ($p=0.28$). There was not a statistically significant difference in the number of interactions ($p=0.66$) or duration ($p=0.95$) due to accommodation type at Hospital B.

It appears that patients who were allocated to share accommodation spent more time with nurses and were observed more frequently but this was not statistically supported for this data set.

Initiation of Interaction

At Hospital A there were a total of 440 interactions that occurred during the observation period. Of these 85% ($n=374$) were instigated without a prompt i.e. were nurse initiated, and for 15% ($n=66$) some prompt initiated the interaction i.e. a call bell or patient calling the nurse. Interactions at hospital B ($n=278$) were without a prompt 94% ($n=262$) of the time with 6% ($n=16$) of interactions initiated by a prompt. For both hospitals over the 24-hour period 89% of interactions were initiated without prompting. When analysis of the

interactions was undertaken based on the three separate periods the results were similar to the total sample (see figure 5.2).

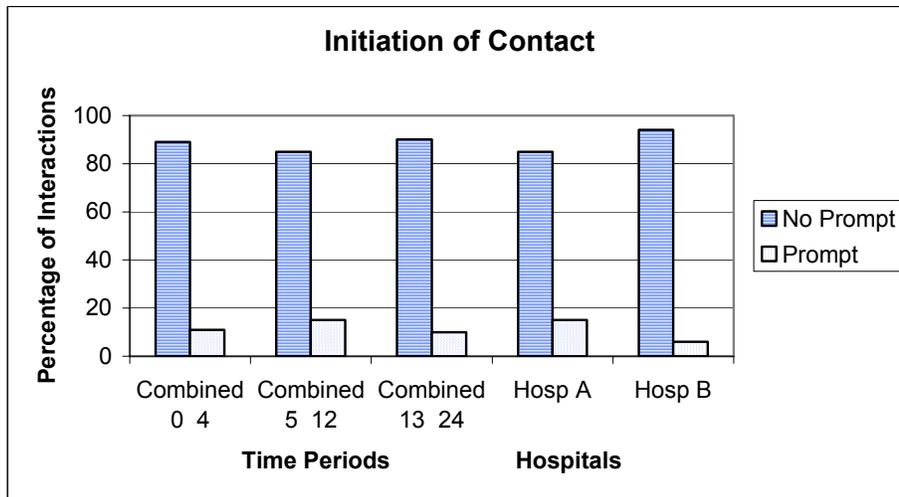


Figure 5.2. Distribution of the initiation of interactions based on time at the two hospitals.

Timings

Periods between nurses observing patients.

Analysis of the time the nurses attended and left the patient allowed calculation of the maximum time, in minutes, between visits per period of observation. The mean maximum time between a visit was 66 minutes, (range 9 -201 minutes) with a mean of 50 minutes (range 9-102) for Hospital A and 81 minutes (range 21-201) for Hospital B. Thirteen patients had a maximum period without observation by a nurse of greater than 90 minutes, with three occurring in the initial period 0-4 post-operative period and 7 occurring during an early shift. Whilst there was a difference between the frequency and time spent with patients based on accommodation type, there was also a difference in the maximum period that patients went unobserved.

The mean maximum time in a single room was 84 (range 21-201) minutes and in share accommodation the time was 51 (range 9-100) minutes.

The mean for the duration of time between the last set of vital signs in recovery and the first set on the general ward was 31 minutes (SD±15.93). One case was excluded as the patient arrived on the ward via the intensive care unit and did not spend time in recovery. Of the 80 cases, one patient had over 100 minutes between the last set of vital signs in recovery and the first set on returning to the ward, 2 patients had first set of vital signs collected 60 minutes after returning to the ward and 8 patients (10%) had first set vital signs collected 50 minutes after returning to the ward.

Length of time to collect vital signs

This research examined the time to collect vital signs, with the timings incorporating the time taken to measure the vital signs and any other activity that was undertaken at the same time such as getting a bedpan or checking infusion pumps. The mean time for vital signs measurement was 5.8 minutes (SD±2.56) with the range being from 1 minute to 15 minutes.

Vital Signs

To determine patterns in the frequency of vital sign collection over the first 24-hours post-operatively the frequency of collection as expressed by the mean minutes between sets of vital signs was explored. Three periods are shown, the initial 0-4 hours, 5-12 hours and the last 12 hours 13-24 (see table 5.7). Upon looking at the spread of minutes per set of vital signs the pattern

of collection that was reflected was hourly during the first four hours after the patient returns to the ward, three hourly during the 5th – 12th hour period and then four hourly during the final 12 hours.

To calculate the minutes between sets of vital signs the number of times a vital sign was collected during an observation period (tsc), per patient, was divided by the hours the patient was observed (HO). This mean result was divided into sixty to get the number of minutes between the measures.

$$60 / \left[\frac{\text{times sign collected (tsc)}}{\text{hours of observation (HO)}} \right] = \text{minutes between collection}$$

	0-4 period (n=42 patients)	5-12 period (n=32 patients)	13-24 period (n=31 patients)
Temperature *	73	128	250
Pulse*	61	162	261
Respiration*	61	162	261
Blood Pressure*	61	181	250
Reflected in Practice	Hourly	3 hourly	4 hourly
* Mean Value-minutes			

Table 5.7. Time elapsed in minutes between the collections of individual vital signs in each period.

When the frequency of respiration and pulse collection was analysed as the core components of a set of vital signs, this resulted in patients having 10 sets of vital signs collected in 24 hours.

If each participating unit is analysed separately the initial collection of vital signs for the first four hours occurs hourly at both hospitals. Hospital A, more vital signs are collected in the 13th – 24th hour period but less in the 5th –

12th hour when compared to Hospital B (see table 5.8). This results in 9 sets of vital signs being collected at Hospital A compared to 11 sets at Hospital B in the 24-hour period.

	0-4 period		5-12 period		13-24 period	
	Hosp A	Hosp B	Hosp A	Hosp B	Hosp A	Hosp B
Temperature *	75	71	90	187	260	240
Pulse*	62	60	154	167	333	222
Respiration*	62	60	154	167	333	222
Blood Pressure*	62	60	200	167	300	222
Reflected in Practice (every n hour)	1	1	2 ½	2 ¾	5 ½	3 ¾
* Mean Value-minutes						

Table 5.8. By Hospital Time elapsed in minutes between the collections of individual vital signs in each period.

The increased collection in temperatures for Hospital A in the 5-12th hour period was most likely due to an aberration in the data due to the small sample. In this period 14 patients were observed for a total of 25 hours, three of these patients were observed for less than an hour but accounted for 1/3 of the temperatures taken in the observation periods. There was no appreciable reason for this increase.

Observations

The collection of observations (other than vital signs) occurred at varying frequencies. Tables 5.9, 5.10, and 5.11 describe the collection of other observations in the three periods. These tables describe the number of patients who potentially could have these aspects monitored, what number

of patients actually had them checked and the range of the number of times that they were checked to a maximum of a four hour period.

In the initial four hour period 42 patients were observed with 93% of patients having their oxygen saturations checked via pulse oximetry (one patient was not checked as the machinery was malfunctioning). The next most frequent observation was of the wound in 88% of patients who had a wound, followed by pain in 83% of the patients. Checking of pain also had the greatest range in the number of times it was checked in the maximum period of 4 hours (range = 0-6). The assessment of sedation level occurred for 55% of the patients. Drains, being asked how are you feeling, fluid management, voiding, nausea and bowels were all assessed in less than 50% of the patients.

	Total Number Patients (n=42)	Number Patients Checked (%)	Median	Range of frequency of checking
Saturations	41	38 (93)	2	0-4
Wound	41	36 (88)	1	0-5
Pain	42	35 (83)	2.5	0-6
Sedation	42	23 (55)	1	0-3
Drain	14	7 (50)	0.5	0-2
How are you?	42	13 (31)	0	0-2
Fluid Management	42	12 (28)	0	0-2
Voiding	42	8 (19)	0	0-1
Nausea	42	7 (17)	0	0-2
Bowels	42	3 (7)	0	0-1

Table 5.9. Initial 0-4 period - number of patients monitored for other observations.

This distribution changed slightly in the 5th – 12th hour period, although the number of patients assessed decreased substantially. The most frequently assessed aspect in this period was pain, but it was only observed in 53% of

the 32 patients observed in this period. Oxygen saturations were checked in 50% of the patients and wounds in 41%. Drains, sedation, being asked how are you feeling, voiding, nausea, fluid management and bowels were all checked in less than 40% of the patients.

	Total Number Patients (n=32)	Median Checked (%)	Range of frequency of checking
Pain	32	17 (53)	1
Saturations	32	16 (50)	0.5
Wound	32	13 (41)	0
Drain	11	4 (36)	0
Sedation	32	11 (34)	0
How are you?	32	9 (28)	0
Voiding	32	6 (19)	0
Nausea	32	4 (12)	0
Fluid Management	32	3 (9)	0
Bowels	32	1 (3)	0

Table 5.10. 5th –12th hour period - number of patients monitored for other observations.

The distribution seen in the 5th - 12th hour period was the same for the final 12 hours with similar number of patients being observed. From the 31 patients observed, in this period, 58% had pain assessed, followed by 41% having their oxygen saturations measured (for two patients the pulse oximeter was being repaired). Wound, how are you feeling, drains, fluid management, sedation, bowels, nausea and voiding were all observed in less than 40% of the patients.

	Total Number Patients (n=31)	Median Checked (%)	Range of frequency of checking
Pain	31	18 (58)	1 0-4
Saturations	29	12 (41)	0 0-4
Wound	31	11 (35)	0 0-3
How are you?	31	10 (32)	0 0-2
Drain	13	4 (31)	0 0-1
Fluid Management	31	9 (29)	0 0-2
Sedation	31	7 (22)	0 0-4
Bowels	31	7 (22)	0 0-2
Nausea	31	3 (10)	0 0-1
Voiding	31	1 (3)	0 0-1

Table 5.11. 13th –24th hour period - number of patients monitored for other observations.

Whilst understanding the distribution of the collection of other observations the other element to be explored was the pattern of collection. The next table (table 5.12) describes the elements of ‘other observations’ that at different times are described in the literature as the fifth vital sign, pain (Tierney et al. 1997) and oxygen saturations (Evans et al. 2001) along with wound and sedation. These represent the more frequently collected ‘other observations’ and show the mean number of minutes between collection.

	Patients observed (n)	0-4 period	5-12 period	13-24 period
Pain*	81	76	150	222
Saturations*	78	77	181	222
Wound*	80	95	250	428
Sedation*	81	139	222	428

* Mean Value in minutes

Table 5.12. Time elapsed in minutes between each activity in each period.

Table 5.13 presents the mean minutes of time elapsed between the checking of other components observed and finally table 5.14 represents how this is reflected broadly in practice.

	Patients Observed (n)	0-4 period	5-12 period	13-24 period
Drain*	14/11/13	162	315	261
How are you?*	81	400	400	545
Fluid Management*	81	461	2000^	600
Nausea*	81	857	750	2000^
Voiding*	81	666	600	6000^
Bowels*	81	3000^	6000^	750

* Mean Value in minutes ^ < 3 patients

Table 5.13. Time elapsed in minutes between each activity in each period.

In table 5.14 where no number is specified this is because the majority of the patients did not have this aspect assessed whilst being observed.

	0-4 period	5-12 period	13-24 period
Pain	Hourly	2 hourly	3.¾ hourly
Saturations	1¼ hourly	3 hourly	3.¾ hourly
Wound	1 ½ hourly	4 hourly	7 hourly
Sedation	2.5 hourly	4 hourly	7 hourly
Drain	2½ hourly	5 ¼ hourly	4.½ hourly
How are you?	6 ½ hourly	6 ½ hourly	9 hourly
Fluid Management	7 ¾ hourly		10 hourly
Nausea	14 hourly	12 ½ hourly	
Voiding	11 hourly	10 hourly	
Bowels			12 ½ hourly

Table 5.14. Time elapsed in minutes between each activity in each period.

Other observations assessed in varying patterns, with some being similar but no two the same. The assessment of the presence or absence of pain was

collected slightly more frequently than vital signs and oxygen saturations, wounds and sedation collected at similar frequencies ranging from 1.5-2.5 hourly in the initial 0-4 hour period, 3-4 hourly in the 5th-12th hour and 6.5 hourly in the 13th-24th hour. Other aspects were collected at varying time intervals ranging from slightly more frequently than once a shift through to every 12 hours.

Other Observations

Data on intravenous monitoring were collected when other observations were undertaken. Looking at the mean number of minutes between checking over the 24-hour period, intravenous therapy (whether on a pump n=29 or no pump n=24) was monitored less frequently than hourly. The mean for checking intravenous therapy managed with a pump over the 24-period was every 136 minutes (n=29) and intravenous therapy without a pump was checked every 116 minutes (n=24). For patient-controlled analgesia infusions the mean time in minutes between checking was 107 minutes. The variation over the periods is presented in table 5.15 with intravenous therapies checked during the 13th -24th period less frequently than two hours between checks.

	Total No	0-4 hour	5-12 hour	13-24 hour
PCA	9/10/10	96	82	122
IVT no pump	14/12/9	92	107	130
IVT with pump	18/12/4	103	133	193
IVT combined	32/24/13	98	120	146
Combined as Reflected in Practice		1.5 hourly	2 hourly	2 hourly

Table 5.15. Frequency of checking intravenous infusions by type of system.

Other aspects of care monitored by nurses but occurring in a minimal number of cases or frequency (less than 15 patients) were the monitoring of nasogastric tubes, oxygen therapy, neurovascular observations, food intake, warmth of patient, orientation, epidural infusions, shortness of breath, blood sugar levels and indwelling urinary catheters.

When examining the rate of complications it was noted that Hospital A had a total of six patients who vomited (15%) all before the 7th hour but none vomited at Hospital B. Of those patients who vomited (5 were observed for 4 hours and one for 145 minutes) during the time of observation only one patient had nausea assessed and then only once. No other complications were observed during the observation periods.

Skill Mix

In an attempt to further explore factors that may contribute to the frequency and patterns of vital signs and observation collection, a review of the nursing staff rosters of the two units was undertaken. Hospital A, the public hospital, had the larger number of full-time equivalent (FTE) staff allocated on the roster at 23.46 FTE with lower bed numbers compared to Hospital B, a private hospital with a FTE staff of 16.15 (see table 5.16). There was a difference in the allocation of Enrolled Nurse FTE with Hospital A having more enrolled nurses and more graduate nurses. Hospital B had more experienced registered nurses, with more than double the number qualified at pay point year 5 and above (13.32 FTE) compared to Hospital A (6.94 FTE).

Hospital A also had student nurses present on the ward but these students were rostered supernumerary to the staffing levels.

Qualification	FTE Hosp A (26 beds)	FTE Hosp B (32 beds)
CNC	1	1
CN	2	0.9
RN 8 or greater	2.1	7.4
RN 7	0.42	
RN 6	1	0.42
RN 5	0.42	3.6
RN 4	6.84	1
RN 3	1	
GNP	3.84	
Unknown RN		1.6
Total RN	14.78	15.92
EN5	1.47	
EN4	0.95	
EN 3	0.63	
EN 1	1.79	
Unknown EN		1.23
Total EN	4.84	1.23
Total Staff	23.46	17.15

Table 5.16. Years of experience based on qualifications and pay increment level.

Summary of Major Findings

The observation of nurses in two clinical settings has revealed a wealth of information in relation to the practice of post-operative monitoring. In summary, for this sample, this has included:-

- Nurses in post surgical settings care for patients recovering from a variety of surgical procedures with Laparoscopic Cholecystectomy and Herniorrhaphy the most common procedures in these two general surgical settings.
- In a 24-hour period nurses spend a mean of 9 minutes per hour with patients and this was spread over a mean of 2.8 visits. The number of interactions and the duration of interactions decreases over the 24-hour post-operative period.
- There was a statistically significant difference between the duration and number of interactions of the nurse and patient between the two clinical settings.
- In the hospital where student nurses were present it was found that students spent more time with patients overall compared to the qualified staff on the same ward.
- For the entire sample patients in share accommodation received more nursing time and more frequent interactions than those in single bed rooms.

- Nurses instigate nurse-patient contacts for 89% of the interactions. Almost half of the interactions between nurses and patients involved a post-operative observation and one quarter involved the collection of vital signs.
- The mean maximum time a patient went unobserved by nurses during the study period was 66 minutes, however the range was much greater.
- The time between the last set of vitals signs in recovery and the first set on the ward was 31 minutes.
- Vital sign collection on average took 5.8 minutes for all staff combined.
- The regimen that vital signs were collected in practice was hourly for the first 4 hours, three hourly from the 5th - 12th hour and four hourly from 13th -24th hour. This resulted in 10 sets of vitals signs being collected.
- In the initial 4 hour post-operative period 93% of patients have a pulse oximeter recording. This then decreased to 50% of the patients.
- Pain, oxygen saturation, wounds and sedation were the most frequent other observations recorded, with pain being collected slightly more frequently than vital signs, and oxygen saturations slightly less frequently.
- Intravenous therapy was checked every 2 hours with infusions on an electronic pump checked less frequently than those without.

- Vomiting was the only complication that occurred during the observation periods for 6 patients in one hospital.
- There were differences in the staffing levels of the two sites. The hospital with fewer beds had more staff but at lower level of experience.
- There appeared to be a relationship between the length of surgery and the amount of time spent in recovery although this was not statistically supported. There was a statistically significant difference in surgery length between the two hospitals.

Discussion

There is a wealth of information imbedded in the practice of nursing. The post-operative surveillance of patients returning to general wards after surgery has been observed and described for the first time in a formal way. Some insights into what this information implies, in relation to the monitoring of patients post-operatively, are explored further.

Diversity in Practice

In describing the nursing practice of monitoring patients on two general wards having undergone a surgical procedure, and determining what was the nursing practice in relation to routine regulated post-operative observations, a diverse collection of findings has been uncovered.

Whilst the geography and accommodation type of the two hospitals were different, there were similarities in the two patient populations highlighting the diversity in the surgical procedures that patients post-operatively have undergone, that nurses care for in the initial post-operative period. In a two-month period the nurses in the two participating wards cared for patients recovering from 25 broadly classified surgical procedures. These were two general surgical wards with some surgical specialties based on the ward. The pressure on hospital bed availability, surgical changes through increased specialisation and increased technological driven surgical techniques meant nurses in general wards were exposed to patients undergoing a wide variety

of different procedures. Long gone are the days when a surgeon would do a surgical list of all one procedure.

The significance of the finding of the relationships between surgical time and time in recovery and the differences in surgical procedure time between the two hospitals reoccurs in the next phase of the research. These will be explored further in the next chapter and in the final integration of the findings of this research.

Workload

In general nurses have viewed the initial post-operative monitoring a patient receives as intensive work (Burroughs and Hoffbrand 1990; Centre for Applied Nursing Research 1998). Hourly observations in the early stages of a patient's recovery impact on nursing workloads. In this research almost 50% of nursing interactions in the first 24 hours post-operatively involve a post-operative observation and almost 25% a set of vital signs. The first four post-operative hours are where the intensity of monitoring occurs. This is not evenly distributed throughout a nurse's shift. With advancing technologies many surgical procedures are quicker and so patients who leave the ward on a morning shift often return during that same shift. There is no way to contain the fluctuating higher periods of monitoring and it is not evenly distributed throughout a day. Observing nurses monitor patients post-operatively has quantified this practice. Initially it was felt the mean time nurses spend over 24 hours of 9.1 minutes per hour was low. This was spread over a mean of 2.8 visits per hour. Whilst this appears less than ideal,

nurses react to this information by multiplying these by the numbers of patients they look after and whilst this calculation seems to come close to a full hour it does not then incorporate administration time. Pincombe et al. (2000:25) described care-time in a study of the care of patients who were dying in general wards and found in a four hour period care-time ranged from 16 minutes to 241 minutes. This would equate to range per hour of 4 minutes – 60 minutes per hour. The length and frequency of contact reported in this research decreased as the length of time after surgery increased. Whilst this would be consistent with what has been traditionally perceived as an appropriate monitoring practice because of a belief that complications are less likely to occur as time from surgery increases, in reviewing post-operative complications there remains no clear relationship between the intensity of the monitoring and the timing of complications. What remains unclear is if more substantive complications may not in fact occur after the initial 24 hours e.g. infection, wound dehiscence, chest consolidations when the patient monitoring rate was decreasing.

The majority (89%) of interactions were initiated by nurses whilst doing rounds for medications, observations, feeding or whilst undertaking activities for other patients. These routines ensured surveillance of patients by nurses. The use of call bells, alarms or relatives to contact a nurse were minimal.

The type of accommodation in which a patient was allocated may be associated with the nursing time they receive. The two hospitals that

participated in the research had different mixes of accommodation type. Patients in share accommodation saw the nurse more often and the nurse spent more time with them than patients in single accommodation. The advantage of being accommodated in shared accommodation appears to be that the maximum time patients went unobserved in this research was less than patients allocated a single room. These differences do not appear to have been quantified in the literature previously, although Pincombe et al (2000) do discuss this in the context that being allocated to a single room increased patient isolation. In addition Adams, Bond and Arber (1995) described ward layout as impacting on the quality of care in that it affects the number of nurses required and the time available for nurse-patient contact.

What is troubling is that whilst the mean time a patient went unobserved was over an hour, in all accommodation types patients went unattended for long periods and the majority of these occurred on a morning shift. Morning shifts have traditionally had higher staffing levels than other periods due to the increased workload undertaken in this shift. Personal experience and anecdotal evidence from the observation of nursing practice suggests the intensive and time consuming work undertaken on a morning shift related to personal hygiene needs, takes the nurse away from other patients for long periods. These findings are similar to those reported by Pincombe et al. (2000) with a range of minutes between care events ranging from 1 minute to 210 minutes.

The mean time between the collection of vital signs on transfer from recovery to the ward was half an hour. The documentation in both sites consisted of different charts being compiled for post-operative observations in recovery and on the ward. There did not appear to be a relationship between the last set of vital signs taken in recovery and the time the next set of vital signs were collected on the ward. It seems the first set of vital signs on the ward was used as a base line assessment rather than a continuum of care.

In addition this research confirmed previously held beliefs that student nurses spend longer with their patients and that they also visited them more often. It is suggested this may be due to the inexperienced nature of their practice in that it takes them longer to perform care, they may be less organised, and have limited foresight in terms of planning activities, as these elements are still being developed. However, the alternative is that they may have more time to spend with patients due to lighter patient loads or being less involved in management activities of the ward.

The monitoring of the patient post-operatively revolves around the collection of vital signs and detection of other signs and symptoms. The collection of vital signs mirrors the practice frequently described in the policy documents that underpin practice (Zeitz and McCutcheon 2002). In reality it seems nurses collect vital signs more frequently than traditional policies have dictated. The two hospital units were specifically chosen because of the different policies describing the collection of vital signs. However, this research reveals they collect the vital signs at similar frequencies. In a study

by Botti and Hunt (1994) it was found that nurses believed hospital policy dictated observation collection at a rate of half-hourly for four hours, despite the fact these guidelines did not exist. In this research the model of collection resembles traditional collection patterns, hourly observations initially, 3 hourly in the period 5th to 12th hour and 4 hourly in the period 13 - 24 hours. This finding is in contrast to that of Long et al (1998) who found vital signs were taken less than the policy determined. These contrasting findings suggest that these practices are routine rather than based on the need of the patient as determined by clinical judgement.

As defined in the previous chapter, minimally, a set of vital signs constitutes pulse and respiration collection. This observation of practice reveals that overall nurses collect 10 sets of vital signs in the patient's first 24 hours after returning to the ward, with one hospital collecting a mean of 9 sets and the other 11 sets. A study investigating high dependency care and routine nursing care described the mean number of observations collected in a 24-hour period for High Dependency Unit type patients was 11.3 compared to 4.2 for patients requiring routine post surgical care. Unfortunately the time of the post-operative recovery is not reported (Coggins 2000).

Whilst computer software programs often allocate 3 minutes as the time to undertake a set of vital signs they are usually not undertaken in isolation. This research found the mean time to be 5.8 minutes and this included other duties attended to whilst recording vital signs, such as resetting pumps, making patients comfortable or documentation. It has been reported that the

collection of vital signs can be allocated up to 15 minutes in other acuity systems (Camp-Sorrell and Wujcik 1994).

What was clear when observing practice was that once the initial intensive monitoring had been undertaken for individual patients, nurses collect vital signs in rounds. These rounds coincide with the four-hourly patterns that are part of hospital culture. Hence after the initial 12 hours of observation post surgery the timing for collection was averaged at 4 hourly. This is supported by the fact that the majority of nurse-contact was initiated without prompting and suggests that regular routine observation collection enables the nurses to attend to the majority of patient needs, where the practice applies to all patients rather than based on individual assessed needs.

Vital signs were not the only aspect of post-operative patient monitoring collected. Other observations included pain, wound, sedation, oxygen saturation and drains and all are collected at varying frequencies. Nurses assess pain and this was the most frequent observation performed, during the 5th to the 24th hour being more frequently collected than vital signs in the 5th-24th hour period. It has previously been reported that nurses are more attentive to pain cues when vital signs are being collected (Manias et al. 2002). A survey undertaken by Mayer, Torma, Byrock, and Norris (2001) reported that whilst 93% of nurses surveyed knew that vital signs were not good indicators of pain, 75% felt that vital sign measurements influenced their treatment decisions regarding pain.

Oxygen saturations were taken less frequently than vital signs with the majority of the patients having oxygen saturations recorded in the first four hours. In a study reviewing pulse oximetry in acute medical wards 50% of patients received pulse oximetry readings (Simon and Clark 2002). Whilst in the surgical setting oxygen saturation measurements collected 6.2 times in 24 hours have been reported for high dependency type patients compared to 1.84 for patients recovering from routine procedures (Coggins 2000). Wound and drain monitoring followed a similar pattern where the percentage of patients who had a wound or a drain had these observed in a decreasing pattern over the 24-hour period. Whilst assessment of voiding patterns tapered off over the 24 hours there was an increase in the number of patients who were asked about bowel habits in the 13-24-hour period as one would expect. Only one third of patients were asked how they were feeling and less than 20% of patients were questioned regarding nausea.

The monitoring of intravenous infusions was a frequent occurrence in the observation period. Intravenous therapies were managed with or without pumps or via patient controlled analgesic (PCA) devices. What potentially differentiated the PCA's from other intravenous infusions was the fact hospital policy in both settings required the checking of these devices hourly whilst in situ. Intravenous pumps appeared from observation to generate work for the nurses during the observation period, as they were often alarming. However, this was not reflected in the data as patients with pumps

had their infusions checked less frequently (every 1.5-3 hours) than those with free flowing infusions (1.5-2 hours).

Another observation that arose from the clinical setting was the lack of detection of any post-operative complications. Vomiting was the only alteration in this group of patient's physiological state during the observation period that could be classified as a traditional post-operative complication. Of these, five patients had laparoscopic surgery (four cholecystectomies).

In comparing the two participating units in relation to frequency and timing of patient surveillance, skill-mix and patient dependencies were often used to measure workload. It is interesting to note the unit with most beds had the least FTEs but the staffing reflected greater experience. This ward also saw the lower amount of nursing time being spent with patients. As discussed by Spilsbury and Meyer it is difficult to analyse skill mix when the data reflects the nurses grading rather than capability (Spilsbury and Meyer 2001). Registered nurses have been reported as making a difference to care delivery but the research in this area is limited (McKenna 1995; Pronovost, Dang, Dorman, Lipsett, Garrett, Jenckes and Bass 2001; Spilsbury and Meyer 2001). Unfortunately patient dependencies were not measured, as whilst both hospitals had computerised measures they used different systems.

These results provide a description of the current practice of post-operative monitoring in two different settings. This phase of the research has provided a description of the diverse population of patients nurses care for, has

quantified the amount and distribution of time nurses spent with patients post-operatively, how these interactions were distributed and lastly the frequency and distribution of the collection of post-operative observations.

Limitations of the Observation Phase

The aim of this phase of the research project was in describing the practice of post-operative monitoring. The two units chosen operated on different models directing the collection of vital signs and other observations and the data collected reflected the resulting patterns. Nursing workload and patient dependency were not measured for this research as the two units had different bed numbers, staffing levels, types of accommodation configurations and both units used different patient dependency systems to assist in the measurement of workloads.

Nursing as situated in the complex world of health-service delivery limits exploration of singular aspects of practice. It was highlighted from the outset that pain was not included as a focus of post-operative patient surveillance because it was a well researched topic in its own right (Manias et al. 2002; Twycross 2002) and the subjective nature of pain and pain measurement (Manias et al. 2002) and the unique policies and procedures that capture comfort monitoring. In undertaking the non-participant observation of nursing practice, pain monitoring was identified as a component of post-operative surveillance and in hindsight the inclusion of pain, more consistently throughout the research, may have been illuminating.

The most difficult aspect of observing nurses' work was capturing the invisible work they do (Royal College of Nursing 1996). Not included in this data were the "professional glance" (Pincombe et al. 2000:54). The professional glance refers to the cursory passing glances nurses may have taken to check a patient as they walked past a room or a casual glance at the intravenous therapy, respiration rate or drainage bag whilst attending other duties. This glance was uncovered from another non-participant observation study of nursing practice in the acute care setting. (Pincombe et al. 2000:54)

Whilst the full 24-hour journey of the patient was observed, the full 24-hour of the nurses' shift was not. What became clear was that after the first 4 hours, observations were collected in rounds. This was particularly evident when observing patients in the evening where hourly surveillance commenced once the night shift started. In discussion with clinical experts it was felt observing the full 24-hour of the nurses shift would only support this notion as observations continued throughout the night based on hourly rounds of the nursing staff.

To decrease the influence of the observer on nurses' actions a 'fly on wall' approach was the aim of the observation. The benefit in this research was that whilst the researcher was a nurse and familiar with setting of post-operative surgical units, the researcher was not known to the nurses being observed. Nurses appeared comfortable with the researcher who could 'talk the talk', who was investigating an aspect of practice that they believed was worthwhile and, at the same time was a student and not an authoritative

figure checking up on their practice (Reid 1991). There was a good camaraderie between the researcher and the nurses, with a strong understanding that the data being collected was about frequency and patterns not individual practice.

Conclusion

In endeavoring to achieve best practice it is important to know what constitutes current practice. Whilst there may be differences in practice in differing organisations, there are aspects that are common to post-operative surveillance in the general ward setting. In exploring the relevance of the practice it is important to identify the relationship between nurse-patient interactions, post-operative monitoring, and the detection of complication.

This chapter described the phase of the research that identified the actual practice of monitoring patients post-operatively. This has quantified the nursing time and distribution of the time spent with patients in the first 24-hours post-operatively after returning to the general surgical ward. In addition it has described the patterns of observation collection and what aspects of patient assessment were undertaken to monitor progress. Traditional patterns of vital sign collection were the mainstay of practice and other observations collected in addition to vital signs vary significantly. This description of practice has begun to unpack issues about the role of the clinical practice of post-operative monitoring, in the detection of complications, by clearly documenting components of practice.

The next chapter builds upon these finding in identifying when, what, and how post-operative complications occur as documented in the medical records.

Chapter 6

Relationship between Vital Signs and Post-operative Complications as described in Medical Records

Introduction

In post-operative recovery, post-operative complications are an often used outcome measure. One of the strongest reasons for collecting routine regulated vital signs in the post-operative recovery phase is the role they play in detecting complications. The nature of general surgical wards present nurses with the challenges of caring for patients recovering from a variety of different surgical procedures, which may also include a range of surgical specialties. There is a need to inform post-surgical nursing practice with general predictors for the rate of complications. This information will assist in determining appropriate levels of patient monitoring that will assist with early identification of complications, or indeed prevention or minimization of complications. There is a belief that nurses possess an understanding of the broad range of complications that may occur post-operatively, but have limited knowledge of, or ready access to, the rates of procedure specific complications due to this diversity of surgical procedures they encounter. However, these rates are well documented in medical journals. Clear links between alteration in vital signs and the occurrence of post-operative complications has not been previously established.

This chapter reports on the third phase of the research, the relationship between observations (including vital signs) and post-operative complications. The focus was when complications do occur, what complications were encountered on surgical wards and how patient complications were detected. This phase of the research was undertaken using a medical record audit to quantify the rate of post surgical complications encountered in the first 24 hours after returning from surgery to a general surgical ward setting. During this same period a review of alterations in vital signs was undertaken.

Supported by current literature on post surgery complication rates, in both nursing and medicine, this chapter presents current data on rates and frequencies of post surgical complications, changes in vital signs, and how complications were detected in the two surgical wards that participated in the research. In addition, factors that may contribute to the frequency of complications occurring are discussed as are the relationships with changes in vital signs and activities of nursing practice that facilitate the identification of complications. Acknowledged is the small sample size for the audit. This phase was intended to explore new ways of measuring the significance of the practice.

Research Questions

The research questions for this phase of the research were

- what post-operative complications occur and with what frequency in the first 24 hours a patient spends on the general surgical ward?
- how are post-operative complications detected?

Method

As described in the two previous chapters this method section refers to the practicalities of the research with the technique of Audit having been discussed earlier in chapter two. This phase of the research was undertaken to determine the frequency and type of post-operative complications occurring during the first 24 hours following a patient's return to the general surgical ward after surgery and the identification of processes for the detection of complications. This initial 24-hour period is traditionally the period when the patient is most closely monitored for changes in their condition. The focus was the detection of patient complications, and the relationship with post-operative observations, more specifically alterations in vital signs. The clinical audit component was undertaken to collect data in relation to the rate of patient complications supported with the information regarding how nurses detected changes in patient condition.

The original view was to ask nurses about their practice of post-operative observations in conjunction with the audit of medical records. This was to determine what aspects of post-operative observations are utilised to monitor patient progress to assist in comparing what nurses say they are

doing with what they do, what is documented in notes and what is written in policy. The nurses' post-operative nursing practice was to be observed and then the nurse interviewed. It was felt the interview could facilitate the unveiling of the knowledge embedded in the behavior (Fontana and Frey 1994) as it is a useful tool to explore the actions of nurses with greater depth and obtain a higher response rate. It was envisaged that the combination of observation and interview would elicit a more accurate reflection of nursing practice than via survey or focus groups, to assist explain and contextualise what was observed and enable the researcher to target responders who are immediately involved in post-operative observations. This phase was designed to identify what aspects of post-operative observation nurses use to assess patient progress and detect complications.

What became clear when observing nurse's practice in the earlier phase of the research was that this process would not be viable in the post-operative clinical setting. The largest obstacle was the fact that nurses collected observations in rounds i.e. at 0800, 1200, 1600. These are either undertaken with a team approach or carried out individually. The allocation of patients to nurses meant that nurses generally had no more than two or three post-operative patients in this first 24-hour period, making it very labour intensive for the researcher to collect the information sought. The observation of practice also highlighted (subsequently supported by the audit) that the rate of post-operative complications is low on the general ward. To actually be present when a complication occurred, and observing the nurse undertaking

those observations to identify triggers for action, would reduce the success of this phase significantly.

It was then decided that as the audit was undertaken and post-operative complications were identified, to return to the nurse looking after that patient and determine how the nurse identified the complication and what triggered any action.

Rigour

The audit was designed to be a prospective audit occurring on the two general surgical units, in different hospitals (both metropolitan - one private, one public) selected previously for the observation of practice. In relation to identifying nursing activities that assist detect complications some aspects of data were compared between sites to uncover differences that may arise from different surveillance models. The audit was to occur for a four-week period at each site. All patients in that four-week period who underwent surgery and returned to the two wards within 24 hours, were included in the research. During the audit, data collection included patient demographic data, the surgical procedure, type of anaesthetic, procedure and recovery time, age, and the rate, frequency and timing of post-operative complications and observations in the first 24 hours of post-operative care after returning to the ward. In addition where a complication was documented, a series of questions were put to the nurse caring for the patient including what they were doing when the complication was identified and what action they undertook. An audit tool was developed and piloted to ensure all relevant

data were collected and that the design facilitated ease of documentation (appendix 6).

Part of the process of developing the audit tool was the definition of vital signs that fall within a determined 'normal' range. The parameters set are presented in table 6.1.

Vital Sign	Less than	More than
Temperature	36°C	38°C
Pulse	60 beats/minute	100 beats/minute
Respiration	10 per minute	30 per minute
Blood Pressure	80/-	180/120
Other Sign -Pulse Oximetry	92%	

Table 6.1. Predefined normal parameters for vital signs.

These parameters were based on definitions described by Blows (2001), and Davis and Nomura (1990) both supported by descriptors in Crisp and Taylor (2000).

The other aspect that required attention was the capturing of patients who returned to intensive care units (ICU) or high dependency units (HDU) before arriving on the ward. A decision was made to include patients who spent time in ICU / HDU but returned to the ward within the initial 24-hour post-operative time-frame as they still represented patients on a general ward recovering from a surgical procedure in the first 24 hours. Data were captured regarding alteration in observations and occurrence of complications.

A system of classification of general surgical procedures was attempted to assist with analysis. Attempts including contacting Royal Australia College

of Surgeons to see if a system existed, investigating the Health Insurance Commission Schedule of Fees based on financial reimbursement and asking two General Surgeons to attempt a classification based on a scale major, moderate and minor procedures. No uniform classification of procedures was possible.

Ethical Considerations

The ethical approval sought for the earlier phases of the research at both hospitals also incorporated this component of the research. Verbal consent was obtained from the nurses who were approached to provide additional information to supplement the medical records. The medical record audit process de-identified the patient from the data collected.

Data analysis occurred with data entered in Microsoft Excel 97 SR-1 and Statistica for Windows version 5.5 1999. Descriptive statistical techniques were used to analyse demographic characteristics and obtain a profile of the collection of vital signs and other observations with mean values including standard deviation or range. Associations between and differences between groups/variables were examined using Student's t-test, Pearson Product Moment Correlation, Mann Whitney U and Wilcoxin tests guided by the measurement scale and distribution of data. Statistical significance was set at a p value = 0.05 or less.

Results

Demographics

During the period of the research, a total of 144 patient medical records were audited across the two practice areas comprising the research setting. The mean age of the sample population was 54 years (range 15 to 93 years), with the gender distribution of the sample population being 36% male and 64% female.

The mean length of surgery as recorded on the operating room nursing record was 79 minutes (n= 142), range 9-418 minutes while the mean time spent in recovery was 86 minutes (n=137) range 15-325 minutes. These data are summarised in table 6.2, with Hospital A the public hospital and Hospital B representing the private facility.

Characteristics	Hospital A (n=61)	Hospital B (n=83)	Total (n=144)
Age (y)*	55.7 ± 19.7	53.6 ± 15.9	54 ± 17.6
Men (%)	49 (30)	27 (22)	36 (52)
Women (%)	51 (31)	73 (61)	64 (92)
Length Surgery –minutes*	111 ± 83.1	55 ± 30	78.7 ± 64.2
Length Recovery -minutes*	105 ± 54.1 (n=59)	71 ± 33 (n=78)	86 ± 46.6 (n=137)
* Mean value ± standard deviation			

Table 6.2. Characteristics of sample population

Elective surgery accounted for 86 %, (n=124), of patient presentations within the sample population, with the remainder representing emergency surgical

admissions. For Hospital A 68% (n=42) of the presentations were elective whereas Hospital B recorded 99% (n=81) elective admissions.

In terms of anaesthetic type, general anaesthesia accounted for 92% (n=133), while regional (n=1), spinal (n=6), epidural (n=5) and caudal (n=1) anaesthesia were also used either alone or in combination with another anaesthetic type. All cases of epidural anaesthesia (n=5) also involved general anaesthesia. For three cases the anaesthesia type was omitted from data collected.

Types of Surgical Procedures

During the four-week period of data collection across the two participating wards a wide variety of general surgical procedures was undertaken. These were broadly classified based on the surgical descriptor used on the operative record sheet (the same as for the observation of practice), for example laparoscopic appendicectomy, mastectomy and open cholecystectomy. In all, 26 different surgical categories were represented in the sample population audited. The two most common surgical procedures in both wards included Herniorrhaphy (n=33) and Laparoscopic Cholecystectomy (n=26). Table 6.3 provides an overview of the surgical procedures including the eight most frequent procedures for both wards.

Surgical Procedures	Hospital A	Hospital B	Total
Herniorrhaphy	18	15	33
Laparoscopic Cholecystectomy	13	13	26
Gastric Banding		9	9
Mastectomy		9	9
Bowel Resection		7	7
Minor Surgical	6	7	13
Laparotomy	6	3	9
Laparoscopic Fundoplication	4		4

Table 6.3. Most frequently performed surgical procedures.

Procedure Analysis

Laparoscopic cholecystectomy and hernia repair characteristics were analysed, as they were the two most common procedures in each unit. Tables 6.4 and 6.5 summarise data collected in relation to the two specific procedures. Analysis of length of surgery times between the two sites using a Mann Whitney U showed a statistically significant difference between Hospitals A and B (obtained U of 17, critical U at 34, $p < 0.01$) for laparoscopic cholecystectomy. This also applied for hernia repair with an obtained U of 19.5, and a critical U at 60 ($p < 0.01$).

Characteristics	Hospital A (n=13)	Hospital B (n=13)	Total (n=26)
Lap. Cholecystectomy			
Age (y)*	60±15.3	51±14.3	55 ±15.3
Men %	23	15	19
Women %	77	85	81
Length Surgery -minutes*	88±18.2	58±16	73±22.9
Length of Recovery - minutes*	93±25.9	69±20.8	81±26
General anaesth %	100	100	100

* Mean value ± standard deviation

Table 6.4. Characteristics of population undergoing Laparoscopic Cholecystectomy

Characteristics Herniorrhaphy	Hospital A (n=18)	Hospital B (n=15)	Total (n=33)
Age (y)*	59.8 ± 14.4	60 ± 17.5	60 ± 15.6
Men %	61	80	70
Women %	39	20	30
Length Surgery -minutes*	77 ± 26.6	42 ± 17.2	61 ± 28.7
Length of Recovery – minutes*	96 ± 64.6 one no surg time	61 ± 26.8	80 ± 53.4 one no surg time
General Anaes %	89	80	85

* Mean value ± standard deviation

Table 6.5. Characteristics of population undergoing Herniorrhaphy

Length of Stay

The medical record audit revealed 84% (n=70) of patients in Hospital B came direct to the ward from recovery and for Hospital A 80% (n=49). The remaining patients either went via a high dependency unit (HDU), intensive care unit (ICU) or day surgery.

Medical record audit occurred on the first 24 hours after returning to the ward from recovery (or the nearest ascertainable point if via HDU or ICU). The mean length of stay for patients audited in Hospital A was 23.02 hours (SD ± 2.15) and for patients audited in Hospital B was 23.13 hours (SD ± 3.07). Of the 144 cases 84% (n=121) had records covering the whole 24 hours with 16% (n=23) staying on the ward for less than the 24 hours, either due to discharge or time spent in another unit.

Complications Identified

Nausea and Vomiting

Nausea and vomiting were the most frequently recorded adverse events experienced by patients in the first 24 hours following return from surgery. Overall 37.5% (n=53) of patients experienced nausea, vomiting or both during this period. In Hospital A 26% (n=16) of patients experienced at least one episode of nausea and vomiting and Hospital B recorded 46% (n=37). Of the 43 patients (30%) who experienced nausea alone in both hospitals combined, 58% (n=25) had a single episode, 32.5% (n=14) experienced two episodes and 9% (n=4) had three or more episodes. Vomiting occurred in 20 cases (14%) with 45% (n=9) of these patients also experiencing nausea. Table 6.6 provides a summary of the rate of nausea and vomiting. Whilst there were similarities between the two hospitals in the percentage of patients experiencing nausea and vomiting, and vomiting alone there was a statistically significant difference, using a t-test, between the number of times patients experienced nausea between the two sites ($p=0.01$). The mean number of patients experiencing nausea of 0.20 (SD ± 0.40) at Hospital A compares to 0.05 (SD ± 0.21) at Hospital B. Whilst still statistically significant a reverse in the rate occurred between the hospitals with Hospital A a mean of 0.13 (SD ± 0.34) patients experienced vomiting compared to Hospital B with a mean of 0.37 (SD ± 0.48) patients ($p=0.00$).

There was no correlation between the rate of nausea and / or vomiting with length of surgery ($r=0.1$, $p=0.1$) for the total sample. At Hospital A there was

a moderate positive correlation ($r=0.47$) and at Hospital B there was a weak negative correlation ($r=-0.16$). Whilst many aspects of the surgical process contribute to the rate of nausea, including medications, movement and patient history, length of the procedure may also be an indicator.

Characteristics	Hospital A (n=61)	Hospital B (n=83)	Total (n=144)
Nausea & Vomiting	6.5% (n=4)	6% (n=5)	6.2% (n=9)
Nausea	13% (n=8)	31% (n=25)	23% (n=33)
Vomiting	6.5% (n=4)	8% (n=7)	7.6% (n=11)
Patients experiencing nausea more than once	6.5% (n=4)	17% (n=14)	12.5% (n=18)

Table 6.6. Percentage of patients documented experiencing nausea & vomiting.

Other Complications

In addition to nausea and vomiting, 17% (n=25) of patients experienced another 'clinical event' during the initial 24-hour post-operative period. In Hospital B 16% of patients experienced a clinical event, with three patients experiencing two different problems. In Hospital A, 19% of the patient records audited experienced a clinical event, with one patient describing two events. The clinical events reported are presented in table 6.7.

Clinical Events	Hospital A	Hospital B	Total Number of Patients (%)
Syncope/Dizzy	3	4	7 (5%)
Urinary	2	3	5 (3%)
Neurovascular	2	3	5 (3%)
Itchiness	1	2	3 (2%)
Chest Pain/Ache	2	1	3 (2%)
Wound Related		3	3 (2%)
Neck Swelling		2	2 (1%)
Indigestion		1	1 (0.7%)
Respiratory	1		1 (0.7%)
Sedation	1		1 (0.7%)
Burning Sensation	1		1 (0.7%)

Table 6.7. Clinical Events documented in the first 24 hours after surgery.

In total, there were 32 'clinical events' identified in the sample population. Four patients experienced two different 'clinical events' and three occurred in the intensive care unit prior to being transferred back to the ward. There were only three more significant complications. These included two patients who had an exacerbation of a pre-existing medical conditions, one each being episodes of chest pain in a patient who regularly experienced angina and asthma in a young patient with a history of same, together with a wound dehiscence.

There was a weak negative correlation, using a Pearson Product Moment Correlation ($r = -0.3$), between the length of surgery and post-operative clinical events. There were insufficient clinical events to meaningfully compare the rate between the two sites.

Due to the diversity of procedures and the range of operative times, laparoscopic cholecystectomy ($n=26$) and herniorrhaphy ($n= 33$), which represented the two most common surgical procedures of the medical records audited, were used as procedure based points of comparison to identify if any difference existed in the rate of clinical events between hospital sites that could be attributed to the difference in surveillance models. The mean age of patients undergoing laparoscopic cholecystectomy was 55.5 ($SD\pm 15.3$) years and 60 ($SD\pm 15.6$) years for those having herniorrhaphy.

The rate of clinical events for laparoscopic cholecystectomy for both sites was 19% (n=5 patients with complications) and for herniorrhaphy the rate of clinical events was 22% (n=7). There was a weak positive correlation, ($r=0.21$ and $p= 0.000$), using a Pearson Product Moment Correlation, between the length of surgery and post-operative complications for these two procedures.

Complications and Observations

The two Hospital samples were combined, due to the small numbers of patients who experienced a 'clinical event', for analysis on mechanisms that detection complications and relationships between complications and vital signs. The aim was to gain a picture of the nurse's response and patient changes in a generic population rather than hospital specific difference.

Of the 25 patients who experienced a clinical event only 2 patients had a corresponding alteration in vital signs (lowering of BP) both experiencing syncope / dizzy. Table 6.8 summarises the clinical event type and the intervention that the nurse enacted when it was detected.

Clinical Events	Number of Patients (%)	Interventions
Syncope / Dizzy	7 (5%)	Rest in Bed x2, Head Bed Down/Oxygen Vital Signs x2, BP, No intervention recorded x2
Urinary	5 (3%)	Inform Other Nursing Staff Pain relief/IDC Inform Medical Officer x3 No intervention recorded x1
Neurovascular	5 (3%)	Inform Medical Officer Assess/Observe x2 No Intervention recorded x2
Itchy	3 (2%)	Medication Administration x2 No intervention recorded x1
Chest Pain / Ache	3 (2%)	Inform Medical Officer x2 Oxygen/Electrocardiograph Medication Administration
Wound	3 (2%)	Inform Medical Officer Reinforce Dressing x2
Neck Swelling	2 (1%)	Cease intravenous Therapy Inform Medical Officer Pressure Dressing/Observe
Indigestion	1 (0.7%)	Medication Administration
Respiratory	1 (0.7%)	Inform Medical Officer Administer Medications
Sedation	1 (0.7%)	Inform Other Nursing Staff
Burning	1 (0.7%)	No intervention recorded

Table 6.8: Clinical Events and Nursing Intervention

Of the 32 clinical events experienced in 25 patients, 11 (34%) were referred to medical or nursing staff (two to nursing staff), interventions ranged from medication administration for 6 (19%) events, in cases of syncope vital signs were collected for 3 patients and in 7 (22%) episodes no information was documented or recorded in follow up.

Triggers to Identify Complications

With the identification of clinical events nurses were then asked to identify what activities they were undertaking when they were triggered to the existence of a clinical event occurring. Ten clinical events could not be

tracked due to insufficient information in notes or inability to make contact with the nurse caring for the patient at that time. Table 6.9 lists the activities nurses were doing when they identified a clinical event.

Activity leading to Detection	Clinical Event Identified
Doing the Observation Round (22%)	Dizzy x 4 Neurovascular Neck swelling Wound
Incidental (19%)	Urinary x 2 Itching Respiratory Neck swelling Dizzy
Assisting with Mobilisation (9%)	Dizzy x 3
Patient Initiated	Chest Pain x 2
Tallying Fluid Balance	Urinary
Handover from Recovery	Neurovascular
Medical Officer	Neurovascular
Not recorded (31%)	10

Table 6.9. Activities the nurses were undertaking when they identified a clinical event

Detection of complications whilst doing the observation round was the main reason in 22% of the occasions a clinical event was detected. This was not necessarily due to taking the vital signs but rather going on the round. Incidental detection occurred in 19% of the occasions and for three cases (9%) the syncope occurred whilst mobilising the patient. Patients alerted the nurse to a problem in two cases and another was detected whilst calculating patient's fluid balance, had been previously identified in recovery, or was identified by the medical officer caring for the patient. In 31% of the cases the mechanism for detection was not documented or could not be followed up with the staff member who was caring for that patient.

Timing of Complications

Analysis was undertaken to determine when in the 24-hour post-operative journey of the patient the most number of complications occurred. Figures 6.1 and 6.2 show the occurrence of the complications by periods of time that occurred on the general ward. With such a small rate of complications during the 24-hour period it was difficult to undertake any substantive analysis except to say that for this research the majority of clinical events occurred within the first 8 hours. The rate of event occurrence was the same for the 0-4 hour period (n=8) and the 5-8 hour period (n=8).

Complication - a generic term.
Post-operative complication - alteration in patients that are of more serious nature, requiring intervention.
Anticipated events - frequent changes encountered in post-operative patients
Clinical events - changes in patients that are not life threatening and are managed by simple interventions. (see glossary)

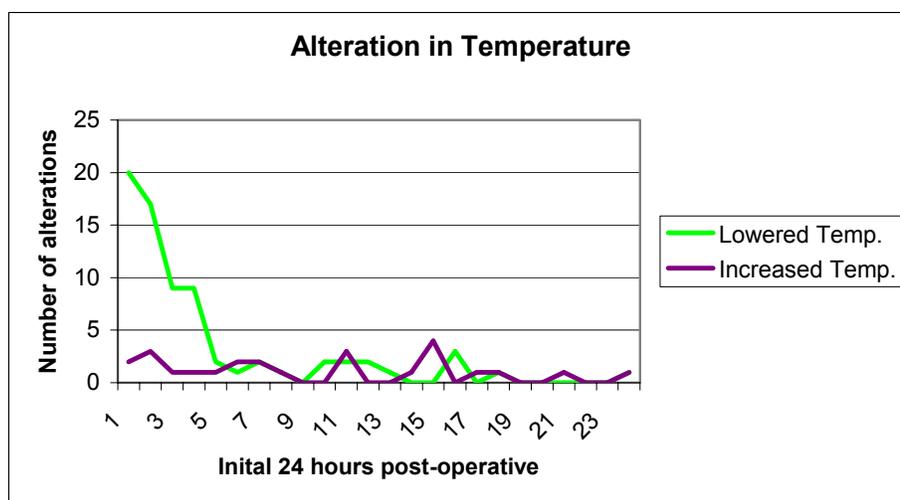


Figure 6.1. Rate of all clinical events in the first 24 hours after surgery

Nausea and vomiting occurred more consistently over the 24-hour period although there was a slightly higher rate in the first 8 hours.

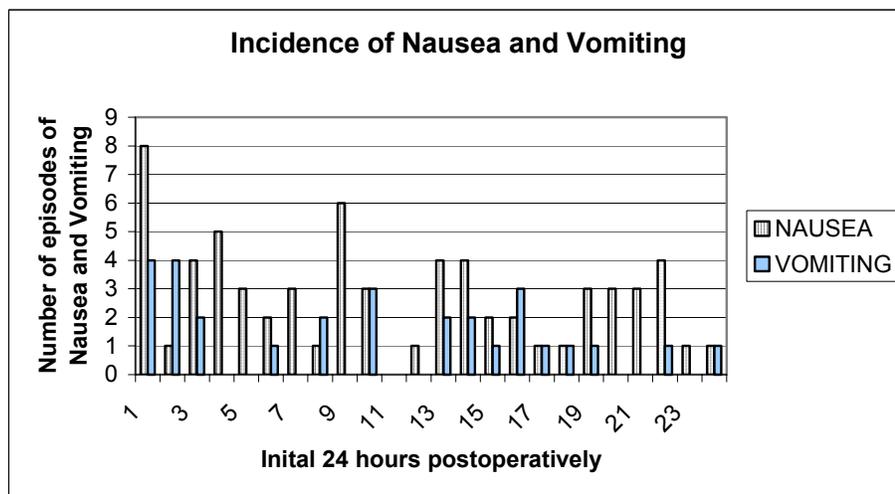


Figure 6.2. Rate of nausea and vomiting the first 24 hours after surgery

Alteration in vital signs

Of the 121 medical records audited of patients who returned directly from recovery to the ward 54 (45%) patients did not have an alteration in vital signs recorded. In total 67 (55%) patients experienced at least one episode of altered vital signs. At Hospital A the most frequent alteration was a temperature of less than 36°C in 20 patients (65%) and for Hospital B the most recorded alteration was a pulse less than 60 beats a minute (33%).

Of the 144 medical records audited, alteration in pulse rate occurred in 55 (38%) patients with 17 (31%) experiencing a pulse rate of more than 100 beats per minute and 38 (69%) patients less than 60 beats per minute. Twenty-seven patients had a single episode, 4 had two episodes, 8 had more than three episodes and 10 had more than four episodes recorded. Of the patients who had episodes of increased heart rate 20% spent time in ICU or HDU and one patient had a heart rate above 100 for the entire duration of their stay on

the ward. Forty-nine percent of all changes in pulse rate occurred in the in the first four hours after the patient returned to the ward. The distribution of changes over the twenty-four hours is presented in figure 6.3.

Analysis of pulse and clinical event using Pearson Product Moment Correlation found that increased pulse rate had a moderate positive correlation with the rate of clinical events ($r=0.31$, $p<0.05$) and nausea ($r=0.49$, $p<0.05$). There was a stronger positive correlation between lowered pulse and vomiting ($r=0.63$, $p<0.05$). As data collected was for a whole hour it was unclear if the vital sign was measured before, during, or after the event. This result may reflect a causative factor for the nausea as in a vagal response.

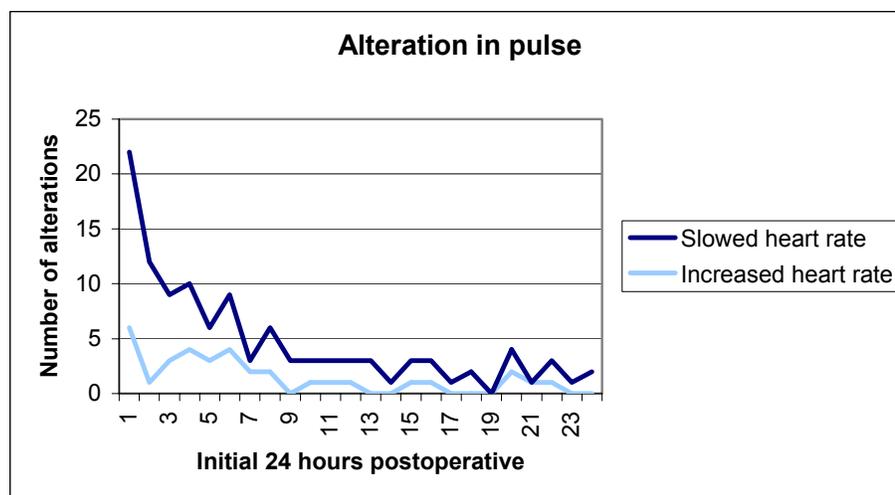


Figure 6.3. Alteration in pulse rate detected in the first 24 hours after surgery

A recorded temperature out side the 36°C – 38°C range occurred in 46 (32%) cases. Of the patients with altered temperature, 34 (74%) patients experienced temperatures less than 36°C and 12 (26%) patients had temperatures greater than 38°C . There were 19 patients who had a single

episode of alteration in temperature, 11 cases had more than two recordings, 3 had three abnormal readings and 10 had four or more reading outside this range, 3 episodes occurred in ICU / HDU setting. Lowered body temperature was more prevalent in the initial 4 hours (56% of all temperature changes), with higher temperature recorded more evenly over the 24 hour period (see figure 6.4.).

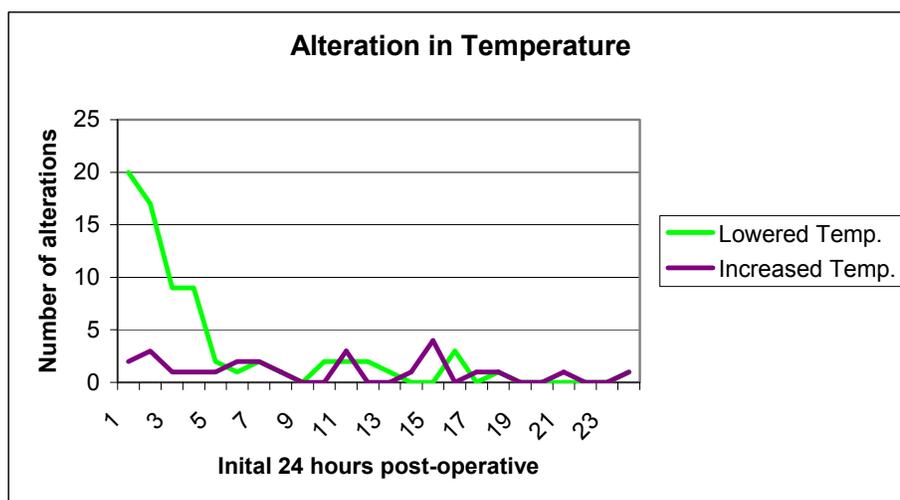


Figure 6.4. Alteration in temperature readings detected in the first 24 hours after surgery.

There was a moderate correlation between the rate of vomiting and lowered temperature ($r=0.63$, $p<0.05$) and increased temperature ($r=0.44$, $p<0.05$) and a weaker correlation between nausea and lowered temperature ($r=0.40$, $p<0.05$).

Three patients had respirations recorded at less than 10, single episodes occurring at the 13th and 17th hour and one patient being recorded at the 5th and 14th hour with normal readings in between. In addition to alteration of vital signs, 5 patients had a single alteration in oxygen saturation recorded by

pulse oximetry of less than 92% at the 1st, 3rd (2 patients), 7th, and 11th hours post-operatively. Patient vital signs recorded which were found to have altered blood pressure readings numbered 9, 8 with a blood pressure less than 85 mmHg systolic (3 patients having more than one reading) with all but 2 recordings occurring in the first 12 hours. One patient experienced a blood pressure greater than 180/120 mmHg in the first hour post-operatively.

Documented sets of vital signs

Patients returning direct to the ward from recovery and who remained in hospital for the first 24 hours post-operatively (n= 97) received a mean of 9 (SD \pm 1.9) sets of vital signs with a range of 4-18 sets. This included patients on acute pain service (APS) charting but excludes sets of vital signs that were pulse and respiration only recorded on APS charts. If observations recorded in HDU and ICU were included (n=108) this increases the mean to 10 sets (SD \pm 3.76) with a range of 4 -24 sets.

Findings of Interest

Results relating to surgical-procedure time and time in recovery indicated there may be some relationship that had not previously been uncovered. There was a statistically significant difference in surgical length and time in recovery between the two hospitals with surgical time (p<0.01) and time in recovery (p<0.01) based on a Mann Whitney U test. Whilst there are many factors that contribute to length of surgery and time in recovery, including

type of procedures and co-morbidities of the patient, there was an indication that there was a relationship between length of surgery and the length of time spent in recovery. Analysis of the total sample using Pearson Product Moment Correlation shows a weak positive correlation between the length of surgery and time spent in recovery ($r= 0.29$; $p < 0.01$).

As presented earlier, the mean time a patient spent in surgery was $78.7 \text{ SD } \pm 64.2$ minutes, with a statistically significant difference between the two units ($p= <0.01$). This had been identified previously with data collected in the observation of practice (pp. 129). For the audit, whilst the surgical time was taken from the nurses' operation record, this was supplemented with the time recorded on the surgeons' operation record. Unfortunately only 16 entries were made. These are summarised in table 6.10.

Characteristics	Hospital A (n=5)	Hospital B (n=11)	Total (n=16)
Length of Nurses Surgery Time (minutes)*	143 ± 151.7	62 ± 38.9	88 ± 93
Length of Surgeons Surgery Time (min)*	81 ± 55.8	62 ± 36.7	68 ± 42.6

* Mean value ± standard deviation

Table 6.10. Comparison of nurse recorded surgical time and surgeon recording.

Whilst there was a difference in the mean of the surgical time recorded by nurses in comparison to surgeons at Hospital A the sample was small. A Wilcoxin matched pairs test for Hospital A does not yield a result due to the small number (n=5) but it was possible that the result does reflect a difference between the times recorded by the nursing staff and the surgeons. Hospital B has a similar mean between the surgical time recorded by nursing

staff and the surgeons the Wilcoxin matched pairs test supports that there was not a statistically significant difference ($p=0.06$) between the two times.

Summary of Major Findings

The analysis of this phase of the research, the audit of medical records, in summary, has revealed for this sample that:-

- Elective surgery and the use of general anaesthesia typified the sample population on general post surgical wards with 82% of patients returning directly from recovery to the ward.
- Nausea and vomiting were the most frequent complications recorded (37.5%). There was some correlation between rate of nausea and vomiting and the length of procedure.
- 17% of the sample experienced a clinical event apart for nausea and vomiting ranging from syncope to indigestion. This included two patients who experienced exacerbations of pre-existing medical conditions.
- Of the patients who experienced a clinical event (n=25) only two had a corresponding alteration in vital signs. The two most common interventions resulting from the detection of an event included referral to other staff members and medication administration.
- The two most common mechanisms for the detection of clinical events was during formal observation rounds or incidentally.
- The majority of clinical events for this sample occurred in the first eight hours after returning to the ward. Nausea and vomiting occurred more constantly throughout the 24-hour period.

- 55% of the sample had an alteration in vital signs recorded, most commonly low temperatures and lowered pulse rate. There was a correlation between lowered pulse and the rate of clinical events, nausea, and vomiting.
- 32% of patients recorded a body temperature of less than 36°C or greater than 38°C, with 74% of this group experiencing the lowered body temperature which was most prevalent in the initial 4 hours.
- Nurses recorded a mean of 9 sets of vital signs over the 24-hour period on the ward.
- The two most common surgical procedures remained consistent, from the observation of practice, being herniorrhaphy and laparoscopic cholecystectomy.
- A weak correlation appeared in this sample for time spent in surgery and time in recovery.
- Differences identified between the surgical time of the two sites in the observation of practice remained for the audited sample and also occurred when analysis was undertaken on herniorrhaphy and laparoscopic cholecystectomy procedures.

Discussion

The medical records of all patients undergoing a surgical procedure in a four-week period in two wards in different hospitals were audited for recorded complications and alterations in vital signs occurring in the general surgical practice setting within the first 24-hour period post-operatively.

Sample Population

The sample population underwent a wide variety of surgical procedures during this period, reflecting the diversity of patients cared for by nurses in general surgical settings. Overall 48% (n= 69) of patients were recorded as experiencing a 'complication', 23 patients in Hospital A (38%), and 46 patients (55%) in Hospital B. While 37.5% of patients experienced nausea and / or vomiting, only 17% patients experienced a 'clinical event', all of which were of a minor nature.

Due to the procedure-specific reporting nature of post-operative complications in the surgical literature, the post-operative complication rates relating to laparoscopic cholecystectomy and herniorrhaphy will be a focus of this discussion.

The demographics of this research sample were similar to those reported in other studies investigating post-operative complications. The mean patient age of 54 years was slightly older than the 41.9 and 48 years reported by Harley and Tsmassiro (1997) and Long et al. (1998) respectively. The results were similar to studies that focussed on the two most common surgical

procedures herniorrhaphy with a mean age reported in this research of 60 years compared to 57 (Arroyo, Garcia, Perez, Andreu, Candela and Calpena 2001), and 55 years (Eno and Spigelman 2000) and laparoscopic cholecystectomy with a mean age of 55.5 years compared to the 45 years reported in the literature (Fleisler, Yee, Lillemoe, Talamini, Yeo, Heath, Bass, Snyder and Parker 1999). The high proportion of patients undergoing general anaesthetic (92%) was also consistent with the findings of Long et al. (1998) 71.5%, Davis and Nomura (1990) 87.2% and Eno and Spigelman (2000) at 90%, although in this research the rate was higher.

There was a near equal gender distribution at Hospital A with strong gender imbalance in the other, which contributed to an overall gender imbalance in the sample population. Hospital B had a larger proportion of women being accounted for by the different types of surgical procedures being undertaken. Mastectomy and gastric banding were represented in Hospital B but not in Hospital A, with both procedures predominantly being undertaken on females. Hospital A comprised a higher proportion of emergency patients potentially resulting in a more normal distribution of gender.

The distribution of the type of admission reflects the type of hospital to which the patient is admitted to with public hospitals admitting a higher proportion of emergency admissions (32%) than the private hospital (1%). Both research sites represented in the research setting had laparoscopic cholecystectomy and herniorrhaphy as the most common surgical procedures.

There is overall sense that the acuity of patients on general surgical wards is higher than in the past. This is due to increasing medical technology leading to an ageing population and patients with more risk factors undergoing surgery. In addition the social and economic pressures on the demand for inpatient beds has seen a shortened length of stay. The sorting of patients at time of surgery, based on type of procedure, progress through anaesthetic and the presence of co-morbidities, is important in identifying patients at risk of developing complications. Patients with increased risk factors for the most part spend a period of time in settings where more intense surveillance is undertaken. This sieving process results in patients with a lower risk of developing post-operative complications, acutely, being cared for in general surgical wards. This was reinforced by the fact that 17% (n=23) of patients returning to the ward spent time in ICU / HDU and the low rate of post-operative complications that occurred on the ward for both the observation of practice and the audit of medical records. Whilst patient's records were audited for the first 24 hours, the patients in this sample spent a mean time of 23 hours on the general ward. This was shortened by ICU / HDU time or early discharges.

Complications

The term 'post-operative complication' refers to a myriad of alterations in the physiological status of patients recovering from surgery. It is acknowledged that there are many factors that contribute to the development of a post-operative complication. This research did not attempt to control these

variables but rather describe the rates as encountered on a day to day basis by practicing nurses. While the focus of this research was the rate of post-operative complications, included in data were 'clinical events' and the 'anticipated events' of nausea and vomiting. Most medical-surgical nursing textbooks provide information on predictable post-operative complications that a patient may suffer after undergoing surgery, without providing the incidence or prevalence of these complications. To source information relating to risk of complications, a search of the surgical literature describing a specific procedure would be required.

Post-operative nausea and vomiting remain significant factors that continue to impact adversely upon length of hospital stay (Fleisler et al. 1999). With the emphasis on shorter recovery times, and length of hospital stay, the effective care of post-operative nausea and vomiting would appear to require some scrutiny.

The results of this research revealed that nausea and vomiting were the most significant complications recorded in the first 24 hours post-operatively. The high rate of nausea and vomiting suggests that this was a predictable event in the post-operative recovery phase rather than a post-operative complication. The rate of nausea and vomiting in this research was 37.5%, while previously reported rates have ranged from 12-52% (Fleisler et al. 1999), with the most commonly cited rates being 20-30%, as described by Watcha and White, (1992; 1995). Bolton (1995) reported a rate of 22% in the first 24 hours after returning to the ward, 20% was reported by Harley and

Tsmassiro (1997) while Davis and Nomura (1990) reported nausea and vomiting at a rate of 31% in this period. A retrospective chart audit covering the first 24 hour post recovery (n=450) revealed the most frequently reported complications were vomiting at 9% and nausea at a rate of 25% (Long et al. 1998). In comparison, this research found vomiting at 14% and nausea at 30%, and while the rates revealed in this research were higher, the trend was similar. While the documented events of nausea and vomiting and vomiting alone were similar across the two wards, there was a difference in the rate of nausea alone, this being significantly higher (31%) in the private hospital, compared to the public hospital setting (13%). Length of surgery is one factor that may contribute to the rate of nausea and / or vomiting with the overall sample demonstrating a correlation between length of surgery and the rate of nausea and this may warrant further investigation. Differences may also be accounted for in relation to anaesthetic medications, individual hospital antiemetic regimens both intra and post-operatively or may be due to an artifact of documentation (Harley and Tsmassiro 1997).

Post-operative complications reported in various studies included pain (Keulemans, Eshuis, de Haes, de Wit and Gouma 1998; Wellwood, Sculpher, Stoker, Nicholls, Geddes, Whitehead, Singh and Spiegelhalter 1998); nausea (Keulemans et al. 1998; Wellwood et al. 1998); dizziness; headache (Wellwood et al. 1998); wound related including haematomas, seromas, infection (Arroyo et al. 2001; Vrijland, van den Tol, Luijendijk, Hop, Busschbach, de Lange, van Geldere, Rottier, Vegt, Ijzermans and Jeekel 2002)

dehiscence; urinary retention; and pneumonia (Vrijland et al. 2002). In addition Heseltine and Edlington (Heseltine and Edlington 1998) reported the five most common complications for day surgery procedures as nausea and vomiting, bleeding, sore throats, bruising / swelling and excess drowsiness with pain, soreness and muscular pain also being cited. Whilst Eno and Spigelman's (Eno and Spigelman 2000) study on hernia repairs described a complication rate of 14% the complications listed include haematoma, urinary retention, wound infection, pneumonia and electrolyte imbalance. Based on a compiled list of complications described by Davis and Nomura (1990), Long et al. (1998) found that complications occurring in greater than 5% of the population included impaired sensation, abnormal breathing patterns, tachycardia, bradycardia, low oxygen saturation, fever and arrhythmia. They found complications, excluding nausea, occurred in a decreasing pattern over the 24-hour period from 11% in the first 4 hours to 4% in the 21st-24th hour so that by 3.5 hours less than 20% of the patients experienced a complication. In the study by Davies and Nomura (1990) altered vital signs were experienced in 41% and abnormal signs and symptoms 48% of the total sample. The most common abnormal sign and symptom was nausea and vomiting 31% of patients (n=78).

Following nausea and vomiting the other identified clinical events reported in the medical records audited required minimal intervention from clinical staff. Syncope was the most common event and was detected whilst doing an observation round or whilst mobilising the patient. Urinary complications

were typified by urinary retention and discomfort where a urinary catheter was in situ. The neurovascular events reported did not indicate imminent limb injury. One episode of chest pain and respiratory difficulties related to pre-existing medical conditions, which the patients managed on a regular basis. No clinical event was specifically detected via the collection of vital signs, nor would it be expected that these events would be.

The distribution of the clinical events over the 24-hour period do appear to relate to the known intensity of vital sign collection as described in the policy documents or as uncovered in the observation of practice. There was no difference in the rate of events in the 0-4 hour period or the 5-8 hours period and yet the number of vital signs collected falls from hourly to four hourly over this period.

It is worthy of note that no patients who returned to the general surgical practice areas subsequently experienced a clinical event or complication of such significance to require transfer to a more acute care practice area (e.g. HDU), which suggests / reflects accurate post-operative assessment regarding patient suitability and stability to return directly to general surgical wards post-operatively.

Complications and Observations

Whilst the early identification of complications is important it was equally important to review the action that was the trigger when a clinical event was detected. One third of clinical events resulted in a report to other staff

members, in the majority of cases to medical staff. Medication was administered in less than one quarter of the events and for a similar number no action was recorded.

Similar distribution was uncovered in relation to the activity that the nurse was undertaking when a clinical event was identified. Nearly one quarter of the problems were discovered on nursing observations rounds although the nature of the problems did not necessarily cause a change in vital signs. It would appear the patient assessment component of observations rounds may have facilitated detection. Others detected were incidental or associated with other activities. In exploring the relationship between complications and vitals sign changes it was found in only 2 of the 7 cases of syncope that there was an associated change in a vital sign. A retrospective chart review on the monitoring of patients during immunoglobulin infusions, Camp-Sorrell and Wujcik (1994) found five out of nine reactions detected were reported by the patient and four were detected by nurses during the vital sign monitoring with none of the reactions being life-threatening. It would appear that patient assessment skills are the vital factor in detecting clinical events, rather than collection of vital signs.

The medical records reflect that for the entire 24-hour period a patient was on the general ward, a mean of 9 sets of vitals signs were collected. As reported in the observation of practice, the most intensive vital sign collection period is the first four hours after returning to the ward. The frequency of collection then decreases in intensity. Identifying when

complications occurred was undertaken to determine if any relationship with the frequency of collecting vital signs could be established. Whilst there was a slight increase in the presence of anticipated and clinical events in the first eight hours generally vital sign collection tapers off after the first four hours and no significant relationship can be found.

Alterations in vital signs, a traditionally held view as an identifier of post-operative complications, occurred in a large number of patients without the underlying presence of a complication. These changes predominately reflected a slow pulse and lowered body temperature. Bradycardia has been reported as the most common alteration in vital signs (Davis and Nomura 1990) and has been identified as occurring in 41% of post-surgical patients (Harley and Tsmassiro 1997). Slowing of the pulse rate can occur because of a number of reasons including physiological fitness and certain medications including beta-blockers and for this research is not referred to as bradycardia and it is not necessarily an indicator of acute physiological change.

A similar rationale applies for the analysis of lower body temperature. The patients identified with lowered body temperature did not have a corresponding physiologic change and have not been discussed as hypothermia, but are highlighted due to the potential clinical significance. The rate of lowered body temperature in the peri-operative phase has been reported to range from 20%-90% (Oliver 2001), with these figures representing intra-operative and recovery unit periods. There have been no reported studies reviewing the rate of lowered temperature once a patient

has returned to the ward post-operatively. The 56% of patients with lowered body temperature during the first four hours on the ward in this research can only be compared to rates reported for patients discharged from recovery. The results from this research were higher than the reported 7.8% of patients whose temperature was less than 36°C on discharge from recovery (Oliver 2001) but similar to the reported 46% by Smith also on discharge from recovery (Smith, Parand, Pinchak, Hagen and Hancock 1999). It has been identified that the significance of ongoing lowered temperature includes increased rate of wound infection, longer hospital stays, impaired circulation, increase in oxygen demand, and poorer pain management (Smith et al. 1999; Oliver 2001). The implications of lowered body temperature in the general ward setting are an area for further investigation.

The majority of changes in pulse and temperature occurred in the intensive monitoring period of the first four hours. Alterations in vital signs were found by Davis and Nomura (1990) during the initial four hours to decrease 11.6% in hour 1 to 1.2% in the fourth hour. In addition they found occurrences of altered vital signs never went above the fourth hour rate in the period 5-24 hours.

Despite there being no statistical significant relationship between alterations in vital signs and complications, increased pulse rate did have a weak positive correlation with nausea. Lowered pulse and temperature both had a moderate correlation with the rate of vomiting. Low numbers of patients had changes in respiration, blood pressure and oxygen saturation.

In undertaking analysis on the length of surgery and time in recovery as potential factors influencing the rate of complications, there was strong evidence there were different surgical times experienced in the different hospitals. It was uncertain if this was a process issue or a significant clinical discovery. There was a statistically significant difference ($p=0.000$) between the surgical times of the two hospitals with the operative time and time spent in recovery being significantly less in Hospital B (private) compared to Hospital A (public). Surgery time and length of time in recovery is affected by multiple factors including type and complexity of surgical procedure and / or anaesthetic type, surgeon and / or anaesthetist experience, patient comorbidities, elective versus emergency procedure and possible variations in the recording of operative time. However this finding needs to be treated with caution, as it may be an artifact due to the way nurses record operating time. At Hospital B the hospital records operation time as commencing at 'knife to skin' time but for Hospital A the hospital records theatre time as commencing when the patient enters the theatre suite. It was difficult to compare these results with other nursing research papers as the definition of the time used was not specified in many publications (Long et al. 1998). In surgical research articles written by medical staff the length of surgery is usually defined as occurring from the first incision to the last (Keulemans et al. 1998; Wellwood et al. 1998; Vrijland et al. 2002). However, Eno and Spigelman (2000) describe operation time commencing at time of skin preparation. Differences in reported surgical time means of 38.45 minutes (Arroyo et al. 2001) - 126 minutes (Long et al. 1998) have been reported.

Operating surgeons complied poorly with the documentation of surgical time. From the few cases that could be compared it seems that whilst at one hospital nursing and surgeon reporting were identical, there was great variation at the other hospital, whilst organisations may define operation time differently, so may the staff within it.

The interpretation of recovery time is also influenced by this lack of definition. Reported times in the literature range from 84 minutes (Fleisler et al. 1999) through to 102 minutes (Long et al. 1998) whereas the mean for this research was 88 minutes. What has been uncovered was a weak positive correlation between the length of surgery and the time spent in recovery and this has not previously been reported.

Impacting factors on the development of complications are diverse. This research found there was a weak negative correlation between length of surgery and post-operative complication in the total sample. At the same time there was a weak positive correlation between length of surgery and post-operative complication for the two procedures of laparoscopic cholecystectomy and hernia repairs.

General surgery covers a wide and diverse group of procedures. Patients post-operatively experience a broad range of complications, as represented in a variety of studies and supported in this research. The identification of any life or limb threatening complications has not been reported in any of the studies reviewed. Alterations in vital signs occur frequently in patients post-

operatively but there was no strong association of these changes as an indicator of post-operative complication. The identification of complications appears to be based on the patient assessment component of practice either undertaken via observation rounds or as an incidental component of every day activities.

Limitations of the Audit Phase

This phase of the research was undertaken by an audit of medical records where quality of documentation directly influences the quality of the results. The only data captured is that which was in the first instance reported to the hospital staff and secondly was then documented by the staff in the records (Harley and Tsmassiro 1997). Data omissions may reflect lack of due diligence on part of researcher or an absence of data in the records. Experience indicates, especially for problems such as nausea, there is probably a level of under-reporting reflected in this analysis (Bolton 1995; Harley and Tsmassiro 1997). The information recorded in the documentation in the most part met the needs of the research. The other interesting challenge was lost or missing records (Camp-Sorrell and Wujcik 1994). One nurse, on one ward, thought the special observation chart used to document the initial four hours of observations was destroyed on discharge. Prior to this being identified one patient record was lost. For another patient at the other ward the observation record was nowhere to be found and was never recovered.

Pain was excluded because data collection method of medical record audit was considered inadequate in accurately reflecting the unique and personal experiences of pain (Manias et al. 2002). In addition, there is a substantive amount of literature available (American Society of Anesthesiologists Task Force on Pain Management 1995; Huang et al. 2001; Manias et al. 2002; Twycross 2002) and hospital specific policies, protocols and procedures that inform and guide post-operative pain management.

There were three specific process issues that limited some of the results. The decision to include patients who spent part of the initial 24 hours in HDU / ICU caused difficulty in actually registering the start of the 24-hour period after leaving recovery as, ICU patients in particular, usually go from theatre to ICU. In both hospitals observations collected in ICU / HDU were recorded on special observation records that do not stay with the patient's record. The 24-hour graphic chart was completed and only summarises data collected in the time spent in ICU / HDU.

In addition to this situation, patients who returned to the ward with analgesic intravenous infusions were guided by specific protocols in relation to surveillance and monitoring. They were in part managed by acute pain services and had a special hourly graphic chart which required hourly pulse, respiration and sedation checks as well as a recording relating to amount of analgesic infused. This, by nature, tended to inflate the number of observations recorded albeit pulse and respirations only. In relation to data collection these were identified separately.

Conclusion

This phase of the research has described the occurrence of a variety of clinical events in the post-operative phase, some relating to surgery including urinary retention, wound ooze and syncope and others potentially coincidental, including indigestion, itchiness and exacerbation of pre-existing medical conditions. The research revealed that post-operative events tended to be of a minor nature consistent with the findings of previous studies. The traditional lists of post-operative complications seem to have been superseded by more common nuances. While potentially life-threatening complications can still occur, the majority of patients at high risk are generally identified either pre-operatively or immediately post-operatively and located in an intensive care setting for the immediate post-operative period.

Some of the alterations identified were highly predictable, such as nausea, vomiting and pain. If these events are highly predictable, it could be questioned whether they represent complications at all. It is suggested that they might be more appropriately considered anticipated events. A clearer understanding regarding the classification of complications, events and / or occurrences in the post-operative phase would assist in measuring outcomes and comparing research findings.

The research highlighted that over a half of patients post-operatively registered vital sign measures outside the normal parameters. In addition clinical events were detected incidentally whilst undertaking other nursing

activities or whilst specifically on observations rounds but not as a direct result of the measurements of vital signs.

If the purpose of routine post-operative nursing observations is to facilitate the detection of post-operative complications, then the findings / results of this research raise questions regarding the necessity for the current frequency and number of observations collected in the early post-operative phase on surgical wards. The implications of these findings and questions will be discussed in detail in the following chapter.

Chapter 7

Integrating the Research on Post-operative Monitoring

“Care should be appropriate, effective, efficient and economic.”

(Thompson 1998:59)

Introduction

It is asserted that nursing occurs in a climate of evidence-based practice, where the popular nursing press and literature ask nurses to question practice rituals and support or refute them with research-based evidence. This thesis has presented the three phases of research exploring the practice of post-operative patient surveillance. This was achieved by determining what is currently happening in relation to routine, regulated post-operative observations, both in practice and in hospital policy, and to identify which nursing interventions if any are detecting changes in a patient's condition. This was with a view to determining if the practice of taking regular routine vital signs detects post-operative complications.

The focus of this chapter is to draw aspects of the discussions from the previous three chapters together to determine if the taking of regular routine vital signs (and other observations) has a positive impact on the detection of post-operative complications. This chapter has been designed to discuss the triangulation of the three phases and the literature in order to provide a

greater insight into the practice of post-operative monitoring in the context of the real world of practice.

Before clear links are made between post-operative patient monitoring patterns and patient outcomes the findings of the different phases of the research are discussed based on the three themes identified previously (pp. 17):

- Vital signs as a traditional focus versus evidence-based nursing practice.
- The relative merit of diversity of care delivery versus perceived gold standards.
- Vital signs as routine and ritualised nursing care versus care directed by clinical judgement.

Incorporated into these themes are discussions about what does inform the practice of post-operative monitoring, the diversity in practice, the impact on workload that rituals generate and barriers to changing how care is delivered.

Background

Challenging traditions and rituals is difficult when there is uncertainty about what constitutes best practice. Myths, assumptions and differing perceptions about what nurses should be, and are doing are ever present. Describing what constitutes contemporary nursing practice is an important starting point in deconstructing nursing work to effect change. There is a belief that “if care is to move forward, exact details of care processes must be measured

to allow them to be manipulated with some degree of precision" (Robinson, 1996:34). If advances are to be made in relation to identifying better practice, decisions need to be made that are grounded in the clinical context or so-called 'real world' of nursing practice. The practice of nursing a patient recovering from surgery revolves around the assessment and observation of patients in the nurse's care. Vital signs and observation of other signs and symptoms of the patient are components of this practice. In the post-operative phase, patient monitoring is based on routine and regulated observation. Before the best practice for post-operative patient monitoring can be developed a comprehensive picture of practice needs to be identified.

This research has resulted in a description of the practice of post-operative surveillance for patients returning to the general wards after a surgical procedure as described in

- the policies that underpin the practice,
- observation from the practice of nurses providing the care,
- the rate of post-operative complications as described in the medical records,
- and the nursing interventions that are used in practice to detect changes in the patient.

The research has provided a process to explore and evaluate nursing practice that includes policy review, observation of practice and medical record audit.

The combination of these methods has provided substantial insights into

clinical nursing practice that both related to the purpose of this research and ancillary to the topic under investigation.

The identification of the role current post-operative monitoring practices have in detecting post-operative complications leads to questions regarding the applicability of traditional practice in the current clinical context. This is in a climate of efficacy and outcomes that are central to the provision of care. Arising from the literature was the three themes that situate the results of this research about post-operative patient monitoring in the reality of nursing practice. These are important, as research into nursing practice cannot be broken into separate components; it needs to be considered in the real world of practice.

Vital signs as a traditional focus versus evidence-based nursing practice.

Evidence-based practice

Evidence-based practice is the current movement in nursing attempting to inform practice provision. This movement incorporates components of clinical decision-making based on evidence, clinical expertise and patient need (Mulhall 1998; Rycroft-Malone et al. 2002). In the literature many authors cite examples of nursing practices that are not evidence-based. One of these is vital sign collection (Hanney 1992; Schumacher 1995; Beyea 2000; Allen et al. 2002). In changing the focus of clinical practice to EBP it has been described that it is important to identify the basis of practice (Beyea 2000:109; Allen et al. 2002:1). In an attempt to identify the foundations of the practice of

post-operative patient monitoring in the general ward setting the elements of evidenced based practice are discussed to determine what underpins the practice of post-operative vital sign collection.

The current research knowledge relating to post-operative monitoring has been discussed at length in the Background chapter (pp. 14). What was demonstrated, in relation to vital sign collection and post-operative monitoring, is that there is little evidence in the literature to direct the appropriate frequency of observations. This is similar to the experience of Botti et al. (2001) who undertook a review of medical and nursing literature seeking support for post-coronary angiography observations, were confronted by a scarcity of evidence for current practice. The research that is available lacks rigour, with methods not clearly reported, consists of sporadic studies, based on small samples, usually focusing on simple or minor procedures, lacks definitions of terminology, uses participants with low risk factor profiles, reports that have not published, and in general with findings that have applicability to the specific sites that have been investigated (Leinonen and Leino-Kilpi 1999; Pearson 2002). The information which they provide clinicians is limited and this is reflected in the low level of impact the research has had broadly across clinical settings.

Evidence Underpinning Text

In addition to research findings that inform practice there is a sense that research findings should underpin the text that supports practice (i.e. the textbooks that are used in undergraduate programs). This research has

uncovered two sources of text that traditionally support practice, nursing textbooks and clinical based policy documents.

It is illuminating that in the 21st Century contemporary nursing practice based text books (some espousing a specialty based text in medical-surgical nursing) describe such a diversity of practice for the monitoring of patients in the early post-operative phase on general surgical wards. There were four texts identified that recommended a frequency of vital sign collection ranging from 15 minutely (Saxton et al. 1990; Smeltzer and Bare 2000; Lewis et al. 2000) to one hourly for four hours followed by four hourly collection (Crisp and Taylor 2000). Another four texts made no recommendation regarding the frequency of observation collection, other than one that stated 'monitor frequently' (Phipps et al. 1987; Luckman et al. 1993; Nettina 1996; Black, Hawks and Keene 2001)! None of the discussions presented in the texts relating to the practice refer to any research or any rationale for the recommendations they make regarding patient monitoring. Whilst practicing clinicians may not rely on these texts as a primary source of information, they are being provided to pre-registration nurses in their early stages of practice development, as evidenced by the fact that three of these texts are recommended in pre-registration nursing programs in South Australia (Black and Matassarini-Jacobs 1997; Crisp and Taylor 2000; Lewis et al. 2000).

It has been suggested that in relation to vital sign collection there "is little empirical evidence for existing regimens and wherever regimens are recommended in the literature, the suggestions appear to be based on current

clinical practice" (Botti et al. 2001:139). If in general clinicians do not rely on textbook accounts to support their practice what do they use? A survey of 600 nurses discovered that knowledge sources most frequently used in practice included knowledge from individual patients, experience, nursing school, workplace, physicians, intuition, what has worked for years and then information from the literature (Estabrooks 1999). Whilst there is an assumption that current research should support practice (this is probably the core point of this discussion) it has been demonstrated that clinicians believe hospital policy underpins current practice (Botti and Hunt 1994).

The survey of policy documents used in South Australia demonstrates that policy documents describe a diverse range of practices. A large number of hospitals (91%) had prescriptive, regimented recommendations for the collection of vital signs in the early phase of post-operative recovery. Only one hospital had a clinical judgement model requiring two sets of vital signs to be collected in the first hour and then the frequency was to be determined by the registered nurse. Of the hospitals that described traditional patterns of collection only one regimen was common in the majority of sites (27%) and that was hourly vital sign collection for four hours then four hourly. It is interesting to note that this is the only prescriptive regimen that was identified in the nursing texts (Crisp and Taylor 2000). All other regimens occurred in less than 10% of the sample. This diversity of practice is highlighted in the range of vital sign collection regimens used in one hospital with 11 different surgical wards describing 7 different regimens. It could be

argued that this vast diversity in the practice described in policy reflects the dynamic nature of clinical practice, however one could also argue that it demonstrates a lack of identified best practice for the frequency of post-operative vital signs.

Does the evidence inform the development of policy? The same survey of policy documents uncovered clinical expertise of the nurses was the largest influence in informing policy in 27% of the sites, with expertise sought from the medical staff, when required, at 24% of the organisations and from other specialised personnel. Whilst literature was mentioned as a factor that initiated the review or development of a policy it did not rate as an element that informed practice based policy. Where evidence based practice may have informed policy decisions is through organisational association with The Joanna Briggs Institute (JBI), an organisation involved in the evaluation of research and integrating it into nursing practice. Seven of the 37 hospitals (19%) cited they had an affiliation with the JBI and it is assumed this is through Corporate Membership and the use of the JBI Clinical Practice Manuals.

If policy is not informed by research and does not provide direction in relation to best practice, and the research is not clear about best practice, what is underpinning post-operative patient monitoring? Despite the belief that “practice based on sound research affects outcomes positively” (Estabrooks 1999:277), evidence is not the only determinant of practice. The evidence-based movement has espoused practice based on evidence,

clinician expertise and patient need (Mulhall 1998; Rycroft-Malone et al. 2002). One must ask does clinician expertise and patient need underpin the practice of post-operative vital sign collection given that it is clearly not evidence?

Expertise Underpinning Practice

Evidenced-based practice describes clinical expertise as one of the elements that informs clinical decision-making. If clinical expertise is determining the frequency of vital sign collection, why on one hand do nurses describe frustrations at the high frequency of vital sign collection and at the same time collect so many vital signs? It has been suggested that nurses take vital signs in ward settings less than the policy dictates (Long et al. 1998) and that 80% of nurses in one survey believed they were necessary for their patient, with 20% stating they were unnecessary for their patient but continued observations anyway (Botti and Hunt 1994:56). In this same survey it was uncovered that 88% of nurses conformed to a regimen despite it not being documented or being required by the patient (Botti and Hunt 1994).

If the rationale for the practice is unclear what is it that nurses are doing? If the findings from the survey of the policy documents are compared to the results of the observation of practice it illustrates how many sets of vital signs nurses collect in comparison to the recommendations in policy documents. In both hospitals the collection of vital signs resembled a pattern of hourly for the first four hours, then 3 hourly for next 8 hours and then four hourly (9 sets), the differences are summarised in table 7.1.

	Number of Sets	0-4 hours	5-12 hours	13-24 hours
Hospital A	9	Hourly	2½ hourly	5½ hourly
Hospital B	9	Hourly	2¾ hourly	3¾ Hourly

Table 7.1. Collection of vital signs in the clinical setting

In comparison, their respective policies recommend for Hospital A hourly for 2-6 hours until stable then 4 hourly for minor cases (7 sets- 10 sets) and hourly for six hours, two hourly for 4 hours then 4 hourly for major cases (11 sets). At Hospital B the policy stated two sets of vital signs in the first sixty minutes on the ward and then up to the discretion of the registered nurse (a minimum of 2 sets). A comparison is described in Table 7.2.

	Number of Sets	Pattern of vital sign collection
Hosp A- minor	7-10	Hourly for 2-6 hours until stable, then 4 hourly
- major	11	Hourly for 6 hours, 2 hourly for 4 hours, then 4 hourly
Hosp B	2 (minimum)	2 sets in the first 60 minutes and the discretion of the RN

Table 7.2. Policy description for the collection of vital signs.

In Hospital A, the hospital with a policy describing a traditional regimen of collection, the number of sets of vital signs collected in practice falls in the upper ranges of the number of sets to be collected as recommended in the polices. For Hospital B where there is a clinical judgement model only prescribing two sets of vital signs in the first hour the practice still reflects a more traditional frequency of vital sign collection.

Individual patient differences may account for the higher than recommended collection of vital signs than in the policy recommendations but it appears that there is more emphasis on compliance with traditional patterns than patient need. Botti and Hunt (1994) state that nurses believe the frequency of post-operative observations is determined by hospital policy with Burroughs and Hoffbrand (1990:371) believing that observations are “made largely as a routine procedure, unrelated to the perceived need of the individual patient”. These authors (Burroughs and Hoffbrand 1990; Botti and Hunt 1994) believe that the ‘systems’ and policies the nurses work within are limiting the possibilities for individualised nursing care.

Tradition Underpinning Practice

Tradition permeates all manner of clinical practices (Cox Dzures 1998) but why do these traditional regimens of vital sign collection still exist? There are arguments that the continuation of the regulation of this practice provides medico-legal protection for the organisation, that the regimens support a structure to the operation of the hospital and that the existence of these regimens are important to guide inexperienced staff.

The absence of substantive evidence leads Schumacher (1995:142) to believe that the collection of vital signs is “one regimen in nursing supported more by tradition rather than empirical evidence”. As demonstrated previously (pp. 11) the collection of vital signs has not always been the domain of nursing. The integration of vital signs into nursing practice has evolved over a 60-year period but the tradition still manages to adhere to practice. The

collection of vital signs has been enculturated through the years, by hospitals adoption of traditional models of vital sign collection without any supporting evidence, with subtle variations between and within organisations without any rationale. Nurses collect large numbers of vital signs in the first 24 hours after the patient returns to the ward from surgery within the higher range recommended in policy. In contrast to the findings of Long et al. (1998) this research has found nurses take vital signs similarly to the traditional patterns of collection despite the availability at both hospitals, where the research was undertaken, to take fewer sets of vital signs than has traditionally been the case. Closer examination of the patterns of vital signs collected and the recommendations in policy highlight that whilst nurses are enabled in the policy to make decisions regarding the frequency of vital sign collection, in particular to decrease the number of sets collected, they continue to collect vital signs based on the traditional regimens.

Let us not confuse clinical expertise with doing things the way they have always been carried out. One could argue that patients today may have higher dependencies and nurses have used their clinical judgement to increase surveillance or is it equally compelling to conclude that these high levels of vital sign collection result from traditional practice (Schumacher 1995; Allen et al. 2002).

In reality the practice of post-operative vital sign collection is determined by traditional patterns that have evolved over a period of 50 years (Schumacher 1995; Allen et al. 2002). There is a belief that “the absence of research studies

which guide the frequency of post-operative vital sign assessment indicates that existing protocols are based on tradition rather than research findings” (Botti and Hunt 1994:53). One acknowledges that there are many aspects of traditional practice that are appropriate. Unless we have evidence that supports the continuation of such practices then the basis for the practice and potential benefits to the patient are questionable. There is a need for evidence to support procedures and process otherwise they become “habitual and dysfunctional without” (Taylor 2002). As described by Burroughs and Hoffbrand (1990:371) activities that are ‘habit’ can easily become ‘tradition’ and before you know it are looked upon as ‘policy’.

Traditional patterns of vital sign collection and the lack of evidence are also reflected in the textbooks that describe clinical practice. It appears that the policies that nurses use to determine their practice are in the most part developed based on tradition and clinical experience and exist to protect the organisation rather than improve patient outcome. These documents that support the activities of the clinicians do not support a singular best practice. So is there a need for one?

The relative merit of diversity of care delivery versus perceived gold standards.

Before embarking on a debate regarding the need or otherwise of establishing a best practice for post-operative patient surveillance two aspects need to be clarified. Firstly the current diversity of practice that exists

in the literature and in practice and the challenge of establishing one gold standard or best practice when the terms and language are not consistent.

Number of Sets of Vital Signs

Whilst the diversity of the regimens that direct the collection of vital signs has been highlighted the discussion finished by comparing sets of vital signs taken in the initial 24-hour period after returning to the ward. The use of the number of sets collected has been a simplistic useful tool to gauge and measure differences in practices throughout this research. Previous studies have demonstrated an impact at a local level to reducing the number of sets of vital signs collected. Schumacher (1995), Long et al. (1998) and Davis and Nomura (1990) all recommend a reduction in the number of sets of vital signs collected in the immediate 24 hours post-operatively. A reduction from 11 to 8 sets resulted from the work of Davis and Nomura (1990) and then based on this finding Schumacher (1995) evaluated a reduction in sets from 14 to 9 and Long et al. (1998) recommended a reduction from 18 to 8 sets in the first 24 hours post-operatively. Policy documents analysed for this research recommended a frequency of collection of 9 sets for all policies reviewed and 10 sets for hospitals that described traditional models covering the complete 24-hour period. Where the procedure was described as major 12 sets were recommended and minor cases 7 sets. This is in comparison to the reality of practice where the observation of practice revealed a mean of 9 sets per 24 hours were collected for both hospitals combined. The medical records reflected patients returning direct to the ward from recovery received a mean

9 sets of vital signs. The policies describe a mean of 9-10 sets and in today's practice setting nurses are collecting 9 sets. The literature reports recommendations for the number of sets to be collected at 8 and 9 sets in 24 hours. This reflects a small reduction in the number of sets of vital signs nurses have collected over 10 years. There still exists wide variation in the practices described that do not take into account the immense change in health care and clinical practice as epitomised by shorter length of patient stays, improvements in surgical techniques and medication therapies. Are 9-10 sets in the initial 24 hours post-operatively the gold standard?

Clarification of Terminology

Gold standard implies similarities, consensus, and a notion that what is undertaken is of the highest quality. In relation to post-operative surveillance, what has been uncovered is a variety of differences relating to the language used to describe the practice. Throughout this text issues of language have been highlighted. In the glossary there are the definitions of the terms vital signs and observations as they were used for this research based on current descriptions in the literature. The research relating to post-operative complications highlighted differences in terms relating to post-operative complications, anticipated events and clinical events and so these were subsequently clarified. Ambiguity in the use of the terms is evident (Evans et al. 1999b; Botti et al. 2001) and was highlighted in the analysis of the policy documents. The majority of the hospitals in the sample (89%) used the term observation, which represented a variety of combinations, including

<p><i>Post-operative complication</i> alteration in patients that are of more serious nature, requiring intervention.</p> <p><i>Anticipated events</i> frequent changes encountered in post-operative patients</p> <p><i>Clinical events</i> changes in-patient that are not life threatening and are managed by simple interventions.</p>
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TPR and BP and other elements (32%), TPR and BP (30%), or there was no definition provided. Other descriptors included temperature only, or pulse and respiration only, or temperature and blood pressure or TPR and BP and oxygen saturations. Similarly this was found in relation to the term vital sign, with 24% of the documents using the term but only half of these defined the descriptor, one third described TPR and BP and some sites (10%) used the term to mean TPR and BP and oxygen saturation measurement. Due to the lack of clarity and to assist with analysis of data collected in the observation of practice a set of vital signs was considered to minimally consist of pulse and respiration. This was then supported in the observation of practice where the collection of pulse and respiration was a core element and variations occurred in temperature and blood pressure measurement. Temperatures were taken less frequently through out the 24-hour period and blood pressure recorded less in the 5th - 24th hour period. In practice for the most part a set of vital signs consisted of temperature, pulse, respiration and blood pressure, with blood pressure and temperatures not always collected with pulse and respirations. This difference may be accounted for with patients on narcotic infusions that require hourly collections of pulse and respirations and less frequently, temperature and blood pressure recordings.

It has been stated that the “term *nursing observation* is often used synonymously with vital sign measurement, whether or not vital sign measurement is the most appropriate for assessment in a particular context” (Botti et al. 2001:139).

A Fifth Vital Sign

The collection of other observations covered a range of aspects being monitored including oxygen saturations, pain, wounds, sedation, drains, being asked how are your feeling, fluid management, voiding, nausea and bowels, intravenous therapy and minimally nasogastric tubes, oxygen therapy, neurovascular observations, food intake, warmth of patient, orientation, epidural infusions, shortness of breath, blood sugar levels and indwelling urinary catheters. Whilst a debate still continues in the literature regarding what should be an observation (Walsh and Ford 1991) and what may constitute a fifth vital sign - oxygen saturations or pain assessment (Tierney et al. 1997; Evans et al. 2001), data reflected a lack of consistency in the collection of these elements with the traditional vital signs.

The observation of practice saw information regarding the presence or absence of pain being collected more frequently than vital signs after the first four hours on the ward. In relation to the number of sets collected information about the presence or absence of pain was collected more frequently than vital signs at a mean of 11 times and oxygen saturations only being collected 8 times in 24 hours, but most frequently occurring in the first 4 hours after returning to the ward. The polices described the assessment of pain occurring less frequently than wounds, drains and intravenous therapy with oxygen saturations even less frequently than all of these. Despite pushes from different health care factions (Tierney et al. 1997; Huang et al. 2001; Mayer et al. 2001) neither pain nor oxygen saturation clearly stand out as

being collected as a fifth vital sign and it is felt should remain as components of observations rather than as a fifth vital sign.

Current practice and the policy underpinning practice remain unclear as to what aspects of observations are vital. The most common aspects assessed by nurses as demonstrated in the observation of practice were pain, oxygen saturation, wounds and sedation but they did not fit readily with the routine regimens of vital sign collection. Policies describe wounds, neurovascular assessment, checking drains and intravenous therapy followed by pain as the most frequent other observations to be collected. In debating what could constitute a fifth vital sign it is worthy to note only 20% of patients observed were asked about the presence of nausea but nausea and vomiting were experienced by 37.5% of patients, the most frequent complication in the medical record audit. The elements of post-operative patient monitoring, the practice and the terminology relating to the practice of observation collection is not consistent and this is reflected in both the literature and the daily practice of nurses.

Gold Standard

This research has identified what could constitute current best practice of vital sign collection, based on expert opinion, for the patient post-operatively in the general ward. That is the collection of vital signs in a predetermined pattern, focusing on the time in the post-operative period rather than the patient need. More specifically the most common regimen for post-operative patient monitoring in the first 24 hours after returning to the ward, as

supported by policy documents (Zeitz and McCutcheon 2002), the texts, (Crisp and Taylor 2000), and in the practice, is hourly vital sign collection for four hours, then four hourly observations, equating to 9 sets in 24 hours, with an association with other observations not clearly defined. In relation to other observations such as wounds and drains there is no consistent practice recommended.

If nursing were in need of a gold standard this regimen would be it; the acquired knowledge available supports this singular regimen. It can be argued by evidence-based purists that this is not a gold standard as the gold standard for evidence would be as a result of a randomised controlled trial (Higgs et al. 2001). However, as discussed previously, best practice is not achieved through traditional practices and expert opinion but based on the combination of rigorous evidence, (not only randomised controlled trials), clinical expertise and patient need. This standard of post-operative vital sign collection is not based on substantive evidence, does not allow for clinical judgement (although has been based on clinical expertise), and the emphasis is on time intervals rather than the individual needs of the patient. The determination of a regimen as the standard of practice does not take into account other models that are currently being practiced including a clinical judgement model and models that incorporate the collection of vital signs in the recovery area as a continuum of care.

Diversity of Practice

The uniqueness and individuality in the interactions between the patient and the nurses do not support a one-size fits all approach. Care decisions are made in situations “where there are frequently no right and wrong solutions or actions” (Higgs et al. 2001). What patients are seeking in best practice is care that is “high quality, effective, efficient, and affordable” (Higgs et al. 2001). In the process of using traditional regimens for monitoring patients post-operatively all patients have been made to fit into one-size (Harley and Tsmassiro 1997). This approach is described by Fleischer (1989), in relation to patients undergoing gastrointestinal procedures, as being universal monitoring where by policies direct the same monitoring for all patients undergoing a certain type of procedure. In contrast he describes selective monitoring whereby decisions are made on the basis of the type, complexity and length of the procedure and the individual patient risk factor profile. The use of universal monitoring de-emphasises individual differences that occur in patients who rarely have “one-dimensional problems” (Higgs et al. 2001:488).

This multi-dimensional practice is highlighted in the diverse number of general surgical procedures that patients undergo and that nurses care for at any one time. The research in the observation of practice and the audit of medical records revealed that patients had undergone 26 different categories of surgical procedures on the two different wards making it impossible for one regimen of post-operative monitoring to meet the needs of this diverse

array of patients. This diversity may account for one organisation utilising seven different post-operative vital signs regimen in their unit level policies.

Whilst patients and the procedures they undergo are different so are the organisations that nurses practice in and the levels of support hospital systems provide clinicians with. The survey of policy documents revealed no differences between the frequencies of vital sign collection based on the hospital type. Whilst rural hospitals and public organisations had policies that recommended increased frequency of collection of vital signs / observations these were not statistically significantly different. Some of the reasons for the higher levels of monitoring may be accounted for by differences in the level of clinical support (including the presence of medical staff, intensive care services), the risk level associated with the procedures, staffing levels and patient risk profiles. The observation of practice that occurred within a private and a public hospital ward revealed minimal difference in the frequency of monitoring vital signs with the public hospital ward collecting slightly more frequent vital signs.

The provision of a gold standard assists in measuring compliance and performance, supports organisational processes, assists organisational efficiency and provides portability of nursing skills between organisations. However, the purpose of post-operative monitoring should be the improvement of patient outcomes through the early detection of alterations in the patients' post-operative condition. Broad standards are required that focus on these outcomes rather than on predetermined recipes for care.

There is the potential for EBP recommendations to support the continuation of recipe book clinical decision-making. Whilst it is argued that protocols assist in the establishment of standards (Davis and Nomura 1990) it is also felt that true professionals do not need prescriptive procedure manuals (Overfield 1990). The focus should be on the provision of information that supports clinical practice based on rational decisions, professional determinations and research evidence (Higgs et al. 2001). Rather than identifying best practice as an individual gold standard there is a need for practice development to enable the clinicians to use clinical judgements to determine frequency of post-operative vital sign collection and monitoring other aspects of post-operative recovery. It would be more appropriate for nursing care to be based on “clinical judgement and updated information rather than on procedures” (Overfield 1990:39). Clinical judgements need to be based on individual patient needs (including risk factor profile, surgical procedure, length of the anesthetic, time spent in recovery), the expertise of the staff, contemporary evidence available, current workload and the requirements of the organisation to determine the best regimen of monitoring a specific patient (Malangoni in, Sentinel Event Alert 2000:1). Whilst this seems logical the survey of policy documents revealed there are few clinical judgement models evident in practice.

Vital signs as routine and ritualised nursing care versus care directed by clinical judgement.

Vital sign collection as a component of nursing practice is based on tradition and does not appear to have undergone any significant changes in relation to the mechanisms of collection or the frequency since its integration into practice in the 1940's and 50's. This is despite ongoing debate in the literature about the lack of substantive evidence to support the current practice and a sense of disgruntlement amongst clinical nurses about the fact that they consider they collect so many vital signs. Nurses question the relevance of the practice, there is a lack of evidence to support the practice, and nurses drive the development of policy and contribute to the content. One then wonders why nurses are collecting so many vital signs? Is it because it is a traditional practice that is a ritual that has not undergone intense interrogation or been discussed critically (Bayne 1997) or are there barriers that support the continuation of this ritual rather than a shift to clinical judgement models of practice? Are these regulated routine policies designed to provide optimal care to the patients, protect the organisation or have they become ritualistic?

Routine, ritual practice was explored earlier in this thesis in relation to vital sign collection. Routine and regulated refers to the pattern of collection of observations and vital signs that are deemed necessary based on the patient condition (i.e. just returned from surgery), as specified in hospital / ward policy and are based on predetermined time scales. In addition ritual action was discussed as portrayed in the literature as being the undertaking of

activities that are without thought as to the clinical need, based on practice that is ingrained in the culture and being the way it has always been done. When the purpose for the routine is lost and it is undertaken without thought it becomes a ritual (Philpin 2002).

Rituals are evidenced in the practice of post-operative patient assessment as they returned to the ward. One issue highlighted from the review of policy documents was the lack of clarity in relation to the assessment of the patient as they arrived on the ward. Some policies were clear regarding the specific collection of base line observations others were vague i.e. hourly for the first four hours. The significance of this was highlighted in the observation of practice where it was noted that the mean time taken between the last set of vital signs in recovery and the first set on the ward was 30 minutes. This is despite the fact that the inference in the policy documents was once the patient was determined as stable to leave recovery the traditional regimens recommend vital sign collection at the rate of hourly or more frequently. At the two hospital sites chosen for the observation of practice there was no continuity between vital signs collected in recovery and those commenced on the ward. This was exemplified by the separate documentation used by recovery and general ward staff to record vital signs. Whilst there is an argument which is what the value of these observations is in the provision of a base line assessment of the patient for subsequent comparison this can be achieved by assessing other aspects of the patient rather than measuring vital signs that have been recorded within the last 30 minutes. The policy at two

hospital sites surveyed incorporated the collection of vital signs and observations as part of the ongoing surveillance of patients post-operatively from recovery to the ward. Once the patient was transferred there was already a predetermined regimen that had commenced in recovery. It is noted that both of these occurred in smaller rural hospitals where there is also a larger integration of staff between recovery areas and at the ward level.

Workload and Rituals

Decisions regarding frequency of post-operative patient monitoring should be based on patient need rather than ritualistic practice. Based on casual conversations with many nurses, it appears that nurses feel they are undertaking too many routine regulated vital signs based on tradition rather than patient need or, as suggested earlier, based on scientific sources of evidence. Research has revealed that nurses believe that there is too much emphasis placed on observations and that unnecessary observations take up valuable nursing time (Burroughs and Hoffbrand 1990).

In relation to workload these prescriptive routines preclude flexibility in the clinical setting. The clusters of time established from the analysis of policy i.e. 0-4, 5-12 and 13 -24 hours post-operatively assist in determining the intensity of workloads that occur once a patient returns to the ward. The policy documents revealed almost half of vital signs are collected in the initial 0-4 hour period. Uncovered through the observation of practice was that almost 50% of interactions between the nurse and patients involved an observation

and a quarter involved the collection of vital signs. In addition the mean time to collect vital signs was 5.8 minutes although reports in literature have recorded times of up to 15 minutes (Camp-Sorrell and Wujcik 1994). A previous observation of practice undertaken to investigate the management of post-operative pain revealed that a considerable intrusion to the nurses providing care was seeking out equipment, that was not within the patient's proximity, to measure vital signs and oxygen saturations (Manias et al. 2002). Whilst vital sign collection is time consuming the challenge is that this workload is not predictable. With changes in surgical technology and shorter procedure times (Harley and Tsmassiro 1997) patients can begin to return to the ward setting anywhere from 10.00am and return to the ward until late in the night with staff receiving minimal notice regarding the impending return. It has been reported that patients with a high care acuity (for example those in the immediate post-operative phase) impact on the care received by other patients (Coggins 2000). The intense monitoring period impacts on the usual workload throughout the day and whilst overall workload can be estimated intensive patient observation periods cannot always be predicated in relation to other patient requirements and ward activities.

Comparing the results of the practice described in the policy documents and quantifying the practice in the clinical setting it is evident that the frequency of collection mirrors the traditional routine patterns rather than the policies. This is even more surprising when one unit observed had the one and only non-traditional policy recommendation. Where the policy described the

closest practice to a clinical judgement model of collection (two sets of observation in the first hour then up to the RN) the nurses collected vital signs and observed the patient that reflected a traditional regimen. In addition the site that had a traditional prescriptive policy the nurses collected vital signs more frequently than were required in the policy. This pattern again mirrored a traditional pattern of hourly for the first hour hours, three and half hourly for the next eight hours and then four hourly. It could be argued that they were using clinical judgement and were being cautious about monitoring the patient. In reality they were collecting vital signs in the manner that has been the culture of post-operative practice for a very long time.

The work of vital signs collection is resource intensive (Toms, 1993; Botti and Hunt 1994; Beyea, 2000), not only in relation to nursing time that can be wasted on superfluous observations, but also in seeking out equipment and in relation to the maintenance of increasingly technologically driven equipment (Simon and Clark 2002).

Value of the Ritual

The value of the ritual of vital sign collection in the post-operative setting is believed to be the detection of complications and ensure that staff are checking on patients. The intensity of the initial observation period, most commonly at least hourly for at least the first 4 hours (92% of traditional regimens that covered the first 24-hour period), has a limited relationship with the occurrence of complications. The virtue of having patients spend

time in a recovery unit before being transferred to a general ward is in ensuring patients are stable after their surgical procedure before being transferred to an area with less intensive monitoring (Schumacher 1995). The clinical events detected in this research occurred for the most part in the first eight hours. In other studies it has been stated that if complications do not occur within the initial 2.5 hours they were unlikely to occur in the first 4 hours (Harley and Tsmassiro 1997; Centre for Applied Nursing Research 1998). It has been reported that for minor gynaecological surgical patients there is a complication rate of 26% (including alterations in vital signs) with 60% of all complications occurring in the first two hours of the patient returning to the ward with those occurring outside this period being nausea, vomiting, abdominal pain and headache (Hann and Ross 1987). The occurrence of the complications identified in this research do not mirror the patterns of vital sign collection.

Nurses may be able to justify their practice on a superficial level but when challenged or questioned the value in the rituals become less certain. It has been argued that the systems in which nurses operate value the completion of tasks, particularly to prescribed timeframes. That completion of tasks or ticking off the boxes is a protective mechanisms that enables nurses to quantify work and reduce feelings of guilt for not providing the little extra touches of care (Binnie and Tichen 1998). This is supported by Philpin who believes that rituals assist nurses guard against anxiety in that it is easier to complete tasks without involving oneself in the realities of the patient's

condition (Philpin 2002). Evans et al. state that unnecessary and ritual observation collection should be minimised (Evans et al. 1999b). Practice based on rituals does not require understanding or knowledge as its purpose. Time spent on rituals that are unrelated to the patient needs is not cost-effective nor is it appropriate use of professional nursing time (Hirsch 1990).

A review of high-risk surgical patients identified the most frequent interventions in the post-operative phase included oxygen therapy, chest physiotherapy, enhancing fluid balance management and calling medical emergency teams (Anaesthesia 2002). The interventions enacted as a result of the detection of a patient complication uncovered in this research were routine practices. Of the cases where an intervention was identified 34% were referred to medical or other nursing staff, with medication administration resulting for 19% of events documented. For 10% of the clinical events identified, vital signs were measured for the complication of syncope. At no time during this research did a patient require transfer from the general ward to HDU / ICU during the initial 24 hours or the calling of specialist emergency support. The actions resulting from the detection of complications were of a more routine nature.

Patients who are identified at risk, or who require intensive surveillance are 'sifted' at the time of surgery and are transferred to high dependency (HDU) or intensive care units (ICU). This may account for the low rate of complications on the general ward setting. Of the 144 patients who spent

time on a general surgical ward in the first 24 hours after surgery, 17% spent time in HDU or ICU prior to arriving on the ward.

The audit of medical records shows that the rate of post-operative complications is rare. In total 48% of patients experienced a complication with around one third of the research sample of patients post-operatively (37.5%) experiencing nausea and / or vomiting and 17% experiencing a 'clinical event'. The clinical events that did occur, dizziness, urinary difficulties, neurovascular compromise, and wound complications, were not detected by changes in vital signs but incidentally (19%) as nurses undertake other activities or whilst undertaking the rounds for observation collection (22%).

In relation to the detection of significant physiologic changes it has been stated that vital signs are limited (Evans et al. 1999b) and that alterations in vital signs outside pre-determined normal values were found in the audit of medical records to occur in 55% of the patients. This large deviation from normal contrasts with the vital sign measurements in an emergency department, of 140 patients who were found to have close to the normal parameters traditionally reported with mean values of pulse rates at 78 beats / minute, respiration at 17 breaths/minute and blood pressure recording at 127 systolic and diastolic of 77 mm Hg (Edmonds et al. 2002). It would appear that patient assessment is a vital factor in detecting clinical events, rather than the collection of vital signs.

Why are nurses collecting vital signs with such frequency when there is no relationship with the collection to patient outcomes? The routines that support clinicians such as observation rounds may still have value if the clinician, based on the evidence, the individual experience and the needs of the patient, determined the frequency and the elements of these rounds. There is an increasing sense that vital sign collection should be based on patient need rather than routine (Dempsey et al. 2002). Collecting a large number of vital signs in an 'obs round' does not constitute individualised care (Walsh and Ford 1991). Due to the nature of the complications experienced how they were detected and the routine interventions that resulted, the value in observations is in the assessment of the patient rather than the vital sign measurements.

Rituals regulating practice

Nurses believe that policy determines practice (Botti and Hunt 1994) and yet it has been found that nurses collect vital signs less frequently than policy dictates (Long et al. 1998). Compliance with policy recommended frequencies of vital signs collection was described in a gastrointestinal investigation unit (Dempsey et al. 2002). This research found nurses collect more sets of vital signs than policy determines and in this study despite both sites having different polices, collected vital signs at similar frequencies. The policies analysed in this research do not support the use of clinical judgement and where they might i.e. choosing a frequency from a range, nurses are still collecting vital signs based on traditional regimens. The

existence of policy must then support the notion that organisations require the regulation of practice and the policy documents are the vehicle by which this is achieved.

Whilst on one hand policies describe a diversity in practice and opportunities for limited clinical decision making these are designed to control practice. The different components of this research reveal diversity in the routine regulated regimens of collection of vital signs and models for observing patients in the initial post-operative period once the patient had returned to the general ward. Whilst this diversity was dominant in relation to the frequency and type of information collected, a large number (76%) of sites recommended regular and routine practices in their policy documents, as described by Fleischer (1989) as universal monitoring. These policies leave minimal room for selective monitoring based on factors such as the health and fitness of the patient, the type of procedure or the length of anesthetic. Whilst terminology was used such as 'up to the discretion of the RN', there was always a minimum statement or a guideline that followed. As described in the survey chapter frequently used terms in relation to the frequency of collection included 'minimum', 'may be increased', 'then review', 'more frequently if required', 'where applicable', 'as required', 'if indicated', 'up to RN to determine type and frequency', 'guideline' and 'discretion of RN'. Many of these were being used as a disclaimer rather than encouraging nurses to use clinical judgement in determining the need for vital signs monitoring.

These routines support the practice of less experienced nurses and are perceived to provide order and protect the organisation. Whilst these routines are used by advanced beginner nurses (King and McLeod Clark 2002) to guide practice, they are ritualised by experienced practitioners who are unable to make informed clinical decisions based on the context and individual patient. Professional nursing practice needs to revolve around critical thinking rather than the completion of tasks or rituals (Long et al. 1998).

Barriers to Clinical Judgement Models

In the literature there are editorial comments on the search for rationale to support the practice of post-operative monitoring (Hanney 1992) and Internet based discussion from clinicians seeking information regarding appropriate frequencies of vital sign collection in the post-operative period (Vital Signs 2000). However the group of clinicians initially approached in this research to assist explore the issues surrounding the practice indicated strong support for regulated routine vital signs and did not want to see change to current practice. However the rationale they provided to support the current practice was aspects related to regulation and control of nurse's behaviour, in the most part, for example a means to make sure staff 'check' on patients, assisting less experienced staff to assess patients comprehensively and the provision of a medico-legal safety net. This fear of medico-legal implications has been reported as a factor that may be limiting the rationalisation of the practice of vital signs collection (Burroughs and

Hoffbrand 1990). Regimens for vital sign collection are seen as a mechanism to support less experienced nurses so they do not have to make “clinical judgements about care requirements” (Dempsey et al. 2002:185). Factors described that related to patient outcome were in the minority i.e. detection of patient complications, a legitimate reason to interrupt patients. In the reality of practice do nurses need regulation to provide best practice or does regulated practice reassure the organisation that best practice is being provided? The evidence to date based on expert opinion is that vital signs are not a mechanism that should be used to ensure regular monitoring of the patient (Evans et al. 1999b).

In the clinical setting and in defining practice there appears to be a lack of ownership of the practice of vital sign collection. The research, through the review of policy documents, has clearly demonstrated that nurses determine the content and direct the frequency of vital sign collection. There is a sense that hospitals support the use of these routine practices, via policy documentation, as they provide structure to ward activities. A nurse’s day revolves around a variety of rituals and routines that afford an operational framework to assist undertake all the tasks required. This research reveals that 89% of nurse / patient interactions are nurse initiated. Not only do routines assist efficiency they provide organisational systems that enable nurses to work together as team on the same shift and from shift to shift i.e. knowing that the last set of vital signs on the previous shift were taken at a specified time. In addition routines enable other workers in the health care

system to understand the daily routines of the ward such as patient hand over times. Rituals enable the retention of social order through the support of cultural and social construction (Philpin 2002). In a study by the Royal College of Nursing in the United Kingdom (cited in Kitson 1999) it was demonstrated that the systems and structures in acute settings did assist the provision of efficient nursing care. There is a sense that ritualised practice meets organisational needs rather than patient or nurse needs and assists in the efficiency of the organisation (Mussallem 1979). There is a certain sense of safety afforded to practice that maintains the status quo. Through the setting of recipe based standards, these routines reassure the organisation that certain things are being achieved such as routine patient surveillance.

With a cultural shift to best practice coming from within and outside of the nursing profession, clinicians can no longer rely on the rationale for practice being “This is the way we have always done things” (Beyea 2000:109) or hiding behind routines. It has been argued that evidenced-based practice, being the concept of basing clinical decisions and practices on best available evidence (Higgs et al. 2001), is the way of the future. How do you shift the basis of clinical decision making from tradition to evidence-based practice in relation to the collection of post-operative vital signs? Whilst the provision of more substantive evidence is the short sighted answer, Linton (1998) believes the challenge is in changing the behaviour rather than just the provision of information. One important ingredient is emancipating nurses from regulated routine practice; freeing them up from authority directed practice.

Enabling nurses to consider the research, consider the patient, consider their previous experiences and make care based decisions i.e. frequency of vital sign collection based on the individual patient rather than policy documents, outdated texts or fear of medico-legal repercussions.

Discussions on this point raise some interesting thoughts. Pre-registration educators strongly defend the belief that they develop nurses' independent decision making skills but when they get to the clinical areas it is not practised. Clinical nurses believe nurses are encouraged in practice to make independent decisions but do not possess the skills to do so! The students observed in this research spent more time with patients but appeared to integrate the traditional routines into their practice. Nurses need to be able to develop skills to make decisions based on unique situations rather than fitting all patients into predetermined prescriptive frameworks (McMurray 1989). Whilst Philpin (2002) reports that rituals do assist in the transition from student to practitioner they also enculturate them in a way of care delivery that is not conducive to making independent clinical judgements.

To achieve best practice in the surveillance of patients post-operatively there needs to be a paradigm shift in the way nursing care is delivered. This includes changing practice from tradition and rituals to practice based on evidence, changing practice from routine regulated practice to encouraging a diversity of practice based on patient need and underpinned by sound clinical decision making. There is a need to change many of the mechanisms in which care is delivered to focus on the patient rather than the system

(Kitson 1999). These changes require the development of a substantive evidence base to inform clinical decision making and a change in the culture in which nurses' practice (Rycroft-Malone et al. 2002).

Conclusion

Through the triangulation of the findings of the various components of this research it has been found that the regulated routine collection of vital signs does not assist in the detection of post-operative complications. The small number of clinical events that occur in the general ward setting, the routine interventions they enact, the frequency of deviations of vital signs outside the normal range, and the lack of any relationship between the vital signs and the rate of complications support this. So why do nurses collect so many vital signs? It has been argued that it is the tradition, an unsubstantiated belief that they detect complications, a process supported by the organisation believing it provides a level of protection and possibly because nurses are not encouraged to develop skills in independent decision making. If the collection of vital signs is not impacting on care it is timely that the current practice of post-operative patient monitoring is challenged. There is a need for a long-term systematic creation of evidence, that is widely disseminated and a change to the culture in which nurses practice.

The final chapter in this thesis details the implications of these findings, and makes recommendations for the future for patient monitoring post-operatively.

Chapter 8

Recommendations and Conclusion

The research to date on post-operative observations has been disparate and has had minimal impact on nursing practice. The research phases for this thesis were designed to build upon previous research to develop a more substantive evidence base that would assist with more informed decision-making regarding the best practice of post-operative monitoring. This research has drawn together existing knowledge and created new evidence, through the use of triangulation, whilst acknowledging the context in which nurses practice.

This final chapter draws a conclusion to the research in highlighting the flaws in the current practice of monitoring patients post-operatively and suggesting directions for future change.

Before discussing the recommendations of this research project, which will substantiate a need for a systematic program of research into clinical practices before change can occur and future direction for changes to the way care is delivered, it is timely to summarise the finding from this research and acknowledge the limitations of a research project such as this. Whilst the research focussed on post-operative monitoring other findings peripheral to

this practice have also been uncovered and these are highlighted in the other implications section.

Synopsis

The real world of nursing practice is complicated and dynamic with a case in point being post-operative patient monitoring. It has been demonstrated that the literature provides very little substantive evidence to inform the best practice for patient monitoring when returning to general wards from surgery. The literature that has been uncovered and critiqued is location specific, involves small samples, is not widely published and appears to have, at best, changed practice only at a local level.

The findings from a survey of policy documents that direct the practice of post-operative care in the state of South Australia have demonstrated that nurses manage the process of policy development and review and also are the main contributors of information upon which practices are based. The sample included public and private organisations and rural and metropolitan based hospitals. It is important to note that the content of the documents lacked support from substantive research. What has been described is that the most common regimen espoused in the policy documents is vital sign collection hourly for the first four hours and then four hourly with this occurring in 27% of the sites. It was evident that there is a great diversity in the patterns of vital sign collection recommended, but in the majority (91%) of the organisations the collection of vital signs was described using a regulated routine regimen of collection.

The frequency of vital sign collection described for the majority of policies is reflected in the practice of clinical nurses as observed in the general surgical wards of two hospitals. This is despite one ward policy describing a clinical judgement model to determine the frequency of vital sign collection. Nurses collected vital signs hourly for the first four hours, three hourly for the next eight hours and then every four hours. The number of sets of vital signs collected in a 24-hour period has been described in the literature over a 10 year period and has ranged from 8-14 sets (Davis and Nomura 1990; Schumacher 1995), and this is similar to that described in policy (10 sets) and found in practice (9 sets). Nurses collect vital signs based on tradition, this tradition is described with minor variations in the majority of polices and in sites where no traditional policy exists nurses still collect the vitals signs in a traditional pattern.

Nurses have articulated the purpose of intensive monitoring in the initial post-operative phase as the early detection of complications. An audit of medical records of all patients undergoing surgery in two surgical wards, over a one month period, demonstrated that the complications that occurred were minor in nature, occurred infrequently, and did not have a relationship with changes in vital signs. These alterations in the patients physiology have been defined as clinical events rather than post-operative complications. The audit revealed that the changes in vital signs occurred frequently (55% of sample) and the most common changes were slowed pulse rate and lowered

temperature. These alterations did not reflect physiologic changes in the patients.

Systematic patient surveillance assisted in the detection of clinical events and anticipated changes in the patient's recovery. These events were detected during observation rounds (22%), incidentally (19%) and whilst assisting with mobilisation (9%). The remaining mechanisms whereby a clinical event was detected included patient or other health care worker identification and whilst completing documentation or for some events it was not uncovered how an event was detected.

This research has collated the current evidence available that underpins the practice of post-operative patient monitoring on two general surgical wards. It has described textual accounts that underpin practice including textbook accounts and policy documents. Presented is the current practice of post-operative patient monitoring as observed on two surgical wards. Finally, it has been discussed that patients post-operatively, on general wards in this research, experience clinical events rather than the traditional post-operative complications expressed in the literature and that there was not a relationship between the detection of these events and alterations in vital signs. This leads one to conclude that the current intensive frequency of vital sign collection may not necessarily be contributing to positive patient outcomes but is potentially reassuring for organisations and managers.

Vital signs are collected based on traditional patterns rather than as a result of evidence-based nursing practice. They are collected routinely, are a ritualised practice and are not generally determined by the individual clinician or the individual patient. Of note is that whilst the practice described is diverse, it is based on regimented predetermined regimens as described in traditional polices that drive the frequency of collection. There has been no rigorous evidence to underpin best practice to inform clinicians about the frequency of post-operative observation collection.

Limitations

As has been described vital sign collection is an integral component of clinical practice and has a long tradition within practice. Undertaking research into this aspect of practice does not come without its own challenges. Whilst the early goal was to change the practice of vital sign collection in the post-operative setting, the reality necessitated the consolidation of current knowledge and the description of the current practice to precede the development of a coordinated program of research that would impact more significantly on nursing practice. It was important to draw together the disparate and uncoordinated activities that had been previously undertaken to investigate the practice and to set the benchmark for substantive practice change in the near future.

The context of this research was the clinical settings within the state of South Australia. Whilst two representative hospitals were chosen to investigate more intensely the practice of vital sign collection, one a tertiary public

hospital and the other a medium sized private hospital, the research undertaken within the clinical settings does only reflect these two organisations and in doing so provides a bench mark to compare other organisational practices. Whilst the research setting is in South Australia, the international literature, both the text that describe the practice and the research reported, suggest that regulated routine vital sign collection does occur internationally. It has been difficult to ascertain from the literature and through collegial networking a comprehensive picture of the nature of patient monitoring in the post-operative setting globally. This is in part because most of the literature available is quite dated.

The specific limitations of the research methods have been reviewed in the individual chapters describing each phase but in general they relate to four ideas, the language surrounding practice, the impact of the research on practice, the invisible work of nurses and process issues that are challenging to investigate.

The recurring challenge is researching a topic where the language used to describe the practice has not had consistent meaning. Vital signs and observations are terms used to describe the same thing on one hand, whilst describing totally different aspects of practice on the other. This inconsistency of language was evident in the policy documents that underpin practice, and in the literature.

The nature of investigating any aspect of clinical practice heightens individual awareness of that aspect of practice. Conference presentations, publications, casual conversations, surveys and the researcher's presence in the clinical setting can cause individual reflection on current practice for both practitioners and organisations. These changes may be present in data on an individual basis or a heightened awareness may have altered practice in some other unmeasurable way. This may be the frequency of collection of vital signs, the types of observations undertaken or even the quality of the documentation.

The work of nurses is unique and the dynamic nature of practice sets up its own challenges for research. The invisible work of nurses is difficult to capture. This was evident in the observation of nursing practice and the cursory glances that nurses made to observe patients without physically interacting with them. This aspect of observation remains unmeasured. The audit of medical records only captures the work of nurses that is documented and whilst a familiar chant 'if it is not documented it is not done' is recognised, there are many aspects of nursing work that are not recorded in the medical records and subsequently not captured on auditing.

The processes and procedures of organisational structure can constrain the types of data collected. Nurses take observations in rounds, patients spend time in intensive care and high dependency settings, and patients have special infusions that can alter the frequencies and type of observations collected. The data collected describes the real world of nursing practice,

these systems and processes may influence the data collected when focusing on a single practice, but reflect the reality of practice.

Despite these limitations the question still remains - why are nurses collecting so many observations in the first 24 hours after a patient returns to the general ward after surgery? The collection of vital signs remains a traditional practice based on rituals, habit and history, prescribed by authoritative figures based on a perception that these routines protect clinicians and are supported by practitioners as they provide structure to the organisation of the day. The focus of observation collection does not appear to lie in the improvement of patient outcomes

Recommendations

Whilst the research set out to investigate the practice of vital sign collection in a pragmatic way it was discovered that the practice could not be separated from the culture in which nurses practice. The type of recommendations that were viewed as potentially being made at the outset of the research have changed shape considerably due to the interaction of the context in which vital signs are collected. Whilst some specific practice changes are suggested there are also some larger strategic implications of this research in relation to the culture of practice and future research.

Patient Surveillance and Outcomes

This research supports the notion that there is limited value in collecting the intensive number of vital signs that have traditionally been taken. There is no

evidence available prior to this research to support the routine collection and this research has demonstrated that clinical events rather than post-operative complications are the most common occurrences accounted for in this post-operative period.

There is no association with changes in vital sign measurements with these clinical events and in general these problems are identified incidentally or whilst on observation rounds rather than by nature of recording vital signs. There needs to be a change to the practice of post-operative monitoring that can directly relate to improved patient outcomes.

Facilitating the uptake of the knowledge by clinicians and incorporating the new evidence into their practice is a problem that has been well described in the literature (Thompson 1998; Higgs et al. 2001). It has to be emphasised that whilst investigations are being undertaken on the practice of vital sign collection, even if they are small studies specific and local in nature, the area is plagued with a number of research studies that have not been published. Whilst Gardner believes that nurses want to share their discoveries and advancements in clinical practices there are barriers to publishing clinical innovations (Gardner 2003). Clinicians as researchers are not always empowered to publish, the publishers seek academic publications and the profession is not always supportive of scholarly achievements. Despite ongoing support for publication as a key communicative tool within the profession (Gardner 2003) it has been found that “traditional scientific

journals” are not the most effective means for knowledge circulation (Estabrooks 1999:285).

Culture Shifts

Practice change will not occur on a local level in isolation, especially for practices that have such an embedded tradition and that are enculturated in the way of doing and being. What we have seen is that the small research projects on vital sign collection have not impacted on practice and this is believed to be due to the larger culture that nurses operate in not being facilitative to small practice change. The bigger picture needs to be changed before appreciable differences to the care delivery processes are seen. The practice of regulated routine vital sign collection provides a framework to assist do the work of nursing and are integral to functioning of the organisation. Whilst new models can be implemented there is a more urgent need for a culture shift in the way nurses operate.

As has been discussed, whilst this can be achieved through the elements of evidenced-based nursing all elements of EBN need to be considered, evidence, clinical expertise and patient need. The provision of evidence alone will not change the practice and this is where the culture shift is important. Nurses need to be empowered to make clinical decisions based on the patient, the evidence, the organisation and the current climate. Organisations need to establish processes that enable nurses to make individual decisions based on these factors rather than the current version of the policies and procedures manual.

This culture change needs to occur from the way we educate nurses and in the clinical environs in which they practice. We need nurses to develop decision-making skills rather than rely on prescriptive policy that have no evidentiary basis.

The review of policies revealed a large variety of content, quality and information for the practice it directed. Whilst one could recommend more consistency amongst these policies it would be more pertinent to recommend the development of standards for post-operative monitoring based on patient outcome rather than procedural requirements. In relation to the gold standard of positive monitoring we should not be seeking out an ideal regimen for the frequency of collection of vital signs but the establishment of patient outcome standards to assist evaluate clinical effectiveness of patient monitoring.

Empowering nurses to use clinical judgement models to determine their practice is the way of the future.

Models of practice

Whilst changing culture is a challenge it is contextually important to facilitate change occurring in individual elements of practice. Where there is a push for change to the way nurses monitor patients post-operatively a short-term solution is to implement a model of practice that retains the structure and routine of prescribed vital sign collection. That is, a model where regular observation rounds are undertaken as they currently exist, with the focus on

assessing the individual, asking how they are feeling, checking comfort levels and appropriate measuring of clinical interventions such as infusion pumps, wounds, and drains. Hanney (1992) suggests that direct observation of patients is undervalued as a process of assessment. Where there are indications of a deviation from a normal process of recovery the nurse could then initiate the collection of vital signs if indicated. This system change would be supported by the use of current documentary processes.

The value in this model is that it reduces the work generated in collecting the vital signs (i.e. finding equipment, physical time to collect) at the same time as retaining the traditional purposes of vital sign collection, in that it retains a protective mechanism for the organisation, guides junior staff, and encourages more interactive patient nurse interaction. This observation-driven rather than vital sign-driven model has the potential to enable quality interactions between nurse and patient that are less intensive and potentially more accurate. In addition it is a step in the direction of empowering nurses to make decision based on the current condition of the patient.

Systematic Program of Research

This research has established the groundwork for a systematic program of investigation to engage the use of evidential processes for policy and care process development related to post-operative patient monitoring. Practice change cannot occur without a more substantive evidential base. More research projects can be undertaken on vital sign collection and occurrence of post-operative complication (Dempsey et al. 2002). This needs to be

undertaken as part of a systematic program of research rather than small isolated and local projects.

There needs to be support given to publication and dissemination of research findings related to clinical practice. Nurse academics are encouraged and often rewarded based on publications and presentations but similar systems are not available to clinicians. Whilst clinicians are aware of the value of publishing research, once research has been undertaken and practice changes implemented there are limited systems of support to actively encourage clinicians to publish findings.

Other Implications

Having reviewed the recommendations related to vital sign collection as a component of post-operative monitoring this research also highlighted issues that may have implications for other aspects of practice.

The collection of vital signs is only one component of post-operative patient surveillance. This research highlighted other issues in relation to care of the patients post-operatively. Not extensively reported previously is the constitution of nursing practice in the post-operative setting. This research has uncovered the types, frequencies and duration of the interactions between the nurse and the patient with nurses spending 8.5 minutes per hour over the 24-hour period with the patient with a mean of 2.5 visits. In addition quantified is the difference in nursing time spent with patients based on the type of accommodation. It is interesting to note the patients in

share accommodation in public hospitals appear to receive the most amount of nursing time. The public hospital also had fewer bed numbers, more FTE's but less experienced nurses. Uncovered was the amount of the time patients go unmonitored in this acute phase of their recovery. The mean time a patient went unobserved was over an hour for all accommodation types, but where patients went unattended for longer periods the majority of these occurred on a morning shift. With the layout of the ward impacting on patient care having previously been reported (Adams et al. 1995). The only other similar reports to these are by Pincombe et al. (2000) investigating the care dying patients receive in the acute setting who describe a range of minutes between care events ranging from 1 minute to 210 minutes.

A high rate of nausea and vomiting was recorded in this sample with 37.5% of the patients experiencing an episode of one or both. It would appear that nausea and vomiting is a common event in the post-operative recovery phase rather than a complication. Whilst the clinical focus of post-operative care has been pain, potentially the care of nausea and vomiting has been overlooked. Implications of poor management of nausea and vomiting include increased length of stay (Fleisler et al. 1999) and discomfort for the patient.

One aspect of post-operative care that has received a lot of clinical attention is pain assessment and management. On the other hand, this research uncovered a range of clinical events, especially nausea and vomiting, that could be potentially better managed in the clinical setting. Alternative

models of post-operative care have previously been proposed (Anaesthesia 2002). A post-operative surveillance model where a clinician would review high risk patients after returning to the general ward for 3 days post-operatively has been designed and trialled in Victoria (Anaesthesia 2002). It was intended to support clinical staff and appears not dissimilar to acute pain service models. It is a potentially useful model where there is a high turnover of staff or where inexperienced staff are a large component of the workforce. These models of specialisation increase generic clinician reliance on specialist practitioners reducing individual expertise. It is potentially more important to educate clinical staff to manage patients post-operatively more holistically rather than spend time on routines that have minimal impact on patient outcomes rather than support than this separation of different post-operative specialists? If clinicians received more support could they manage these problems more appropriately?

Frequency of intravenous monitoring was collected as a component of the observations undertaken for the patient post-operatively. The data demonstrates that intravenous therapy being delivered through a pump is checked just over the two hours and intravenous therapy without a pump is checked just under the two-hour period. Where there is a patient controlled analgesia infusion the mean time in minutes between checking is 107 minutes. A personal observation has been that hospital policies in general recommend infusions be to be checked hourly. But it appears intravenous

infusions whether via electronic device or manual delivery system are checked closer to the 2 hourly mark than on the hour.

This research has clarified further the role of patient temperature monitoring in the initial post-operative period. There has been a sense that initial temperature monitoring is not required as the intent is to detect inflammatory responses and that these occur later in the post-operative journey. Oliver (2001) reported that 7.8% of patients discharged from a recovery unit had a temperature that was less than 36°C whilst 46% of patients were reported by Smith et al. (1999). The 56% of patients with lowered body temperature during the first four hours on the ward in this research can only be compared to rates reported for patients discharged from recovery. It has been identified that the significance of ongoing lowered temperature includes increased incidence of wound infection, longer hospital stays, impaired circulation, increase in oxygen demand, and poorer pain management (Smith et al. 1999; Oliver 2001). The incidence of post-operative hypothermia appears to be a potentially significant problem in the post-operative general ward and that temperature monitoring in the initial period once a patient returns to the ward needs further consideration and evaluation.

Whilst debate rages as to what should be the fifth vital sign, pain, pulse oximetry or some other observation, further evaluation needs to be undertaken as to the merit of appointing one aspect as a fifth vital sign, especially when the value of collecting the four vital signs nurses already

collect is being questioned. Questions regarding the universal or selective collection of pulse oximetry will continue where clinical effectiveness has not been established (Fleischer 1989). The value of oxygen saturation in acute ward settings has been challenged because oximetry results have limited clinical application (Fleischer 1989; Simon and Clark 2002), and pain would be more beneficially captured in an observation model rather than in the collection of vital signs. Rather than focus on the intricacies, evaluation needs to focus on models that are going to improve patient outcomes with efficiency and meet broader standards.

In this research there were substantial differences identified between the length of surgery in the two hospitals and also a relationship between the length of surgery and length of time a patient spends in recovery. Whilst the difference in the length of surgery could be accounted for by the different mechanisms used to measure surgical time this rationale does not necessarily account for the difference in the length of time, a patient spends in recovery. There remain unaccounted differences between length of surgery and time in recovery between two different hospital types.

Future Studies

A systematic research program into post-operative monitoring is the future of research into this practice. Future research opportunities will be discussed in relation to those focusing on vital sign collection and studies related to other aspects of practice.

Vital Signs

Specific elements for investigations include:-

- The provision of evidence regarding the practice of vital sign collection. The conduction of more substantive research into the incidence of post-operative complications and / or adverse events. This should include a larger sample for a medical record audit, the inclusion of International Classification of Diseases (ICD) codes and the investigation of different surgical procedures i.e. orthopaedic and cardiac specialties. More information needs to be generated regarding the incidence of post-operative complications across a range of procedure rather than the traditional procedure specific reporting that is presented in the literature.
- The development, implementation and evaluation of new models of patient surveillance that are based on generic standards and patient outcomes. The one model discussed previously is the retention of current regimens for collection that focuses primarily on patient assessment and includes vital sign collection where specifically indicated. An alternative model is the abolishment of regimens and focus on a clinical judgement model where by frequency of observation collection is based on individual need. Both these models would need formal evaluation.
- The incidence and implications of altered body temperature in the general ward setting over the entire post-operative journey.

- Similar investigations can be carried out for other procedures where routine regulated observations are undertaken, including day procedure settings and out-patient services. In addition the routine collection of other observations such as neurological observations and neurovascular checking.

Other Studies

More generic studies relating to the post-operative recovery phase include:-

- Investigations into the relationship between surgical time and recovery time between hospital operative units and the existence of a relationship between surgical time and recovery time. Is there a direct relationship between length of surgery and the amounts of time spent in recovery or do other factors such as staffing levels and experience, hospital protocols influence this more specifically? It would be interesting to look at different surgery lengths between hospitals that use the same parameters to measure surgical time. To identify factors that contribute to longer anesthetic times is it just staff experience or are there process issues that lengthen the time a patient sustains an anaesthetic? Studies in these areas would be beneficial through the identification of more efficient processes and in predicating workloads for recovery units.
- Research into the best practice for the management of nausea and vomiting.

- Studies to evaluate the role of potential fifth vital signs of pain assessment and oxygen saturations. There are still discussions on the efficacy of both these components of practice. It does seem a little backward that in trying to change the practice of vital sign collection other authors are trying to expand the existing practice. Potentially a change of emphasis away from measurements to assessments may make these debates obsolete.
- This research has highlighted that deviations from the normal parameters of vital signs are quite frequent especially in relation to alteration in pulse rate and temperature. There is scope for further studies to reevaluate the normal physiology of vital sign parameters in the 21st Century. This includes the frequency of temperature surveillance in the identification of hypothermia and fever post-operatively.
- Further studies could be undertaken into the content, frequency and duration of nursing interactions with a view to identify the unique aspects of nursing practice and highlight areas for changes in practice to improve efficiency and patient outcomes. "It is through better-informed practice that we will make a difference to patient outcomes" (Madjar 2002).
- The use of information technology in the clinical setting to measure patient dependency is prevalent. The use of this information is not well described in the literature. There is scope for more investigation into

patient dependency, skill mix and the impact on patient outcomes (McKenna 1995).

Alternative Models

There is no doubt that the practice of nursing has changed. The integration of vital sign collection into nursing practice has evolved over 60 years and during this same time dramatic changes have been seen in the way health care is delivered. Unfortunately these changes have not always impacted on the way nurses practice. Research into the practice of nursing uncovers a wealth of insight but also presents many challenges. Despite being questioned by clinicians, vital sign collection in the post-operative setting has undergone minimal change. This research has highlighted the lack of a relationship between the current practice of post-operative vital sign collection and the detection of post-operative complications. This has led to the recommendation that new models of post-operative monitoring need to be developed and evaluated to ensure the practice of nursing does contribute to improved patient outcomes.

If the practice of regulated routine post-operative monitoring was to continue in the general surgical ward setting the model this research has identified the standard for surveillance is hourly for four hours then four hourly. This recommendation is based on previous research, the most frequent pattern being described in the policy documents, and based on the current nursing practice in the clinical settings. This research has established that few patients in this study experienced post-operative complications. The

clinical events they did experience did not cause alterations in vital signs and were certainly not detected by nurses through changes in these physiological measurements. The evidence does not support relationships between detection of complications and alterations in vital signs.

In contrast to the recommended gold standard this research advocates the best practice of post-operative patient monitoring would revolve around a clinical judgement model. Singular gold standards do not meet the individual needs of the patient nor are they appropriate when the patients returning to the general surgical ward setting have undergone such diverse surgical procedures. Surveillance tailored to patient requirements would enable the monitoring of aspects of the patient's condition most likely to alter during post-operative recovery based on co-morbidities, and the procedure type, remembering that patients already undergo a sifting process having the opportunity to receive more intensive monitoring prior to returning to the ward by spending time in ICU / HDU units. A clinical judgement model would potentially reduce the number and type of observations collected. In freeing up nurse's time from the resource intensive practice would enable more time to be spent on assessing other aspects of post-operative recovery including levels of comfort (pain and nausea management) post-operative education, fluid balance monitoring and other aspects directly related to the specific surgical procedure. Where standards are required general patient outcome focussed standards should be developed.

The implementation of a clinical judgement model requires a substantial culture shift to the way nurses practice. This change is preordained to fail if clinical settings change from regulated practice straight to a clinical judgement model without addressing the plethora of issues that surround nursing practice in the real world. This is evident in the hospital that described a clinical judgement model in the policy but the nurses still collected vital signs based on a traditional pattern. These issues include the need for the organisation to protect itself through advocating regulated practices of surveillance, the belief that inexperienced staff do not have the necessary skills or resources to make clinical decisions and a view that routines assist with efficiency. The reality is that monitoring based on specific procedures or models emphasising the use of professional clinical judgement by clinicians may provide more efficient use of nursing resources contributing significantly more to positive patient outcomes.

In relation to post-operative vital sign collection nurses do not seem to be making clinical decisions based on their own expertise and the individual needs of the patient. The limited evidence previously supporting the practice of post-operative vital sign collection, the traditional aspects to the practice and the new evidence uncovered through this research suggest that the practice is not related to patient outcomes and that change to the practice of post-operative surveillance needs to occur. Implementing changes to traditional practice needs to be carefully balanced with appropriate education and support for clinicians. This needs to occur in relation to the

education at both preparation level and ongoing clinical education. There need to be processes in place that support nurses to make independent decisions regarding care appropriate to the patient's individual needs with safeguards that protect the individual, the organisation and the patient.

The research supports the notion that patient assessment skills are the vital factor in detecting clinical events, rather than collection of vital signs. In light of the intensive workload traditional patterns of monitoring generate and the limited success in implementing a clinical judgement model this research supports an interim post-operative observation model. This model uses the patterns of routine regulated practice for the assessment of the patient post-operatively and that the findings of this assessment drive the need for the collection of vital signs. The emphasis of this assessment changes from physiologic measures to assessment focussing on presence or absence of pain and nausea, level of sedation, monitoring wounds and drains, and management of additional therapies. Where indicated the nurse would initiate the collection of vital signs if warranted. It has been demonstrated that alterations in vital sign measurements, in the post-operative phase, are not uncommon anyway. The development of this model arises as a compromise between the traditional practices nurses are familiar with and a practice based entirely on individual clinical judgements. This model would ensure the organisation of regular surveillance, support inexperienced staff in establishing routines and commence a process of encouraging nurses to make patient focussed decisions about their clinical needs. A model such as

this would ensure adequate monitoring of patients and change the focus of assessment from vital signs to other aspects of recovery impacting on the quality of the interaction between nurse and patient and contributing more positively to the outcome for the patient.

Conclusion

The complexity of the central concepts that surround post-operative observations, the review of the literature and tacit knowledge indicates that there are challenges in determining the best practice for the most effective and efficient way of monitoring patients post-operatively. Prior to this research there was a need for more substantive evidence to support an appropriate frequency of post-operative observation collection, supported by investigations into the relationship between when complications occur, and what nursing practices are detecting changes in patient's condition during the post-operative phase. What needed to be determined was if the collection of regular routine vital signs detects changes in patient condition or whether problems are reported or detected in-between vital sign collection times. There was a need for evidence to be reviewed in context of the reality of practice including medico-legal implications, process requirements of organisations and supporting inexperienced staff. Once this information had been collected by means of rigorous research the most effective practices for post-operative monitoring could be determined, based on evidence and the reality of practice.

In determining if the collection of vital signs detect post-operative complications, this research described the intensity of routine, regulated post-operative observations that are not only described in policy but also undertaken in practice. It was found that nurses, based on traditions and clinical expertise, support the rituals of observation collection by creating the

policy and enacting the processes despite a lack of evidence or patient need. Whilst the occurrence of deviations in vital sign measures occurs frequently in patients recovering post-operatively the incidence of post-operative complications is low. Instead patients experienced clinical events and that patient assessment is the pivotal component to detecting changes rather than physiologic measures provided by vital sign collection.

It was clear from the outset that there was a lack of clarity relating to the terminology surrounding the practice. Whilst there has been an assumption that the terms vital signs and observations had clear definitions, their use in the literature and in the policies that support practice have revealed multiple and overlapping meanings. This in turn has contributed to diverse and different practices in the clinical arena.

What was revealed in this research was the practice of post-operative vital sign collection is based on tradition, the way it has always been done. The patterns of monitoring are not based on patient risk profile, surgical procedure or length of anaesthetic but that most hospitals describe regulated routine patterns in their policies that have been purported for many years. It has been argued that nurses base their practice on hospital specific policies that describe traditional practice. These policies that support practice have been, for the most part, determined by nurses using clinical experience (based on tradition) but lack evidence to support their recommendations. Even specialist nursing textbooks lack substantive evidence to support the variety of practice they describe. What has been demonstrated is the

collection of regulated routine vital sign collection overrides policies where clinical judgement models are supported. There is no current evidence that supports the practice described in these policies as benefiting patient outcome.

As described in the introduction, the vision for this research was to change the practice of post-operative vital sign collection. In reality, the goal became the contribution of a different understanding based on new evidence, generating knowledge of the context in which the practice occurs and the drawing together of current literature related to the practice of vital sign collection through the use of triangulation. Through this process the research has recommended changes to the current practice of post-operative monitoring. These changes consider the complexities of determining a singular best practice for the most effective and efficient way of monitoring patients post-operatively, taking into account the real world of practice that includes medico-legal limitations, self-protection mechanisms set by organisations and a perceived need that inexperienced nurses require formal processes for support. This research has provided substantive evidence to support an appropriate frequency of post-operative observations collection, taking into account the evidence on when complications occur, and the processes that detect changes in patient's condition during the post-operative phase. The collection of regular routine vital signs does not detect changes in patient condition. Regular surveillance and focussed patient assessment are more important indicators.

The practice of post-operative surveillance at this point can be viewed as being at a crossroads. Nurses can continue to do what they are doing whilst more studies are undertaken that play around the edges, skirting around the same old issues such as frequency and alteration in vital signs. This would continue to support an essentially traditional practice, with policy driven decisions based on a few scattering of studies neither supporting nor discounting best practice. There are many aspects to the practice of vital sign collection in the post-operative settings that can be investigated. It is more important to move the practice forward and develop and evaluate new and different models of surveillance that are more time and resource efficient for nurses and more relevant to individual patient need.

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Appendix 1 Publications arising from this Research

Appendix 2.1 Ethics Approval



OFFICE OF THE VICE-CHANCELLOR

7 December 00

Ms K Zeitz
CLINICAL NURSING

Dear Ms Zeitz

H/52/00 *POST OPERATIVE OBSERVATIONS: RITUALISED OR VITAL IN THE DETECTION OF POST OPERATIVE COMPLICATIONS*

I write to advise you that the Human Research Ethics Committee has approved the above project noting your amended documents received on 21.11.00 and on the basis of minor amendment to your patient and participant Information Sheets.

A copy of the endorsed application form is enclosed for your records.

Approval is current for one year. The expiry date for this project is: **31 December 2001**

Where possible, subjects taking part in the study should be given a copy of the Information Sheet and the signed Consent Form to retain.

Please note that any change to the project which may affect its ethical aspects will invalidate the project's approval. In such cases an amended protocol must be submitted to the Committee for further approval.

A renewal/status report form is enclosed for future use. Please fill this in prior to the above expiry date and send to the Committee's Secretary. Applications for renewal must include a brief report on the project's progress and any ethical issues which may have arisen. Similarly, the Committee should be informed if the project has been completed, has lapsed, or been withdrawn.

Yours sincerely,


CE MORTENSEN
Convenor
Human Research Ethics Committee

Enquiries: Helen Malby, Secretary, Human Research Ethics Committee

Postal Address: ADELAIDE UNIVERSITY, SA 5005, AUSTRALIA
Tel: (08) 830-34014 Fax: (08) 830-33417 Email: helen.malby@adelaide.edu.au

Appendix 2.2 Ethics Approval

Adelaide Community Healthcare Alliance Inc



55 Anzac Highway
 Ashford SA 5045
 Phone 080 8375 5261
 Fax 080 8371 1272
 info@acha.org.au

25 April 2001

Ms Kathryn Zeitz
 18A Farrell Street
 GLENELG SOUTH SA 5045

Dear Ms Zeitz

Re: Post Operative Observations

Thank you for attending the ACHA Research & Ethics Committee meeting on 18 April 2001 and I now have pleasure in advising that this project has been approved for a period of 12 months subject to the following conditions:-

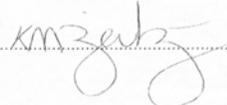
- **THAT YOU ACKNOWLEDGE YOUR AGREEMENT TO THE UNDER MENTIONED CONDITIONS BY SIGNING AND RETURNING THE ATTACHED COPY OF THIS LETTER, PRIOR TO THE COMMENCEMENT OF THE RESEARCH and**
- The data collected for the purpose of this research project cannot be used for any other purpose without the approval of the Research and Ethics Committee. Requests to use this data for other purposes must be made in the form of a formal research proposal.
- That the data collected for the purpose of this research will be stored and kept confidential for at least 15 years in accordance with good clinical practice guidelines issued by the TGA.
- That copies of all completed consent forms and any other data used in this research may be inspected at any time by representatives of the Research & Ethics Committee.
- That a report on the progress of the research will be made to the Research & Ethics Committee in October and then at half yearly intervals. This report is to indicate whether any ethical problems or complications have arisen, particularly side effects of drugs used or any other factor which may result in the investigation not producing any result (as distinct from the anticipated result).
- That you will notify the Research & Ethics Committee of any changes that may be required within the research proposal.
- Research & Ethics Committee approval is conditional upon your meeting any statutory obligations that you may have in relation to this project.

- Any extension to the initial approval period is to be requested in writing together with the inclusion of a progress report.

Please do not hesitate to contact me if further clarification is required.

Yours sincerely,

YVETTE WINTER
 COORDINATOR, ACHA RESEARCH & ETHICS COMMITTEE

Signed.....  Dated..... 3/5/01

Appendix 2.3 Ethics Approval

Royal Adelaide Hospital 

Medical Administration
Level 3, Margaret Graham Building
Royal Adelaide Hospital
North Terrace, Adelaide 5000
South Australia
Telephone: (08) 8222 5345
Facsimile: (08) 8222 5936
Web: <http://www.rah.sa.gov.au>

8222 4139
25 August 2000

Ms K Zeitz
DEPT OF CLINICAL NURSING
UNIVERSITY OF ADELAIDE

Dear Ms Zeitz,

Re: "Post operative observations; ritualised or vital in the detection of postoperative complications." RAH Protocol No: 000813

I am writing to advise that ethical approval has been given to the above project. Please note that the approval is ethical only, and does not imply an approval for funding of the project.

Human Ethics Committee deliberations are guided by the Declaration of Helsinki and N.H. and M.R.C. Guidelines on Human Experimentation. Copies of these can be forwarded at your request.

Adequate record-keeping is important and you should retain at least the completed consent forms which relate to this project and a list of all those participating in the project, to enable contact with them if necessary, in the future. The Committee will seek a progress report on this project at regular intervals and would like a brief report upon its conclusion.

If the results of your project are to be published, an appropriate acknowledgment of the Hospital should be contained in the article.

Yours sincerely,


Dr M James
Chairman
RESEARCH ETHICS COMMITTEE

Royal Adelaide Hospital North Terrace Adelaide South Australia 5000 Telephone: (08) 8222 4000 Facsimile: (08) 8222 5170

Appendix 3: Survey Letter for Policy Documentation

ADELAIDE
UNIVERSITY
AUSTRALIA

DEPARTMENT OF CLINICAL NURSING

FACULTY OF HEALTH SCIENCES
LEVEL 3, ELEANOR HARRALD BUILDING
ROYAL ADELAIDE HOSPITAL
ADELAIDE UNIVERSITY SA 5005
AUSTRALIA

Dear (Director of Nursing)

I am currently a Ph.D. student with The Adelaide University Clinical Nursing Department. I am coordinating an investigation entitled

Post operative observations; ritualised or vital in the detection of postoperative complications.

The purposes of this study are to determine what is currently happening in relation to routine, regulated postoperative observations, both in practice and in hospital policy and to identify which nursing interventions if any are detecting changes in a patient's condition.

As a component of this, I am trying to identify current policies, determining the postoperative observations patients receive when they return to the ward from the recovery unit. I am surveying all hospitals in South Australia with surgical units. It is for this that I seek your assistance. This project has received ethics approval from The Adelaide University Human Research Ethics Committee.

I am seeking assistance for two things

- Firstly, copies of any documentation that determines frequency and type of postoperative care. I would suspect they come in the form of policies, care plans, critical pathways or card index systems on the wards. Inclusive of documentation from different units or campuses.
- Secondly, an outline of your process for determining hospital-nursing policies i.e. who decides what clinical policies should be? Is it a policy and procedure committee or certain individuals?

I acknowledge this may be an awkward task in some settings. I am more than happy for your organisation to collate this information or I am happy to liaise with yourself, or a nominated person, and collect the various components of this information myself.

If you have any concerns regarding this project you can contact me direct (telephone numbers) or my Supervisor, Dr Helen McCutcheon (telephone numbers).

Thank you for considering this matter and I look forward to your response.

With kind regards

Kathryn Zeitz MRCNA, Dip App Sci, BN, Grad Dip Ed, MN

Appendix 4: Informed Consent
Appendix 4.1 Participant Information Sheet

[Hospital Research and Ethics Committee Title]

Post operative observations; ritualised or vital in the detection of post operative complications

Participant Information

Purpose of this research

The purposes of this study is to determine what is currently happening in relation to routine, regulated postoperative observations, both in practice and in hospital policy and to identify which nursing interventions if any are detecting changes in a patient's condition.

Your role

The nursing practice of postoperative observations, undertaken on your ward will be observed. At times your practice may be observed. The observation involves collecting information about the nursing activities involved in postoperative observation on your ward and not just of your practice.

Potential benefits

It is envisaged this project will provide insight into the nursing practice of patient postoperative observations. It is hoped it will provide knowledge into what nurses are doing and potentially what nurses should do in relation to best practice.

Participation

Your participation in this project is voluntary and you are free to withdraw from the project at any time. Your withdrawal will be without prejudice to employment.

Confidentiality

Your confidentiality will be preserved throughout the study with the researcher and supervisor the only people with access to the raw data. Your participation and personal details will not be divulged.

As principle researcher I can be contacted at any time: -

Kathryn Zeitz
18A Farrell Street
GLENELG SOUTH 5045

Phone Number *****

If you have any complaints or enquires a procedure is outlined on the page attached

Appendix 4.1 Participant Information Sheet (Con't)

[Hospital Research and Ethics Committee Title]

Document for participants in a research project

CONTACTS FOR INFORMATION ON PROJECT AND INDEPENDENT COMPLAINTS
PROCEDURE

The Research Ethics Committee is obliged to monitor approved research projects. In conjunction with other forms of monitoring it is necessary to provide an independent and confidential reporting mechanism to assure quality assurance of the institutional ethics committee system. This is done by providing patients subjects with an additional avenue for raising concerns regarding the conduct of any research in which they are involved.

The following study has been reviewed and approved by the [Hospital Name] Research and Ethics Committee:

Project title: Post operative observations; ritualised or vital in the detection of post operative complications

1. If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the project coordinator:

Name: Kathryn Zeitz

*Telephone: ******

2. If you wish to discuss with an independent person matters related to
 - making a complaint, or
 - raising concerns on the conduct of the project, or
 - the [Hospital Name] policy on research involving human subjects, or
 - your rights as a participant

Contact the Research and Ethics Committee's Coordinator on phone *****.

Appendix 4.2 Patient Information Sheet

[Hospital Research and Ethics Committee Title]

Post operative observations; ritualised or vital in the detection of post operative complications

Patient Information Sheet

Dear Patient

The ward you are currently a patient on is involved in a study looking at the observation of patients after an operation. The focus of the study is the nursing care patients receive. It will involve a researcher (who is also a nurse) observing nursing care after patients return from theatre.

Purpose of this research

The purposes of this study is to determine what is currently happening in relation to nursing observations while you are recovering from your operation, both in practice and in hospital policy and to identify which nursing practices if any are detecting changes in a patient's condition.

Potential benefits

It is envisaged this project will provide insight into the nursing practice of patient postoperative observations. It is hoped it will provide knowledge into what nurses are doing and potentially what nurses should do in relation to best practice.

Participation

You are not required to participate. The observation will only be of the nurse and there activities. If you do not wish this to occur whilst you are a patient please let your nurse know.

Confidentiality

Confidentiality is assured and none of your personal details will be collected during this phase of the study.

As principle researcher I can be contacted at any time: -

Kathryn Zeitz
18A Farrell Street
GLENELG SOUTH 5045

Phone Number *****

If you have any complaints or enquires a procedure is outlined on the page attached

Appendix 4.3 Participant Consent

[Hospital Research and Ethics Committee Title]

Post operative observations; ritualised or vital in the detection of post operative complications

CONSENT FORM

1. I,(please print name)
consent to take part in the research project entitled:

Postoperative observations; ritualised or vital in the detection of postoperative complications.

2. I acknowledge that I have read the attached Information Sheet entitled:

Postoperative observations; ritualised or vital in the detection of postoperative complications. Participant Information.

3. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker.

4. My consent is given freely. I have been informed that, while information gained during the study maybe published, I will not be identified and my personal results will not be divulged.

5. I understand that participating in this project is voluntary and I am free to withdraw from the project at any time.

6. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

7. I have been informed that a copy of a report of this study will be made available to me.

.....(signature) (date)

WITNESS

I have described to (name of subject)

Status in Project:

Name:

.....
(signature) (date)

Appendix 5: Data Collection Tool for Observation of Practice

Observation of Practice Data Collection Sheet

To describe current nursing practice in relation to the postoperative observations a patient receives in the first 24 hours after returning to the ward. What is actually happening in practice, including when nurses undertake postop. observations (frequency) and what (type of observations) they do to observe the patient.

Date: _____ Observ Comm: _____ Code: _____
 Ceased: _____ (Patient Number/total)
 Age _____ Gender M / F

Surgical procedure _____ Length of surgery (mins) _____ Length of time in recovery (mins) _____

Time of Last Obs Recovery: _____ Time First Obs on Ward: _____ Time Period Post

Operative: _____

Time In	Contact no prompt	Contact Prompt	Vital	Sign	Collec tion		Other Observations Undertaken	Other Activities	Documentation & time of note	Notes	Time Out
		Call bell/Relative	T	P	R	BP					
	Purpose	Purpose									

Appendix 6: Data Collection Tool for Medical Record Audit

POSTOP COMPLICATIONS FREQUENCY										
Subject	<input type="text"/>	Date	<input type="text"/>	<input type="text"/>	<input type="text"/>					
Unit	<input type="text"/>									
Case number	<input type="text"/>									
Age	<input type="text"/>	<input type="text"/>					2 Gender	Male	<input type="text"/>	
								Female	<input type="text"/>	
Surgical Code	<input type="text"/>	<input type="text"/>								
Description	<input type="text"/>									
Surgical Anaes	Spinal	<input type="text"/>	5 Type	Elective	<input type="text"/>					
	General	<input type="text"/>		Emergency	<input type="text"/>					
	Epidural	<input type="text"/>								
	Other	<input type="text"/>								
Time Surgery	<input type="text"/>	7 Time Recovery	<input type="text"/>	<input type="text"/>	<input type="text"/>					
Date	<input type="text"/>		<input type="text"/>	<input type="text"/>	<input type="text"/>					
If PO complication identified	<input type="text"/>						Describe	<input type="text"/>		
Changes in Vital Signs?	<input type="text"/>									
Interventions undertaken?	<input type="text"/>									
Triggered an intervention?	<input type="text"/>									
Notes	<input type="text"/>									

																								Notes				
Hour 1		Hour 2		Hour 3		Hour 4-24																						
30	30	30	30	30	30	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		22	23	24	
Complications Observed																												
Alteration in Vital Signs																												

Glossary

Anticipated Event

Anticipated events refer to those predictable changes that are frequently encountered in patients post-operatively including pain, nausea and vomiting.

Clinical Event

Clinical events refers to changes in the patient's condition that are non-life threatening and are most often managed by nursing intervention alone, such as wound ooze, syncope and indigestion.

Complication

For this thesis complication was considered a generic term used to describe all alterations in a patient's post-operative condition.

Observations

Vital signs are a component of patient observations or clinical observations. Patient observations, or 'obs' as they are commonly called, refers to the measurement of vital signs in addition to the measuring and assessing of other aspects of a patient's condition such as wound ooze, neurovascular status and pain.

Evans et al. (1999:2) explain that vital signs "suggests measurement of vital or critical physiologic functions, whereas the term 'observations' implies broader range of measures".

Monitoring

In relation to the post-operative setting, monitoring refers to the process of maintaining regular observations of patients. Fleiser (1989:263) takes the liberty of providing three definitions including monitoring as the collection of vital signs or of making observations or the “noting of process” which refers to measuring of the quality of care that is delivered. In the post-operative context monitoring suggests ongoing assessment of patients in a systematic manner. This assessment may include the collection of vital signs, evaluating patient comfort and assessing additional therapies such as drains or infusions.

Post-operative Complication

Post-operative complication refers to alterations in the patient’s condition that is attributed to the surgical intervention. Traditionally medical-surgical nursing texts have described post-operative complications as “shock; hemorrhage; deep vein thrombosis; pulmonary embolus; respiratory complications, such as hypoxemia, atelectasis, and pneumonia, among others; urinary retention; intestinal obstruction; and possible post-operative psychosis”. (Smeltzer and Bare 1996:403) They are generally considered to be of a more serious nature that required nursing and / or medical intervention. These complications are often of a ‘visible nature’.

Surveillance

Surveillance in the context of this thesis describes the broader supervision of a patient’s recovery. It encompasses formal monitoring processes including

the collection of observations as well as the evaluation of recovery that occurs incidentally, as a component of other activities such as medication rounds, activities of daily living or review of plans of care.

Vital signs

Descriptions in the literature vary in relation to the components that make up vital signs. Mosby's Medical and Nursing Dictionary (1983:1140) define vital signs as "the measurements of pulse rate, respiration rate and body temperature. Although not strictly a vital sign, blood pressure is also customarily included". Whilst Chuk (1999) defines vital signs as heart rate, blood pressure and respiratory rate and Crisp and Taylor (2000) as temperature, pulse, blood pressure, respiration and oxygen saturation.

This paper supports the description of vital signs as consisting "of temperature, pulse, respiratory rate and blood pressure". (Evans et al. 1999:15; Hwu et al. 2000)