THE EFFECT OF PROVIDING CONCRETE OBJECTIVE INFORMATION DURING THE PROCEDURE OF TURNING ICU PATIENTS IN BED

LYN DEAN, RN, BN, Grad Dip Nursing (Education)

A thesis submitted in accordance with the total requirements for admission to the degree of Master of Nursing

Faculty of Nursing, Midwifery and Health
University of Technology, Sydney

March 2005

Certificate of Authorship/Originality

I certify that the work in this thesis has not been previously submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help I have received in my research work and in the preparation of this thesis itself has been acknowledged. In addition, I certify that all the information sources and literature used are indicated in the thesis.

Signature of candidate

Production Note:
Signature removed prior to publication.

Acknowledgements

I would like to express my gratitude to Professor Sharon McKinley[±], principal supervisor, for challenging me to develop a greater understanding of the research process and also for her guidance and advice during my candidature. I would also like to thank Associate Professor Jane Stein-Parbury who acted as co-supervisor, as well as Margaret Kelly and Graeme Prince for final version proofreading and formatting. Additionally, I wish to acknowledge my family and friends who have constantly supported me.

Further, I would like to thank the ICU patients, who although experiencing difficult circumstances, willingly participated with the intent of finding ways to improve clinical practice and also the ICU nursing clinicians who supported this study with the same intent. Without both of these groups assistance, the contribution this study makes to the body of nursing knowledge would not be possible.

Finally, to the many nursing leaders who have shared their experience and wisdom to answer my questions, as well as offering encouragement throughout my nursing career, my passion for quality patient care and to represent the nursing profession is a testimony to their leadership. I truly wish to thank them all.

[±] Professor of Critical Care Nursing, Faculty of Nursing, Midwifery and Health, University of Technology, Sydney and Royal North Shore Hospital, Sydney.

Table of Contents

Chapter 3 – Method

Chapter 4 – Results

Chapter 5 – Discussion

Chapter 6 – Conclusion

List of Figures

List of Tables

Writing Aids

1. Macquarie Dictionary (Online) http://www.macquariedictionary.com.au/Lyndean

2. *Publication Manual of the American Psychological Association*, 4th Edition. (1994) Washington DC.

List of Abbreviations (commonly used within the text)

ANCOVA	Analysis of covariance
ANOVA	Analysis of variance
ANZICS	Australia and New Zealand Intensive Care Society
APACHE II	Acute Physiology and Chronic Health Evaluation
EMG	Electromyogram
ETT	Endotracheal tube
FiO_2	Fraction of inspired oxygen
HR	Heart rate
ICU	Intensive care unit
MAP	Mean arterial pressure
RCT	Randomised controlled trial
RR	Respiratory rate
SaO_2	Arterial oxygen saturation of haemoglobin
STAI	State-Trait Anxiety Inventory
VAS	Visual analogue scale

Abstract

Patients in the intensive care unit (ICU) experience anxiety when exposed to factors such as, receiving mechanical ventilation, having an endotracheal tube, the inability to effectively communicate, experiencing pain and frequently undergoing stressful procedures. This thesis reports the results of a randomised controlled trial, testing whether a concrete objective information intervention provided to ICU patients when being turned in bed reduced state anxiety. The associations between sedation, pain, adrenergic drugs, turning and state anxiety, are also described. Further, the relationship between physiological parameters, turning and state anxiety are also examined.

The intervention was tested in a randomised controlled trial of 40 ICU patients. The sample comprised equal numbers of men and women. The mean age was 67 years in the control group and 65 years in the intervention group. Most patients had an admission diagnosis of cardiovascular disease (33%), respiratory (23%), gastrointestinal (23%) or neurological (10%). All patients had an artificial airway, either an endotracheal tube (80%) or tracheostomy tube (20%), and most (90%) were receiving mechanical ventilation at the time of data collection. The groups were similar at baseline with respect to study outcome, state anxiety, as well as clinical characteristics.

Patients randomised to the control group received the usual care of being turned in bed that was standardised and delivered by nurses who were guided by scripts. The intervention group received usual care with additional concrete objective information consisting of the sensations expected to be experienced by the patient when turned in bed. State anxiety was measured with the Faces Anxiety Scale immediately prior to and within three minutes of completing the turning procedure.

Prior to turning, patients reported moderate levels of state anxiety with the means similar for both the control (2.50) and intervention (2.60) (range 1-5) groups. Following turning, the state anxiety mean score for the control group was (2.50) and the intervention group (2.35). The concrete objective information had no effect on state anxiety during turning when analysed with ANOVA ($p=.63$).

In this study sample, two-thirds of patients who reported anxiety during the turning procedure had not received a sedative agent. Additionally, the physiological parameters of mean arterial pressure, heart rate and respiratory rate tested with Pearson's correlation, were found to have no relationship to patients' levels of state anxiety.

It is concluded that the concrete objective information intervention tested in this study, had no effect on the level of state anxiety experienced by ICU patients when they were turned in bed. It is recommended that the implementation of the Faces Anxiety Scale will assist nurses to more accurately assess anxiety and implement treatment therapies, to assist in reducing patients' experience of anxiety.

Chapter 1 – Background

1.1 Being critically ill

To provide comfort and ensure the well being of the intensive care unit (ICU) patient is an important role of the critical care nurse. The experience of being critically ill is one that has implications not only for the patient, but also for family members and friends. Patients in the ICU are often very ill and are admitted following traumatic events such as accidents and life-threatening illnesses. Patients are vulnerable and fearful about potential death and disability, and being physically ill leads to emotional responses. Emotion is heightened when admitted to the ICU, as it is an isolating environment for patients, often leading to a lack of sleep and frightening dreams, resulting in experiencing stress and anxiety.

Understanding the experience of being critically ill is important for health professionals. With increasing technological advances, more patients are surviving critical illness with an ICU stay. Together with an increasingly older population and higher patient acuity, health care is facing new challenges. As reported by Australian Health Workforce Advisory Committee (AHWAC, 2002), the number of beds in ICUs in Australia is increasing (1387 beds in 1997 and 1672 beds in 2000). Correspondingly, the number of ICU patient admissions has increased with 106,913 in 2000 and 136,944 in 2002 (Higlett, Anderson & Hart, 2004).

The ICU has advanced technology that, although essential to save lives, may create an alien environment for patients. While attention to physiological stability is the priority for patient care, nurses are also required to be responsive to patients' emotional needs resulting from the interaction with the ICU environment. During

their ICU stay, patients commonly experience anxiety, which may be attributed in part to the stressors of the ICU environment.

1.2 The intensive care unit environment

The ICU environment is one of constant activity. The lights are often on 24 hours of the day; there are foreign noises such as the beeping of cardiac monitors and mechanical ventilators, invasive therapies and a high number of staff in attendance night and day. All of these factors contribute to patient anxiety. The literature reports that the experience of having an endotracheal tube (ETT), as well as difficulty communicating while receiving mechanical ventilation, contribute to patients' anxiety levels. Further, the lack of information, experience of pain and the frequency of procedures have all been described as examples of stressors that contribute to anxiety.

The endotracheal tube: Patients have reported experiencing discomfort while receiving mechanical ventilation, primarily due to the presence of an ETT. The perception of nurses and patients regarding the stressors faced by patients in the ICU environment was investigated by Cornock (1998) who identified having an ETT in the mouth as one of the most stressful experiences reported by both patients and nurses. Grapp, Blecha & Munro (2002) interviewed 22 patients who had experienced at least six hours of ETT intubation following cardiac surgery. All patients reported some level of discomfort with the tube, with the majority of discomfort felt in the throat, and movement was found to increase discomfort. The common description of how the tube felt was: uncomfortable, sharp pain, choking and gagging. Further, Wunderlich, Perry, Lavin & Katz (1999) interviewed 19 patients who had been discharged from ICU who had received mechanical ventilation within the past three months. Twelve patients reported they were uncomfortable with the tube and some

said it was painful. In a study by Rotondi et al. (2002), 100 patients who remembered receiving mechanical ventilation and the ETT during their ICU stay were interviewed upon being transferred to a ward. Experiences with the ETT reported by patients included concern at being unable to speak (82%), anxiety (88%), not being able to sleep (80%), feeling like choking (85%) and not getting enough air (92%) (Rotondi et al.).

Communicating while receiving mechanical ventilation: Mechanically ventilated patients have reported that their anxiety most directly relates to their inability to talk and communicate effectively (Chlan, 1998; Chlan, 2003; Fontaine, 1994; Hall, 1996; Kim, Garvin & Moser, 1999; McCartney & Boland, 1994; Menzel, 1997; Thomas, 2003; Wong, Lopez-Nahas & Molassiotis, 2001). Effective communication between nurses and mechanically ventilated patients is important to optimise successful patient outcomes. The factors that limit nurses' ability to communicate with mechanically ventilated patients are difficulty lip-reading and the lack of appropriate communication skills training (Happ, 2001). Some intensive care nurses do not speak to patients while at the bedside other than to explain a procedure such as suctioning or repositioning. Nurses rely on the consciousness level of the patient to direct their communication efforts and spend more time responding to patients than giving patients information about their care (Hall, 1996).

The communication needs of patients receiving mechanical ventilation was investigated by Fitch, Remus & Stade (1998). A pilot study was conducted consisting of interviews with 14 ICU patients who had an artificial airway in place and at the time of the first interview had been receiving mechanical ventilation for at least 18 hours. Patients were asked to participate in a 15 minute interview with a research

nurse and complete the Mechanically Ventilated Patient Communication Needs Tool and also the anxiety subscale of the SCL – 90 R. Patients pointed, mouthed or raised a finger that corresponded to a number from a list of possible responses that had been written in bold black letters and placed in front of them on a large card. While the patient completed the interview, the clinical nurse caring for the patient completed the Mechanically Ventilated Patient Communication Needs Tool: Nurse Perception. The results indicated that nurses do not assess individual patients' communication needs the same as patients assess their own communication needs. In 2001, Wojnicki-Johansson found in interviews with patients after discharge from ICU that patients reported nurses' lack of ability to detect the needs of the ventilated patient. If nurses were aware of these needs, they were unable to provide the desired information, in particular treatment plans. Patients were asked about the most effective communication methods during their period of mechanical ventilation. The most important non-verbal communication preferences reported by patients were for touch (including hand pressure) and eye contact. The results of these studies highlight the need to improve nursing efforts to communicate verbally and non-verbally with patients being mechanically ventilated.

Information: The lack of information and the patient's misunderstanding about care, prognosis and treatment provide a source of anxiety in the critical care setting. Ambiguity and lack of predictability further increase anxiety. A common theme of former patients' recollections of their ICU experience is the expression of a need for more information, in particular about their environment, prognosis and procedures they undergo (Brooks, 1999; Hafsteindottir, 1996; Hall-Lord, Larsson & Bostrom, 1994; Hupcey & Zimmermen, 2000; Stein-Parbury & McKinley, 2000;

Watts & Brooks, 1997). The dependence on a machine and the loss of control add to the patient's emotional distress. Fears of death and disability, sensory alterations and sleep deprivation also increase stress (Bone et al., 1995; McCartney & Boland, 1994). Former ICU patients have reported that receiving information promoted feelings of ease and security, and indicated the importance of being introduced to personnel and being informed about progress, nursing procedures, treatments, the environment and equipment (Brooks, 1999; Hafsteindottir, 1996). Moreover, patients reported that they felt more secure if they received information and explanations prior to nursing and medical treatment (Bergbom-Engberg & Haljamae, 1988; Hafsteindottir, 1996; McKinley, Nagy, Stein-Parbury, Bramwell & Hudson, 2002; Scott, 2004). Providing patients with specific information regarding mechanical ventilation has demonstrated positive outcomes on ventilation time and anxiety levels (Kim et al., 1999).

Pain: The relationship between pain and anxiety is cyclic, with pain and anxiety exacerbating each other (Cullen, Greiner & Titler, 2001). Anxiety has been associated with higher pain intensity. Pain is frequently reported in the literature as a stressor in ICU and contributes to patients' level of anxiety (Adamson, Murgo, Boyle, Kerr, Crawford & Elliott, 2004; Clark, Fontaine & Simpson, 1994; Stanik-Hutt, 2003). Observable indicators of pain include physiological signs, such as blood pressure and heart rate, and behavioural, including facial expressions, body movement and rigid posture (Gelinas, Fortier, Viens, Fillion & Puntillo, 2004; Odhner, Wegman, Freeland, Steinmetz & Ingersoll, 2003). Gelinas et al. (2004) reviewed the records of 52 patients receiving mechanical ventilation with a total of 183 pain episodes analyzed. The researchers identified that patient self-report of pain was recorded only 29% of the time (58 of 183), whereas observable indicators of pain were recorded

66% of the time (123 of 183), and a pain scale was used 1.6% of the time. Additionally, patients' experience of pain in the ICU is well documented. Pochard et al. (1995) studied patients 48 to 96 hours after receiving mechanical ventilation and measured pain with a visual analogue scale (VAS) calibrated as a numeric rating scale (NRS). Thirty percent of patients reported pain with mean intensity of 3.5 (range 0-10). Although a VAS is usually 100mm horizontal line with anchors at each end, Wewers and Lowe (1990) identify that the VAS used as a NRS assists individuals to use the tool who have difficulty in understanding the concept of the VAS and has been an effective way to measure pain. Nelson et al. (2001) used the modified Edmonton Symptom Assessment Scale (ESAS) in 100 medical ICU oncology patients, with moderate to severe pain reported by 56% of patients. Desbiens, Mueller-Rizner, Connors, Wenger, & Lynn (1999) studied 1582 seriously ill patients, of whom 17.6% reported experiencing levels of moderately severe pain.

Procedures performed in the ICU: The practice of repositioning immobile patients from either a lateral or supine position two to three hourly is standard care provided by nurses in the ICU (King & Crowe, 1998). The measurable physiological outcomes related to turning patients include improved ventilation and perfusion within the lungs (Gavigan, Kline-O'Sullivan & Klumpp-Lybrand, 1990); and prevention of pressure sores, muscle contractures (Ng & McCormick, 1982), pulmonary infection and the development of sepsis (Hawkins, Stine & Plummer, 1999). The procedure of turning patients is performed in many patient populations, not only intensive care. However, studies to determine the effects of turning in the critical care population are scarcely reported, with the majority of studies measuring physiological effects (Gavigan et al., 1990; Gentilello et al., 1988; Higgins-Martin, 2001; Lewis et al., 1997; Sahn, 1991).

In a study by Puntillo et al. (2001), a total of 6201 patients (child and adult) underwent various clinical procedures, of which 1395 adults were turned in bed. Turning was reported to be the most painful and distressing procedure for adults. The pain experienced by traumatically injured patients in the first 72 hours in intensive care was recorded by Stanik-Hutt, Soeken, Belcher, Fontaine & Gift (2001). Thirty subjects had measures of pain and anxiety taken at rest in the supine recumbent position. Seventeen of these subjects were then turned onto their side and had pain scored again. Anxiety scores prior to turning, recorded with the State-Trait Anxiety Inventory (STAI) were relatively high, with the mean score being 49.4 (range 26-74). Pain scores recorded with the VAS were significantly higher after subjects were turned. In 96% of this sample, the reported pain location was the site of injury. The authors concluded that significant increases in pain occur with the activity of turning.

1.3 Addressing the problem of patients' anxiety in the ICU

Pharmacological agents are administered to patients receiving mechanical ventilation with the intent to promote comfort and cooperation with treatment. However, over-sedation, under-sedation, overuse of restraints and unrelieved discomfort are common problems associated with mechanically ventilated patients (Grossman, Labedzki, Butcher & Dellea, 1996). Increasingly, a nursing intervention in the treatment of anxiety, other than sedation, is the use of complementary therapies such as massage, therapeutic touch and music therapy (Barnason, Zimmerman & Nieveen, 1995; Biley, 2000; Chlan, 1998; Cox & Hayes, 1999; Wong, Lopez-Nahas & Molassiotis, 2001; Richards, 1998).

Within the clinical setting, cognitive information interventions have been helpful in treating patient distress and anxiety. These interventions work to change

patient perceptions of the known stressful experience (Fontaine, 1994; Leventhal & Johnson, 1983), and have focused on patients undergoing stressful procedures and postoperative care (Johnson & Leventhal, 1974; Suls & Wan, 1989). Additionally, their application to the ICU population has demonstrated reduced anxiety with patients receiving mechanical ventilation (Kim et al., 1999).

This thesis reports the effectiveness of a cognitive information intervention provided to ICU patients when being turned in bed, with the majority receiving mechanical ventilation. Information was provided to patients in concrete objective terms, that is, the sensations that the patient could expect to experience during the turning procedure. The primary study outcome measured was state anxiety experienced during the turning procedure.

1.4 Outline of thesis

In this chapter the problem of anxiety experienced by critically ill patients exposed to a complex and highly technical ICU environment has been identified. In Chapter 2 the literature is reviewed to identify the prevalence, assessment and treatment of anxiety in ICU patients. The theory of coping with stressful events and the application of concrete objective information as an intervention to reduce anxiety are presented. Previous interventions using concrete objective information are reviewed, with the strengths and limitations of these studies discussed. The research hypothesis and aims are then presented. Chapter 3 describes the preliminary investigation to develop the concrete objective information intervention. The research methodology used in this study is then outlined and the intervention described. In Chapter 4 the study sample and effects of the intervention are presented. The main effect of turning on state anxiety is examined and the relationships between sedation,

pain, adrenergic drugs, turning and state anxiety are explored. The association of physiological parameters, turning and state anxiety is also examined, as are the sensations experienced by patients while being turned. In Chapter 5 the research findings and potential factors that may have contributed to the intervention effect are discussed. The study's strengths and limitations, as well as implications for practice and future research, are then addressed. Finally, Chapter 6 summarises the results and discussion reported in this thesis.

1.5 Summary

Critical care nurses provide comfort and support to seriously ill patients and their families. The ICU environment is complex and stressful. Patients in the ICU experience anxiety that has been attributed to factors such as receiving mechanical ventilation, an ETT, lack of information, the inability to effectively communicate, pain and frequently undergoing stressful procedures. Treatment for anxiety has predominantly been by the administration of sedative agents. Nursing interventions such as complementary therapies have demonstrated some effect on ICU patient anxiety levels. Over the past 30 years cognitive information interventions have demonstrated effective application in treating patient distress and anxiety and more recently have shown effect in ICU patient populations. This study reports the effectiveness of a cognitive information intervention provided to ICU patients when being turned in bed, with the majority receiving mechanical ventilation. The main effect of turning on state anxiety was examined. The associations between sedation, pain, adrenergic drugs, turning and state anxiety are explored. Further, the relationship between physiological parameters, turning and state anxiety are examined.

Chapter 2 – Literature Review

2.1 Introduction

Patients in ICU experience anxiety that has been attributed to factors such as receiving mechanical ventilation, an ETT (Grapp et al., 2002), lack of information, the inability to effectively communicate (Chlan, 1998; Thomas, 2003), pain and frequently undergoing stressful procedures (Stanik-Hutt et al., 2001). Patients interviewed following discharge from the ICU stated that if they had received information their anxiety would have been reduced (McKinley et al., 2002). Cognitive information interventions have been helpful in treating patient distress and anxiety. These interventions work to change patient perceptions of the known stressful experience (Fontaine, 1994; Leventhal & Johnson, 1983), and have focused on patients undergoing stressful procedures and postoperative care (Johnson & Leventhal, 1974; Suls & Wan, 1989).

This chapter commences by describing the physical and psychological impact of anxiety on ICU patients. Then the effectiveness of nurses' assessment of anxiety, the studies that have previously measured ICU patient anxiety, and the treatment of anxiety are discussed. The theory of coping with stressful events and concrete objective information is also reviewed. Interventional studies that have investigated concrete objective information as a method of reducing patient anxiety are then described and critiqued. Finally, the research hypothesis and aims for this study are described.

2.2 The impact of anxiety on the ICU patient

The impact of illness, hospitalisation and the loss of control over the situation can lead to anxiety (Moser et al., 2003). Critically ill patients may experience anxiety because of the severity of their illness, and the invasive procedures and complex treatments they undergo (Cullen et al., 2001). Anxiety has been described as an emotional state marked by apprehension, increased motor tension and autonomic arousal (McCartney & Boland, 1994; Wong et al., 2001). Patients who remain aware in the ICU commonly exhibit sensations of anxiety. Anxiety and fear have similar physiological manifestations but different causes. Anxiety is an emotional response to unknown or identifiable threats; fear is triggered by an actual external threat (Bone et al., 1995).

Physiological and psychological effects of anxiety: Within the literature, anxiety has been described as including affective, cognitive and physiological components. Examples of the affective component include feeling edgy, fearful, tense, uncertain and worried (Frazier et al., 2002). Cognitively, persons experiencing high levels of anxiety may become distracted or confused, or they may have decreased memory and intellectual reasoning (Crippen, 1995; Frazier et al., 2002; McCartney & Boland, 1994). Physiologically, anxiety involves increases in sympathetic activity, including increases in heart rate, elevated blood pressure, diaphoresis and tremors (Bone et al., 1995; Michelson, Gold & Sternberg, 1994).

In response to a stressor, the body triggers a series of coordinated reactions (Michelson et al., 1994). Anxiety may precipitate humoral physiological responses, including the release of hormones that results in release of glucocorticosteroids, which may in turn disrupt the patient's homeostasis (Bone et al., 1995; Crippen, 1995;

DeKeyser, 2003). The physiological response to stress has been reported as a maladaptive process that may lead to a variety of potentially harmful events (Bone et al., 1995; DeKeyser, 2003). These events include increased oxygen consumption resulting in myocardial and cerebral ischaemia (potentially leading to infarction), arrhythmias, hypercoagulability, malnutrition, fluid and electrolyte imbalances, delayed wound healing, decreased immune system response, and sudden death (Bone et al., 1995; Weiss & Puntillo, 2001).

Patients in ICU experience not only physical stress such as trauma and sepsis, but also psychological stress. According to DeKeyser (2003), the three most common stressors among ICU patients are pain, sleep deprivation, and fear or anxiety. Each of these stressors has been shown to be associated with decreased immune functioning (DeKeyser, 2003). Fifty-nine patients hospitalised with coronary disease were studied to determine the effects of nursing care on the patient's heart rate, diastolic blood pressure and incidence of arrhythmias. Patients who perceived a previous caregiving experience as negative were more likely to have higher blood pressure and anxiety levels during care (Weiss & Puntillo, 2001). Further, Moser & Dracup (1996) assessed the anxiety level of 86 patients within 48 hours of patient arrival with myocardial infarction. Complications were observed in 22 patients, with an increased risk of myocardial ischaemia and arrhythmias experienced in patients with higher anxiety levels (Moser & Dracup, 1996).

With an increasing awareness of the impact anxiety has on ICU patients, nursing interventions and strategies to reduce patient anxiety require development. To implement and evaluate these interventions, nurses must be able to accurately detect ICU patient anxiety.

Nurses' assessment of anxiety: Critical care nurses have reported objective cues of anxiety to include extreme alertness, inability to relax, asking a lot of questions, holding the nurse's hand, increased heart rate and respiratory rate, and decreased oxygen saturation (Grossman et al., 1996). When surveyed, critical care nurses most commonly reported the perceived individual physical indicators of anxiety were increased heart rate, increased blood pressure and increased respiratory rate (Moser et al., 2003).

The assessment of anxiety by nurses based on a range of physical and behavioural indicators may be invalid and unreliable in many ICU patients (Frazier et al., 2002). Patients experiencing anxiety during their hospital stay have had their anxiety undetected by nurses. O'Brien et al. (2001) report the study of 101 patients admitted with myocardial infarction, who rated their own anxiety using the State-Trait Anxiety Inventory (STAI). Patients' mean anxiety levels were 37.2 (SD 12.4) indicating mild anxiety. The patient notes were then examined to determine if the clinical assessment of patient anxiety was recorded by the nurse or physician (O'Brien et al.). There were only 45 sets of patient notes in which clinicians had documented patient experiences of anxiety, and no objective measure to assess anxiety was used.

Although recognized by nurses as important, the ability to assess anxiety in ICU patients is difficult. In particular, relying on physical indicators alone to assess anxiety may not be effective. Therefore, using instruments for discerning levels of anxiety may be more effective in detecting anxiety in the ICU population.

Studies reporting anxiety levels in the intensive care population: Various tools have been used to measure anxiety in ICU patients. As patients are often intubated and sedated, studies have reported patient anxiety retrospectively, even though limitations with patient recall have been documented. Nevertheless, ICU patients have reported experiencing anxiety during their ICU stay. Pochard et al. (1995) prospectively studied 43 patients in ICU 48 to 96 hours after receiving mechanical ventilation and measured anxiety using a VAS (range 0-10). Twenty-two (51%) patients experienced an anxiety disorder and 16 patients (37%) described intense fear of dying. The mean anxiety recorded prior to discharge from ICU was 3.4. In a study of extubated, cardiac surgical patients (n=43) who had received preoperative information or standard care, patients had state anxiety levels measured after ICU discharge with the STAI (range 20-80) (Kim et al., 1999). The anxiety levels recorded were 44.19 in the experimental group compared to 53.24 in the control.

Researchers in recent years have focused on recording real time anxiety levels of patients in ICU and various studies have reported patient anxiety level while receiving mechanical ventilation. Chlan (1998) studied mechanically ventilated patients receiving music therapy or standard care and recorded moderate levels of state anxiety ranging from 10.1 to 16.2 using the six item modified STAI (range 0-

18). In a similar study reported by Wong et al. (2001), mechanically ventilated patients receiving music therapy had moderate levels of state anxiety. The mean state anxiety level was 53.34 using the STAI (range 20-80). Connelly, Gunzerath & Knebel (2000) reported an average anxiety level of 1.07 using the modified short form Profile of Mood States (sPOMS) to measure tension-anxiety (range 0-4) in patients being weaned from mechanical ventilation. Nelson et al. (2001) used the Edmonton Symptom Assessment Scale (ESAS) to measure anxiety in 100 medical ICU oncology patients. Moderate to severe anxiety was reported by 63% of patients. Within the sample, more than 60% of patients were mechanically ventilated during their stay in ICU, with 32% of patients receiving mechanical ventilation on day 4 when the ESAS was administered. Stanik-Hutt et al. (2001) measured the anxiety levels of patients in a surgical ICU while they were resting in the supine recumbent position. Anxiety scores were measured prior to turning only and were recorded using the STAI. Anxiety levels were moderately high, with the mean score being 49.4 (range 26-74) out of a possible range of 20 to 80. Hattan, King & Griffiths (2002) recorded anxiety in postoperative cardiothoracic surgical patients and reported a mean score of 30.16 using the VAS (range 0-100). McKinley, Stein-Parbury, Chehelnabi, & Lovas (2004) reported the use of the Faces Anxiety Scale to measure anxiety levels in 106 ICU patients, of whom 95 were mechanically ventilated. Some level of anxiety was reported by 85% of patients, with mean (SD) of 2.9 (1.2) from a possible range of 1 to 5 (McKinley et al., 2004).

Treatment of anxiety: In 2003, Frazier et al. reported the views of critical care nurses that treating anxiety was important and that commonly used strategies included pharmacological relief. The preferred sedative agents for the treatment of

anxiety are midazolam for short-term use, followed by lorazepam for longer-term use (not available in Australia), and propofol for rapid awakening. Consensus recommendations for intravenous sedation use in adult patients in the intensive care unit have been in place since 1995 (Shapiro et al., 1995). They are updated on a regular basis (NHMRC, 1999; Jacobi et al., 2002) and these recommendations remain current practice in the treatment of anxiety in ICU patients today (Liu & Gropper, 2003).

As described above, researchers who have used a tool to measure anxiety, have demonstrated that patients experience significant levels of anxiety during their ICU stay. The standard treatment of anxiety in the ICU is the administration of sedative agents. However, the use of therapeutic interventions to assist patients to develop strategies to cope with stressful experiences have also demonstrated effective reduction of anxiety experienced by patients undergoing stressful procedures.

2.3 Theory of coping with stressful experiences

Life events are considered stressful when they threaten to overwhelm a person's resources for coping with them (Johnson, Fieler, Jones, Wlasowicz & Mitchell, 1997). The degree of stress a person experiences depends on that person's assessment of the outcome of the encounter (Shi, Munjas, Wan, Cowling, Grap & Wang, 2003). For example, receiving an intramuscular injection may be perceived as stressful, however the consequence of the outcome, discomfort, may not be viewed as significant, and therefore the anxiety experienced may be small. Alternatively, for a patient requiring life saving surgery, the consequence of the outcome, potential death, may result in extreme anxiety.

Whenever events are stressful, a coping response will occur. Lazarus and Folkman (1984) identify that coping refers to cognitive and behavioural efforts to manage demands that are appraised as exceeding the resources of the person. Importantly, coping is defined independently of its outcome, as efforts will continue despite whether the strategies are effective in alleviating distress (Shi et al., 2003). Coping has two functions: the reduction of emotional responses and the reduction of the impact of functional activities (Johnson et al., 1997). Further, coping involves efforts to alter the stressful situation (problem focused) as well as efforts to regulate the distress associated with the situation (emotion focused) (Lazarus & Folkman, 1984). Seeking information, planning and taking action are examples of problem focused coping (Penley, Tomaka & Wiebe, 2002).

People cope with a stressful situation either by attempting to alter the situation or by changing their feelings about it. The latter requires new appraisals or reappraisals, which in turn engender new coping strategies (Shaw, 1999). Cognitive information interventions are directed at helping patients cope with stressful events and have been effective in reducing anxiety through the application of concrete objective information (Johnson et al., 1997).

Concrete objective information: By structuring expectations, sensory information helps to focus attention on the objective features of an experience rather than the subjective emotional responses. Concrete objective features of sensory information include: physical sensations; temporal characteristics; environmental features; and causes of the sensations (Johnson, 1999). Sensory information describes the patient's perceptual experience, that is, it describes the sensations that can be

expected (Clark, 1997; Leventhal & Johnson, 1983). Sensory descriptions focus on what the patient will see, feel, hear, smell and taste during an event. Objective terms for physical sensations include a sweet taste, an ache, people wearing masks, and clicking sounds (Christman, Kirchhoff & Oakley, 1992). Temporal characteristics include the duration of the experience. Environmental features include descriptions of being transported from one place to another, or the size of a room (Johnson, 1999). The cause of the objective experience includes the source of sensations such as what causes a noise, and identifying symptoms that are side effects of treatments so that they are not mistaken for symptoms of disease (Clark, 1997; Christman et al., 1992; Johnson, 1999).

Sensory information increases patients' ability to obtain and process information. If patients have a clear and unambiguous schema about the procedure, they will be better able to cope with the actual experience because it will be similar to the schema they have formulated (Garvin, Huston & Baker, 1992). This decreased ambiguity facilitates the use of the patient's existing repertoire of coping strategies (Johnson et al., 1997; Leventhal & Johnson, 1983), by facilitating retrieval of relevant information from memory, planning how to deal with the experience, and assembling resources that will be needed. Patients more confidently deal with new experiences when they have dealt with similar experiences in the past (Johnson & Lauver, 1989).

2.4 Research studies using concrete objective information interventions

Over the past four decades a number of studies have tested the provision of concrete objective information to patients as an intervention prior to receiving an invasive or stressful procedure. This section is a review of intervention studies that have investigated concrete objective information (sensory and procedural information) to reduce emotional distress in clinical settings. The important strengths and limitations of this selection of studies are identified and discussed. Table 1 describes and provides an overview of these studies and their outcome measures.

Table 1. *Experimental studies using concrete objective information and outcomes demonstrated*

Study	Sample	Stressor	Comparison	Outcome measure	Result/p
Johnson, Morrissey & Leventhal, 1973	Adults – mixed, n=99 RCT	Endoscopic examination	Control – no specific information Procedure alone Sensory alone	Hand tension Sedation Heart rate (HR) Gagging	Sensory group demonstrated less hand tension and less sedation (18.8mg versus 24.9mg diazepam), less HR changes and less gagging
Johnson, & Leventhal, 1974	Adults – mixed, n=48 RCT	Endoscopic examination	Control – no specific information Behavioural instruction alone Sensory information alone Combined sensory and behavioural	Amount of sedation Coping with gagging Time to swallow	Sensory group demonstrated less sedation $p<.025$. Combined group demonstrated that there was greater ability to cope with gagging (36.4% versus 90%, $p<.025$) and increased time to swallow $p<.01$.
Anderson 1987	Adults – males, n=60 RCT	Cardiac Surgery	Control – routine preparation Combined sensory and procedural Sensory and procedural information plus coping strategies (exercises)	Anxiety (STAI) In control	Combined group lower anxiety scores $p<.02$ and greater belief in control $p<.005$
Suls & Wan 1989	Adults-child – mixed, meta-analysis	Dental surgery, pelvic examination, cataract surgery, endoscopy, Cholecystectomy, cold pressor, electric shock.	Control Procedural and sensory information combined	Negative affect Pain Distress	The largest and consistent benefits in negative affect, pain and distress associated with combined information.
Burish, Snyder & Jenkins, 1991	Adults – mixed, n=60 RCT	Chemo-therapy for cancer	Control – standard treatment Coping information preparation (PREP) Relaxation training (RT) PREP and RT combined	Anxiety (MAACL) Sickness Impact Profile	RT alone significant reduction in anxiety compared to control ($p<.02$). PREP alone significantly more effective coping with chemotherapy compared to control ($p<.03$)

Legend: Randomised Controlled Trial (RCT); State Trait Anxiety Inventory (STAI); Multiple Affect Adjective Check List (MAACL).

Table 1. *Experimental studies using concrete objective information and outcomes demonstrated (continued)*

Study	Sample	Stressor	Comparison	Outcome measure	Result/p
Gammon & Mulholland 1996	Adults – mixed, n=82 Quasi	Total hip replacement	Control – routine advice and support Procedural, sensory & coping information	Anxiety (HADS) Depression (HADS) Self Esteem Scale Sense of Control	Combined group lower anxiety (p=.01) and less depression (p=.01) compared to control group. Higher sense of control (p=.01) and self esteem (p=.01) compared to control group
Kim, Garvin & Moser, 1999	Adults – mixed, n=43, RCT	Mechanical ventilation after cardiac surgery	Control – usual care Combined sensory and procedural information	Duration of intubation Anxiety (STAI) Ease of communic-ation	Combined group: Lower anxiety (p<.001), shorter intubation time (p=.03) and less difficulty in communicating (p=.03) compared to control group
Shi et al., 2003	Adults – mixed, n=83 RCT	ICU admission	Control routine information Preparatory sensory information	ICU Stress	Preparatory Inf group experienced less ICU (p<.01)
LaMontagne et al., 2003	Adolescent mixed n=109 RCT	Spinal fusion surgery	Control information only Coping only Combined information and coping	Anxiety (STAI) Pain (VAS)	Combined information and coping group demonstrated reduced post op anxiety (p<.01) when preoperative anxiety levels were high. Interventions involving coping had significantly lower postoperative anxiety (p<.01) and decreased average levels of pain in age group 11-13, (p<.01)

Legend:Randomised Controlled Trial (RCT); Hospital Anxiety and Depression Scale (HADS); State-Trait Anxiety Inventory (STAI); Visual Analogue Scale (VAS)

The early seminal work by Johnson and Leventhal involved a series of studies that provided procedural description, sensory description or behavioural instruction to patients receiving threatening procedures that were known to cause pain, anxiety or discomfort. One of the earliest studies in this series was an investigation by Johnson, Morrissey & Leventhal (1973) into the effect of endoscopic examination on patients. Ninety-nine patients were randomly assigned to receive either no specific information (control group, n=35), procedural information (experimental group one, n=30) or sensory information (experimental group two, n=34). Groups one and two received the information by listening to a seven-and-a-half minute audio tape that provided general information. Then groups one and two reviewed 11 different photographs. Group one (procedural information) examined photographs that did not contain people and illustrated the procedure with descriptions of the clinic, the diameter and length of the tube. The messages included statements of throat swabbing, taking pictures and the administration of medications. Group two (sensory information) viewed photographs that contained people and described the sensations experienced in various steps of the investigation, for example, the prick of a needle, drowsiness, the size of tube being similar to a thimble, and the pumping of air into the stomach causing a feeling of fullness similar to that of eating a large meal. Behavioural indicators of distress and fear were recorded during the examination and included dose of sedative, heart rate, hand and arm movements, gagging during insertion of tube, and restlessness. The results demonstrated that patients receiving the sensory information when compared to the control group experienced less hand tension ($p<.02$) and received less sedation (18.8mg versus 24.9mg of diazepam, $p<.05$). Patients receiving sensory information had smaller heart rate changes and experienced less gagging during the procedure, although these were not statistically significant.

In a follow-on study, Johnson & Leventhal (1974) again explored patients receiving endoscopic examination. There were 48 patients (male and female) recruited from a single site and randomly assigned to either a control group, behavioural instruction group, sensory information group or combined behavioural and sensory information group. Sensory information was again provided by means of an audio tape and viewing pictures in a booklet. After receiving behavioural instruction on the use of rapid mouth breathing and panting to reduce gagging, patients were instructed on how to swallow. Patients then practised breathing, panting and swallowing with the instructor. Outcome measures were recorded during the examination. In the sensory group (n=13), patients experienced reduced gagging ($p<.05$) and patients who were under 50 years of age required a lower amount of diazepam during the procedure (7.07mg versus 13.25mg, $p<.025$). The combined group (sensory information and behavioural instruction, n=11) resulted in improved coping with the tube and reductions in gagging (36.4% versus 90%, $p<.025$) and patients were more in control of the procedure with an increased time (seconds) for swallowing (28.0 versus 43.0 seconds, $p<.01$). Overall, this study demonstrated that sensory information reduced most indicators of emotional response. However, both sensation and behavioural instruction was needed to alter time for tube passage. This study, when combined with the original 1973 endoscopy study, demonstrates that sensory and procedural information increases the ability to cope with swallowing.

Three preoperative preparations for patients undergoing cardiac surgery were evaluated by Anderson (1987) and demonstrated reduced psychological distress and facilitated physical recovery, reduced preoperative anxiety and reduced the incidence of postoperative hypertension. Sixty male patients were randomly assigned to routine

preparation, combined sensory and procedural information, or sensory and procedural information plus coping strategies (exercises). The control group received the routine hospital preparation, which included a 30 minute interview that outlined hospital procedures and answered questions about heart disease and surgery. The information group received the routine hospital preparation as well as additional information about the procedures and the sensations they would experience. Information was provided by means of an 18 minute video tape of interviews with previous cardiac patients describing their experiences. This was followed by a six minute audio tape describing the cardiac procedure, again including sensations. Patients took the audio tape back to their room to listen to it again prior to surgery if they wished to. The information plus coping strategies group received the routine hospital preparation and the sensory and procedural information video and audio tapes. Additionally, they watched a 42-slide show in which a physical therapist guided patients through coughing, deep breathing and leg exercises, techniques for turning in bed and exercises to reduce muscle soreness after surgery. Each patient practised the exercises until they could perform them correctly without prompting and could describe the rationale for the exercise.

Outcome measures were recorded on the evening prior to surgery and again on the evening of the seventh postoperative day. All groups were comparable at baseline for demographic and clinical characteristics as well as state anxiety, knowledge of exercises and belief in control over recovery. The results indicated that the two experimental groups had significantly lower STAI (anxiety) scores ($p<.02$) than the control group. Therefore information alone (a component of both experimental groups) may be sufficient to reduce preoperative emotional distress. Further, it was expected that the information plus coping group, having been taught exercises, would

have the greatest perceived control over recovery. However, both experimental groups showed significantly greater belief in recovery control than the control group ($p<.005$) but did not differ from each other. The incidence of acute postoperative hypertension was 75% in the control group, 45% in the information group and 40% in the information plus coping group. The incidence of hypertension was significantly lower in the experimental groups compared to the control group ($p<.02$) but did not differ between the experimental groups. A limitation of the study was the reliability and validity of the knowledge and control measures collected, primarily from the Patient Survey Questionnaire and nurses' global ratings, with both of these new measures requiring further evaluation. However, this limitation was offset by the use of the STAI, a well-recognised and valid measure to record state anxiety. Another limitation was that the sample only consisted of males, which makes generalisation of results to other cardiac surgery populations difficult. This study demonstrated that, despite its limitations, the use of sensory and procedural information is an effective intervention to reduce anxiety and increase perceived control in this population of patients undergoing cardiac surgery.

A meta-analysis of studies using sensory, procedural, and combined sensory-procedural preoperative information on coping outcomes was performed by Suls & Wan (1989). Twenty-one studies were reviewed. Five studies designed to induce pain were conducted in the laboratory setting, the remaining were conducted in a health care setting and involved medical or surgical procedures. The sample size, type of stressor, outcome variables, experimental conditions and statistics were all examined. The results indicated that, in contrast to sensory information, procedural information provided no significant benefits over control group instruction.

Combined sensory-procedural preparation yielded the strongest benefits in terms of reducing negative affect, pain and other-rated distress. Additionally, the results provided no support for the notion that providing both sensory and procedural information produces information overload.

Burish, Snyder & Jenkins (1991) studied 60 newly diagnosed cancer patients (29 female, 31 male) who were randomly assigned to one of four treatments: routine information (control); relaxation training (RT); preparatory information (PREP); or combined PREP and RT. In the control group, a nurse provided routine information to patients on the purpose of chemotherapy, its actions, administration and side effects. Patients in the RT group were taught to relax and then were guided in the use of visual imagery to achieve deeper relaxation. Following this, the chemotherapy was administered and on completion, RT measures were terminated. Patients were asked to practise the RT procedures at home. This procedure was repeated for the second and third treatment. On the fourth and fifth treatments, the patients administered their own guided imagery relaxation procedure. Patients in the PREP group received a clinic tour on the first visit that described the procedural steps involved in attending for chemotherapy, as well as sensory information about chemotherapy. After viewing a 20 minute video that described the procedural and sensory components of receiving chemotherapy, patients participated in a discussion, question and answer session with a therapist. Patients were also provided with a booklet to take home containing a summary of the information provided in the total clinic tour. The combined RT and PREP group received the complete procedures for both interventions. Data were collected from patients at each of their first five chemotherapy treatments to

determine feelings of anxiety, nausea, impact of illness and knowledge of the chemotherapy treatment.

The four groups' demographic data were comparable at baseline, except for age ($p<.05$). In the RT group patients were significantly younger than in the three other groups, therefore age was used as a covariate in all analyses. Data were analysed using a two (PREP, no PREP) by two (RT, no RT) factorial design. The overall analysis of the Sickness Impact Profile score demonstrated a significant effect for PREP ($p<.03$), indicating an ability to cope more effectively with the chemotherapy treatment. PREP patients' families also rated the patient's coping at home as more effective, including experiencing less nausea (home record form, $p<.02$). The PREP intervention increased patients' knowledge of the disease and its treatments (knowledge questionnaire, $p<.05$). The results of the Multiple Affect Adjective Check List (MAACL) indicated that RT patients experienced less anxiety ($p<.02$) and the PREP patients experienced less depression ($p<.04$). This study demonstrated that a sensory and procedural information intervention, provided as a multi-component, single-session, coping preparation package, improved patients' well-being and ability to cope with chemotherapy treatments. This intervention was more effective than relaxation techniques in this cohort of patients.

The effect of a preparatory information intervention for patients undergoing total hip replacement (THR) was evaluated by Gammon & Mulholland (1996) to determine if patients experienced reduced anxiety and depression, and increased self-esteem and sense of control. At time of admission, 82 patients (24 males and 58 females) from a single-site hospital were alternately assigned to either the intervention

or control (usual information and care) group. On the day before surgery, patients in the experimental group were given an information session consisting of sensory and procedural information for preoperative care. Six hours later patients in this group were given the same type of information on postoperative care. This session was supplemented with an information booklet, again consisting of sensory and procedural information for THR. All patients in the experimental group were followed up twice-weekly to reinforce the information already provided. Prior to discharge, patients were provided with another information session to prepare them to cope at home. Again, information was provided as sensory and procedural, and was reinforced by a written information booklet. Data were collected via three questionnaires: the Hospital Anxiety and Depression Scale (HADS); the Health-Illness Questionnaire; and the Self-Esteem Scale. The results indicated that patients in the experimental group showed lower anxiety (4.2 versus 4.4, $p<.01$) and less depression (4.2 versus 6.8 $p<.01$) as measured on the HADS; a higher sense of control (19.9 versus 11.2, $p<.01$) as measured on the Health-Illness Questionnaire; and a higher sense of self esteem (19 versus 17.4, $p<.01$) as measured on the Self-Esteem Scale. The study was limited by the fact that baseline clinical data were not reported. Therefore the results of the study are difficult to generalise to other populations. However, the results did demonstrate that sensory and procedural information prior to THR surgery is an effective method of reducing anxiety and depression, and improving the sense of control and self-esteem in this group of patients.

LaMontagne, Hepworth, Cohen & Salisbury (2003) evaluated the effectiveness of preparatory information on anxiety and pain. Following power analysis, 109 adolescents aged between 11 and 18 years (88 female) undergoing

surgery for spinal fusion were randomised to one of four groups (three experimental and one control). The groups included: control (standard information about surgery, hospital routines, postoperative clinic visits); concrete objective information (sensory and procedural information) only; coping instruction only; and combined concrete objective information plus coping instruction. The concrete objective information only included procedural and sensory information on the surgical procedure and postoperative activities. The coping instruction included relaxation techniques, breathing and positive thinking to manage postoperative pain. The combined group received instruction on both types of information. All interventions were delivered by a video tape that was eight to ten minutes in length and was watched by all patients and their family members the day before surgery. The patients received coping instruction and practised the relaxation and breathing techniques with the researcher. Anxiety was measured with the STAI preoperatively and then on day two. Pain was measured with a VAS postoperatively on day two and day four. There were no differences between groups for preoperative anxiety levels. The information plus coping intervention was more effective in decreasing postoperative anxiety ($p<.01$) when preoperative anxiety scores were high. Conversely, when preoperative anxiety scores were low, people receiving single modality interventions, that is, standard information alone, concrete objective information alone or coping instruction only, demonstrated lower postoperative anxiety. When age was controlled for, interventions which included coping instruction were more effective in reducing postoperative anxiety ($p<.01$) and pain in patients who were between 11 and 13 years old ($p<.01$).

Kim et al. (1999) provided combined procedural and sensory information (concrete objective information) relating to stress and communication, to Korean patients preoperatively prior to mechanical ventilation. Forty-three patients undergoing cardiac surgery were randomised to either usual care (control group, n=22) or additional procedural and sensory information (experimental group, n=21). The control group received the routine hospital preparation, which was given to the patient and their family members. Information included a description of the surgery, length of stay in ICU, possible complications and duration of surgery. Patients were told that they would receive mechanical ventilation (brief explanation) and then family members were encouraged to donate blood. The experimental group received the routine hospital preparation as well as additional information about the procedure of mechanical ventilation and the sensations they would experience. The information was provided by the investigator in a 30 minute session and in an information booklet which described mechanical ventilation as well as how to communicate while receiving mechanical ventilation. The booklet was left with patients to review again prior to surgery in their own time. Fifty-six patients were originally recruited to the study. However, two were excluded due to extended mechanical ventilation (>48 hours), one refused to fill in the questionnaire and ten patients were not enrolled as they could not remember what happened during mechanical ventilation. Therefore, 43 patients (27 female and 16 male) were studied.

The outcome measures were recorded on the evening prior to surgery and again when the patient returned to the general ward after discharge from the ICU. Both groups were equivalent on baseline characteristics. Patients who received the information intervention experienced less state anxiety recorded with the STAI (44.19

versus 53.24, p<.001) and lower levels of negative mood, measured on the negative affect subscale of the Positive and Negative Affect Schedule (4.48 versus 8.14, p<.006) during mechanical ventilation than the control group. Patients in the experimental group experienced less difficulty in communicating (4.48 versus 7.82, p=.03) and shorter intubation time in the ICU after surgery (13.85 versus 17.68, p=.03) than the control group. The time at which data were collected is a limitation of the study. In particular the number of people who were unable to remember the experience of mechanical ventilation demonstrates that patient recollections after ICU admission may not be as accurate as they would be if collected at the time of receiving the intervention. This study demonstrated that a combined sensory and procedural information (concrete objective information) intervention targeting the procedure of mechanical ventilation and the sensations experienced, leads to a reduction in state anxiety, improved communication and shorter intubation time in this population.

Shi et al. (2003) studied 83 cardiac surgical patients admitted to an ICU who received either usual care (control group, n=41) or an additional preoperative information session consisting of sensory and procedural information about the ICU experience (experimental group, n=42). The information intervention was delivered by audiotape, however no description of the content or duration of this information intervention was described by the authors. The aim of the study was to evaluate the theoretical framework of Lazarus' theory of stress, appraisal and coping (see section 2.3). Primary appraisal, ICU stress, was assessed using the ICU Environmental Stressor Scale (ICUESS) and coping was assessed with the Jalowiec Coping Scale (JCS). The results indicated that sensory and procedural information had a significant

effect on the primary appraisal with reduced perceived level of ICU stress ($p<.01$). This study was limited by the absence of a description of the concrete objective information intervention. It is therefore not replicable and comparison to other cardiothoracic ICU studies is difficult. However, the study demonstrated that patients receiving sensory and procedural information about the ICU experience prior to undergoing cardiac surgery had less perceived stress during their ICU stay.

2.5 Summary of studies using concrete objective information

The studies reviewed demonstrate that concrete objective information can be applied and evaluated in a variety of health care settings. Two studies were in outpatient settings (Johnson et al., 1973; Johnson & Leventhal, 1974); four were in acute care settings (Anderson, 1987; Burish et al., 1991; Gammon & Mulholland, 1996; La Montagne et al., 2003); two were in critical care settings (Kim et al., 1999; Shi et al., 2003); and one was a meta-analysis that evaluated a variety of health care settings as well as laboratory studies (Suls & Wan, 1989). The majority had mixed gender populations, except for Anderson and LaMontagne et al., and were randomised controlled studies with sample sizes ranging from 43 to 109 patients. All studies incorporated a variety of methods to communicate the information, either in person, with cassette tapes, videos or booklets. No study reported if one method of communicating information was more effective than the other. Further, no studies asked for patients' recollections of whether the sensations described in the information provided were felt during the procedures. Five studies reported anxiety as an outcome measure, two reported stress/distress and two reported coping (with gagging). All studies reported either improved coping or reduced anxiety/distress

with sensory information or combined sensory and procedural information (concrete objective information).

2.6 Summary of literature review and research hypothesis and aims

As highlighted in Chapter 1, it is well documented that patients in the ICU experience anxiety due to many factors, such as receiving mechanical ventilation, the inability to effectively communicate, the lack of information, experiencing pain and undergoing regular procedures. The effect of experiencing anxiety can lead to complications such as cardiac arrhythmias, myocardial and cerebral ischaemia, fluid and electrolyte imbalances, delayed wound healing, decreased immune system response, and sudden death. As reported in previous studies, moderate levels of anxiety are frequently experienced by ICU patients. The most common method of assessment of anxiety is the reliance on physiological indicators, such as vital signs, however these indicators may not always be reliable. Additionally, the treatment of anxiety is primarily through administration of sedatives.

Developing interventions that assist patients to cope with stressful procedures during their ICU stay is important in assisting nurses to provide effective care. Previous clinical studies have demonstrated that providing information to patients in concrete objective terms, that is, the sensations that the patient could expect to experience during a procedure, results in improved coping and reduction in patient anxiety/distress levels. Therefore, this study will explore the effectiveness of applying concrete objective information to ICU patients who undergo the procedure of being turned in bed and, in the majority of cases, receive mechanical ventilation.

Hypothesis: The hypothesis tested in the study was that ICU patients who are given concrete objective information regarding turning experience lower state anxiety when repositioned than patients who are not given concrete objective information.

Primary aim: The primary aim of the pilot study was to investigate whether an information-based intervention reduces state anxiety during the turning procedure.

Secondary aims: The secondary aims are to explore the associations between sedation, pain, adrenergic drugs and state anxiety, and the relationship between physiological parameters, turning and state anxiety.

Chapter 3 – Method

3.1 Introduction

Critically ill patients experience anxiety during their ICU stay (McKinley et al., 2004). There are many factors within the ICU environment that lead to patients experiencing anxiety (Cornock, 1998; Thomas, 2003). Patients have expressed the need for more information and receiving information has been shown to promote feelings of security (Brooks, 1999). Information provided in concrete objective terms during a procedure describes the sensations to be expected from the perspective of the patient (Leventhal & Johnson, 1983) and has demonstrated reduced patient anxiety levels in previous clinical studies (Kim et al., 1999). However, delivering concrete objective information to patients about the sensations experienced while being turned in bed has not previously been studied in the ICU patient population.

The hypothesis tested in the study was that ICU patients who are given concrete objective information regarding turning (independent variable) experience lower state anxiety (dependent variable) when repositioned than patients who are not given concrete objective information. The primary aim of the study was to investigate whether an information-based intervention reduced state anxiety during the turning procedure. The secondary aims were to explore the associations between sedation, pain, adrenergic drugs and state anxiety, and the relationship between physiological parameters, turning and state anxiety.

This chapter describes the preparatory investigation carried out to develop the turning procedure and the research method. It was necessary to explore and describe the sensations experienced by patients while being turned in bed. Additionally, a method to record and measure the patient's physical response to anxiety during the turning procedure required evaluation before it could be used in the study. The study design, including setting and sample, recruitment, the usual care of turning patients and the implementation of the intervention, is discussed. Finally, data collection and data analysis methods used to test the primary and secondary study aims are described.

3.2 Preparatory investigation

Prior to the commencement of the pilot study, a preliminary investigation was carried out to develop the turning intervention through exploring and recording the usual practice of turning ICU patients in bed and through identifying and describing the sensations felt by volunteers when being turned in bed. The information was then placed in scripts that detailed usual care alone or with additional sensations experienced, referred to as concrete objective information.

Developing the turning intervention: In the ICU, the practice of turning patients in bed occurs primarily to change bed sheets or as part of the usual practice of routine repositioning. Turning patients involves moving the bed into a position to facilitate the turn, that is, laying the bed head flat if elevated, removing pillows, and placing indwelling catheters, tubes and invasive lines into secure positions that will not cause discomfort to the patient and will ensure safety. The individual is rolled from either a lateral or a supine position, provided with skin care, and pillows placed

behind the back and head. The patient is then positioned against the pillows and the bed moved back to the original position. The process of turning patients is often referred to by nurses as rolling patients, and therefore the terms are used interchangeably.

The control (usual care) and intervention group (concrete objective information) scripts for turning were developed by adapting the four-stage process for message construction described by Clark (1997). This process included: describing the usual turning procedure; identifying and describing patients' experience of the turning procedure; validating the sensations experienced during the turning procedure; and finally, writing the message.

Describing the usual turning procedure: To establish the usual practice for turning patients in the ICU, ten intensive care patients being turned by nursing staff were observed. Observations included noting the order in which the various stages of the procedure were performed, signs of non-verbal communication including touch and eye contact, and any verbal procedural information given to patients. This observation became the basis of the information script for the 'control' group, but also helped form components of the experimental intervention.

The ten ICU patients observed had an artificial airway and were mechanically ventilated. Some patients were alert enough to respond to questions and commands, however they were all unable to speak due to the ETT in their mouth. Most patients were receiving intravenous drug therapies, for example, noradrenaline to control blood pressure, opioids for the management of pain and sedatives for the management

of anxiety. The patients also had invasive lines such as central venous catheters, wound drains and indwelling urinary catheters. In observing the patients being turned in bed, nurses told patients about the actions involved in the procedure, for example, 'I am about to turn you onto your side'. There was little explanation provided during the procedure, for example, the patient was not informed that the head of the bed was being lowered and the pillow removed. Additionally, some nurses would touch the patient's shoulder first to gain the patient's attention and then speak to them, and some nurses spoke without physical contact. In preparing to turn the patient, the patient's arm was moved across their chest, their leg lifted and crossed over the other leg and then held in this position to facilitate the roll. The patient's shoulder and hip were held by the nurse who then rolled the patient towards them. The patient's skin was then inspected, cream applied if appropriate and pillows placed behind their back and head, with the patient then positioned against the pillows. The bed was moved back into a position with the head elevated. Observing the ICU patients being turned in bed demonstrated that the information provided to patients was mostly procedural information and did not consist of concrete objective information.

Identifying and describing patients' experience of the turning procedure:

To identify and describe the concrete objective features that occurred during the turning procedure, three strategies were carried out. These were

- interviewing patients after discharge from ICU;
- turning healthy volunteers in bed; and
- simulating the ICU patient.

Interviewing patients after discharge from ICU: Within the literature, patients in ICU report the ETT as uncomfortable and the inability to communicate effectively as stressful (Bone et al., 1995; Chlan, 1998; Hall, 1996; Kim et al., 1999; McCartney & Boland, 1994; Stein-Parbury & McKinley, 2000). Further, Puntillo et al. (2001) reported turning as the most painful and distressing procedure for adult patients in ICU. It was, therefore, anticipated that patients might recall the sensations experienced while being turned in bed in the ICU and be able to describe them. Five patients were interviewed one day after discharge from the ICU to the ward to determine recollections of their stay there. In particular, the patients were questioned about being turned in bed and if they remembered how it felt. These patients did not recall exact procedures they had experienced while in the ICU, and did not remember anything specific about the procedure of being turned. However, the patients did remember having an ETT in their mouth. Patients who had recently undergone cardiothoracic surgery remembered experiencing more pain in their legs than from their sternal wound, although they did not remember if this occurred more when being turned.

As the patients discharged from ICU could not recall or describe the sensations experienced while being turned in bed, patient interviews were not pursued further. It was therefore decided to obtain this information by simulating the procedure of turning people in bed with a small sample of volunteers.

Turning healthy volunteers in bed: Volunteers from the hospital, who were not involved in direct patient care within the ICU, were invited to participate in being turned in a standard intensive care hospital bed by two assistants. Volunteers either

received the usual routine repositioning procedure or the usual turn in bed to change the bed sheet. Sixteen healthy individuals volunteered to participate, four males and 12 females. The volunteers comprised nurse educators, administrators, research assistants and technical assistants. Each volunteer was instructed that information was sought that described the sensations experienced during the turning procedure, in particular, 'what it felt like when being turned'.

Half of the volunteers were turned for position change and half were turned to have the sheet changed. Prior to performing the turn, the volunteers were informed that they were either going to be repositioned by being turned onto their side, or that they were going to be turned and that the sheet would be changed underneath them. The volunteers were informed that during the procedure they would not be given additional procedural information because the aim of the exercise was for them to focus on the sensations experienced while being rolled and not on the verbal cues. After the procedure, the volunteers were asked to describe all sensations experienced, and whether they perceived them to be positive or negative. The first eight volunteers were rolled for repositioning in the bed, that is, from a supine position to the left lateral position, without sheet change. The volunteer lay supine on the mattress, the bed was then elevated to a height that ensured that the assistants performing the turn were not at risk of straining their back or causing injury. The volunteer was then rolled onto their left side and held in this position by one assistant. While the volunteer was lying on their left side, the other assistant placed pillows behind the volunteer's back and head. The volunteer was then placed back against the pillows. Once in this position, the head of the bed was elevated and the bed lowered to its original height. The volunteer was then asked to recount the sensations experienced

and these were documented by the researcher. The combined sensations described by the eight volunteers were collated, with similar sensations grouped. The sensations and frequency of responses expressed by the participants during the procedure are listed in Table 2.

Table 2. *Frequency of sensations experienced by volunteers during turning in bed*

Sensations reported as being experienced by the volunteers during turning in bed	**Frequency (n=8)**
Secure hand, felt more in control	4
Loss of control when rolled	2
Uncomfortable feeling of being squashed	1
Insecure, afraid of falling	3
Noise of bed (motor)	5
Momentum	2
Movement of limbs, out of control	1
Loss of perception of where in the bed when bed moves	5
Speed of movement causes anxiety	4
Afraid the movement would not stop	4
Stiffen when moved	1
Movement of the bed, 'at the dentist'	1

The next eight volunteers were turned and the sheet changed. As with the first group of volunteers, each volunteer lay supine on the mattress and the bed was then elevated to an appropriate height. The volunteer was then rolled onto their left side and held in this position by one assistant. While the volunteer lay on their left side, the second assistant released the right side edge of the bottom sheet from the mattress and rolled it up to form a lump, which was placed against the edge of the volunteer's back and leg. A new sheet was placed to cover the exposed mattress, with the right edge of the new sheet being tucked under the mattress's edge. The remaining loose sheet was rolled and placed against the existing lump against the volunteer's back. With this lump behind, the volunteer was then rolled over the sheets and placed in the right lateral position and both sheets pulled through. While the volunteer was lying on their right side, the old sheet was removed and the new sheet tucked in on the left mattress edge. The volunteer was then positioned with pillows behind their back and head, and placed back against the pillows. Once in this position the head of the bed was elevated and the bed lowered to its original height. The volunteer was then asked to recount the sensations experienced and these were documented by the researcher. The combined sensations described by the eight volunteers were collated, with similar sensations grouped. The sensations and frequency of responses expressed by the volunteers during the procedure are listed in Table 3.

Table 3. *Frequency of sensations experienced during turning in bed and having the sheet changed.*

Sensations experienced during turning in bed and having the sheet changed	Frequency (n=8)
Coldness on back	1
Feeling of being exposed, not covered with clothes	2
Speed of roll	4
Lump in bed uncomfortable	4
Movement of limbs, loss of dignity	1
Secure hand, participant felt more in control	5
Loss of perception of where in the bed when bed moves	4
Noise of bed, thought something was wrong with the bed	1
Insecure, afraid of falling	4
Loss of control when rolled	5
Noise of bed with movement felt like being at the dentist	1
Uncomfortable feeling of being squashed	3
Noise of changing sheets, sounds seemed to be 'exaggerated'	2

Researchers who have studied informing patients about procedures have recommended that the sensations experienced by 50% of the respondents should be included as part of concrete objective information (Christman et al., 1992; Clark, 1997; Johnson, 1999). With at least 50% frequency, it was highly likely that participants' representations of the anticipated procedure would contain some of the features they would experience (Clark, 1997). The sensations reported by the

volunteers 50% of the time were collated and placed under themes that would form the basis of the information intervention. The themes that emerged were security, person movement, and bed noise and movement. The typical features of the turning experience have been listed under the themes' headings and are outlined in Table 4.

Table 4. *Combined sensations experienced during turning in bed, described as themes*

Sensations experienced during turning in bed, described as themes		
Security	**Person movement**	**Bed movement and noise**
Touched	Momentum	Unfamiliar
Hands (hold person tightly)	Movement would not stop	'Problem'
Knowing what is happening	Fear of falling	Loss of perception of where
	Sensation of falling	in the bed when bed moves

The sensations described under the headings of security and bed movement could be easily described and linked to specific actions and explanations within the information scripts. However, the sensations associated with the 'fear and sensation of falling' were not as easy to describe. Therefore, the concept of the sensation of falling was explored further.

Exploring and describing the sensation of falling: Ten volunteers (63%) described the speed of the roll, eight volunteers (50%) reported feeling out of control when being rolled and 12 volunteers (75%) reported either the fear of falling or not stopping, as the components that contributed to the 'sensation of falling'.

Volunteers who reported the sensation or fear of falling were asked if they may have experienced this because they felt the edge of the bed. Several volunteers reported that the sensation of falling would occur no matter where they were in the bed because it was felt during the turn and not due to feeling the edge of the bed. To paraphrase one participant's experience: 'when the movement commenced, I felt I was in control, but as the movement continued, I felt a loss of gravity and then I felt the sensation of losing my balance. As the momentum and speed increased during the turn the feeling of loss of control intensified and when I reached a feeling of total loss of control I felt that I was falling.'

To identify whether the experience of falling has been previously investigated, a literature search was conducted. Concepts relating to falling have been reported by specialities including aged care, rehabilitation, neurophysiology, kinesiology and physiotherapy, with common themes identified; however, the concepts were not specific to turning in bed. Postural control has been described as the ability to maintain equilibrium and orientation in a gravitational environment (Horak, 1987; Massion, 1994). Specifically, visual information is important in maintaining posture and balance (Duarte & Zatsiorsky, 2002; Wade & Jones, 1997). Falls occur most frequently in elderly populations during transfer and turning from one position to another (Mbourou, Lajoie & Teasdale, 2003) or when visual information is inadequate (Owen, 1985). Further, the loss of balance during turning has been reported as a cause of falling (Hyndman, Ashburn & Stack, 2002).

With the information from the volunteer accounts and the literature, the next step taken was to observe another five patients in the ICU being turned in bed to

gather additional information to ensure the sensations in the information intervention were accurately described.

Observing patients being turned in bed to describe the sensation of falling: Five ICU patients were observed during the turning procedure and the effects experienced by the participants can be described in three phases. The first phase represents the commencement of the roll. The nurse prepares the patient to be rolled by moving the patient's arms and legs into position to facilitate the roll. At this stage, the patient initially is heavy to hold and turn but does not appear to resist being moved. Second, as the patient continues to be rolled and reaches a 90 degree angle the patient is observed to tense the forearms. Third, when the patient is turned further and reaches a semi-prone position, the patient often tries to grab hold of someone or something. During the turning procedure patients were observed mostly to have their eyes closed. However, if their eyes were open, the response to turning did not change.

The information from the above observations and from the turning of the volunteers was then combined to better describe and understand the experience of being turned. In the first phase of the turning procedure the heavy feeling is the initial gravitational pull that the volunteer described in the earlier account of sensations experienced during turning. In the second phase the person becomes aware of the increasing momentum and speed and the tensing of the forearms may indicate anxiety. In the final phase, the person is aware of the increasing momentum and starts to 'feel the sensation of falling' or being unbalanced, and is searching for someone or something to break their fall.

The description of the sensation of falling within the concrete objective information script was linked to the statements of moving quickly and feeling out of control. The sensation of falling was not specifically linked to vision as it was difficult to identify a specific visual target for patients to focus on if the patients' eyes were open. Additionally, the sensations of being disorientated or feeling unbalanced would be described to the patients when the bed was about to be moved. Having established the sensations experienced by the volunteers when being turned in bed, it was important to identify if there were sensations that were particular to ICU patients that needed to be included in the information intervention as well.

Simulating the ICU patient: Within the literature patients describe the ETT as uncomfortable and causing pain, choking, coughing and gagging (Cornock, 1998; Grapp et al., 2002; Rotondi et al., 2002; Wunderlich et al., 1999). The five discharged ICU patients interviewed for this study reported remembering the ETT in their mouth. However, there was no mention about discomfort with the indwelling catheter (IDC), central venous catheter (CVC) or wound drain, common devices inserted in ICU patients.

To examine the effect of the catheters and drains on the sensations experienced while being turned, five healthy volunteers (from the original 16 volunteers) were again asked to participate in being turned. The five volunteers, one male and four females, had intensive care nursing experience. First, volunteers had an ETT placed in their mouth, which was shortened to be well above the epiglottis and secured to the face with tape. The shortened tube was then attached to ventilator tubing and connected to a ventilator. Second, the distal end of a CVC was shortened,

placed below the right clavicle and secured with tape onto the volunteers' skin. The catheter was connected to an intravenous line that was connected to a 500 mL bag of fluid. Third, the distal end of an IDC was shortened, taped to the left inner thigh and connected to tubing with a drainage bag containing 200 mL of water. A shortened wound drain was then secured with tape to the left upper quadrant region of the abdomen and connected to a Redivac bottle containing 50ml of water.

In preparing to turn the volunteers, the catheters and drains were moved into positions that simulated usual practice. That is, the CVC line usually clipped to linen was released and placed next to the volunteer's side, the wound drain tubing was clamped and placed next to the volunteer's side, and the IDC drainage bag was moved to the side that the volunteer would end up facing. Each volunteer was rolled from the supine position to the lateral position. During the turn the volunteers were asked to concentrate on the sensations experienced in relation to the catheters and drains. All volunteers identified the pulling and dragging of the oral tube to be uncomfortable; however, the simulated CVC, IDC and abdominal drain did not cause any discomfort or pulling in the volunteers.

The data gathered through investigating the turning procedure, in particular the strategies of reviewing the literature, interviewing patients after discharge from ICU, turning healthy volunteers, and simulating the ICU patient, led to the following elements being included in the concrete objective information script:

- the movement of the bed up or down;
- the sound of a motor;

- feeling disorientated or unbalanced with the bed moving stopping as soon as the bed becomes stationary;
- feeling the tube in one's mouth or one's neck being pulled;
- the feeling of wanting to cough;
- the feeling of moving quickly;
- the feeling of being held tightly; and
- the feeling of being out of control, like falling.

Validating the sensations experienced during turning procedure: Clark (1997) suggests that a second set of interviews be conducted with a further sample of participants who have undergone the procedure to confirm the conclusions drawn from the analysis of the findings from the discovery stage. A trial of the turning procedure containing the concrete objective information was not conducted, due to the inability of mechanically ventilated ICU patients to verbalise. The validation of the experience would be captured during the pilot study with this process assisting in developing an accurate description of concrete objective information. At the completion of the turn, some patients would be asked to indicate yes or no by nodding or shaking their head to the following six questions:

- Did you hear the sound of a motor?
- Did you feel disorientated or unbalanced with the bed moving?
- Did you feel the tube in your mouth or neck being pulled as you moved?
- Did moving make you cough?
- Did you feel yourself moving quickly?
- Did you feel a little out of control, like you were falling?

Responses would be recorded to establish frequency of the sensations experienced.

The application of concrete objective information has been shown to reduce anxiety prior to and during procedures because the message includes a description of physical sensation (Johnson, 1972; Leventhal & Johnson, 1983). Concrete objective information, in particular sensory information, increases patients' ability to obtain and process information. If patients have a clear and unambiguous schema about the procedure, they are better able to cope with the actual experience because it is similar to the schema they have formulated (Garvin et al., 1992). For example, Johnson & Lauver (1989) found that when patients had experience with particular procedures in their past, their confidence in dealing with new related experiences increased. Therefore, this study was designed so that patients who received the turning procedure containing the concrete objective information would be questioned within 24 hours of receiving the information, to determine if the information they had received had helped them prepare for subsequent repositioning. Patients' responses to the questions would assist in determining if the concrete objective information was used by the patient and whether this information decreased their anxiety levels.

Writing the intervention and control scripts: Drawing on the clinical observations, the descriptions given by the initial volunteers, the literature review and the simulated ICU volunteers, the key points of procedural and sensory information regarding turning were identified and placed within the two scripts. The first script developed was what had been observed as the usual practice of turning patients and became the control script. The second script was the usual practice plus the concrete objective information.

Once both scripts were developed they were tried on the same five healthy volunteers who had participated in both turning exercises to determine the speed at which the procedure could be carried out, the ease of reading the scripts, and to ensure that each person's role was clearly identifiable and not confusing. The scripts and the intervention are described in detail at section 3.3.3.

The control and intervention scripts were subsequently reviewed to evaluate the percentage of concrete objective and procedural information. To establish inter-rater reliability in the scoring of the types of information, Cohen's Kappa was calculated. The scripts were assessed using the Types of Information Instrument (B. J. Garvin, personal communication, November 30, 2000, Appendix A). The researcher and one of her supervisors independently coded all information. The control script contained 100% procedural information. Category-by-category inter-rater reliability as indicated by the Cohen Kappa statistic was 1.0. The intervention script contained 51% concrete objective information and 49% procedural information. Category-by-category inter-rater reliabilities as indicated by the Cohen Kappa statistic were 0.92 for concrete objective information and 1.0 for procedural information.

With the turning procedure scripts developed, establishment of the method to measure anxiety was required. The Faces Anxiety Scale (McKinley, Coote & Stein-Parbury, 2003) was chosen to evaluate the patient's feelings of anxiety in response to the turning procedure. Additionally, it was considered that a supplemental measurement device, the electromyogram (EMG), might be suitable to measure forearm tension (Andreassi, 2000), which is a behavioural response to anxiety (Puntillo et al., 2004a).

Evaluating the use of the electromyogram in ICU patients: As described at section 3.2, patients were observed to tense their forearms when being turned in bed. Anxiety has been associated with forearm tension. The technique of recording muscle activity to measure forearm tension has been studied using EMGs (Andreassi, 2000). It was considered that the use of the EMG might provide additional information on the presence and intensity of anxiety when being turned in bed.

A literature search in Medline and CINAHL did not reveal any articles that described using the EMG as an instrument to measure anxiety in the intensive care population. However, the Aspect electrographic monitor (Aspect Medical Systems; Massachusetts) routinely used in the ICU to record electroencephalography (EEG) contained the software to record EMG. It was considered that this instrument could provide additional information about anxiety in the proposed study population. The staff of the Electrophysiology Department of the hospital (study site) provided assistance and advice on testing the Aspect monitor for this purpose and provided information on electrode products, lead placement and use of the EMG monitor.

A healthy volunteer was sought to test the ability of the monitor to record forearm tension in a quiet environment, free of electrical equipment. The volunteer was placed in a room away from the clinical area where she sat in a chair. Three electrodes were positioned on the forearm and connected to the Aspect monitor, and the EMG trace was recorded. This test resulted in an interpretable trace that contained minimal interference. The volunteer then lay on a bed with the electrodes still in place and the EMG recording as the volunteer was turned in bed in the same way the study patients would be. The movement of the arm while being repositioned resulted

in significant interference (artifact electrical signals) and made the EMG trace difficult to interpret. To overcome this interference, the arm of the volunteer was passively moved into a position above her head, and the body turned toward the arm. This movement resulted in an interpretable EMG trace with minimal artifact. Based on this, forearm EMG recording was next tested on two ICU patients to ascertain the amount of interference, particularly from electrical equipment used extensively in the ICU, and patient tolerance to the EMG.

Two patients and their families were approached to participate and gave consent for the electrodes and monitor to be attached to the patients. The first patient was awake and alert, receiving oxygen therapy by a facemask, was connected to a cardiac monitor and was receiving continuous haemodialysis. The EMG trace had significant interference, however the cardiac monitor was free of electrical interference. It was uncertain whether the interference was due to the movement of the patient or the technical environment. The second patient, for whom a family member gave consent, was sedated, intubated and mechanically ventilated. In this instance the EMG trace was recorded with minimal interference.

As the patients for the proposed study would be required to be awake and responsive, it was decided that the recording of the EMG in this population might not consistently provide an accurate measure of forearm tension to assist in the assessment of anxiety. Therefore, this measure was not pursued further.

3.3 Research methods

3.3.1 Research design

The provision of concrete objective information while turning patients in ICU had not been previously reported in the literature; nor had the Faces Anxiety Scale been used in the measurement of state anxiety in ICU patients being turned in bed. Consultation with the hospital clinical epidemiologist led to the recommendation that a pilot study would provide measurement of baseline data during the turning procedure using the Faces Anxiety Scale in the ICU population. The data collected would establish a mean anxiety level and a projected effect size for a larger study, which could be factored with a significance level and power calculation, to determine a sample size for future studies.

The pilot study conducted was an experimental randomised control group design in ICU patients randomly assigned to receive either usual care when being repositioned in bed (control group) or an additional concrete objective information intervention describing the sensations experienced while being turned (experimental group). The study design was chosen to control for the effect of extraneous variables on the dependent variable, state anxiety, to minimise threats to internal validity. A randomised two-group design was chosen to increase the likelihood of both groups being comparable in all factors except for the intervention.

3.3.2 Research setting and sample

Study population: Research participants were patients receiving treatment in the general, cardiothoracic or neurosurgical ICUs within a metropolitan tertiary referral hospital in Sydney, Australia. The combined ICUs have a total of 29 beds.

At most times during the 24-hour period, two visitors were permitted at the patient's bedside. The usual staffing ratio of the study ICUs was one registered nurse per patient. Patients were eligible for the study if they had an artificial airway in situ, were 16 years and older and were able to interact even intermittently in order to respond to questions, open their eyes to name or spontaneously, or were awake and had sufficient corrected vision to see the Faces Anxiety Scale. Patients were excluded if they did not understand information in English, had an intellectual disability, or had received either neuromuscular blockade with sedative therapy or unreversed anaesthesia in the previous 12 hours. A purposive sample of at least 65% mechanically ventilated patients was sought to ensure the intervention was tested in a substantial number of patients who were unable to communicate verbally.

Sample size: The sample size for the pilot study was based on the feasibility of participant recruitment and data collection within the University timeframe to complete the Master of Nursing degree on a part-time basis and allow a valid statistical analysis. The data from the 40 patients entered into the study would allow determination of the size of the effect of the intervention on state anxiety. This baseline data would then assist in calculating the sample size required for a larger randomised controlled trial.

3.3.3 Study intervention

Usual care: The practice of turning ICU patients in bed occurred primarily to change the sheets or as part of the usual practice of routine repositioning. Two or three nurses, together with a porter, were required to turn a patient, and turning patients was performed two to three hourly. In preparing the patient for turning, the nurse instructed the patient about the actions involved in the procedure, for example, 'I am about to turn you on to your side'. The bed was then moved into a position to facilitate the turn. This included elevating the bed to a height that ensured that the nurses performing the turn were not at risk of straining their back or causing injury. The bed head, if elevated, was laid flat and pillows removed from behind the patient's head and back. The indwelling catheter drainage bag was placed on the side of the bed that the patient would end up facing. Invasive lines, for example CVC lines, were placed in a position that ensured they were safe and would not be dislodged during the turn. In preparing to turn the patient, the patient's arm was moved across their chest, their leg lifted and crossed over the other leg and then held in this position to facilitate the roll. The patient's shoulder and hip were held by the nurse who then rolled the patient towards them. The patient's skin was then inspected, cream applied if appropriate, and pillows placed behind the patient's back and head, with the patient then positioned against the pillows. Once in this position, the head of the bed was elevated and the bed lowered to its original height. The patient remained in this position until the next scheduled turn, which was two to three hours later, unless the patient became uncomfortable or their condition became compromised, for which the patient would be repositioned again. This information was placed into a script to be used during the study (Appendix B).

The intervention: Patients randomised to the intervention group received additional concrete objective information, in addition to the usual care, while being turned in bed. The intervention was carried out by the nurses working in the ICU and each nurse involved in conducting the turn was allocated a role. The roles were distinguished as nurse one and nurse two. In preparing the patient for turning, nurse one touched the patient's shoulder and introduced the names of the staff who helped with the turn. The patient was given information that their position would be changed and that they would be moved onto their left (or right) side and would remain on this side for at least two hours. They were informed that this was to prevent their skin from becoming sore. The patient was informed that the head of the bed was being laid back flat and the height of the bed adjusted. The nurse told the patient which direction the bed was moving, that is, up or down, and also told the patient that they would hear the sound of a motor as the head of the bed moved. Patients were told that they may feel disorientated or unbalanced with the bed moving, but that it would stop soon. Patients were then told that their pillow would be removed from behind their head and back.

Nurse one then advised the patient that they would feel the nurse touching their arm and leg. The patient was also informed that the nurse would bend their left (or right) leg and place it over the left (or right) leg, and then would move their left (or right) arm and place it over their chest and move their right (or left) arm away from their body. The patient was also told that they may feel the tube in their mouth or neck being pulled as they moved, and that it may make them cough. The nurse stated to the patient that they would hold the tube to stop it from moving. Nurse two told the patient that the nurse would place his or her hands on the patient's left (or right)

shoulder and on their left (or right) hip and roll them towards the nurse. The patient was advised that they would feel themselves moving quickly and when they were moving they would feel a little out of control, like they were falling, and it was due to the speed (momentum) of moving. The nurse told the patient that the patient would feel the nurse's hands on their shoulder and hip holding them tightly, and that this was to stop them from falling.

Nurse one informed the patient that they were now on their right (or left) side and had stopped moving. The nurse then assessed the patient's skin and provided back care as needed. This nurse then told the patient that he or she was about to apply lotion and the patient would feel the nurse's hands on their back applying cool lotion. Nurse two advised the patient that they would continue to hold the tube in the patient's mouth or neck to stop it from being pulled as they moved. Nurse one then stated to the patient that they would put a pillow behind the patient's back and a pillow behind their head and would move the patient back to lean against the pillows. Nurse two stated that they would move the head of the bed up, that the patient would hear the sound of the motor as the bed moved and that they may feel a little disorientated or unbalanced with the moving, but that it would stop soon. This information was placed into a second script (Appendix C).

3.3.4 Ethical considerations

Ethics approval was granted by the Human Research Ethics Committees of Royal North Shore Hospital and the University of Technology, Sydney. The main ethical considerations were informed consent, potential anxiety learned about during the study procedure, privacy and confidentiality.

Informed consent: The study involved the testing of information given during the procedure of repositioning by turning the patient in bed. Patients were not submitted to any procedure that would not otherwise be done at the discretion of the clinical staff. The additional activities for the patients were: receiving information given in a certain way; responding to the Faces Anxiety Scale and VAS; and responding to questions. Patients were free to decline to participate and to withdraw their participation at any stage of the study, and did not have their ICU care jeopardised in any way. Research procedures including data collection were explained using the approved patient information sheet that was read to patients; patients were asked to indicate consent by nodding or shaking their head. The attending nurse countersigned the patient information sheet (Appendix D) indicating that the consent had been obtained in the above manner.

Anxiety: All patients enrolled in the study who reported anxiety in the course of the study were treated for the cause of their anxiety. If the anxiety was due to pain it was dealt with in the usual way, that is, the nurse identifying the source of pain, providing comfort measures and analgesics. If anxiety was not related to pain, the nurse caring for the patient tried to establish the source of the anxiety and dealt with it accordingly, thereby ensuring distress was minimised for the patients in both groups.

Privacy and confidentiality: Privacy was ensured with no information identifying any individual being presented or published. Confidentiality was maintained with all patient data being stored in a locked filing cabinet and accessed only by the study researcher. Data were entered into the computer database and a paper record stored with a study number. No identifying information was stored with

the data. The file linking study number and patient hospital number was stored separately from data and was password protected.

3.3.5 Procedures

ICU staff education: Once ethics approval had been granted by the relevant committees, a one-on-one education session was provided to the majority of the nursing staff working in the relevant clinical areas. Nursing staff were shown the scripts for the intervention and usual care and were informed about the way the scripts were developed and the significance of the concrete objective features of the experimental intervention. The use of the Faces Anxiety Scale and the VAS was explained at this time. The process of patient recruitment into the study was described. Support from the nursing staff in notifying patients who may potentially fit the criteria for inclusion was sought, as was support in performing the turns with the information described within the scripts.

Patient selection: Each morning from Monday to Friday, for 12 months (April 2002 to April 2003), each patient was reviewed in the ICU to identify whether they met the inclusion criteria until the sample size had been achieved. As eligible patients were identified, the registered nurse caring for that patient was approached and asked if they agreed to their patient being asked if the patient would agree to participate in the study, and also if the nurse was willing to help. A time that was convenient to the nurse was agreed upon. At that time, the patient was read the information statement approved by the Ethics Committees and asked if they wished to participate in the study. Patients indicated consent by either nodding or shaking their head, yes or no. If the patient agreed to participate the attending nurse was asked to

witness the consent process and then to countersign the information statement to verify that the consent process had been followed. Upon the patient consenting to participate, the researcher randomised the patient to the control or intervention group by the toss of a one dollar coin, whereby heads represented the control group and tails the intervention group. The bedside nurse witnessed not only the toss of the coin but also the documentation of the outcome of the toss, thus ensuring the validity of the randomisation. All enrolled patients were assigned a study number. Patients were entered into the study only once with data being collected at the time of the relevant turn in the bed. In total 49 patients were approached with five men and four women declining to participate in the study. Reasons why patients refused to participate included pain, tiredness, frustration and generally wanting to be left alone.

Instrumentation:

Anxiety: Anxiety was measured with the Faces Anxiety Scale, a five-point single-item scale from no anxiety (neutral) through to extreme anxiety with interval level measurement properties (Appendix E). Facial expressions of emotion are revealed by changes to the muscles of the forehead, eyebrows, eyelids, cheeks, nose, lips and chin (Ekman, Levenson & Friesen, 1983). Therefore, the recording of anxiety may be achieved with a faces scale that depicts these changes. To develop the Faces Anxiety Scale, a graphic artist drew five faces, based on photographs and descriptions of muscular changes, with a range of emotions from no anxiety (neutral) through to extreme anxiety (McKinley et al., 2003). The Faces Anxiety Scale has been shown to allow for the self-assessment of anxiety in critically ill patients, in particular, as instruments consisting of longer validated scales that depend on a verbal

response and more functional cognitive capacity have a limited use for patients receiving mechanical ventilation.

Criterion validity: The criterion validity of the Faces Anxiety Scale in ICU patients was assessed in a previous study. A research assistant made a single clinical judgement of 106 patients' anxiety levels in the range of one to ten based on their non-verbal responses to nine questions about mood, and physical and behavioural signs. The patients then responded to the Faces Anxiety Scale. The correlation between the patients' subjective self-assessments of anxiety and the research assistant's objective assessment was 0.64 (Pearson's correlation coefficient). Some level of anxiety was reported by 85% of patients, with mean (SD) of 2.9 (1.2). Ninety percent of patients included in this study were mechanically ventilated (McKinley et al., 2004).

The Faces Anxiety Scale is considered to have good construct validity, as the human expressions of emotion are recognisable representations of actual anxiety (McKinley et al., 2003). Construct validity of the Faces Anxiety Scale will be further enhanced over time by the use of the scale in clinical studies that measure anxiety as their outcome.

Pain: Pain was measured with a VAS, a horizontal line 100 mm in length, with labelled anchors at each end to indicate extremes (none at all to worst imaginable pain). The VAS has been used in various settings to measure pain intensity. In 2001, Bodian, Freedman, Hossain, Eisenkraft and Beilin recorded postoperative pain scores in 150 patients following intraabdominal surgery with both the VAS and the McGill

pain questionnaire and reported a Spearman rank correlation coefficient of 0.69. Further, the VAS has been used to measure pain in a critical care population with Stanik-Hutt et al. (2001) reporting that the VAS demonstrated adequate reliability and validity for measuring pain intensity in surgical and traumatically injured patients.

Control group turning: Patients assigned to the control group received all of the usual care given in the ICU. In this group the information provided about the turning procedure was given with a script (Appendix B) to reduce the variability from nurse to nurse. The script was designed to capture and reflect the usual way the procedure is performed, including explanations. The script was placed where it could be readily viewed during the procedure. Prior to commencing the turn, patients were shown the Faces Anxiety Scale on an 11 cm by 42 cm card and asked to point to the face that showed how they felt at that time. Patients were then asked to indicate if they had pain and if they responded 'yes', were shown a 100 mm VAS on a piece of paper 15 cm by 21 cm and asked to mark their pain intensity with a pen. Nurses then turned the patients guided by the script. Once the patient was repositioned, anxiety levels and pain intensity of the patient were then re-measured with the Faces Anxiety Scale and the VAS respectively, within three minutes of the completion of the procedure. Patients were then asked to shake or nod their head, yes or no, to six questions to determine if they experienced the following sensations when being repositioned:

- Did you hear the sound of a motor?
- Did you feel disorientated or unbalanced with the bed moving?
- Did you feel the tube in your mouth or neck being pulled as you moved?
- Did moving make you cough?

- Did you feel yourself moving quickly?
- Did you feel a little out of control, like you were falling?

Intervention group turning: Patients assigned to the intervention received all of the usual care given in the ICU. In this group the concrete objective information given about the procedure was again given with a script (Appendix C) to reduce the variability from nurse to nurse. The script, with key words highlighted, was placed where it could be readily viewed during the procedure. As with the control group, prior to commencing the turn patients were shown the Faces Anxiety Scale and also asked to indicate if they had pain. If they responded 'yes', patients were shown the VAS. Nurses then turned the patients guided by the script. Once the patient was repositioned, anxiety levels and pain intensity of the patient were then re-measured with the Faces Anxiety Scale and the VAS respectively, within three minutes of the completion of the procedure. Patients were then asked to shake or nod their head, yes or no, to the same six questions asked in the control group to determine if sensations were experienced when being repositioned.

The patients in the intervention group were questioned 24 hours after completion of the turn to answer yes/no, or nod/shake their head, if they had remembered being turned in bed and being given specific information during the turning procedure. These patients were then asked if they had, in the last 24 hours, recalled the information given to them during subsequent turns and if this resulted in them being more prepared and less anxious during the turning procedure than on previous occasions.

Data collection: The researcher collected all demographic and clinical data from the ICU flow chart, the ICU database and patient records using a specific data collection form (Appendix F). Data collection from the patient was undertaken and recorded on one occasion for both usual care and information intervention patients.

Demographic and clinical data: The demographic data of age and sex was collected from the patient records. The clinical data collected from the patient records included admission date to hospital and diagnosis, admission date to ICU and diagnosis, and previous medical history. The clinical data collected from the ICU database included Acute Physiology and Chronic Health Evaluation (APACHE) II (Knaus, Draper, Wagner & Zimmerman, 1986) score on admission to the ICU, patient death in the ICU, the date and time of patient discharge to the ward, and alive at the ICU discharge. Data collected from the hospital laboratory database included the pathology results available at the time of performing the turning procedure and included the most recent acid-base level, oxygen and carbon dioxide levels, electrolytes (sodium, potassium), white blood cells, haemoglobin and renal clearance (creatinine).

Patient clinical observations collected at the time closest to performing the turn were recorded by the researcher. Neurological status included the patient's Glasgow Coma Score (GCS) and the ability to respond to questions. Respiratory status included the presence of airway devices and support the patient was receiving at the time of the turning procedure, such as ETT, tracheostomy tube, oxygen facemask, continuous positive airway pressure (CPAP), mechanical ventilation, and reason for mechanical ventilation. The patient's respiratory rate, percentage of inspired oxygen

(FiO_2) administered and percentage of haemoglobin saturated with oxygen (SaO_2) were recorded immediately prior to, and again within three minutes of completing the turning procedure. The patient's cardiovascular status including heart rate and mean arterial pressure (MAP) was recorded immediately prior to, and again within three minutes of completing the turning procedure. Physiological parameters were measured with the Marquette Tram 100 monitoring system (Marquette Medical Systems Inc, Milwaukee, USA). The monitor was maintained according to the manufacturer's recommendation by the medical electronics department of the hospital. Relevant channels were calibrated at the start of each nurse's shift.

The clinical data collected from the ICU flow chart included drug therapies that could influence the patient's level of anxiety (MIMS, 2004; Morrill, 2000). These drugs included the categories of anxiolytics, sedatives, opioids, analgesics, adrenergics, corticosteroids, anti-epileptics and anaesthetic agents. In total there were 29 standard drugs that were routinely administered to the ICU patients listed under these categories. These are detailed in the data collection form (Appendix F). The drugs and doses were recorded as being administered at the time of the turning procedure, as well as within the 24 hours prior to the turning procedure.

3.3.6 Data analysis

Data were entered into the computer from the data collection sheets by the researcher. An Access database was used for entry and management of data. Data were transferred to SPSS version 11.0 for analysis. To determine sample characteristics, baseline clinical and demographic data were compared between groups with t-tests for interval data and chi-square for categorical data.

To evaluate the primary aim of the study (whether an information intervention reduces state anxiety) the anxiety scores following the turn were compared between the group receiving usual care and the group receiving the intervention using analysis of variance (ANOVA). Pain as a potential confounder to anxiety was recorded and the mean state anxiety scores after turning for patients experiencing pain were analysed with ANOVA. Pre-procedural anxiety score was tested as a possible confounder to post-procedure anxiety score using analysis of covariance (ANCOVA).

To evaluate the first component of the secondary aims of the study (exploring the association between sedation, pain and state anxiety) the drugs used were categorised and compared between groups. Patients were categorised as recently sedated if they were currently receiving sedatives and/or opioids or if they had received these drugs within a defined period prior to data collection. The defined periods were current infusion for morphine, 4 hours for midazolam and 30 minutes for propofol. Association of anxiety with each drug was tested with a chi-square analysis. Following this, the mean state anxiety scores after turning for patients recently sedated compared with non-sedated patients were analysed with ANOVA. The second component of the secondary aims exploring the relationship of adrenergic drugs and state anxiety after turning was analysed with ANOVA. The third component explored the relationship between physiological parameters, turning and state anxiety. To assess the relationship between state anxiety and physiological parameters, the level of state anxiety after turning was correlated with mean arterial pressure (MAP), heart rate (HR) and respiratory rate (RR) after turning and analysed with Pearson's correlation.

3.4 Summary of methods

The experience of repositioning healthy volunteers and their account and descriptions of the sensations they encountered while being turned in bed was a necessary process in developing the information intervention. Through undertaking the steps of describing the usual turning procedure, describing patient experiences, validating the turning procedure and writing the scripts, a better understanding of patients' experiences was obtained. With this information, a pilot study was conducted in which 40 adult ICU patients, who had an artificial airway with at least 65% of these patients receiving mechanical ventilation, were randomised to receive the usual turning procedure (control), or were prepared for the procedure with information from the patient's perspective in relation to what the patient may feel and experience when being turned in bed (intervention).

Patient consent and randomisation to the control or intervention group was carried out by the investigator and witnessed by the nurse in attendance at the patient's bedside. Clinical and demographic data were collected from the ICU flow chart, the ICU database and patient records using a specific data collection form. Patient clinical observations were collected at the time closest to performing the turn. The primary outcome of the study, whether an information intervention reduces state anxiety, was measured with the Faces Anxiety Scale immediately prior to conducting the turn and then again within three minutes of completing the turn. A potential confounder of anxiety was pain intensity and this was measured with a VAS prior to commencing the turn and then again within three minutes of completing the turn. The secondary aims were to explore the associations between sedation, pain, adrenergic drugs and state anxiety, and the relationships between physiological parameters,

turning and state anxiety. The delivery of sedative, analgesic and adrenergic drugs was recorded at the time of the turn and then compared between the control and intervention groups. The physiological parameters of mean arterial pressure, heart rate and respiratory rate were also recorded at the time of the turn and then compared between the control and intervention groups.

Chapter 4 – Results

4.1 Introduction

Concrete objective information contains a combination of descriptions of sensations, what the patient will hear, feel, smell and taste, along with descriptions of the steps involved in the procedure (Clark, 1997; Leventhal & Johnson, 1983). Providing information in this way has reduced patient levels of anxiety as the patient's expectation about the procedure corresponds with the actual experience (Garvin et al., 1992; Johnson & Lauver, 1989). As described in Chapter 3, the development of a turning intervention occurred through exploring and recording the usual practice of turning ICU patients in bed and through identifying and describing the sensations experienced by volunteers when being turned in bed. The information describing the turning procedure was then placed into two scripts that described either usual care alone or care with additional sensory information.

Over a 12-month period (April 2002 to April 2003), 40 ICU patients were randomly assigned to receive either usual care when being repositioned in bed or an additional concrete objective information intervention. The hypothesis tested whether intensive care patients who are given concrete objective information regarding turning experience lower state anxiety when repositioned than patients who are not given concrete objective information. The primary aim of the study was to investigate whether an information-based intervention reduces state anxiety during the turning procedure. The secondary aims were to explore the associations between sedation, pain, adrenergic drugs and state anxiety, and the relationship between physiological parameters, turning and state anxiety.

This chapter commences by describing the demographic characteristics and clinical history of the sample. The groups are compared at baseline for demographic characteristics, clinical history, clinical observations, drugs, state anxiety and pain. The main effect of turning on state anxiety and pain is tested. The exploration of the relationships between opioid, sedative and adrenergic drugs and physiological parameters and state anxiety are then presented. Finally, the sensations experienced by patients while being turned, and whether concrete objective information is recalled and used by patients in subsequent turns, are explored.

4.2 Sample characteristics

Demographic and clinical characteristics: The intervention (n=20) and control groups (n=20) were similar with respect to all major demographic and clinical characteristics at baseline as detailed in Table 5. The sample comprised similar numbers of men and women. The mean age was 67.50 years in the control group and 64.70 years in the intervention group. Most patients had an admission diagnosis of cardiovascular disease, respiratory, gastrointestinal or neurological, with sepsis, renal and orthopaedic combined and categorised as other. The mean APACHE II score on the first day of admission to ICU was similar in each group (18.85 and 16.55 respectively). According to Knaus et al. (1986, p 414), APACHE II scores of 15 and above identify a moderate degree of severe illness. It is important to take into consideration that the APACHE II scores were inflated by patients' neurological scores and that all patients had an artificial airway in place. The median length of stay (LOS) for the total group in ICU was 6.0 days (range 1-309) and the median LOS in hospital was 24 days (range 6-324). All patients had an artificial airway, either an endotracheal tube (80%) or tracheostomy tube (20%), and most (90%) were receiving mechanical ventilation at the time of data collection. The mean Glasgow Coma

Scores (GCS) were similar between groups, with all patients in the control group recording scores of 11.0 and the intervention group mean 10.95 (range 10-11). The GCS were low because all patients had an artificial airway in place and were unable to speak. However, all patients (100%) were able to follow instructions and could respond to questions by shaking or nodding their head.

Table 5. *Comparison of demographic characteristics and admitting diagnosis to ICU*

Characteristic	Control (n=20)		Intervention (n=20)		
	Number	%	Number	%	p*
Male	11	55%	9	45%	
Female	9	45%	11	55%	.38
Admitting diagnosis to ICU[¶]					
Cardiovascular	8	40%	5	25%	.25
Respiratory	4	20%	5	25%	.50
Gastrointestinal	4	20%	5	25%	.50
Neuro	1	5%	3	15%	.30
Other	3	15%	2	10%	.50
Airway					
Endotracheal tube	16	80%	16	80%	
Tracheostomy	4	20%	4	20%	.65
	Mean	SD	Mean	SD	p*
APACHE II	18.85	7.04	16.55	5.77	.26
Age (years)	67.50	16.42	64.70	13.83	.56

*t-test for interval data, Fisher's Exact test for nominal/ordinal data; ¶APACHE III diagnosis categories as modified by Australia and New Zealand Intensive Care Society (ANZICS)

Medications that could influence state anxiety were recorded at the time the turning procedure was conducted. The common categories of drugs recorded included sedatives, opioids and adrenergics, and are detailed in Table 6. Patients were categorised as recently sedated if they had received sedatives and/or opioids within a defined period prior to data collection. These periods were: infusion of morphine at the time of conducting the turning procedure; midazolam within the previous four hours; or propofol within the previous 30 minutes. Over half of the control group (55%) were categorised as recently sedated at the time of being turned, compared to less than one-third of the intervention group (30%). Between 20% and 35% of patients in the control and intervention group received either noradrenaline or dobutamine at the time of being turned.

Clinical physiological measurements were also collected immediately prior to turning patients in bed, and are detailed in Table 6. The MAP mean, HR mean, RR mean, fraction of inspired oxygen ($Fi0_2$) mean and level of arterial haemoglobin saturated with oxygen ($Sa0_2$) mean were similar between the control and intervention groups. In both groups, patients were stable, with the clinical measurements within the standard ICU haemodynamic parameters (Urden, Stacy & Lough, 2002).

State anxiety was recorded prior to and within three minutes of patients being turned in bed. Patients reported on average moderate levels of state anxiety with the means similar for both the control (2.50) and intervention (2.60) (range 1-5) groups (Table 6). Presence of pain was also recorded at this time. There were five patients in the control group and two patients in the intervention group who experienced pain pre turn.

Table 6. *Comparison of drug administration, physiological parameters, state anxiety and pain immediately prior to patients being turned*

	Control (n=20)		Intervention (n=20)		
	Number	%	Number	%	p*
Sedative and opioid drugs					
Morphine current time of turn	3	15%	2	10%	.50
Midazolam within 4 hrs pre turn	1	5%	1	5%	.76
Propofol within 30 min pre turn	7	35%	3	15%	.14
Adrenergic drugs					
Noradrenaline	2	10%	4	20%	.33
Dobutamine	2	10%	3	15%	.50
	Mean	SD	Mean	SD	p*
Physiological parameters					
MAP	88.50	11.38	83.95	15.36	.29
HR	88.05	15.95	85.55	16.86	.63
RR	22.25	6.70	20.25	7.25	.37
FiO_2	.36	.06	.35	.05	.62
SaO_2	98.0	1.15	97.6	1.61	.37
State anxiety 1-5					
Pre turn	2.50	1.1	2.60	1.1	.78
	No. (%)	No. (%)	No. (%)	No. (%)	p*
Pain reported	Yes	No	Yes	No	
Pre turn	5 (25%)	15 (75%)	2 (10%)	18 (90%)	.20

*Fisher's Exact test for nominal/ordinal data, t-test for interval data. Mean arterial pressure (MAP); heart rate (HR); respiratory rate (RR); fraction of inspired oxygen (FiO_2); arterial oxygen saturation of haemoglobin (SaO_2).

4.3 The effect of turning on state anxiety and pain

State anxiety scores immediately after patients were turned: Within three minutes of the completion of turning the patient, state anxiety was recorded. To test the effect of information during turning on state anxiety, the mean score between the control group (2.5) and the intervention group (2.35) was analysed with analysis of variance (ANOVA). There was no difference between groups (p=.63) as detailed in Table 7.

Both groups reported on average moderate levels of state anxiety after turning. There was no change in the pre and after turn state anxiety means in the control group. There was an observed 10% decrease in state anxiety in the intervention group after turning, however the difference did not reach statistical significance.

Table 7. *The effect of pre turn state anxiety scores and group as confounders of state anxiety after patients being turned*

Dependent variable		Pre Turn	After Turn	ANCOVA (Statistics)	
State anxiety 1-5		Mean (SD)	Mean (SD)	State anxiety pre turn F (p)	Group F (p)
After turn	Control	2.50 (1.1)	2.50 (1.1)		
	Intervention	2.60 (1.1)	2.35 (1.2)	2.97 (0.09)	0.24 (0.63)

The influence of pre turn state anxiety scores on state anxiety scores after turning: A one-way between group analysis of covariance (ANCOVA) was conducted to compare the effectiveness of the turning procedures designed to reduce patients' level of state anxiety, as detailed in Table 7. The independent variable was the type of turning procedure (usual care or with additional concrete objective information) and the dependent variable was the state anxiety scores recorded after the turning procedure was completed. The pre turning state anxiety scores were used as the covariate. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate (Pallant, 2001). After adjusting for pre turning scores, there was no significant difference between the control and intervention groups on post turn state anxiety scores ($p=.63$). There was a change in the means between the pre turn and post turn state anxiety scores as indicated by an F value of 2.97, although this did not reach statistical significance ($p=.09$).

Presence of pain immediately after patients were turned: Pain responses were categorised as yes or no for experiencing pain after turning (Figure 1). Less than one-quarter of patients in both groups reported pain after turning. Fisher's Exact test was conducted and no difference between groups was identified ($p=.65$).

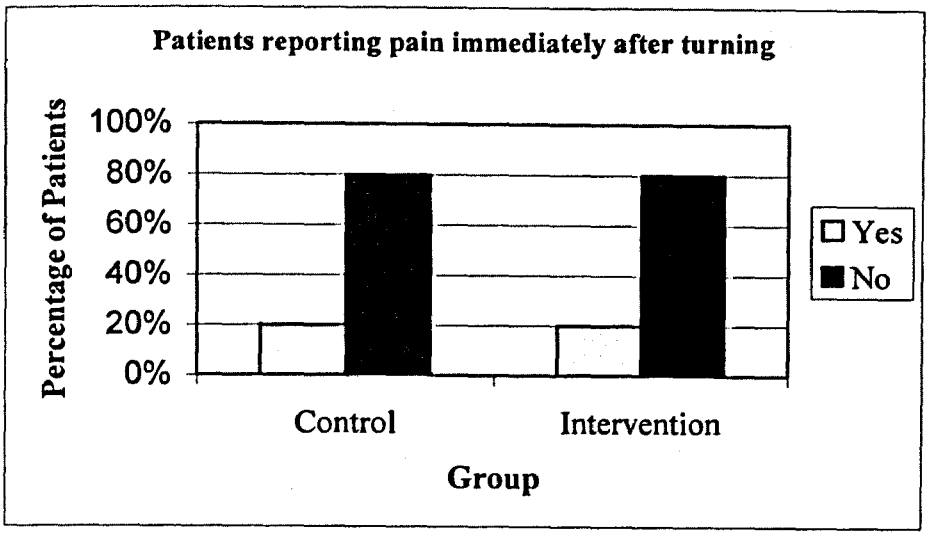


Figure 1. *Pain reported after patients being turned*

The relationship of pain and state anxiety after patients were turned: As there were no differences between groups' experience of pain and state anxiety after turning, the relationship of pain and state anxiety after turning was assessed by combining all patients to form one group (n=40). The mean state anxiety scores after turning for patients experiencing pain were analysed with ANOVA with no difference between groups identified, as detailed in Table 8.

Table 8. *The influence of pain on state anxiety after turning*

Dependent variable		Pain after turn (n=8)	No pain after turn (n=32)	ANOVA (statistics)
State anxiety 1-5		Mean (SD)	Mean (SD)	Between group F (p)
After turn	Combined group (n=40)	2.38 (1.3)	2.44 (1.2)	.018 (.89)

Of the 20% of patients who experienced pain, the mean state anxiety levels were similar to those of patients who did not experience pain after turning. Therefore, the presence of pain did not influence the level of state anxiety after turning in this sample of patients.

4.4 The influence of sedative and opioid drugs on the level of state anxiety experienced after turning

The influence of sedation on state anxiety after turning: The relationship of sedation and state anxiety after turning was assessed by combining all patients to form one group (n=40). The mean state anxiety scores after turning for patients recently sedated were analysed with ANOVA, as detailed in Table 9. In total 13 patients were sedated, with the mean state anxiety scores similar to those of the remaining 27 patients, who did not receive the sedative or opioid drugs morphine, midazolam or propofol at the time of turning. Patients experienced moderate anxiety after turning, either with or without the influence of sedative and opioid drugs.

4.5 The association of the effects of adrenergic drugs on state anxiety after turning

The relationship of adrenergic drugs and state anxiety after turning: The relationship between anxiety and adrenergic drugs was assessed by combining all patients to form one group (n=40). The mean state anxiety scores after turning for patients receiving the drugs noradrenaline and dobutamine were analysed with ANOVA, as detailed in Table 9. Six patients received noradrenaline at the time of turning, with the mean anxiety scores higher than for the group of patients who did not. There was no statistical difference between groups (p=.20). The five patients

who received dobutamine had lower mean state anxiety scores than patients who did not and this did reach statistical significance (p=.035). The results indicate that the administration of noradrenaline did not influence the level of state anxiety post turning. The administration of dobutamine may have been associated with lower state anxiety scores post turning in this sample of patients. However, it is more likely attributed to random variation and Type 1 error due to small numbers.

Table 9. *The effect of sedative and adrenergic drugs on state anxiety after turning*

Dependent variable: state anxiety (1-5) after turn	Drug received		ANOVA (statistics)
	Yes	No	
Combined group (n=40)	Mean (SD)	Mean (SD)	Between group F (p)
Sedatives	2.38 (1.2)	2.44 (1.2)	.022 (0.88)
Noradrenaline	3.00 (1.7)	2.32 (1.1)	1.724 (0.20)
Dobutamine	1.40 (0.6)	2.57 (1.2)	4.776 (0.035)

4.6 Relationship of physiological parameters, turning and state anxiety

The association of turning with MAP, HR and RR between groups was explored by comparing means in a one- way ANOVA. There were no differences between groups after turning with MAP, HR and RR, as described in Table 10.

Table 10. *Physiological parameters after turning*

	Control n=20		Intervention n=20		ANOVA (statistics)
	Mean	SD	Mean	SD	Between group F (p)
MAP post turn	89.05	13.86	89.35	16.29	.004 (.95)
HR post turn	89.90	16.74	88.00	16.73	.129 (.72)
RR post turn	22.20	6.90	22.90	7.73	.091 (.76)

*ANOVA for interval data. Mean arterial pressure (MAP); heart rate (HR); respiratory rate (RR).

State anxiety after turning and the relationship of physiological parameters: To assess the relationship between state anxiety and physiological parameters, the level of state anxiety after turning was examined with MAP, HR and RR after turning for the combined group (n=40). Pearson's correlation found no relationships (r=.140, p=.19; r=.153, p=.17; and r=.053, p=.37 respectively). Therefore patients in this sample had no correlation between level of state anxiety and MAP, HR and RR.

4.7 Sensations reported as being experienced during the turning procedure

The final 24 patients randomised and entered into either the control or intervention group were asked to nod (yes) or shake (no) their head in response to whether they experienced specific sensations while being turned in bed (Table 11). The following six questions were asked at the completion of the turning procedure and when the patient was comfortable to answer:

- Did you hear the sound of a motor?
- Did you feel disorientated or unbalanced with the bed moving?
- Did you feel the tube in your mouth or neck being pulled as you moved?
- Did moving make you cough?
- Did you feel yourself moving quickly?
- Did you feel a little out of control, like you were falling?

Table 11. *Sensations reported as being experienced by patients during the turning procedure*

	(Total group n=24)		(Total group n=24)	
	Yes		No	
	Number	%	Number	%
Sound of the bed motor	6	25%	18	75%
Disorientated when bed moves	6	25%	18	75%
Tube in throat or neck pulled when moved	14	58%	10	42%
Moving made you cough	16	67%	8	33%
Felt yourself moving quickly	11	46%	13	54%
Felt out of control, like falling	4	17%	20	83%

The three sensations experienced by approximately half to two-thirds of patients were: coughing when moving, the tube being pulled, and moving quickly. Less than one-quarter of patients experienced hearing the sound of the bed motor, disorientation when the bed moved and the feeling of falling.

Concrete objective information recalled after turning: The final 12 patients randomised to the intervention group were asked 24 hours after the turn in which they had received the additional concrete objective information, if they recalled the information given to them during subsequent turns. These patients were then asked if the information resulted in them being more prepared and less anxious during the turning procedure than on previous occasions. All 12 patients remembered being turned, however they did not remember the specific information. All 12 patients indicated that they did not recall feeling less anxious in subsequent turns. Therefore, the concrete objective information was not recalled and used by some of the ICU patients in this sample.

4.8 Summary of results

This study tested whether concrete objective information describing the sensations experienced while being turned in bed led to patients experiencing less state anxiety after turning than patients who received the usual turning procedure. Over a 12-month period, 20 patients were randomised to the control group and 20 patients were randomised to the intervention group. All patients had an artificial airway, either with an ETT (80%) or tracheostomy tube (20%), and 90% of patients received mechanical ventilation at the time of receiving the turning procedure.

The 40 patients in the sample comprised similar numbers of men and women. The intervention and control groups were similar with respect to all major demographic and clinical characteristics at baseline. The mean state anxiety score prior to turning was 2.50 in the control group and 2.60 in the intervention group. On completion of turning, the mean state anxiety score for the control group was 2.50 and

for the intervention group 2.35. There were no statistical differences between groups for state anxiety.

The hypothesis was rejected, as the concrete objective information intervention tested in this study had no effect on state anxiety in this sample of ICU patients when turned in bed. Further, the presence of pain did not influence the level of state anxiety after turning. The pre turning state anxiety means demonstrated a trend to influence mean state anxiety after turning, although this was not statistically significant. The presence of sedation and opioid drugs morphine, midazolam and propofol had no influence on the level of state anxiety after turning. However, 68% of patients experienced state anxiety and did not receive any opioid or sedative drugs. The presence of the adrenergic drug noradrenaline did not influence the level of state anxiety after turning, however dobutamine administration was shown to be associated with lower state anxiety. The level of state anxiety after turning was not correlated with the physiological parameters of MAP, HR and RR. In a sub-sample of 24 patients, three sensations were experienced by approximately half to two-thirds of patients: coughing when moving, the tube being pulled, and moving quickly. Less than one-quarter of patients experienced hearing the sound of the bed motor, disorientation when the bed moved, and the feeling of falling. Further, the concrete objective information was not recalled by some of the patients who were asked about this in subsequent turns.

Chapter 5 – Discussion

5.1 Introduction

This chapter commences with an overview of the development, implementation and evaluation of the procedure of turning ICU patients in bed as part of usual care or having provided patients with additional concrete objective information. The findings of this study are discussed in relation to the body of existing research and literature. The study's strengths and limitations, implications for clinical practice and future recommendations are also addressed.

As reported in the literature review (Chapter 2), critically ill patients experience anxiety and pain during their ICU treatment (Adamson et al., 2004; Chlan, 1998; Connelly et al., 2000; McKinley et al., 2004; Pochard et al., 1995; Stein-Parbury & McKinley, 2000). The procedure of turning is frequently performed in ICU and in previous studies it was reported that patients experienced pain, distress and anxiety with this procedure (Puntillo et al., 2001; Stanik-Hutt et al., 2001). Providing information to patients in concrete objective terms, that is, the sensations that the patient could expect to experience during the procedure, has demonstrated reduction in patient anxiety levels in previous clinical studies (Gammon & Mulholland, 1996; Kim et al., 1999; LaMontagne et al., 2003). However, concrete objective information during the turning procedure has not previously been investigated and evaluated in the ICU patient population.

To examine the effect of conducting a turning procedure with additional concrete objective information in the ICU patient population, a pilot study was proposed. The first stage involved developing the concrete objective information for the turning procedure by observing ICU patients being turned and then conducting interviews with patients once discharged from ICU. Additionally, healthy volunteers were then turned in bed and the sensations they described recorded. The information obtained from the interviews, observations and sensations experienced was then used to develop two scripts, one that detailed usual care when turning and one that included concrete objective information about the sensations to be experienced.

In the second stage over a 12-month period, 40 ICU patients were randomly assigned to receive either usual care or to receive the information intervention, delivered by nurses who were guided by the scripts. This study identified and measured levels of state anxiety associated with turning ICU patients in bed from either a supine to lateral position, or from a lateral to opposite lateral position. The hypothesis tested in the study was that ICU patients who are given concrete objective information regarding turning experience lower state anxiety compared with patients who receive usual information. The primary aim of the study was to investigate whether an information-based intervention reduced state anxiety during the turning procedure. The secondary aims were to explore the associations between sedation, pain, adrenergic drugs and state anxiety, and the relationship between physiological parameters, turning and state anxiety.

The results of the study led to the hypothesis being rejected, as the concrete objective information intervention tested had no effect on ICU patients' state anxiety when turned in bed. Further, the presence of pain did not influence the level of state anxiety after turning. In relation to drug administration, the presence of sedative and opioid drugs morphine, midazolam and propofol had no influence on patients' levels of state anxiety after turning. The presence of the adrenergic drug noradrenaline did not influence the patients' levels of state anxiety after turning. Additionally, the patients' levels of state anxiety after turning was not correlated to the physiological parameters of MAP, HR and RR. In a sub-sample of 24 patients, three sensations were experienced by approximately half to two-thirds of patients: coughing when moving, the ETT or tracheostomy tube being pulled, and moving quickly. Further, the concrete objective information was not recalled in subsequent turns by patients who were asked about this.

5.2 The recognition and treatment of state anxiety in ICU patients

This study identified and measured state anxiety associated with turning ICU patients in bed. This section discusses the study's findings of the ICU patient assessment and prevalence of state anxiety, nurses' response to anxiety, the association between state anxiety and pain and the influence of adrenergic drugs on state anxiety in this sample.

Assessment and prevalence of state anxiety: Thirty-two of 40 (80%) patients reported experiencing some level of state anxiety that ranged from mild to extreme. The mean state anxiety score for the total sample, assessed by the ICU patients using the Faces Anxiety Scale (range 1-5) prior to being turned in bed was 2.55 (SD ±1.1).

Levels greater than 3.0 are regarded as moderate to severe anxiety (McKinley et al., 2004). The levels of state anxiety reported by ICU patients in this study, of whom 90% were mechanically ventilated at the time of data collection, are comparable to the levels of anxiety reported in other studies in which ICU patients received mechanical ventilation (Chlan, 1998; Connelly et al., 2000; McKinley et al., 2004; Nelson et al., 2001; Wong et al., 2001). The levels of state anxiety reported in this study are also consistent with patients' recollections of being mechanically ventilated as reported in Kim et al. (1999). Additionally, previous studies in which ICU patients were not receiving mechanical ventilation reported similar anxiety levels in relation to patients' ICU stay (Hattan et al., 2002; Pochard et al., 1995; Stanik-Hutt et al., 2001).

A number of scales were identified that could potentially have been used to measure state anxiety in this study. The difficulty associated with measuring anxiety in the ICU population has been described in previous studies. In their study of the symptom burden of seriously ill patients, Desbiens et al. (1999) delivered a five symptom questionnaire to 1644 inpatients. Patients rated the frequency and severity of symptoms. However, 25% of patients could not complete the questionnaire due to intubation or inability to communicate. Connelly et al. (2000) measured tension-anxiety using the modified short form Profile of Mood States (sPOMS) and commented that in its current form this lacks clinical utility. In their study, two patients did not complete the instrument because of an inability to concentrate for extended periods, and some patients were slow to complete the assessment because of fatigue and requiring a rest period. The State-Trait Anxiety Inventory (STAI), a validated tool to measure anxiety, has limitations as reported in a study investigating ICU patients' experience with mechanical ventilation (Kim et al., 1999). The

researchers elected not to administer the questionnaire while patients were receiving mechanical ventilation in the ICU. Rather, the instrument was administered after discharge from ICU. Ten patients were excluded because they could not remember being mechanically ventilated and one patient felt too ill to complete the questionnaire. Further, the use of the shortened version of the STAI has had difficulties reported with participants being unable to read the response scale. Although the investigators read the items to the subjects, three people withdrew due to fatigue or restlessness (Chlan, 1998). Recently, McKinley et al. (2004) reported a study in which 106 patients were able to complete the self-assessment of state anxiety with ease. The authors concluded that the Faces Anxiety Scale is a valid measure for state anxiety in the ICU population and is an easily administered tool that assists the self-assessment of state anxiety. All patients in this study were easily able to point to a face on the scale that represented the way they were feeling immediately prior to and after completing the turning procedure.

Critical care nurses identify the need to assess patients for anxiety and they report using various methods including physiological parameters and behavioural signs as indicators in the assessment of anxiety (Frazier et al., 2002). Moser et al. (2003) reported that nurses identified that patients' responses to experiencing anxiety were most often assessed by looking for the physical indicators of increased HR, increased blood pressure or MAP and increased RR, with behavioural indicators of anxiety reported as motor restlessness and failure to cooperate with care. In this study the physiological parameters of MAP, HR and RR were collected prior to and after turning patients in bed to determine if they changed with patients' levels of state anxiety. In patients who experienced anxiety after turning, there was no correlation

between MAP, HR, RR and state anxiety levels. This result is similar to that of McKinley et al. (2004) who found no relationship between MAP and HR and the ICU patients' anxiety levels recorded at rest. Therefore, physiological parameters alone are unreliable in assessing whether ICU patients are experiencing anxiety.

Nurses' response to anxiety: The most commonly reported treatment of anxiety is the administration of sedative and opioid agents (Frazier et al., 2003; Jacobi et al., 2002; Liu & Gropper, 2003). In this turning study, 80% of patients experienced a level of state anxiety after turning. Of these, more than two-thirds of patients reported state anxiety and did not receive sedation. These results are similar to those of McKinley et al. (2004) in which two-thirds of ICU patients who experienced moderate anxiety had not received sedation prior to the time of interview. Puntillo et al. (2004a) studied 5957 patients undergoing procedures in the ICU and recorded the pain intensity and procedural distress at the time of the procedure being performed. More than two-thirds of these patients did not receive a sedative or opioid within an hour of undergoing, or during, the procedure (Puntillo et al., 2004a). These studies indicate that accurate assessment of anxiety is paramount if appropriate therapeutic interventions, such as sedative agents, are to be administered to reduce patients' feelings of anxiety in the ICU.

Association between state anxiety and pain: The relationship between anxiety and pain is reciprocal in nature (Cullen et al., 2001), with pain regarded as a stressor in ICU that contributes to patients' levels of anxiety (Stanik-Hutt, 2003). Pain was recorded in this study using the VAS in order to determine if the presence of pain influenced patients' levels of state anxiety with the turning procedure. One-fifth of patients experiencing pain reported similar mean levels of state anxiety to those of patients who did not experience pain. Therefore, pain did not influence patients' levels of state anxiety after turning. The frequency of pain experienced during turning in this study (20%) was lower when compared with other studies. Investigators report that 30% to 56% of patients experience pain during their ICU admission (Gelinas et al., 2004; Nelson et al., 2001; Pochard et al., 1995). In this study, of the eight patients who experienced pain, only five of 40 (13%) patients received morphine immediately prior to, or during, the turning procedure. Similarly, Puntillo et al. (2004a) reported that of the patients who experienced pain while undergoing six potentially painful procedures in ICU, only 20% of patients received opioid drugs one hour before and/or during procedures. This is despite the reported standard practice of administering opioid medications, primarily intravenous morphine, to treat pain in the ICU (Puntillo, 2003).

The prevalence of pain experienced in ICU patients is well documented (Bone et al., 1995; Crippen 1995; Cullen et al., 2001: Fontaine, 1994; Puntillo et al., 2001; Puntillo et al. 2004b). Pain is a subjective experience and assessment relies on patients accurately describing their pain experience. Interpreting ICU patients' pain levels is challenging if patients are unable to speak due to intubation or have altered levels of consciousness (Puntillo et al., 2004a). Puntillo et al. (2004a) report the pain

behaviours observed in patients who underwent procedures in ICU and experienced procedural pain. The frequently recorded behaviours observed included grimacing, rigidity, wincing, shutting of eyes, moaning and clenching of fists (Puntillo et al., 2004a). One-fifth of ICU patients reported experiencing pain during the turning procedure as measured on a VAS. Most of the patients in this study were receiving mechanical ventilation and unable to speak at the time of being turned. The use of an alternative instrument to measure pain, such as the behavioural pain scale (Payen et al., 2001) or observing pain behaviours (Puntillo et al., 2004a), may therefore be a more appropriate method to record pain, and warrants further investigation.

The purpose of turning patients every two to three hours in the ICU is to promote comfort and prevent other complications of bed rest and mechanical ventilation. Although a small number of patients experienced pain prior to and after being turned in bed, the change in position may have resulted in the patient becoming more comfortable and may have led to lower or similar pain levels experienced after turning. This finding is different from previous studies that have reported increasing pain levels with turning (Puntillo et al., 2001; Stanik-Hutt et al., 2001). Comparisons with these results are difficult to make due to limitations in both studies, that is, pain scores were measured after turning only, and turning was performed in only 17 of 30 patients in the second study.

Adrenergic medication influence on level of state anxiety: The administration of vasoactive drugs, including adrenergic agents, is an intervention frequently used within ICU. In New South Wales, vasoactive drugs are the third most common intervention used in ICU, with reported use 23% of the time. Intra-arterial monitoring is the most common intervention in ICU, followed by mechanical ventilation (Fisher & Herkes, 1995). Administration of the adrenergic drugs noradrenaline and dobutamine has been reported to increase central nervous system stimulation. This may lead patients who receive these drugs to experience anxiety (Morrill, 2000), that is, the physical signs of anxiety rather than the emotional experience. In Chlan's study (1998) of 54 ICU patients undergoing mechanical ventilation, half were administered vasoactive medications prior to receiving a music therapy intervention or standard care. Of the patients who were turned in bed in this study, six patients were receiving noradrenaline infusion at the time and their level of state anxiety after turning was not affected. Five people received dobutamine and their anxiety levels reduced after turning. This result is counter-intuitive and, although statistically significant, may be attributed to small numbers and a Type I error. With the small sample of patients receiving adrenergic drugs in this study it is not possible to draw any conclusions.

Intensive care patients when turned in bed experience a moderate level of state anxiety. Providing interventions that focus on common practices and procedures administered in the ICU may assist in reducing the level of state anxiety experienced.

5.3 The turning intervention

The intervention selected for this study involved turning ICU patients in bed from a lateral position to either the opposite lateral or the supine position and providing concrete information about the sensations expected to be experienced during the turning procedure. The primary aim of the study was to investigate whether the information-based intervention reduced state anxiety during the turning procedure. This section discusses the study findings of the effect of the intervention on state anxiety and the content, intensity and delivery of the turning procedure.

The concrete objective information intervention tested in this pilot study had no effect on the level of state anxiety experienced when patients were turned in bed in this sample of ICU patients. Several possible explanations for the differences in these findings in comparison to previous successful trials using concrete objective information deserve consideration.

Previous studies have identified that the procedure of being turned in bed is associated with pain or distress (Neilson et al., 2001; Puntillo et al., 2001; Stanik-Hutt et al., 2001). However, the relationship between turning and level of anxiety and distress was not clearly established. Neilson et al. reported that patients were asked to self-report pain in relation to distressful procedures during their ICU stay. One-third of patients perceived the procedure of turning in bed to be moderately to severely painful and uncomfortable. Puntillo et al. measured distress only after, and not prior to, turning. Conversely, Stanik-Hutt et al. measured anxiety prior to, and not after, turning. The level of distress or anxiety has not been measured prior to and after the turning procedure. Therefore, a question to be answered is whether anticipation or

recollection of turning causes the patient to report anxiety or whether the act of turning causes the anxiety.

In this study, state anxiety was measured prior to and again after turning. The mean state anxiety scores in the control group remained the same after turning, whereas in the intervention group the mean state anxiety decreased a small amount after turning. This was not statistically significant. This study was conducted to measure and record state anxiety with the intention to determine an effect size. This in turn would inform a future study and allow for an accurate power calculation to be performed. In interpreting these study results, the sample size may not have been large enough to detect the effect of the information intervention, and therefore a type II error may have occurred.

The procedure of being turned in bed may not have caused an increase in patients' anxiety. When patients had their state anxiety measured after being informed that they were about to be turned in bed, they reported a moderate level of anxiety. The time when anxiety was measured may not have captured the level of anxiety experienced by the patient during the turning procedure. State anxiety was measured within three minutes of the completion of the turn and not during the turn. It is possible to stop and measure anxiety in the middle of turning with the Faces Anxiety Scale, due to its ease of use. However, rather than interrupt the procedure as this was not standard practice, it was reasonable to consider that measuring anxiety at the completion of the turn would capture the anxiety experienced. Additionally, it had been considered that a method of measuring anxiety, such as forearm tension measured with an electromyogram (EMG), might have been able to detect anxiety

during the turn without interrupting the procedure. As described in Chapter 3, the EMG was not reliable for use in recording forearm tension in ICU patients during the turning procedure.

In addition to the way anxiety was recorded in relation to the turning procedure, the timing of information delivery may have contributed to the ICU patient's ability to process the information. Subsequently, this may have influenced the patient's level of state anxiety. Interventional studies have been reported to reduce anxiety levels in patients receiving concrete objective information during procedures in inpatient and outpatient settings (Anderson, 1987; Burish et al., 1991; Gammon & Mulholland, 1996; LaMontagne et al., 2003) and, more recently, during ICU procedures (Kim et al., 1999; Shi et al., 2003). In all of the above studies, the patients received concrete objective information either prior to admission to hospital, or prior to admission to the ICU. This may have allowed patients in the studies more time to develop strategies to deal with anxiety. Additionally, in both of the ICU studies, patients had similar procedures, that is, cardiac surgery. These patients were provided with information in preoperative clinics, several days prior to undergoing surgery. It is postulated that the patient's ability to draw on the mental picture during the procedure assists the patient to be more prepared and have a greater degree of control over the experience, leading to a reduction in anxiety (Garvin et al., 1992; Johnson & Lauver, 1989). It is reasonable to assert that the more time patients have to develop the strategies to deal with anxiety, the greater the benefit that will ensue. In this turning study, the majority of patients were not elective admissions to ICU and therefore could not receive the concrete objective information prior to the turning procedure being conducted. As patients did not receive the information prior to ICU

admission, they may not have had adequate time to develop the mental pictures (cognitive schema) required to assist the recognition of the information provided in the intervention that could be used to reduce their anxiety.

Another factor within the intervention that may have influenced the level of state anxiety experienced by patients was the length of the turning procedure. The duration of the time taken to perform the turning procedure in this study was approximately three to five minutes. The time has been estimated from the commencement of preparing the patient to be turned in bed, that is, introducing the nurses performing the turn, to the completion of the repositioning and the patient lying in a new position, as detailed in the turning scripts. The intervention script was slightly longer, but this did not extend the length of time required to conduct the turning procedure. The turning procedure performed in this study was relatively shorter than procedures performed in other interventional studies. Although authors have not reported the duration of the procedures that have been studied, each of the procedures is complex in nature: for example, gastrointestinal endoscopic examination (Johnson et al., 1973); postoperative cardiac surgery care (Anderson, 1987); chemotherapy administration (Burish et al., 1991); postoperative total hip replacement care (Gammon & Mulholland, 1996); postoperative spinal fusion surgical care (LaMontagne et al., 2003); receiving mechanical ventilation following cardiac surgery (Kim et al., 1999); and ICU care following cardiac surgery (Shi et al., 2003). All of these procedures are longer in duration and require more time to recover than the turning procedure conducted in this study.

The concrete objective information provided in the above reported studies has been used in many media, such as reading material, video and verbal instruction and discussion. For example, Johnson et al. (1973) delivered an information intervention that involved listening to a seven-and-a-half minute cassette tape; Anderson (1987) delivered an information session using three strategies, an 18 minute video, a six minute cassette tape, and a slide show consisting of 42 slides; Burish et al. (1991) conducted an information session that included watching a 20 minute video; LaMontagne et al. (2003) conducted an information session consisting of watching an eight to ten minute video and then rehearsing strategies to assist coping; and Kim et al. (1999) conducted a 30 minute information session which included reading and discussing an information booklet. In this study, the concrete objective information was provided only verbally, and at the time of the procedure. Johnson & Leventhal (1974) suggest that behavioural preparation and prior rehearsal on specific actions, for example, holding a wound when coughing, are necessary for participants to sustain control over external threats that result in anxiety. Patients in this study were given detailed instruction, however they were not asked to rehearse actions. In developing the intervention, rehearsal was not considered important because turning was performed regularly, every two to three hours in the ICU, and therefore patients were likely to be familiar with the turning procedure and would not need rehearsal. It may be more appropriate to provide patients with the concrete objective information one hour before conducting the procedure so that they have time to process the information. This may result in the ability to develop the strategies required for dealing with anxiety experienced during turning. This could be tested in future studies.

In this study, the intervention script contained 51% concrete objective information and 49% procedural information. This amount of concrete objective information may have not been significant enough to overcome the level of anxiety. However, in 1999 Kim et al. reported reduced levels of anxiety in ICU patients who received an information booklet, which included 36% concrete objective information, 63% procedural information and 1% other information. Additionally, the authors reported that the level of concrete objective information was in excess of that routinely used by nurses. These results would indicate that the level of concrete objective information described in the turning procedure had adequately represented the sensations expected to be experienced by ICU patients while being turned in bed.

Theoretically, concrete objective information, given before a procedure, facilitates coping by decreasing the difference between expectations and actual experiences (Clark, 1997). Since coping efforts are made in response to stress appraisal, appraisal is identified as a determinant of coping (Lazarus & Folkman, 1984; Shi et al., 2003). That is, cognitive appraisal processes determine if an event is stressful. The degree of stress a person experiences depends on how much of a stake they have in the outcome of an event. If the situation has little relevance for the person's safety and sense of well-being, then the appraisal will be that it poses no threat or harm, or offers no significant prospects for any gain. It may be that the turning procedure was not an event that provoked as much stress compared to the stress experienced from other ICU procedures. The ICU patients were coping with highly demanding environments as well their physical condition. The literature reports that the stressors of the ICU environment include: the inability to communicate; endotracheal suctioning; endotracheal tubes in airways; mechanical

ventilation; turning; and noise and light (Chlan 1998; Kim et al., 1999; Neilson et al., 2001; Pochard et al., 1995). Some patients in this study identified that the ETT concerned them during the turning procedure. The degree of anxiety caused by the ETT during turning was unknown, as the healthy volunteers in the preliminary investigation were turned with a shortened ETT, which is different to the ICU patients in this study. Nevertheless, the patient may experience anxiety prior to turning. However, the demand of turning does not create additional anxiety and therefore the patient is not required to draw on internal resources to overcome this anxiety to cope with the turn. Further, the turning procedure is usually performed by a minimum of two people. Consequently, the patient may feel safe and secure because of the external resources, that is, nurses and assistants being present and holding them during the turning procedure.

The number of nurses present and the way the nurses performed the turning procedure may have influenced the anxiety experienced by patients. The turning procedure for the control and intervention groups were standardised and placed within scripts. However, the standard approach to care may have led patients in both groups to feel more secure. In both scripts, nurses were prompted to introduce themselves to the patients, and were directed to tell the patient the procedural elements involved in the turning procedure. Previous studies (Brooks, 1999; Hafsteindottir, 1996; Hall-Lord, Larsson & Bostrom, 1994; Hupcey & Zimmermen, 2000; McKinley et al., 2002; Stein-Parbury & McKinley, 2000; Watts & Brooks, 1997) have reported patients' request for information during their stay in ICU. Therefore, procedural information may have been effective in reducing anxiety. Suls & Wan (1989) report in their meta-analysis that combined procedural and sensory information has better

outcomes for patients and outweighs the outcomes of procedural information alone. However, procedural information may be beneficial when compared with no instruction. A systematic review conducted by McDonald, Hetrick & Green (2004) reported on whether preoperative education improves postoperative outcomes (anxiety, pain, mobility, length of stay and the incidence of deep vein thrombosis) in patients undergoing hip or knee replacement surgery. Nine studies involving 782 participants met the inclusion criteria. Three trials found that preoperative education was beneficial in reducing preoperative anxiety on a scale of 0 to 100. The authors concluded that there is evidence that preoperative education has a modest beneficial effect on preoperative anxiety. Prior to commencing the turning study, observational work was carried out to determine the way patients were turned in bed in the ICU. This demonstrated that the amount of information and verbal communication provided during the turning procedure in the ICU was variable depending on the nurse concerned. As a result of standardising the turning procedure, patients in both control and intervention groups may have received improved verbal communication and clearer procedural information, which may have contributed to patients feeling more secure and less anxious.

In addition to standardising the turning procedure, the effect of touch may have contributed to patients feeling secure and less anxious. The usual practice of turning ICU patients involves nurses placing their hands on patients during the procedure. In this study, nurses were specifically directed as to where their hands should be placed on the patient during the intervention and control groups' turning procedures. Moon & Cho (2001) randomly assigned the intervention of hand holding with standard care for patients undergoing cataract surgery and found patients had

reduced anxiety in the hand holding group. Standardising hand placement in this sample of ICU patients alone is unlikely to have contributed to patients feeling secure as patients are frequently held and turned in ICU and security may have been attributed to the nurses being present or in sight of the patient. McKinley et al. (2002) conducted interviews with patients after discharge from ICU and reported that patients expressed the importance of having nurses readily available and nearby, not only to meet their needs but also to provide the assurance that they were safe.

5.4 Strengths and limitations of the study

There are several strengths of this study. It was conducted as a randomised controlled trial, increasing the likelihood that if differences had been observed, they would have been due to the intervention. The study population represented ICU patients with complex disease processes, who were predominantly non-elective patients, and men and women were equally distributed in the sample. In previous ICU studies investigating concrete objective information, the samples consisted of only surgical patients in cardiothoracic ICUs. This study has demonstrated the ability to study such a complex patient population, who were unable to speak due to having an artificial airway in place, and implement and evaluate an information intervention for patients being turned in bed.

A key strength of the study was the instrument used to measure the primary outcome, state anxiety. All patients in the ICU who had an artificial airway in place easily responded to the Faces Anxiety Scale. At the time, the majority of patients were receiving mechanical ventilation. In previous studies where anxiety has been measured in ICU patients receiving mechanical ventilation, the inability of patients to respond to other anxiety scales has been reported as a limitation. Additionally, the

standardised nature of the turning procedure may be easily incorporated into current clinical practice with minimal training or expense. The time taken to provide the information intervention was no longer than the standard practice of turning ICU patients in bed.

The study had several limitations that must be considered. Using healthy volunteers to describe the sensations experienced while being turned in bed may not have resulted in accurate capture of the sensations experienced by the ICU patients during the turning procedure. As the healthy volunteers were turned in a bed away from the ICU, the external factors such as noise and lighting, as well as the internal factors such as volunteers not experiencing the critical illness and the uncertainty this creates, this may have contributed to the lack of recognition of the sensations experienced by patients turned in bed in this study. Of the six sensations included in the intervention, only three sensations were recalled as being experienced by approximately half to two-thirds of patients during the turning procedure. Further, the turning procedure with the concrete objective information was only performed once with state anxiety measured before and after this turn. A limitation may be that the turning procedure with additional sensory information could have been administered on consecutive turns with the anxiety recorded at the completion of the second turn and not the first turn. This may have provided patients more time to develop the cognitive schema required to assist in coping with the turning procedure during subsequent turns. The sample size of 40 patients was not determined through power analysis, which further limits the study. However, it was planned that the results of this study would be used to determine the sample size required for a larger randomised controlled trial.

5.5 Implications and recommendations

Patients in ICU experience state anxiety. Nurses have assessed anxiety by detecting physiological or behavioural changes in patients. This practice is potentially less accurate than using a validated anxiety assessment tool. There are limitations with tools measuring anxiety in ICU patient populations. However, the implementation of the Faces Anxiety Scale will assist nurses to assess anxiety and implement treatment therapies, whether they are information, drug or other interventions, to reduce patients' experience of anxiety. Additionally, successfully preparing a patient for a procedure with information from the patient's perspective in relation to what they may feel and experience will enable nurses to provide optimal care in a way that promotes feelings of ease and security for the patient.

Several areas are identified within this research study as potential development opportunities. The first is to repeat the turning study with a sample size determined by an effect size of 20% and power calculation. Comparably, the effect of the concrete objective information intervention in the Kim et al., (1999) study was 17%. The intervention could include more information about sensations that could be explored from the perspective of the patient. The intervention could include a component of providing the information to the patient on the turn before the turning procedure was to be performed again.

In previous studies the concrete objective information was developed for the procedures mostly carried out in relation to the experience of hospital (LaMontagne et al., 2003) or ICU treatment (Shi et al., 2003). Future research in which concrete objective information is provided for patients admitted to the ICU could include a combination of routine procedures in ICU such as ETT suctioning, mechanical

ventilation and central line insertion. This would increase the number of procedures during which information is delivered to the patient, thus focusing on interventions that have increased intensity and duration. In this study some patients did experience some level of pain, however the experience of pain has not been well described by patients who are receiving mechanical ventilation. The assessment of pain in future studies using a behavioural observation scale is worthy of further investigation in ICU patients receiving mechanical ventilation.

5.6 Summary of the discussion

In this study, the Faces Anxiety Scale was an effective tool to assess state anxiety in ICU patients, who at the time most were receiving mechanical ventilation. The ICU patients experienced moderate levels of state anxiety prior to being turned in bed. All patients were able to identify a face representing a level of anxiety. Other assessment tools for recording anxiety levels in patients receiving mechanical ventilation, such as the STAI and sPOMS, have been reported as having limitations in this patient group, due to the inability to effectively communicate. A small number of the ICU patients reported pain during the turning procedure. Although the prevalence of pain is lower than that reported in other studies, the method of recording pain with a VAS might not be effective. Therefore, the use of an alternative tool, such as a behavioural pain scale for ICU patients warrants further investigation.

The concrete objective information intervention tested in this study had no effect on the level of state anxiety experienced by ICU patients when they were turned in bed. Several factors may have contributed to this result. The sample size of 40 patients may not have been large enough to detect an effect. The time of recording the patients' anxiety, that is, within three minutes of completing the turn, may not

have captured the anxiety experienced within the turn. The method of delivering the information intervention may have also influenced the result. In this study, information provided to the patient during the turning procedure was administered immediately prior to commencement of the procedure. In previous studies information was provided prior to admission to hospital or ICU, by written, verbal and audiovisual aids, and in sessions that were longer than those administered for the turning procedure. Although patients recorded moderate levels of state anxiety prior to turning, the demands on turning may not have caused additional anxiety. Patients may feel safe during the turning procedure because nurses are present and holding them firmly during the turning procedure. Therefore, the turning procedure may not be as stressful compared to other procedures performed in ICU such as ETT suctioning, mechanical ventilation and CVC line insertion. Further, the procedural information alone may have influenced the patients' experiences due to the consistent and standardised approach to the turning procedure.

Finally, using healthy volunteers to describe the sensations experienced while being turned in bed may not have resulted in accurate capture of the sensations experienced by critically ill patients. There were three sensations confirmed as being experienced by the ICU patients in this study. Approximately half to two-thirds of patients experienced coughing when moving, the ETT or tracheostomy tube being pulled, and moving quickly. These three sensations may be helpful descriptions to be included in information provided to patients when being turned in bed. However, the concrete objective information intervention during the procedure of turning ICU patients in bed requires more detailed exploration in future research studies..

Chapter 6 – Conclusion

6.1 Introduction

This thesis reports the results of a randomised controlled trial, testing whether a concrete objective information intervention provided to ICU patients when being turned in bed reduced state anxiety. The purpose of the intervention was to provide information about the sensations expected to be experienced by ICU patients when being turned in bed. The intervention was designed for patients who were alert and had an artificial airway in place, with the majority of patients receiving mechanical ventilation.

As identified in Chapter 1, the development of an intervention was considered necessary because patients in the ICU experience anxiety. Patients who have been interviewed during or following an ICU stay have reported that several factors, such as receiving mechanical ventilation, having an endotracheal tube, the inability to effectively communicate, experiencing pain and frequently undergoing stressful procedures, contribute to patients experiencing anxiety. Patients have reported that if they had received more information during their ICU stay, their anxiety would have been reduced.

Despite the significant physiological and psychological impact anxiety has on ICU patients, anxiety often goes undetected. Various instruments have been used to assess and record anxiety, however researchers have reported that these are difficult to use for ICU patients, who may be intubated and receiving mechanical ventilation. The Faces Anxiety Scale was chosen to measure anxiety in this study as it had been used to record self-assessment of anxiety by ICU patients who, at the time, were

receiving mechanical ventilation. In recent years, the treatment of anxiety for ICU patients has focused on the administration of sedative agents and interventions such as complementary therapies. Previous clinical studies have demonstrated that interventions that provide information to patients in concrete objective terms result in improved coping and a reduction in patient anxiety/distress levels in a variety of inpatient and outpatient settings. However, delivering concrete objective information to patients about the sensations experienced while being turned in bed had not previously been studied in the ICU population.

The intervention tested in the study, as described in Chapter 3, was developed by reviewing the literature, observing ICU patients being turned in bed by nurses, interviewing ICU patients after discharge to a ward and asking if they recalled being turned in bed, and finally, turning healthy volunteers in bed to describe the sensations experienced during the procedure. The information describing the turning procedure was then placed into two scripts that described either the standard procedure of turning or turning with additional sensory information.

A randomised controlled two-group trial design was used in this study of 40 ICU patients. The sample was recruited from a major metropolitan hospital in Sydney, Australia. Patient consent and randomisation to the control or intervention group was carried out by the investigator and witnessed by the nurse in attendance at the patient's bedside. Patients received the turn, delivered by nurses, who were guided by the scripts. Patient clinical observations were collected prior to performing the turn. State anxiety was measured immediately prior to and within three minutes of completing the turning procedure.

6.2 Summary of findings

As described in Chapter 4, patients in ICU experience moderate levels of state anxiety prior to being turned in bed. The assessment tool, the Faces Anxiety Scale, was easily administered and all patients were able to identify a face representing a level of anxiety that reflected the way they were feeling at that time. In this study sample physiological parameters did not correlate to patients' levels of state anxiety and two-thirds of patients who reported anxiety during the turning procedure had not received a sedative agent.

The concrete objective information intervention tested in this study had no effect on the level of state anxiety experienced by ICU patients when they were turned in bed. As discussed in Chapter 5, a number of factors may have contributed to this result. The sample size of 40 patients may not have been large enough to detect an effect. The information provided to the patient during the turning procedure was administered immediately prior to commencement of the procedure. In previous studies information was provided prior to admission to hospital or ICU, by written, verbal and audiovisual aids, and in sessions that were longer than those administered for the turning procedure. Further, although patients recorded moderate levels of state anxiety prior to turning, the demands on turning may not have caused additional anxiety. Patients may feel safe during the turning procedure due to the external resources, for example, the nurses present and holding them during the turning procedure. Finally, the procedural information alone may have influenced the patients' experiences due to the consistent and standardised approach to the turning procedure.

In conclusion, the material presented in this thesis contributes to the increasing body of knowledge regarding the level of anxiety experienced by ICU patients. This study clearly demonstrates that ICU patients experience anxiety and is often undetected by nurses. The implementation of the Faces Anxiety Scale will assist nurses to assess anxiety and implement treatment therapies, whether they are information or drug interventions, to reduce patients' experience of anxiety. Additionally, successfully preparing a patient for a procedure with information from the patient's perspective in relation to what they may feel and experience will enable nurses to provide optimal care in a way that promotes feelings of ease and security for the patient.

Several areas are identified within this research study as potential research opportunities. The information intervention could be provided twice, first to the patient on one turn and then again on the next scheduled turn to be performed, with anxiety being measured prior to the first turn and then again after the second turn. Future research could also include concrete objective information being provided for a combination of routine procedures in ICU such as ETT suctioning, mechanical ventilation and central line insertion. This would increase the number of procedures during which information is delivered to the patient, thereby focusing on interventions that have increased intensity and duration.

References

Adamson, H., Murgo, M., Boyle, M., Kerr, S., Crawford, M. & Elliott, D. (2004) Memories of intensive care and experiences of survivors of a critical illness: An interview study. *Intensive and Critical Care Nursing*, 20, 257-263.

Anderson, E. (1987) Preoperative preparation for cardiac surgery facilitates recovery, reduces psychological distress, and reduces the incidence of acute postoperative hypertension. *Journal of Consulting and Clinical Psychology*, 55, 513-520.

Andreassi, J. L. (2000) *Psychophysiology. Human behaviour & physiological response.* 4th Edition. Lawrence Erlbaum Associates, Publishers, London.

Australian Health Workforce Advisory Committee. (2002) *The Critical Care Nurse Workforce in Australia*, AHWAC Report 2002.1, Sydney.

Barnason, S., Zimmerman, L. & Nieveen, J. (1995) The effects of music interventions on anxiety in the patient after coronary artery bypass grafting. *Heart Lung*, 24(2), 124-132.

Bergbom-Engberg, I. & Halijamae, H. (1988) A retrospective study of patients' recall of respirator treatment (2): Nursing care factors and feelings of security and insecurity. *Intensive Care Nursing*, 4(3), 95-101.

Biley, F. C. (2000) The effects on patient well-being of music listening as a nursing intervention: A review of the literature. *Journal of Clinical Nursing*, 9(5), 668-677.

Bodian, C. A., Freedman, G., Hossain, S., Eisenkraft, J. B. & Beilin, Y. (2001) The visual analog scale for pain. Clinical significance in postoperative patients. *Anesthesiology*, 9(6), 1356-61.

Bone, R. C., Hayden, W. R., Levine, R. L., McCartney, J. R., Barkin, R. L., Clark, S., Cowen, J., Fontaine, D., Fromm, R. E., Guerrero, M. Jr., et al. (1995) Recognition, assessment, and treatment of anxiety in the critical care patient. *Disease- A-Month*, XLI(5), 293-360. Mosby.

Brooks, N. (1999) Patients' perspectives of quality of care in a high-dependency unit. *Intensive and Critical Care Nursing*, 15, 324-337.

Burish, T. G., Snyder, S, L. & Jenkins, R. A. (1991) Preparing patients for cancer chemotherapy: Effects of coping preparation and relaxation interventions, *Journal of Consulting and Clinical Psychology*, 59(4), 518-525.

Chlan, L. (1998) Effectiveness of a music therapy intervention on relaxation and anxiety for patients receiving ventilatory assistance. *Heart & Lung*, 27(3), 169-176.

Chlan, L. (2003) Description of anxiety levels by individual differences and clinical factors in patients receiving mechanical ventilatory support. *Heart & Lung*, 32(4), 275-282.

Christman, N. J, Kirchhoff, K. T. & Oakley, M. G. (1992) Concrete objective information. In G. M. Bulechek, & J. C. McCloskey (Eds.), *Nursing interventions: Essential nursing treatments*. W. B. Saunders Company: Philadelphia.

Clark, C. R. (1997) Creating information messages for reducing patient distress during health care procedures, *Patient Education and Counselling*, 30, 247-255.

Clark, S., Fontaine, D. K. & Simpson, T. (1994) Recognition, assessment, and treatment of anxiety in the critical care setting. *Critical Care Nurse*, 14 (4 Supplement), August. 2-16.

Connelly, B., Gunzerath, L. & Knebel, A. (2000) A pilot study exploring mood state and dyspnoea in mechanically ventilated patients. *Heart & Lung*, 29(3), 173-179.

Cornock, M. A. (1998) Stress and the intensive care patient: perceptions of patients and nurses. *Journal of Advanced Nursing*, 27, 518-527.

Cox, C. & Hayes, J. (1999) Physiologic and psychodynamic responses to the administration of therapeutic touch in critical care. *Intensive and Critical Care Nursing*, 15, 363-368.

Cullen, L., Greiner, J. & Titler, M. G. (2001) Pain management in the culture of critical care. *Critical Care Nursing Clinics of North America*, 13(2), 151-166.

Crippen, D. (1995) Understanding the neurohumoral causes of anxiety in the ICU. *Journal of Critical Illness*, 10(8), 550-560.

Desbiens, N. A., Mueller-Rizner, N., Connors, A. F., Wenger, N. S. & Lynn, J. (1999) The symptom burden of seriously ill hospitalised patients. *Journal of pain symptom management*, 17, 248-255.

DeKeyser, F. (2003) Psychoneuroimmunology in critically ill patients. *AACN Clinical Issues*, 14(1), 25-32.

Duarte, M. & Zatsiorsky, V. M. (2002) Effects of body lean and visual information on the equilibrium maintenance during stance. *Experimental Brain Research*, 146(1), 60-9.

Ekman, P., Levenson, R. W. & Friesen, W. V. (1983) Autonomic nervous system activity distinguishes among emotions. *Science*, 221, 1208-1210.

Fisher, M. McD. & Herkes, R. G. (1995) Intensive care: Speciality without frontiers. In: Parker, M. M., Shapiro, M. J. & Porembka, I. T. (Eds.), Critical Care: State of the Art, vol 15. *Society of Critical Care Medicine*, 9-27, Anaheim, C. A.

Fitch, M. I., Remus, S. & Stade, B. (1998) Communication needs of patients receiving mechanical ventilation: A pilot study. *Official Journal Canadian Association Critical Care Nurses*, 9(3), 16-23.

Fontaine, D. K. (1994) Nonpharmacologic management of patient distress during mechanical ventilation. *Critical Care Clinics*, 10(4), 695-708.

Frazier, S. K., Moser, D. K., Riegel, B., McKinley, S., Blakely, W., Kim, K. A. & Garvin, B. J. (2002) Critical care nurses' assessment of patients' anxiety: Reliance on physiological and behavioral parameters. *American Journal of Critical Care*, 11(1), 57-64.

Frazier, S. K., Moser, D. K., Daley, L. K., McKinley, S., Riegel, B., Garvin, B. J. & An, K. (2003) Critical care nurses' beliefs about reported management of anxiety. *American Journal of Critical Care*, 12(1), 19-27.

Gammon, J. & Mulholland, C. W. (1996) Effect of preparatory information prior to elective total hip replacement on post-operative physical coping outcomes. *International Journal of Nursing Studies*, 33(6), 589-604.

Garvin, B. J., Huston, G. P. & Baker, C. F. (1992) Information used by nurses to prepare patients for a stressful event. *Applied Nursing Research*, 5(4), 158-163.

Gavigan, M., Kline-O'Sullivan, C. & Klumpp-Lybrand, B. (1990) The effect of regular turning on CABG patients. *Critical Care Nursing Quarterly*, 12(4), 69-76.

Gelinas, C., Fortier, M., Viens, C., Fillion, L. & Puntillo, K. (2004) Pain assessment and management in critically ill intubated patients: A retrospective study. *American Journal of Critical Care*, 13(2), 126-135.

Gentilello, L., Thompson, D. A., Tonnesen, A. S., Hernandez, D., Kapadia, A. S., Allen, S. J., Houtchens, B. A. & Miner, M. E. (1988) Effect of a rotating bed on the incidence of pulmonary complications in critically ill patients. *Critical Care Medicine*, 16(8), 783-86.

Grapp, M. J., Blecha, T. & Munro, C. (2002) A description of patients' report of endotracheal tube discomfort. *Intensive and Critical Care Nursing*, 18, 244-249.

Grossman, S., Labedzki, D., Butcher, R. & Dellea, L. (1996) Definition and management of anxiety, agitation and confusion in ICUs. *Nursing Connections*, 9(2), 49-55.

Hafsteindottir, T. B. (1996) Patients' experiences of communication during the respirator treatment period. *Intensive and Critical Care Nursing*, 12, 261-271.

Hall, D. S. (1996) Interactions between nurses and patients on ventilators. *American Journal of Critical Care*, 5(4), 293-297.

Hall-Lord, M. L., Larsson, G. & Bostrom, I. (1994) Elderly patients' experiences of pain and distress in intensive care: a grounded theory study. *Intensive and Critical Care Nursing*, 10, 133-141.

Happ, M. B. (2001) Communicating with mechanically ventilated patients: state of the science, *AACN Clinical Issues*, 17(2), 247-258.

Hattan, J., King, L. & Griffiths, P. (2002) The impact of foot massage and guided relaxation following cardiac surgery: A randomised controlled trial. *Journal of Advanced Nursing*, 37(2), 199-201.

Hawkins, S., Stine, K. & Plummer, L. (1999) An holistic approach to turning patients. *Nursing Standard*, 14(3), 52-56.

Higgins-Martin, A. (2001) Should continuous lateral rotation therapy replace manual turning. *Dimensions of Critical Care Nursing*, 20(1), 42-9.

Higlett, T., Anderson, T. & Hart, G. K. (2004) *Review of intensive care resources and activity 2001/2002.* Australian and New Zealand Intensive Care Society, Melbourne, Australia.

Horak, F. B. (1987) Clinical measurement of postural control in adults. *Physical Therapy*, 67(12), 1881-5.

Hupcey, J. E. & Zimmermen, H. E. (2000) The need to know: experiences of critically ill patients. *American Journal of Critical Care*, 9(3), 192-198.

Hyndman, D., Ashburn, A. & Stack, E. (2002) Fall events among people with stroke living in the community: circumstances of falls and characteristics of fallers. *Archives of Physical Medical and Rehabilitation*, 83(2), 165-70.

Jacobi, J., Fraser, G. L., Coursin, D. B., Riker, R. R., Fontaine, D., Wittbrodt, E. T., Chalfin, D. B., Masica, M. F., Bjerke, H. S., Coplin, W. M., Crippen, D. W., Fuchs, B. D., Kelleher, R. M., Marik, P. E., Nasraway, S. A., Murray, M. J., Peruzzi, W. T. & Lumb, P. D. (2002) Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. *Critical Care Medicine*, 30(1), 119-141.

Johnson, J. E. (1972) Effects of structuring patients' expectations on their reactions to threatening events. *Nursing Research*, 21(6), 499-504.

Johnson, J. E., Morrissey, J. F. & Leventhal, H. (1973) Psychological preparation for an endoscopic examination. *Gastrointestinal Endoscopy*, 19(4), 180-182.

Johnson, J. E. & Leventhal, H. (1974) Effects of accurate expectations and behavioural instructions on reactions during noxious medical examination. *Journal of Personality and Social Psychology*, 29(5), 710-718.

Johnson, J. E. & Lauver, D. R. (1989) Alternative explanations of coping with stressful experiences associated with physical illness. *Advances in Nursing Science*, 11(2), 39-52.

Johnson, J. E., Fieler, V. K., Jones, L. S., Wlasowicz, G. S. & Mitchell, M. L. (1997) *Self-regulation theory: Applying theory to your practice*. Oncology Nursing Press, Inc. Pennsylvania.

Johnson, J. E. (1999) Self-regulation theory and coping with physical illness. *Research in Nursing & Health*, 22, 435-448.

Kim, H., Garvin, B. J. & Moser, D. K. (1999) Stress during mechanical ventilation: Benefit of having concrete objective information before cardiac surgery. *American Journal of Critical Care*, 8(2), 118-126.

King, J. & Crowe, J. (1998) Mobilization practices in Canadian critical care units. *Physiotherapy Canada*, p 206-211.

Knaus, W. A., Draper, E. A., Wagner, D. P. & Zimmerman, J. E. (1986) An evaluation of outcome from intensive care in major medical centers. *Annals of Internal Medicine.* 104(3), 410-8.

LaMontagne, L. L., Hepworth, J. T., Cohen, F. & Salisbury M. H. (2003) Cognitive behavioural intervention effects on adolescents' anxiety and pain following spinal fusion surgery. *Nursing Research*, 52(3), 183-90.

Lazarus, R. S. & Folkman, S. (1984) *Stress, Appraisal and Coping.* Springer Publishing Company, New York.

Leventhal, H. & Johnson, J. E. (1983) Laboratory and field experimentation: development of a theory of self-regulation. In P. J. Wooldridge, M. H. Schmidt, J. K. Skipper, & R. C. Leonard (Eds.), *Behavioural science and nursing theory.* St Louis: C. V. Mosby.

Lewis, P., Nichols, E., Mackey, G., Fadol, A., Sloane, L., Villagomez, E. & Liehr, P. (1997) The effect of turning and backrub on mixed venous oxygen saturation in critically ill patients. *American Journal of Critical Care*, 6(2), 132-140.

Liu, L. L. & Gropper, M. A. (2003) Postoperative analgesia and sedation in the adult intensive care unit: A guide to drug selection. *Drugs*, 63(8), 755-767.

McCartney, J. R. & Boland, R. J. (1994) Anxiety and delirium in the intensive care unit. *Critical Care Clinics*, 10(4), 673-680.

McDonald, S., Hetrick, S. & Green, S. (2004) Pre-operative education for hip or knee replacement. Cochrane Musculoskeletal Group *Cochrane Database of Systematic Reviews. 3, 2004*

McKinley, S., Nagy, S., Stein-Parbury, J., Bramwell, M. & Hudson, J. (2002) Vulnerability and security in seriously ill patients in intensive care. *Intensive and Critical Care Nursing*, 18, 27-36.

McKinley, S., Coote, K. & Stein-Parbury, J. (2003) Development and testing of a faces scale for the assessment of anxiety in critically ill patients. *Journal of Advanced Nursing*, 41(1), 73-9.

McKinley, S., Stein-Parbury, J., Chehelnabi, A. & Lovas, J. (2004) Assessment of anxiety in intensive care patients by using the faces anxiety scale. *American Journal of Critical Care*, 13(2), 146-52.

Massion, J. (1994) Postural control system. *Current Opinion in Neurobiology*, 4(6), 877-87.

Mbourou, G. A., Lajoie, Y. & Teasdale, N. (2003) Stop length variability at gait initiation in elderly fallers and non-fallers, and young adults. *Gerontology*, 49(1), 21-6.

Menzel, L. (1997) A comparison of patients' communication-related responses during intubation and after extubation. *Heart & Lung*, 26(5), 363-371.

Michelson, D., Gold, P. W. & Sternberg, E. M. (1994) The stress response in critical illness. *New Horizons*, 2(4), 426-431.

MIMS 2004 (online) http://mims.hcn.net.au/ifmx-nsapi/mims-data/

Moon, J.-S. & Cho, K.-S. (2001) The effects of handholding on anxiety in cataract surgery patients under local anaesthesia. *Journal of Advanced Nursing*, 35(3), 407-415.

Morrill, P. (2000) Pharmacotherapeutics of positive inotropes. *American Operating Room Nurses Journal*, 71(1), 190-92. (AORN)

Moser, D. K. & Dracup, K. (1996) Is anxiety early after myocardial infarction associated with subsequent ischemic and arrhythmic events? *Psychosomatic Medicine*, 58(5), 395-401.

Moser, D. K., Chung, M. L., McKinley, S., Riegel, B., An, K., Cherrington, C. C., Blakely, W., Biddle, M., Frazier, S. K. & Garvin, B. J. (2003) Critical care nursing practice regarding patient anxiety assessment and management. *Intensive and Critical Care Nursing*, 19, 276-288.

Nelson, J. E., Meier, D. E., Oei, E. J., Nierman, D. M., Senzel, R. S., Manfredi, P. L., Davis, S. M. & Morrison, S. (2001): Self-reported symptom experience of critically ill cancer patients receiving intensive care. *Critical Care Medicine*, 29, 277-282.

Ng, L. & McCormick, K. A. (1982) Position changes and their physiological consequences. *Advances in Nursing Science*, 4(4), 13-25.

NHMRC. (1999) *Acute pain management: scientific evidence*. National Health and Medical Research Council; Commonwealth of Australia, Canberra.

O'Brien, J. L., Moser, D. K., Riegel, B., Frazier, S. K., Garvin, B. J. & Kim, K. A. (2001) Comparison of anxiety assessment between clinicians and patients with acute myocardial infarction in cardiac critical care units. *American Journal of Critical Care*, 10(2), 97-103.

Odhner, M., Wegman, D., Freeland, N., Sterinmetz, A. & Ingersoll, G. L. (2003) Assessing pain control in nonverbal critically ill adults. *Dimensions of Critical Care Nursing*, 22(6), 260-267.

Owen, D. H. (1985) Maintaining posture and avoiding tripping. Optical information for detecting and controlling orientation and locomotion. *Clinics in Geriatric Medicine*, 1(3), 581-99.

Pallant, J. (2001) *SPSS survival manual.* A step by step guide to data analysis using SPSS for windows. Allen & Unwin.

Payen, J., Bru, O., Bosson, J., Lagrasta, A., Novel, E., Deschaux, I., Lavagne, P.& Jacquot, C. (2001) Assessing pain in critically ill sedated patients by using a behavioral pain scale. *Critical Care Medicine*, 29(12), 2258-63.

Penley, J. A., Tomaka, J. & Wiebe, J. S. (2002) The association of coping to physical and psychological health outcomes: A meta-analytic review. *Journal of Behavioural Medicine*, 25(6), 551-603.

Pochard, F., Lanore, J. J., Bellivier, F., Mira, J. P., Belghith, M., Brunet, F. & Dhainaut, J. F. (1995) Subjective psychological status of severely ill patients discharged from mechanical ventilation. *Clinical Intensive Care*, 6, 57-61.

Puntillo, K. A., White, C., Morris, A. B., Perdue, S. T., Stanik-Hutt, J., Thompson, C. L. & Wild, L.R. (2001) Patients' perceptions and responses to procedural pain: Results from Thunder Project II. *American Journal of Critical Care*, 10(4), 238 – 251.

Puntillo, K. A. (2003) Pain assessment and management in the critically ill: Wizardry or science. *American Journal of Critical Care*, 12(4), 310 – 316.

Puntillo, K. A., Morris, A. B., Thompson, C. L., Stanik-Hutt, J., White, C. & Wild, L.R. (2004a) Pain behaviours observed during six common procedures: Results from thunder project II. *Critical Care Medicine*, 32(2), 421 – 427.

Puntillo, K. A. & Levy, S. J. (2004b) Appropriately timed analgesics control pain due to chest tube removal. *American Journal of Critical Care*, 13(4), 292 – 301.

Richards, K. C. (1998) Effect of a back massage and relaxation intervention on sleep in critically ill patients. *American Journal of Critical Care*, 7(4), 288-298.

Rotondi, A. J., Lakshmipathi, C., Sirio, C., Mendelsohn, A., Schulz, R., Belle, S., Im, K., Donahoe, M. & Pinsky, M. R. (2002) Patients' recollections of stressful experiences while receiving prolonged mechanical ventilation in an intensive care unit. *Critical Care Medicine*, 30(4), 746-752.

Sahn, S. A. (1991) Continuous lateral rotational therapy and nosocomial pneumonia. *Chest*, 99(5), 1263-67.

Scott, A. (2004) Managing anxiety in ICU patients: the role of pre-operative information provision. British Association of Critical Care Nurses, *Nursing in Critical Care*, 9(2), 72-79

Shapiro, B. A., Warren, J., Egol, A. B., Greenbaum, D. M., Jocobi, J., Nasraway, S. A., Schein, R., Spevetz, A. & Stone, J. R. (1995) Practice parameters for intravenous analgesia and sedation for adult patients in the intensive care unit: An executive summary. *Critical Care Medicine*, 23(9), 1596-1600.

Shaw, C. (1999) A framework for the study of coping, illness behaviour and outcomes. *Journal of Advanced Nursing*, 29(5), 1246-1255.

Shi, S-F., Munjas, B. A., Wan, T. T. H., Cowling, W. R., Grap, M. J. & Wang, B. B.L (2003) The effects of preparatory sensory information on ICU patients. *Journal of Medical Systems*, 27(2), 191-204.

Stanik-Hutt, J. A., Soeken, K. L., Belcher, A. E., Fontaine, D. K. & Gift, A. G. (2001) Pain experiences of traumatically injured patients in a critical care setting. *American Journal of Critical Care*, 10(4), 252 –259.

Stanik-Hutt, J. A. (2003) Pain management in the critically ill. *Critical Care Nurse*, 23(2), 99-103.

Stein-Parbury, J. & McKinley, S. (2000) Patients' experiences of being in an intensive care unit: A select literature review. *American Journal of Critical Care*, 9(1), 20-27.

Suls, J. & Wan, C. K. (1989) Effects of sensory and procedural information on coping with stressful medical procedures and pain: a meta-analysis. *Journal of Consulting and Clinical Psychology*, 57(3), 372-9.

Therapeutic Guidelines Limited (2000), *Psychotropic*, version 4.

Thomas, L. A. (2003) Clinical management of stressors perceived by patients on mechanical ventilation. *AACN Clinical Issues*, 14(1), 73-81.

Urden, L. D., Stacy, K. M. & Lough, M. E. (2002) *Thelan's Critical Care Nursing diagnosis and management*. 4th Edition. Mosby Inc, St Louis, Missouri.

Wade, M. G. & Jones, G. (1997) The role of vision and spatial orientation in the maintenance of posture. *Physical Therapy*, 77(6), 619-628.

Watts, S. & Brooks, A. (1997) Patients' perceptions of the pre-operative information they need about events they may experience in the intensive care unit. *Journal of Advanced Nursing*, 26, 85-92.

Weiss, S. J. & Puntillo, K. (2001) Predictors of cardiac patients' psychophysiological response to caregiving. International Journal of Nursing Practice, 7, 177-187.

Wewers, M. E. & Lowe, N. K. (1990) A critical review of visual analogue scales in the measurement of clinical phenomena. *Research in Nursing and Health*, 13, 227-236.

Wojnicki-Johansson, G. (2001) Communication between nurse and patient during ventilator treatment: patient reports and RN evaluations, *Intensive and Critical Care Nursing*, 17, 29-39.

Wong, H. L. C., Lopez-Nahas, V. & Molassiotis, A. (2001) Effects of music therapy on anxiety in ventilator-dependent patients. *Heart & Lung*, 30(5), 376-387.

Wunderlich, R. J., Perry, A., Lavin, M. A. & Katz, B. (1999) Patients' perceptions of uncertainty and stress during weaning from mechanical ventilation. *Dimensions of Critical Care Nursing*, 18(1), 2-7.

APPENDIX A: Types of Information Instrument

Types of Information Instrument

Developed by Bonnie J. Garvin, Ph.D., R.N.*
Professor
The Ohio State University
1585 Neil Avenue
Columbus, Ohio 4320

The purpose of this instrument is to provide guidelines for assessing the concrete objective and procedural information contained in textual material. Textual material may be transcripts of actual verbal interactions, patient education brochures, transcripts of audio or video tapes, or any other type of written information. The result is a content analysis of the text that provides the proportion of the text that is concrete objective information, procedural information and other information.

The unit of analysis is the word or group of words (phrase or phrases) that includes some separate and different piece of information about a particular event. The unit is identified by placing parentheses around the word or words in the text.

Utilizing reliability is determined by comparing coders' identification of the same units (within one or two words) and calculating a percentage of agreement (Garvin, Kennedy, & Cissna, 1988). A satisfactory level of agreement is 80%.

The units are then placed into one of three categories of information:

1. CONCRETE OBJECTIVE INFORMATION. Concrete objective information is that which describes the "physical sensations experienced by most individuals in concrete objective terms (that which can be expected to be seen, heard, felt, smelled and tasted), the environmental features, the temporal characteristics (duration of procedure and sequence of events), and the cause of sensations or experience when it is not self-evident" (Johnson & Lauver, 1989, p. 42). An explanation of awareness, level of consciousness, and sleep/awake states are classified as concrete objective information.

2. PROCEDURAL INFORMATION. Procedural information is that which describes the steps of the procedure or experience. It includes what will be done to

and for the patient (Leventhal & Johnson, 1983, p. 202). Procedural information includes the purpose of the procedure or reasons why parts of the procedure are done, who is or will be doing things for the patient, where things will be done, the naming and description of equipment that will be used, and what the patient is told to do for self to facilitate the procedure or coping with the procedure.

3. OTHER INFORMATION. Other information is that which is given to individuals prior to an experience that does not fit into the procedural or concrete objective information categories described above. An example is when a nurse tells a patient that the diagnostic procedure the patient is about to have is a good idea.

The units are marked by placing the number of the category after the parenthesis that marks the end of the unit [e.g., (you will feel a hot sensation)[1]].

Interpretive reliability is determined by comparing the number of agreements in coding to the total number of codes assigned. Category-by-category reliabilities also should be determined. Cohen's kappa should be used to correct for chance agreement. Landis and Koch (1977) characterize a value of kappa above .75 as an excellent agreement beyond chance, and values between .40 and .75 as fair to good agreement beyond chance.

References

Garvin, B. J., Kennedy, C. W., & Cissna, K. N. (1988). Reliability in category coding systems. Nursing Research, 37(1), 52-55.

Leventhal, H. & Johnson, J. E. (1983) Laboratory and field experimentation: development of a theory of self-regulation. In P. J. Wooldridge, M. H. Schmidt, J. K. Skipper, & R. C. Leonard (Eds.), Behavioural science and nursing theory. (pp 189-262). St Louis: C. V. Mosby.

Johnson, J. E. & Lauver, D. R. (1989) Alternative explanations of coping with stressful experiences associated with physical illness. Advances in Nursing Science, 11(2), 39-52.

Landis, J. R. & Koch, G. G. (1977). The measurement of observer agreement for categorical data. Biometrics, 33, 159-174.

*Patty Tornes, B.S., R.N. and Joyce Karl, M.S., R.N. are acknowledged for their assistance in refining the descriptions in this instrument.

OSU patient education
The Ohio State University Hospitals

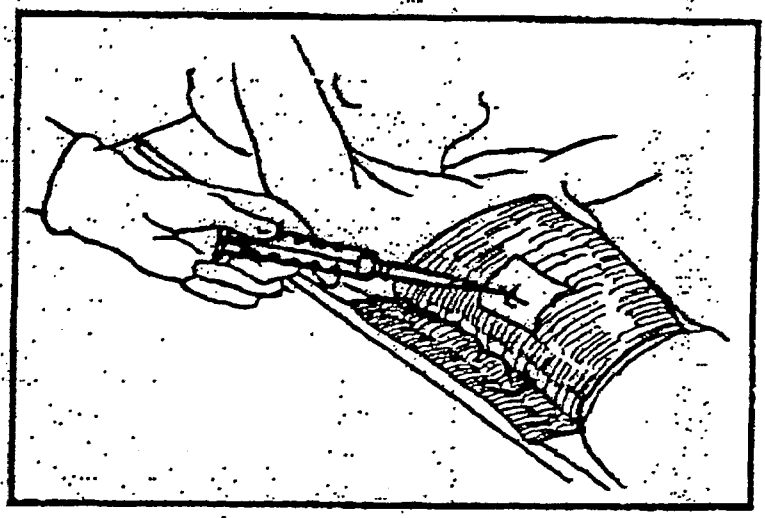
LIVER BIOPSY

To help determine your medical treatment you have been asked to undergo a procedure called a LIVER BIOPSY which is simply an examination of liver tissue.

The liver biopsy is performed using a soft tissue biopsy needle and syringe. This needle has a large opening with a sharp edge for better insertion into the liver. When the needle is in the liver, suction is applied to the syringe and liver tissue is drawn up through the needle. Microscopic examination of the tissue enables the physician to diagnose your illness and plan specific treatment.

You will be allowed to eat and drink before this procedure. Blood work is drawn before the biopsy. You will lie flat on your back with the right side of your chest accessible and your arms held away from the side of your body. The site where the needle is inserted is prepared with antiseptic solution and a medication is used to numb the area. A slight stinging sensation and some brief pain may be felt when the numbing medication enters the liver. Sometimes a tiny incision is made to allow the biopsy needle to be easily inserted.

Immediately before the biopsy needle is inserted and liver tissue is obtained you will be asked to inhale, then exhale completely and hold your breath. It is necessary to lie as still as possible when this occurs. Once the needle is withdrawn a bandage is placed over the area.



Needle insertion and removal of liver tissue takes about 5-10 seconds; the entire procedure lasts about 10-15 minutes.

Following the procedure your blood pressure and biopsy site will be checked frequently. It is important to lie on your right side for four (4) hours and to stay in bed for a total of six (6) hours. You will be allowed to eat and drink as long as you are able to do so while on your right side. After six (6) hours you must remain in bed until the next morning except for getting up to the bathroom. Blood will be drawn in the evening and the next morning following this procedure. You may experience discomfort at the biopsy site or soreness in the right shoulder for a short period of time.

A liver biopsy is a brief but important diagnostic test. Please do not hesitate to ask your physician or nurse if you have any additional questions or concerns.

APPENDIX B: Control Script

ROLLING PROCEDURE CONTROL GROUP

PERSON A
Touch patient's shoulder and tell them that you are about to change their position and move them onto their side.

Move the bed to a position in which the height is at a safe level for all staff and in position to facilitate rolling the patient e.g. lie the head of the bed flat. Also, move the patient's indwelling catheter to the opposite side of the bed if appropriate.

PERSON A
Tell the patient that you are about to move their arm and leg. Lift the patient's leg that is closest to you and place it over the other leg. Move the patient's arm that is closest to you and place it over their chest.

PERSON B
Take hold of the patient's shoulder and hip that is furthest from you, and roll the patient towards you.

PERSON A
Assess skin and provide back care as needed. Tell the patient that you are applying lotion if you are.

PERSON B
Continue to hold the patient whilst skin is being checked.

PERSON A
Secure the patients position by putting a pillow behind their back, and a pillow behind their head.

PERSON B
Move the patient back to lean against the pillows.

PERSON A
Reposition the bed, eg move the head of the bed to an upright position if required.

APPENDIX C: Intervention Script

ROLLING PROCEDURE INTERVENTION GROUP

PERSON A
Touch patient's shoulder and introduce the names of the staff who are going to help with the roll.

We are going to change your position and move you onto your left (or right) side and leave you on this side for at least 2 hours. This is to prevent your skin from becoming sore.

Firstly I will lie the head of the bed back flat and adjust the height of the bed (***state if the bed is moving up or down***). You will hear the ***sound of a motor*** as the head of the bed moves. You ***may feel disorientated or unbalanced*** with the bed moving but it will stop soon. I will take the pillow away from your head.

PERSON A
You ***will feel me touching*** your arm and leg. I will now bend your left (or right) leg and place it over the left (or right) leg. I will move your left (or right) arm and place it over your chest and move your right (or left) arm away from your body.

You may also ***feel the tube in your mouth or neck being pulled*** as you move, it may make you ***cough***. I am holding the tube to stop it from moving.

PERSON B
I will now ***place my hands*** on your left (or right) shoulder and on your left (or right) hip and roll you towards me. You will ***feel yourself moving quickly***. As you are moving you ***will feel a little out of control like your are falling*** due to the speed (momentum) of moving.

You will ***feel my hands*** on your shoulder and hip ***holding you tightly to stop you from falling.***

PERSON A
You are now on your right (or left) side and have stopped moving. Assess skin and provide back care as needed. Tell the patient that you are applying lotion if you are eg you ***will feel my hands on your back applying cool lotion.***

PERSON B
I will continue to hold the tube in your mouth or neck to stop it from ***being pulled*** as you move.

PERSON A
I will now put a pillow behind your back and a pillow behind your head.

PERSON B
I will now move you back to lean against the pillows.

PERSON A

I will now ***move the head of the bed up***, you will ***hear the sound of the motor*** as the bed moves and you ***may feel a little disorientated or unbalanced*** with the moving but it will stop soon.

APPENDIX D: Patient Information Sheet

Hello Mr/Mrs . . . my name is Lyn Dean. I am the clinical nurse consultant for intensive care and also a student doing a masters degree at University of Technology Sydney. In my research I am looking at **what patients feel during** the routine practice of repositioning patients in the bed.

I wish to ask if you would agree to participate in my research project. If you do agree it would involve you responding to some questions about what it felt like to be turned in the bed. I would also ask you to choose a picture of a face that shows how you feel from five faces that I will show you twice. This would be just before the nurses turn you and again just after the turn.

I will record your responses on this sheet but your name and identity will not be recorded with your answers to my questions.

If you do not wish to be in the research that is OK. Also if you start then change your mind that is OK too. Saying no to the research at any time will not make any difference to the care that you receive in intensive care or elsewhere in the hospital.

Agree to participate Yes / No (circle one)

_____

Signature of Investigator obtaining consent, date.

_____

Name and Signature of Witness to consent, date.

APPENDIX E – Faces Anxiety Scale

APPENDIX F: Data Collection Form

Study Number:	Date:	Time

Sex: Male ☐ Female ☐	Age: (years)	Ward: 6 ☐

Admission date and time to Hospital	
Admission date and time to ICU	
Diagnosis on Admission to ICU	
APACHE II	
Relevant Medical History	

Turning Nurses Employee No's:		

Current Respiratory Support (circle one)

Nasal / face mask	Facial CPAP / BiPAP	Mechanical Ventilation	Endotracheal Tube	Tracheostomy
Time and date of extubation		Reason for mechanical ventilation		

Current Blood Results (day of turning procedure)

PaO_2		Sodium	
$PaCO_2$		Potassium	
PH		Haemoglobin	
FiO_2		WBC	
		Creatinine	

Current Neurological Status (day of turning procedure)

Responds to Questions	Yes / No	GCS	

Pain Score Prior to Turning

FACE (number) Prior to Turning

1	2	3	4	5

Vital Signs Prior to Turning

MAP		Respiratory Rate	
Pulse		FiO_2	
		SpO_2	

Pain Score Post to Turning

FACE (number) Post to Turning

1	2	3	4	5

Vital Signs Post to Turning

MAP		Respiratory Rate	
Pulse		FiO_2	
		SpO_2	

Drug	Route	Total dose (last 24 hr)	Infusion rate pre turn	Infusion rate post turn	Bolus dose during procedure	Latest dose & time
Anxiolytics						
Diazepan						
Midazolam						
Other sedatives						
Propofol						
Haloperidol						
Opioids						
Morphine						
Pethidine						
Fentanyl						
Other Analgesics						
Paracetamol						
Indomethacin						
Ketorolac						
Adrenergics						
Noradrenaline						
Dopamine						
Dobutamine						
Adrenaline						
Salbutamol						
Other Inotropes						
Digoxin						
Amiodarone						
Beta Blockers						
Atenolol						
Metoprolol						
Anti-epileptics						
Clonazepan						
Phenobarbitone						
Steroids						
Dexamethasone						
Hydrocortisone						
Methylprednisolone						
Prednisolone						
Other						
Methylphenidate						
Ketamine						
Aminophylline						
Clonidine						
Anaesthetic (< 24 hrs)						