Nurses' lived experience of delivering temporary epicardial cardiac pacing care: an Australian cardiothoracic intensive care finding

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Signed statement

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

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Abstract

There are many examples in literature concerning the effectiveness or complications associated with temporary epicardial pacing practice. While surrounding literature identifies elements essential to safe care and challenges faced by clinicians managing temporary epicardial pacing systems, no literature was identified about nurses' experience in managing this practice. This study contributes to understanding of nurses' experiences of managing temporary epicardial pacing.

An interpretive phenomenological framework articulated by Heidegger was used to generate rich and descriptive data of this little known phenomenon. In-depth interviews were conducted with eight registered nurses who work in the specialist cardiothoracic intensive care and had responsibility for delivering temporary epicardial pacing care. The transcripts from the interviews were analysed using Smith's Interpretive Phenomenology Analysis (IPA) method and to gain deeper interpretation, consideration of Benner's five-stage skill acquisition theory was used as a lens to further examine the findings. The participants' shared experiences revealed three major themes; 'Risky business', 'Take time to own' and 'Zeroing in'. These themes were experienced in a variety of ways depending on the skill level of each participant. Furthermore, the interpretation of the study recognized that an internal motivation to use pacing at its optimal best, is characteristic of an expert.

Strengths and limitations and implications for both clinical practice and education are discussed, and suggestions for future research are included.

Chapter One - Introduction

Introduction

Chapter One introduces the research topic: An investigation of one group of nurses' lived experience of delivering temporary epicardial pacing care. The researcher's personal background including the experiences that led to the research topic being chosen is presented. A brief overview of the historical evolution of temporary pacing is described as well as an introduction to and consequences of temporary epicardial pacing in the research setting. The chapter concludes with an outline of the chapters to follow.

Personal background

In 2008 I was asked to become a clinical champion for temporary epicardial pacing in the cardiothoracic intensive care in which I work. Clinical champions are clinical leaders with passion for patient safety and innovation. Clinical champions engage to a varying extent in a number of core activities including developing guidelines and protocols, education, advocacy and auditing compliance with established protocols. The role is not without challenges. For example, one challenge is a low compliance with established guidelines and protocols. A recent audit within my workplace revealed a 30% compliance rate with the use of protocols. Another challenge is a consistent rotation of new doctors into the unit who are often exposed to the therapy for the first time and therefore need support and education. Yet another is incorrect management of temporary epicardial pacing that can result in critical situations requiring emergency resuscitation. A recent example was of a patient who had life threatening arrhythmias and was required to be defibrillated four times in a twenty-four hour period. This intervention was required as a result of an unrecognised temporary pacing sensitivity problem. Despite regular education

sessions, an epicardial pacing organizational wide instruction document, a temporary epicardial pacing daily check box on the intensive care nursing care plan, and the introduction of a temporary epicardial pacing wires label that alerts nurses to the presence of epicardial pacing wires, significant challenges remain.

The challenges faced in this role called our current temporary epicardial practice into question and required a deeper understanding of managing pacing one which resulted in the choice of a research topic into established practices. The research was driven by three interlocking needs; an aspiration to understand the reasons behind the low compliance with established temporary epicardial pacemaker protocols and incorrect sensing/pacing issues going unrecognised; secondly a desire to appreciate the needs of nurses delivering this therapy; finally, a wish to improve the safety of patients receiving temporary epicardial pacing.

Consequently, the needs driving this research gave rise to the question: What is the lived experience of nurses in delivering temporary epicardial pacing care in a cardiothoracic intensive care unit?

Historical evolution of temporary epicardial pacing

Temporary epicardial pacing systems have their roots in 1889 with John Alexander McWilliam's discovery that the human heart could be contracted by applying an electrical impulse to it (Boveda, Garrigue & Ritter 2014; Ward, Henderson & Metcalfe 2013). We would later call this technique transthoracic pacing. Almost thirty years later in 1926 an Australian doctor Mark C Lidwill made a portable pacemaker device (Ward, Henderson & Metcalfe 2013). One end plugged into a lighting point while at the other end had two pacing poles (Mond, Wickham & Sloman 2012). One pacing pole was applied to the skin, with the other plugged directly into the heart chamber through the

chest wall (Mond, Wickham & Sloman 2012). The device was capable of pacing 80 to 120 pulses a minute and was used to resuscitate a newborn (Mond, Wickham & Sloman 2012; Ward, Henderson & Metcalfe 2013). Several years later in 1932 a physiologist Albert Hyman invented the Hyman pacemaker, an electro mechanical device ran by a hand cranked motor that turned a magnet to apply electricity (Ward, Henderson & Metcalfe 2013). The pacemaker received adverse publicity, was rejected by the medical community who criticised it for interfering with nature by bringing back the dead (Ward, Henderson & Metcalfe 2013).

In 1950, John Hopps built the first external pacemaker after observing cardiac surgery (Bains et al. 2017; Ramsdale 2013; Ward, Henderson & Metcalfe 2013). The pacemaker provided transcutaneous pacing via a vacuum tube connection (Bains et al. 2017). The device was basic, bulky, painful to the patient, and it was powered from an electrical wall socket and carried a potential risk of electrocuting the patient and inducing ventricular fibrillation (Kenny 2008; Ward, Henderson & Metcalfe 2013). In the 1950's number of transcutaneous devices were developed by Zoll and Bakken (Kenny 2008; Ramsdale 2013) They developed rechargeable powered transcutaneous pacing systems, lead acid battery driven external pacemakers connected to electrodes attached to the heart, and transistorized pacemakers connected to electrodes attached to the surface of the heart electrode respectively (Boveda, Garrigue & Ritter 2014; Ward, Henderson & Metcalfe 2013). The development of the transistorized pacemaker led to rapid development of pacemakers. Over these years, temporary epicardial pacemakers have developed from simple single chamber devices with basic programmable functions to increasingly sophisticated complex dual heart chamber devices with adjustable parameters, arguably they are far more complex than the pioneers may have imagined they would become.

An introduction to and consequences of temporary epicardial pacing

Cardiac surgery frequently results in a transient, partial or total loss of the natural cardiac pacemaker function. This results in low or no blood pressure as the heart is not able to pump blood to the body effectively. In these situations, a temporary artificial pacemaker is required. In cardiac surgery when a loss of cardiac pacemaker function either ensues or is anticipated, temporary epicardial pacing wires are attached straight to the surface of heart muscle under direct visualization of the heart, and the wires channelled to emerge through the skin of the chest wall (Bunch 2014). Temporary epicardial pacemakers are used to treat common postoperative cardiac rhythm disturbances; a major cause of mortality and morbidity in post cardiac surgery patients (Batra & Balaji 2008; Ley & Koulakis 2015; McNaughton 2013; Reade 2007a). The temporary epicardial pacemakers are sophisticated systems that allow for a range of pacing therapies from simple one chamber pacing to complex dual chamber, biatrial and biventricular pacing (Reade 2007a). Temporary epicardial pacing systems differ from other temporary pacing systems such as transvenous or transcutaneous. Transvenous and transcutaneous systems are primarily used as emergency backup systems until definitive treatment is available. Epicardial systems allow clinicians far greater capacity to intervene, treat and prevent postoperative life threatening arrhythmias. For example Sullivan, Bartels and Hamilton (2016) state that temporary epicardial pacing systems offer the most beneficial treatment of postoperative transient heart block and greatly assist in preventing the incidence of atrial fibrillation; a common complication that can occur in as many as 60% of patients having cardiac surgery. Epicardial pacing is also used to treat complex pathologies such as pre-existing bundle brunch block, pre-existing atrioventricular block, multivalve surgery, a complex surgery with scars and suture lines (Reade 2007b). Moreover, overdrive pacing is used effectively to prevent post-operative torsades de pointes,

multifocal ventricular tachycardia, and atrial fibrillation and flutter (Neto et al. 2007; Reade 2007b). Due to the significant impact on management of these common pathologies, temporary epicardial pacing has become an essential part of post-operative cardiac surgical care. Additionally, both European and United States resuscitation councils recognize temporary epicardial pacing as the first line treatment of post-operative cardiac arrest in this patient group (Ley & Koulakis 2015; Soar et al. 2010).

Summary of chapters

Chapter One presents the research study, including the researcher's personal background that led to the research topic being chosen and a brief overview of specific information about the research, temporary epicardial pacing. In Chapter Two, the existing research literature about temporary epicardial pacing is summarised and the lack of research addressing nurses' experience of managing temporary epicardial pacing is identified. Chapter Three will provide an overview of qualitative research including the justification for the choice of Heidegger's interpretive phenomenology as a research methodology for this study and its philosophical underpinnings. Smith, Flowers and Larkin (2009)'s method of analysis and Benner's five-stage skill acquisition theory, as a frame of interpretation, will be discussed. And, the methodological value of qualitative research will be addressed. In Chapter Four, the research method for the study is presented including ethical considerations, the recruitment of participants, data collection and treatment of data. Methods used in the analysis and interpretation of data are also discussed. Chapter Five presents the findings of the study, the themes and their sub themes that emerged from interviews with eight nurses who manage temporary epicardial pacing in the research setting. Three main themes are 'Risky business', 'Take time to own' and 'Zeroing in', and findings are discussed with narrative accounts and supportive

quotations from participant's transcripts. In Chapter Six, the five-stage skill acquisition theory articulated by Benner is presented first and the data of this study is interpreted through Benner's skill acquisition lens. The final chapter will outline the study strength and limitations, implications for clinical practice and education and areas for further research as well as concluding thoughts.

Summary

This chapter has provided a brief overview of the research question and the researcher's personal background. The evolution of temporary pacing, and the application of one temporary pacing modality; epicardial pacing is introduced. The chapter concludes with an overview of the chapters to follow. The following chapter will discuss the research literature for this study.

Chapter Two - Literature Review

Introduction

This chapter examines the existing research literature related to temporary epicardial pacing and draws attention to the lack of research addressing nurses' experience of managing temporary epicardial pacing.

Literature background

The literature reviewed for this study was accessed from online databases including CINAHL, PubMed, Embase and Scopus. Only English language papers with full texts available were reviewed. The following key words were used in the search: nurse, nursing, epicardial, pacing, pace, pacemaker, manage, care, understanding, knowledge, lived experience, critical care, intensive care, cardiothoracic, phenomenology. Temporary epicardial pacing management research can be placed into two general categories of evidence, elements of temporary epicardial pacing care and the challenges associated with the safe delivery of temporary epicardial pacing care to the post-operative cardiac surgical patient. Two broad categories of evidence related to nurses' lived experience were also identified. The first category comprised phenomenological research into the lived experience of nurses caring for patients in acute care settings. The second encompassed phenomenological research into the lived experience of nurses caring for patients with advanced technology and equipment.

Elements of temporary epicardial pacing care

One essential but undervalued element of pacemaker care is a daily check of temporary epicardial pacing systems which requires testing sensitivity and output thresholds and

identifying patient's intrinsic (underlying) rhythm, often at a time when the patient is totally reliant on pacing for haemodynamic stability (Ley & Koulakis 2015; Medtronic 2013; Micik, Mackay & Johnson 2014; Reade 2007b; Sullivan, Bartels & Hamilton 2016). Other checks include pacing system connections, battery life, appropriate pacing mode and settings (Ley & Koulakis 2015; Micik, Mackay & Johnson 2014; Reade 2007b; Sullivan, Bartels & Hamilton 2016). Moreover, the literature suggests that good practice also requires routine daily review of electrocardiogram for sensing, pacing or capture issues (Batra & Balaji 2008; Gibson 2014; Ley & Koulakis 2015; Micik, Mackay & Johnson 2014; Reade 2007a). Continuous electrocardiographic monitoring to detect arrhythmias, pacing malfunction and recovery of intrinsic rhythm are additional critical components of caring for patients with temporary epicardial pacing (Chemello, Subramanian & Kumaraswamy 2010). Moreover, literature cites the importance of nurses integrating complex haemodynamic assessment into the management of temporary epicardial pacing modalities, critical for the post cardiac surgery patient (Payne, Zeigler & Gillette 2011; Reade 2007b). Batra and Balaji (2008); Reade (2007a) further highlight recognition of pacing complications and troubleshooting as a necessary part of epicardial pacing therapy. Reade (2007b) describes that temporary cardiac pacing is primarily managed in cardiothoracic intensive care by nurses with specialized cardiac pacing skills. Moreover, management of temporary epicardial pacing has been described as nursing responsibility which includes checking the device, thresholds, appropriate modes and settings as well as detecting pacing abnormalities and troubleshooting (Aitken et al. 2015; Bell 2010; Geiter 2011; Geiter & McDowell 2011; Gibson 2014; Ley & Koulakis 2015).

Challenges in delivering temporary epicardial pacing

Temporary epicardial pacing research identified a number of challenges to the safe delivery of temporary epicardial pacing care. The first is the requirement of detailed knowledge of heart conduction systems, physiology, pathology, medications and methods of cardiac stimulation to enable assessment and management of patients with temporary epicardial pacing (Reade 2007a, 2007b). The second is the necessity to have an advanced level of knowledge regarding functions and complications of temporary pacing, and assessment skills to recognise haemodynamic effects and pacemaker problems (Payne, Zeigler & Gillette 2011). The third challenge is the timeliness of clinical decision making and taking the initiative of intervening often autonomously for temporary epicardial pacing care (Blute, Mustard & Harrington 2014). The increasing complexity of pacing systems was identified as the final challenge nurses faced in managing patients with temporary epicardial pacing care (Blute, Mustard & Harrington 2014; Payne, Zeigler & Gillette 2011). The literature cites nurses as the primary managers of temporary epicardial pacing and describes their role as crucial for safe clinical care of patients requiring this therapy (Ley & Koulakis 2015; Reade 2007a, 2007b). However, in spite of this assertion the research about the nurses' experience of being responsible for managing temporary epicardial pacing care is sparse. There is evidence of nurses frequently feeling nervous and apprehensive while using complex modern equipment and dealing with technology in critical care settings (Zuzelo et al. 2008). The literature recognises that anxiety affects concentration and can result in nurses feeling incompetent while using complex equipment with a fear of potential adverse events that may result as a part of their care (Broyles et al. 2008; Zuzelo et al. 2008). Furthermore, research into nurses' infrequent use of a specific piece of technology, suggests nurses may perceive it as overly complex

and therefore may wish to avoid using or being involved in its management (Broyles et al. 2008; Zuzelo et al. 2008).

Phenomenological studies in nursing

Phenomenology offers a popular nursing research framework (Whitehead, Dilworth & Higgins 2016). It has been suggested there are parallels between phenomenology and nursing because the values and beliefs of both consider people as wholes with their own particular meanings (De Chesnay 2014). Both in nursing and phenomenology, experiences of people are valuable and meaningful according to the context in which they are located. There are many research studies published using a phenomenological framework. For the purpose of this study phenomenological studies by nurses in acute settings and nursing studies related to high technology settings will be explored.

Nurses' lived experience in acute care settings

In the last decade nurses' lived experience in acute care settings has mainly focused on the meaning of patients care experience. For example, Coleman and Angosta (2017) explore nurses caring for patients and their families with limited English. Kooken and Haase (2014) capture the nurses' lived experience of caring for oncology patients. Kutoane and De Beer (2014) explore nurses' experience of caring human immunodeficiency virus (HIV) patients and Catangui and Robertsis (2014) explore nurses' experience in a hyper-acute stroke unit. The most identified topic in the reviewed literature about nurses' lived experience in acute settings is the care of the dying patient. The experience has been explored in different acute care settings, for example, in the emergency room Kongsuwan et al. (2016) and in the critical care unit King and Thomas (2013) and Hinderer (2012). The study of Vanderspank-Wright et al. (2011) is about nurses' experience during withdrawal of life sustaining treatment.

All the studies provide rich meaning of particular nurses' lived experience in specific settings. For example, promises to keep, promise to be trustful, promise to provide comfort, promise to be an advocate, promise that couldn't be kept and promise to remain connected was the rich data identified in one study exploring the care of dying patients (King & Thomas 2013). Another study by Hinderer (2012) identified coping, personal distress, emotional disconnect and the inevitability of death. The literature was replete with examples of phenomenological research capturing true meaning of nurses' lived experience in acute care settings.

Nurses' experience with high technology equipment

In addition to identifying evidence of nurses lived experience in acute care settings, the literature review identified studies that explored nurses' experiences of managing high technology equipment such as extracorporeal membrane oxygenation (ECMO), an artificial heart-lung machine. One study was identified exploring the perception of highly specialized ECMO nurses during the 2009 influenza A (H1N1) pandemic, also known as Swine flu, in New Zealand (Honey & Wang 2013). The study revealed due to the need for isolating the patient, nurses' experienced limited support from the multidisciplinary team (Honey & Wang 2013).

Other studies explored nurses' lived experience of working in high technology environment in general. McGrath (2008) explored the lived experiences of ten cardiothoracic critical care nurses from two cardiothoracic critical care units in Ireland, and three main themes emerged: 'alien environment', 'pulling together' and 'sharing the journey'. The author concludes that experienced critical care nurses can surpass the obtrusive nature of technology, but the journey to technological proficiency is very challenging and novice nurses have difficulty in caring with technology (McGrath 2008).

Tunlind, Granstrom and Engstrom (2015) conducted a qualitative descriptive study with eight critical care nurses in the northern part of Sweden to describe their experience of working in highly technical environments. They conducted semi structured interviews to gain an understanding of the everyday experience of nurses working with complex technology. The study examined technology broadly rather than focusing on a specific technological instrument. However the themes that emerged; namely technology as a security, technology as utility, technology as an obstacle support the study into nurses' lived experience of managing temporary epicardial pacing (Tunlind, Granstrom & Engstrom 2015).

The development of clinical expertise in these studies has at times been informed by Patricia Benner's (1984) phenomenological study. The study provides a suitable framework for examining how nurses make sense of their experiences of acquiring specialist skills required to manage complex technology such as temporary pacing systems. Benner's theory of clinical skill acquisition was one of several theories developed in last three decades (Haag-Heitman, Barbara 2006). Bloom and Ericsson developed a three-phase and a four-stage learning model for children and young adults respectively while Dreyfus and Benner's models were aimed at adults and focused on skill acquisition (Haag-Heitman, Barbara 2006). Dreyfus's model is discussed briefly while Benner's model is detailed in more depth below.

Dreyfus model of skill acquisition

Hubert Dreyfus and his brother Stuart Dreyfus investigated the process of human skill acquisition in airline pilots, chess players and car drivers (Ahlstrom 2014; Lyon 2015). From their investigations, they developed a five-stage model of learning, development and skill acquisition (Ahlstrom 2014; Benner 1984, 2004). The five stages of the Dreyfus

model of skill acquisition are novice, advanced beginner, competent, proficient and expert. The stages are described as:

1) Novice: is limited by rules of performance that are context free.
2) Advanced beginner: applies the rules within specified situation where they can make connections between cause and effect at a very basic level.
3) Competent: begins applying rules within an analytical framework and can identify relevant information, assess perspective and visualize outcome in making decisions, and they apply rules to make choices.
4) Proficient: is nourished by experiences and can visualize a problem immediately in a holistic manner and develop a plan to rectify the concerns.
5) Expert: can immediately respond while analysing any situation and has a very deep knowledge of what works. They are distinguished from a proficient performer by their level of discrimination.

(Ahlstrom 2014, p. 15; Dreyfus 2004, pp. 177-181)

Benner's novice to expert theory of clinical nursing development

Patricia Benner applied the Dreyfus skill acquisition model to articulate knowledge embedded in nursing practice, to describe skill acquisition in clinical nursing practice, to offer the best ways of learning for nurses in different skill levels and to establish her novice to expert theory in clinical nursing (Benner 1984, 2009). In her book *From novice to expert*, Benner (1984) explains that capturing the essence of the 'expert' of clinical nursing practise is needed to support and guide non expert nurses to improve their nursing practise in high acuity, high patient turnover, complex technology and highly specialised environments. Benner's skill acquisition theory explains typical patterns of learning and different learning stages in clinical nursing (Benner 1984, 2009). As Benner's theory

captures aspects of expert's development and provides insights into complex nursing practice, it has been used widely to understand and support both individual and organizational learning; Benner's theory is used to help individual nurse' progress (Haag-Heitman, Barb 2008), in the development of teaching strategies and mentoring programs (Callaghan 2011), in designing evaluation tools used to assess clinical performance (Dale et al. 2013), in developing leadership programs (Fennimore & Wolf 2011; Ng & Ruppel 2016), and increasing nurses' retention (Eigsti 2009; Schroyer, Zellers & Abraham 2016). Benner's theory has been critiqued by some as not being able to generate an understanding and explanation of expertise in clinical nursing. Higham and Arrowsmith (2013) argue that theoretical knowledge by academics and researchers plays a limited role in Benner's view once nurses reached the competent level. Higham and Arrowsmith (2013) assert that nurses are still required to learn new theories and techniques for complex problems, and this will help the nurses become expert. Moreover, Gobet and Chassy (2008) argue that intuition in expert nursing practice in Benner's theory requires more explanation and evidence, and her theory underestimates analytic problem solving at the expert level. Although criticised on these levels, Benner's theory on skill acquisition is the most sustained, thoughtful and influential in nursing (Gardner 2012, 2013). It offers a reliable framework for a deeper interpretation of nurses' experiences of temporary epicardial pacing.

Several fields for future research were recognised in the literature, including seeing the challenges identified in managing temporary epicardial pacing from the perspective of the lived experiences of the nurses managing the care, understanding the support, training and certification nurses may need to perform this role, and the possibility of exploring advanced nursing practice roles in the future of temporary epicardial pacing management. Information gathered from this research may increase the understanding of the holistic

experience of nurses providing temporary epicardial pacing care to their patients and may help give weight to the consideration of advanced nursing practice roles in support of this practice. To illuminate greater understanding of the realities of nurses managing temporary epicardial pacing care and to contribute to the body of knowledge relating to temporary epicardial pacing, this study seeks to answer the following question: What is the lived experience of nurses delivering temporary epicardial pacing care?

Summary

No literature was identified on the topic of nurses' lived experience of delivering temporary epicardial pacing. While a gap in the understanding of the lived experience of managing temporary epicardial pacing systems was identified, several related topics emerged: elements essential to safe care, challenges faced by clinicians managing temporary epicardial pacing systems, meanings assigned by nurses to their experience in acute and high technology settings and clinical skill acquisition. The related literature supports the study into nurses' lived experience of managing temporary epicardial pacing and the methodology and methods chosen. Chapters three and four will focus on the chosen methodology and methods respectively.

Chapter Three - Methodology

Introduction

The goal of this research was to investigate nurses' experiences of managing epicardial pacing care in the post-operative cardiac surgical patient. The research focus was supported by the researcher's personal experience and a review of the literature that indicated a need to investigate this problem of practice. A qualitative methodology was chosen to provide the flexibility necessary for exploring experiences and perceptions of nurses related to their experiences of managing epicardial pacing care. The purpose of this chapter is to provide an overview of qualitative research. The reasoning for the choice of Heidegger's interpretive phenomenology as a research methodology for this study and its philosophical underpinnings will be presented. The work of Smith, Flowers and Larkin (2009) that served as the analytic method of lived experience to inform this research will also be explained. A description of how Benner's five-stage skill acquisition theory was used to frame the interpretation within will be discussed. Finally, assessing the methodological value of qualitative research will be addressed.

Qualitative research

The primary factors to consider when choosing a methodology for a study are the nature of the study and type of knowledge the researcher wants to examine (Schneider & Whitehead 2016). The quantitative researcher seeks to describe and analyse quantifiable experiences by controlling, predicting or measuring, while remaining detached from the process (Whitehead, Dilworth & Higgins 2016). Qualitative approaches involve questions about human experiences, and allow the generation of rich and descriptive data through contact with people in their natural environment; finally, it provides an opportunity for

researchers to explore and understand the meaning of experience (Creswell et al. 2007). Moreover, Whitehead, Dilworth and Higgins (2016) highlight that a qualitative approach is very useful to the disciplines of nursing because qualitative study accepts naturalistic and interpretive approaches to produce rich narrative data; it allows researchers to interpret phenomena. For this study, a qualitative approach provided an opportunity for nurses to attach meaning to the delivery of temporary epicardial pacing care practices encountered in their daily cardiothoracic intensive care nursing practice.

There are many different qualitative approaches for exploring experience and phenomena in different ways, grounded theory, ethnography and phenomenology. Each approach produces different types of research outcomes (Whitehead, Dilworth & Higgins 2016). This research study does not seek to provide a theoretical explanation like grounded theory or cultural phenomenon as ethnography does. The study seeks to understand nurses' lived experience of delivering temporary epicardial pacing in cardiothoracic intensive. Aiming to understand the lived experiences of others falls within phenomenology.

Interpretive phenomenology

Interpretive phenomenology was developed by Martin Heidegger a student of Husserl, a key figure in the development of descriptive phenomenology (Whitehead, Dilworth & Higgins 2016). While Husserl believed essential features of human experience, could be described (descriptive phenomenology) accurately by bracketing out predetermined views, thoughts or feelings, Heidegger questioned the relationship between objects and consciousness and suggested that researchers could not remove themselves from the process of identifying with the essence of something (Sloan & Bowe 2014; Whitehead, Dilworth & Higgins 2016). Moreover, Heidegger believed that the researcher often

'exists', that is they are not distant from the phenomena and this needed to be remembered during the phenomenological process (Sloan & Bowe 2014). For Heidegger it was a necessary condition that a person's experience was related to the phenomena to understand people existing in their lived world: the world of things, people, relationships and language (Whitehead, Dilworth & Higgins 2016). It means that personal awareness related to their human experience is the necessary condition to understand people being in their world (Whitehead, Dilworth & Higgins 2016). The main idea of Heidegger's phenomenology is that human beings exist in the world which consists of objects, relationships and language; and the interpretation of people's meaningful activities is essential to Heidegger's phenomenology (Smith, Flowers & Larkin 2009).

Hermeneutics

Heidegger's interpretive phenomenology is also identified with the concept of hermeneutics. The word hermeneutics originated from the Greek and literally means interpret (Van Manen 2016). Smith, Flowers and Larkin (2009) explain that hermeneutics is the theory of interpretation and was originally used for the interpretation of biblical texts. Hermeneutics was a separate body of thought from phenomenology before Heidegger (Smith, Flowers & Larkin 2009). However, Heidegger considered that people are always in an engaged relationship with the world; and as his phenomenology focused on the concept of 'being', Heidegger emphasised that phenomenology is hermeneutic in that it aims for interpretation of 'being' (Smith, Flowers & Larkin 2009). Moreover, Heidegger highlighted that the richness of meanings could be brought to life through language, and he believed that language could open and unfold the mystery of phenomena (Finlay 2011). Therefore, Heidegger stressed that language and understanding were inseparable, and he defined his phenomenological approach as 'hermeneutical';

proposing that the process of interpretive steps is taken between involving pre-understanding and evolving current understandings (Finlay 2011). For Heidegger, hermeneutics, or interpretation, will always involve preconceptions, assumptions, and prior experiences of the interpreter each with the potential to impede interpretation (Smith, Flowers & Larkin 2009; Smith & Shinebourne 2012). The interpretive process of hermeneutic phenomenology is that participants simply describe their experiences and the researcher analyses these data across cycles of analytic comparisons to identify embedded meanings and themes (Harding & Whitehead 2016; Smith, Flowers & Larkin 2009). The cycle of analytic comparisons of interpretive process is called the hermeneutic circle; it is the origin and essence of all different kinds of analysis methods developed for interpretive phenomenology (Smith, Flowers & Larkin 2009). The concept of the hermeneutic circle can be described as the dynamic relationship between the part and the whole; to 'understand any part of data, a researcher needs to look to the whole, and to understand the whole, the researcher needs to look to the parts' (Smith, Flowers & Larkin 2009, p. 28). This moving back and forth over a series of different ways of thinking about the data may help to strengthen one's relationship to the data (Finlay 2011). According to Smith, Flowers and Larkin (2009), the hermeneutic circle describes the processes of interpretation effectively. As interpretation is a crucial part of capturing the meanings of participants' experience, Smith's interpretive phenomenological analysis (IPA) approach informed by Heidegger's interpretive phenomenology was chosen to frame the structure of the research and guide the overall interpretive direction of the study.

Smith's framework for phenomenological study

The interpretative phenomenological analysis (IPA) approach is a recently developing qualitative inquiry. A form of interpretive phenomenological analysis was suggested by

Jonathan Smith in 1996; he argued for an approach to psychology that would provide a way to accurately express lived experiences (Finlay 2011; Smith, Flowers & Larkin 2009). Originating from psychology, it is increasingly being accepted by disciplines in the human, social and health sciences (Finlay 2011). The purpose of IPA is to examine how participants (individuals) make sense of their experiences (Finlay 2011; Smith, Flowers & Larkin 2009), that is to move from the descriptive to the interpretive. The participants describe their experience in their own words, and the researcher analyses these data and interprets the meaning of participants' experience without bracketing the researcher's preconceived ideas or opinions (Reiners 2012). The researcher must acknowledge that access to experience always depends on what participants tell the researcher about that experience, the researcher then needs to interpret that participant's account in order to understand their experience (Finlay 2011). According to Smith, Flowers and Larkin (2009), this is a 'double hermeneutic because the researcher is trying to make sense of the participant trying to make sense of what is happening to them' (Smith, Flowers & Larkin 2009, p. 3).

Finlay (2011) and Smith, Flowers and Larkin (2009) describe IPA as a specific hermeneutic form of phenomenology, and the researcher employs interpretation that must necessarily implicate the researcher's own view as well as interactions between researcher and participant. As Smith and Shinebourne (2012) explained, 'participants experience cannot be extracted transparently from their heads' (Smith & Shinebourne 2012, p. 73); therefore, capturing participants' experience is a process of involvement and interpretation on the part of the researcher. Utilizing IPA for this study allows the researcher to explore, analyse, and interpret nurses' experience of delivering temporary epicardial pacing care, obtained through their reflection and description of occurrences in the natural setting of the cardiothoracic intensive care unit. Although the use of IPA has

originated from psychology, the research method is accepted by other disciplines such as social and health sciences, with the aim of exploring to 'capture particular experiences as experience for particular people' (Smith, Flowers & Larkin 2009, p. 16). In this research study, cardiothoracic intensive care nurses are the particular people who have particular experiences that are delivering temporary epicardial pacing care. Considering that IPA is dedicated to exploring people making sense of and reflecting on significant experiences (Pietkiewicz & Smith 2012; Smith, Flowers & Larkin 2009), it is an appropriate research tradition to use for studying nurses sense-making in the clinical setting. For this study, nurses will be 'phenomenological' as they reflect on, assign meaning to, and interpret their epicardial pacing management experiences in their clinical nursing practice.

Smith's analysing stages for interpretive phenomenology approach

Some qualitative analysis methods are described in linear and step by step style; IPA also has a guideline for qualitative data. However, the key point of the interpretation process of IPA is a dynamic, non-linear style of thinking between the whole and the part, what it means is that the hermeneutic circle emerges from an interactive analysis process (Smith, Flowers & Larkin 2009). Analysing qualitative data using Smith's IPA framework can be illustrated as three stages, and prior to conducting analysis, it is important that the researcher thoroughly immerse themselves in the data; expressly 'try to step into the participant's shoes as far as possible' (Pietkiewicz & Smith 2012, p. 366). As mentioned previously, the interpretive process of IPA is finding meaning of how participant's make sense of phenomena 'and at the same time to document the researcher's sense making' (Pietkiewicz & Smith 2012, p. 6). An analysis of qualitative data using Smith's guideline was followed.

1. First stage: multiple reading and making notes
    - Close reading of interview transcript (participant's description of his/her experience) several times helps researchers immerse themselves in the data, and each reading may provide some new insights. The researcher makes notes about thoughts and comments of potential significance focusing on content, language use, context and initial interpretive comments. Also, distinctive phrases and emotional responses are useful to highlight.
2. Second stage: transforming notes into emergent themes
    - The researcher works more with the researcher's note rather than with the transcript, but this stage is still grounded in the particular detail of the participant's description. The researcher highlights a brief phrase at a slightly higher level of thought. This process is considered as the hermeneutic circle because the researcher at this stage is inevitably influenced by having already annotated the transcript as a whole.
3. Third stage: seeking relationship and clustering themes
    - The research involves looking for patterns and connections between emerging themes, grouping them together. This process may lead to a reconfiguring and relabeling of themes.

(Pietkiewicz & Smith 2012, pp. 361-369):

After all, Smith, Flowers and Larkin (2009) alerts there are different levels of interpretation, and sometimes the analysis of three stages can be too descriptive. Consequently, (Finlay 2011); Smith, Flowers and Larkin (2009) recommend that taking the interpretation to deeper levels by bringing in metaphors, then importing other theoretical perspectives to understand the essences, the meaning of participants' experience. In terms of the hermeneutic circle discussed previously, the three stages of

analysing data involve moving from the part to the whole in hermeneutic circle, and then deeper through a level of interpretation by utilizing metaphors and by importing other theories as lenses to view the analysis moving from the whole to the part (Finlay 2011). For this study, Benner's '*From Novice to Expert'* theory is used as a lens to view the interpretation of nurses' lived experience of delivering temporary epicardial pacing. Benner asserted that all nurses are at a different level in their clinical nursing practice, and nurses acquire skill and understanding of patient care over time through a comprehensive educational base as well as multitude of experiences (Benner 1984; Davis & Maisano 2016). Participants of this study were at different levels of nursing practice; therefore, Benner's theory may provide the different view of interpretation for study findings to capture richer and truer meanings of nurses' lived experience in delivering temporary epicardial pacing.

Assessing quality of qualitative research

Although using the language 'rigour' from the quantitative paradigm is frequently debated among the qualitative researchers, it is one of the most important aspects of qualitative research (Thomas & Magilvy 2011). Due to the nature of qualitative research and its complexity, there is no one method that can describe the criteria for quality of qualitative research (Harding & Whitehead 2016). Therefore, the researcher followed Smith, Flowers and Larkin (2009)'s recommendation: Yardley's four principles (Yardley 2000, 2016).

Sensitivity to context. Sensitivity to context was demonstrated a number of different ways in this study. The researcher focused on understanding particular nurses' lived experience in the context of delivering temporary epicardial pacing care. Also, it was demonstrated within the interview situation for collecting valuable data through effective interaction

between the researcher and participants; moreover, the data analysis process supported sensitivity to context because the researcher tried to make sense of the participants' sense-making (Smith, Flowers & Larkin 2009; Smith & Shinebourne 2012).

Commitment and rigour. A considerable personal commitment by the researcher is required to conduct an in-depth interview and to stay true to the data analysis process (Smith, Flowers & Larkin 2009; Smith & Shinebourne 2012), this was adhered to throughout this study. Moreover, Smith, Flowers and Larkin (2009) advised using appropriate samples, maintaining interview quality and ensuring a thorough and systematic interpretive data analysis to certify the rigour of the study.

Transparency and coherence. The researcher carefully described selection of participants, construction of interview schedule, conduction of interview and steps used in analysis of the study. This clear description of the stages of the research process is referred as transparency (Smith, Flowers & Larkin 2009). The coherence of qualitative research is judged by the reader; therefore, the researcher carefully drafted and redrafted the analysis for clarity (Smith, Flowers & Larkin 2009).

Impact and importance. According to Smith, Flowers and Larkin (2009), impact and importance of the study is determined by the reader whether the study is interesting, significant or valuable. The researcher believes that the study is unique as the literature review showed that nurses' lived experience of delivering temporary epicardial pacing has not been studied yet. Therefore, the finding of this research study allows to inform various stakeholders and to be useful for future research.

Summary

This chapter has discussed qualitative research in general and overviewed the essentials of Heidegger's interpretive phenomenology and its philosophical origins as well as

hermeneutics and the hermeneutic circle. Also, the interpretive phenomenology analysis method is discussed; because the IPA method allows the researcher to take the interpretation to a deeper level by bringing in metaphor or by importing other theories to examine the essence of participants' experience. This may help the researcher to capture the true meanings of nurses' lived experience of delivering temporary epicardial care. Finally, assessing the quality of qualitative research was discussed. The following chapter will present the methods used in this study.

Chapter Four – Methods

Introduction

The purpose of this interpretative phenomenological study was to explore nurses' lived experience of delivering temporary epicardial pacing in cardiothoracic intensive care. To gain insight into nurses lived experiences, hermeneutic phenomenology articulated by Martin Heidegger was chosen as the philosophical framework for this study. Interpretative phenomenology analysis (IPA) served as data analysis method for this Heidegger's hermeneutic phenomenological study. In this chapter, the research method for the study is presented including ethical considerations, the recruitment of participants, data collection and treatment of data. Methods used in the analysis and interpretation of data are also discussed.

Ethical considerations

The main purpose of ethical considerations in research is to protect research participants and maintain moral values during a research project (NHMRC 2015). Both Central Adelaide Local Health Network (CALHN) and University of Adelaide ethics committees' approval were obtained to conduct this study (CALHN Ref: R20161116).

All participants were provided with an information sheet outlining the research aim, objectives and process. The participants were recruited using targeted recruitment and signed a consent form prior to participation. The criteria for recruitment are discussed below. They were reminded of their right to withdraw from the study at any stage without being penalized or disadvantaged.

It was not anticipated that participants would have any deleterious psychological effects of exploring their own experience of delivering temporary epicardial pacing care.

However, they were encouraged to contact the researcher or counsellor within the hospital or university for support if they had any questions related to their interviews or the research process. Moreover, participants had the opportunity to review their transcripts to determine whether they were comfortable with the researcher using the data collected for the study. No participants objected to the use of their data for the study.

With a small sample size, the potential risk can be maintenance of anonymity, privacy and confidentiality (Whitehead & Whitehead 2016) Therefore, the interviews took place in a private setting, away from the ward to protect participants' identity and to prevent any overhearing. All data were de-identified at the time of data collection and audio-recording verbatim transcription. Consequently therefore, data analysis and reporting of findings in the study contributed to anonymity. The study documents and data were stored in a password-protected digital file. All research data will be kept for 15 years as per human research ethics committee of the hospital.

Research setting

This study was conducted within the cardiothoracic intensive care ward in a large South Australian metropolitan hospital. The site was chosen because cardiothoracic intensive care is highly specialized for post-operative cardiac surgery patients' care, and temporary epicardial pacing is used as one of the treatments for this patient group. Nurses working in the cardiothoracic intensive care manage temporary epicardial pacing on a daily basis. This allowed the researcher to understand the meaning of a particular experience (delivering temporary epicardial pacing) of particular people (nurses working in cardiothoracic intensive care).

Sampling

Purposive, non-probability sampling was used as it was the most appropriate sampling method to gather diverse stories for this study (Whitehead & Whitehead 2016). Purposive sampling was used to ensure that rich and detailed information specific to the phenomenon of interest was gathered (Whitehead & Whitehead 2016). Therefore, purposeful sampling was used to select participants who have the experience necessary to answer the research question. Specific sample size is not normally defined for qualitative research, however, Smith, Flowers and Larkin (2009) suggested that a small sample size can allow for more detailed description and interpretation of experience. In fact, phenomenology aims to capture the deep understanding of a specific lived experience, rather than generate findings to be generalized. The study utilized a sample size of eight participants. All participants were registered nurses who work in the cardiothoracic intensive care and had responsibility for delivering temporary epicardial pacing care. Participants were assigned a pseudonym for use throughout the study.

Recruitment strategy

Prior to recruitment of participants for this study, ethics approval was obtained from Central Adelaide Local Health Network (CALHN) ethics committee and notified to the University of Adelaide Human Research Ethics Committee. After obtaining ethics approval, research presentation sessions were held during staff meetings. Potential participants were provided with an information sheet outlining the study, what is required of them should they choose to participate, their rights to confidentiality and to withdrawing from the study, the researcher's phone number and email addresses to allow participants to clarify and question any aspect of the study (Appendix C for Information sheet). The information sheet was also emailed to the targeted participant group to

Distribution list (DL Health RAH ICU Team4 Nurses) for potential participants who had not attended an information session. The researcher waited for two weeks for participants to consider their participation in the research project, to ask any questions they might have. Participants were also informed that the researcher might have follow up questions regarding the data collected to ensure accuracy of transcription. When the invitation to participate was accepted, the researcher and participant mutually agreed upon a meeting time in a private interview room at the hospital for the interview. Finally, signed consent was obtained prior to the commencement of the study (see Appendix D for Consent form).

Data collection

As this is qualitative research, in-depth interviews were conducted one to one and face-to-face to explore the research question; 'What is the lived experience of nurses delivering temporary epicardial pacing? The open-ended questions provided the flexibility to ask clarifying questions or to elaborate responses (Whitehead & Whitehead 2016; Whiting 2008). According to Whitehead and Whitehead (2016), individual interviews help participants openly share their experience and prevent some participants being inhibited because of a group. Moreover, face-to-face interviews allow the researcher to observe non- verbal aspects of the interview. The interviews took place in an interview room in the intensive care unit of the hospital to ensure participants anonymity and privacy during the interviews and took an average of 45 minutes to complete. The interview questions focused mainly on the participants' experiences of managing temporary epicardial pacing, and further questions were asked to clarify participants' answers or elaborate the responses, listed below in table 1. All interviews were audio-recorded to enable data transcription. Whiting (2008) believes that audio recording gives the researcher opportunity to concentrate on interacting with participants and helps accurate verbatim

transcription of interview. Anonymity was assured during the recording, and participants were reminded of their right to withdraw from the study or terminate the interview at any time. Basic demographic information was gathered: years of work experience in cardiothoracic intensive care and types of postgraduate qualification. However, demographic data was reported as group data, and all information was collected using pseudonyms to ensure anonymity. Moreover, all data was de-identified at the time of data collection.

Table 1 Interview questions

Primary question	Could you please tell me about your experience of temporary epicardial pacing?
Further questions to prompt/clarify	Can you tell me more about that? What do you mean by…? How did that make you feel? What happen next? Why do you think/ say...?

Data recording, storage and management

All interviews were audio-recorded to enable data transcription. After each interview was completed, audio- recorded data of the study was played numerous times and was transcribed verbatim by the researcher. Once the interview was transcribed, any identifying information related to the participants was removed to ensure anonymity. All participants throughout this study are referred to by a pseudonym. Moreover, a reflective research note for each interview was created for future reference. A copy of the transcript was sent to the participant via email to confirm for accuracy of the transcripts. Consent forms and transcripts of interviews were kept secure in the researcher's cabinet with a

lock and will be destroyed after fifteen years as per hospital policy. Computer files and audio-recorded files are stored in password protected files that only the researcher has access to.

Method and procedure used for data analysis

As described previously, interpretative phenomenology analysis (IPA) served as data analysis method for this study within the philosophical framework of Heidegger's hermeneutic phenomenology. The IPA method is developed based on the hermeneutic circle that allows analysing interview data across a cycle of analytic comparisons to identify the essence of meanings and themes (Harding & Whitehead 2016; Smith, Flowers & Larkin 2009). The aim of the IPA method is to gain an understanding of participants' experiences and make sense of the research problem (Smith, Flowers & Larkin 2009; Smith & Shinebourne 2012). Additionally, IPA allows the researcher to apply personal comprehension to analyse the meaning of the data (Smith, Flowers & Larkin 2009).

Smith's method (Pietkiewicz & Smith 2012) of data analysis was maintained throughout the research's analysis, as introduced in Chapter Three of this manuscript. After the researcher completed the transcribed data from the interviews she began the first step of the analysis. At this point, the researcher bracketed her existential presuppositions of managing epicardial pacing. This means that the researcher did not judge participants by bringing in any presuppositions about the phenomenon being studied into any aspects of the study participants reported lived experiences of managing epicardial pacing. The researcher intentionally suspended her beliefs of her everyday life of managing epicardial pacing. The researcher read over the participants' accounts multiple times so she could

gain a sense of the whole of the experience. Once the researcher had the sense of the whole, the meaning units were to be delineated.

In order to stay true to the first-person perspective and also stay faithful to Smith's method of analysis the researcher separated meaning units from the participants' transcripts to make the data more manageable. The meaning units were identified in the margins of the transcript pages. For example; stressed, scared and support. The researcher reflected and imagined the various meaning units within the participants' clinical practice of managing temporary epicardial care while she grouped the meaning units as constituents of larger themes that make up the structure of the experience.

Summary

This chapter presented the research method used in this study. Ethical considerations were discussed prior to the research procedure. The research setting, sampling, recruitment strategy, data collection including management and storage were presented in detail. Finally, the IPA analytic method was explained step by step as well as the reason for importing Benner's theory for a deeper interpretation. Findings and interpretation of this study follow in chapter five and six.

Chapter Five – Analysis

Introduction

The purpose of this interpretive phenomenological study was to explore nurses' lived experience of delivering temporary epicardial pacing. For this study, in-depth interviews were conducted to collect data, and this chapter presents the data, the themes and their sub themes that emerged from interviews with eight nurses who manage temporary epicardial pacing in the research setting.

Eight registered nurses were recruited for the study with each nurse having between five to nine years of overall experience in cardiothoracic intensive care. All participants had completed postgraduate studies in cardiac or critical care and have worked in the clinical setting from two months to six years after they gained their postgraduate qualification.

Three main themes and sub themes that emerged from exploring the patterns across the eight interviews are displayed in Table 2. Moreover, description of each theme is presented as well as the sub themes, with narrative accounts and supportive quotations from participants' transcripts. The interpretation of these findings will be discussed in the interpretation chapter that follows.

Table 2 Major and Sub themes

Major Theme	Sub theme
1. Risky business	1.1 Avoidance 1.2 Stress 1.3 Recognize risk

2. Take time to own	2.1 Being (Been) there 2.2 Experience and knowledge deficit 2.3 Not so risky if follow rules 2.4 Looking for support 2.5 Enhanced responsibility
3. Zeroing in	3.1 Don't follow rules 3.2 Self-directed learning motivation 3.3 Optimizing clinical status 3.4 Do

Theme one: Risky business

The theme, risky business, emerged from all eight interviews. All participants experienced delivering temporary epicardial pacing care as a high risk intervention. They described the potential of this nursing practice to harm patients' recovery, particularly if the temporary epicardial pacing was not managed precisely. This theme demonstrated that on one hand, participants expressed their experience of epicardial pacing management as scary, stressful and one they did not feel completely competent in. On the other hand, the nature of epicardial pacing management and the inherent risk to patients was considered a reason by some participants to become more considered of the practice and work to improve their nursing knowledge and practice in order to deliver safer patient care. Regardless of the experience being scary, the participants managed temporary epicardial pacing with the acknowledgment of the potential risk of the practice and with the recognition of the seriousness of the therapy. Three sub themes were identified within this theme: 1.1) Avoidance, 1.2) Stress and 1.3) Recognising risk.

Sub theme 1.1 Avoidance.

Many participants shared the experience that they wanted to avoid temporary epicardial pacing care interventions such as checking sensitivity, output threshold or confirming the patient's intrinsic (underlying) heart rhythm. Although those checks were included and expected on the intensive care nursing care plan, when allocated these patients some participants did not do the necessary checks due to patient safety concerns and in fear of doing something wrong. Moreover, they doubted whether they were competent enough to perform daily checks properly. Consequently, they were not confident in temporary epicardial pacing care. Roy shared:

I had.. an episode…which was quite…ah…episode of putting a patient into a dysrhythmia and from that point of view post that…it was no adverse effect to the patient but…after that episode…I really stopped doing much with them at all. I just completely ignored them or let the team leader check. In back of my mind, look…you've done something that caused this because of the way of you do it (Roy, line 10-13, 66-67).

Roy stopped performing temporary epicardial pacing checks and delegated the task to the team leader after he had an experience where the patient had an adverse event during pacemaker threshold check. Although the investigation of the incident did not reveal whether the incident was caused by operator error or pacemaker malfunction, Roy "*got too worried that [he] caused harm*" (Roy, line 13). Being concerned about patients' safety was not the only reason for the avoidance. Roy thought he was not competent enough to perform the task, and the incident led him to lose confidence in dealing with temporary epicardial pacing. He said:

...I don't know... my knowledge gap or poor technique cause harm to the patient...then really knock my confidence a lot…to even…sort of attempt to do anything with them (Roy, line 57-58,75-56)

Unlike Roy, Linda did not have a bad experience related to patient's safety. However, she worried about harming patient because she had doubts that her skill level was adequate enough to check sensitivity:

But like…checking sensitivity… I double guess myself... is this the correct way to do it... if I worried about something, I am not going to do it (Linda, line 14, 288-289)

Yvonne and Linda were adamant about not doing daily checks when patients had fast rhythms because the pacemaker needs to be turned ten beats higher than the patient's own rhythm. Linda said,

...if patient is quite tachycardiac, like if patient got [sick] at rate of 110, I am not going to pace over that…I am not…just…not gonna do it (Linda, line 229-231).

Moreover, Yvonne reasoned why she did not want to daily check:

...worried it's gonna go on R on T, and put the patient SVT (supra ventricular tachycardia) all sorts of weird things (Yvonne, line 147-148)

Nancy's reason for not checking output thresholds, the minimum current needed to stimulate the heart to contract was that she was uncomfortable especially when patients

did not have any intrinsic rhythm and were therefore fully dependent on the epicardial pacemaker for heart rate, rhythm and blood pressure. There was a risk during the procedure of patients loosing heart rate and blood pressure completely. Nancy offered three reasons for not performing checks in these circumstances. She said,

…one; I could check it wrong…two; I don't want to put a patient at risk…I would probably say that the third one is unknown (Nancy, line 38-43).

Nancy clarified that the 'unknown' referred to the unpredictability; anything could happen in that circumstance. It is possible that the pacemaker would lose the ability to pace the patient and they would have no cardiac output. Many participants did not feel safe and doubted they had adequate skills and knowledge to perform daily check. They were scarred of doing something wrong and in consequence turned to avoidance.

Sub theme 1.2 Stress

Participants voiced high stress levels of managing temporary epicardial pacing. As already discussed in the literature chapter, nurses often feel nervous and apprehensive while using complex modern equipment and dealing with technology, and it can result in nurses feeling incompetent and invoke a fear of potentially causing harm the patients (Broyles et al. 2008; Zuzelo et al. 2008).

Nancy was extremely stressed about patients with no underlying heart rate losing their blood pressure because of no underlying rhythm during temporary pacing output threshold check, because if a patient is fully dependent on temporary epicardial pacing, the patient will have no pacing support during the checks resulting in short period of no

heart rate or blood pressure. Even though Nancy knew it did not take long dialing up the temporary pacemaker output to gain back control of a patient's blood pressure, she said,

Anything could happen…and I don't want to be the one to explain…I'm sorry your parent is dead because I wanted to check thresholds… (Nancy, line 43-44).

Amy also spoke about her nervousness of dealing with temporary epicardial pacing:

…so I still get nervous doing that sorts of thing, because I know that could end up bad outcome you know… I get more nervous with the pacing wires than others, like drains… (Amy, line 257-259).

Also, Ruby was "*freaking out"* (Ruby, line 18) when she found that temporary pacemaker battery was flashing flat and she had to change it when patient was fully reliant on the epicardial pacemaker for heart rhythm, rate and blood pressure. According to the manufacturer (Medtronic 2013) a temporary pacemaker can operate 30 seconds without battery. This is enough time to change the battery, but Ruby imagined the worst case scenario and was stressed about this.

Furthermore, several participants worried when output threshold of temporary epicardial pacing wires were very high, which meant that the temporary pacemaker needed to be set at maximum limit to function properly. Once output threshold was gradually increased even higher, there was no guarantee that epicardial pacing would work for patient to have adequate blood pressure. In case of temporary epicardial pacing failure, the participants

would have to find alternative solutions to support the patient. Amy shared her concerns about failing temporary epicardial pacing:

Just in case… decide not to work. Yes. They will die or you know you have to reopen or temporary pace them with pads or… (Amy, line 39-40).

Yvonne also spoke about high threshold temporary pacing wires:

… so until something bad things happen…like patient goes bradycardiac and needing it…I would not know how it will act…so that would be a worry behind my mind that if something bad happens, this is one thing that I can't rely on (Yvonne, line 29-30).

The high stress was not only felt from the direct management of temporary epicardial pacing, but also from the participants experienced feeling like they were placed in a position of high responsibility without adequate support resources. Linda shared her high emotional status moments:

Sometimes, I found even…not all the doctors have good understanding… um… some doctors are like, oh, I don't know… they don't even have any idea how to use it… this is kind of worry… because the consultant is not always around, and you have the registrar who has absolutely no idea and you've got minimum idea… it's kind of worry for patient's' safety (Linda, line 67-70).

When Linda realized that the doctors she was working with on a particular shift were inexperienced in epicardial pacing and that she herself was the most experience in this

therapy, she started to worry that no one would be able to help her manage temporary epicardial pacing emergencies should they arise. The high emotional pressure was also expressed by participants due to a shortage of staff skilled in caring for patients with temporary epicardial pacing. This meant junior nurses without knowledge or experience of epicardial pacing were allocated to patients who had temporary epicardial pacemakers attached. Sometimes, it was inevitable due to skill mix issues of the unit. When Amy was in charge, she was very concerned about patient's safety:

I would never want the junior, if the patient got no underlying rhythm. I never wanted junior staff there… if patient need to be paced… you have to go through with the staff…look for this, check this, what to document… if this happens, let somebody know if I'm not here grab somebody else. You know this is patient's lifeline… Patient's safety, I just want to make sure patient's safety. Because I don't want… I don't want something to be happened under my watch... (Amy, line 192-193, 320 -329).

Moreover, Yvonne said,

I would have to pay more attention… I would be going in there [patient's bed space] every hour or two to check whether they have been doing right things (Yvonne, line 73, 89).

Several participants shared their experience of feeling inadequate and powerless. In Ruby's case, a patient slowed his heart rate and his blood pressure was compromised, so the decision was made to pace the patient to maintain adequate blood pressure.

... kind of compromised as well, so…tried to turn it up… but then… it set him into tachycardiac rate… so I don't know…whether that was me doing that or… I turn the pacing back down to what it was…because I thought well if we did try increasing rate and it get excited maybe… so I put it back down…No, he did not go back to where he was (Ruby, line 139-141, 150-154)

Although Ruby followed the correct procedure by increasing pacing rate to increase blood pressure, the treatment did not work as she had expected and did not improve the clinical situation. Ruby then "*felt less confident*" (Ruby, line 149) and inadequate to care for patients who were epicardially paced. Yvonne also felt her troubleshooting skills were inadequate because she tried everything she knew to troubleshoot a particular problem where the epicardial pacemaker failed to stimulate the heart to contract, "*but nothing worked*" (Yvonne, line 21).

Moreover, participants described doctor-nurse relationships that caused them to feel powerless to manage temporary epicardial pacing. Susan shared:

Patient started getting lower and lower blood pressure, and rate was getting lower and lower… and doctors were all busy, so I went in there and turn the rate, started pacing as cardiothoracic consultant said earlier on with good response. Blood pressure came and did not need Norad [noradrenaline], and I told doctors… then ICU team came around, turn the pacing down again and said no I don't think he need pacing…. Back up of 40… within 30 minutes or so… his rate started falling down to 50s again, and MAP (mean arterial pressure) was 55… I have told doctors to come and review again…ended up giving fluid… not quite fluid responsive, and end of the shift turn the rate up again…

feeling like…we are not quite trusted… like…we don't know what we are doing… medical staff don't quite agree with what we were doing (Susan, line 9-10, 21-35)

Susan believed that the patient should have been treated with pacing to sustain good blood pressure. She placed the patient back on epicardial pacing. However, the doctor insisted she turn the epicardial pacing off and commence the patient on the medication to improve blood pressure. With this therapy, the patient's blood pressure was unstable the whole shift and the patient needed volume resuscitation. The blood pressure medication and volume resuscitation did not work, and the patient ended up on epicardial pacing as Susan first suggested. In this situation, Susan felt powerless to provide the temporary epicardial pacing care to the patient needed.

Delivering temporary epicardial pacing care was stressful for the participants because they were aware of the potential risks of the therapy. Moreover, the participants experienced stress when there was working limited support and could not rely on inexperienced doctors or nurses. Furthermore, the participants felt highly stressed when placed in situations where they felt inadequate and powerless to deliver proper temporary pacing care.

Sub theme 1.3 recognizing risk

The participants shared experience of temporary epicardial pacing clearly showed that all participants were aware of and recognized the risk of certain pacing situations. Amy and Ruby they both made similar statements "*we pace people all the time*" (Amy, line 8 and Ruby, line 264). Amy showed her awareness of the potential seriousness of junior bedside nurse caring the patient with epicardial pacing when she said, "*you know this is a*

patient's lifeline" (Amy, line 329). Moreover, Roy's awareness of the situation was also clear in his statement:

We need to deliver appropriate care and regular checking of thresholds… even we do it quite often and we see them every single day, they do present a risk to a patient and we need to be aware of that… (Roy, line 82, 163-164)

Although checking thresholds was described as stressful and by Nancy and Yvonne, and they were reluctant to perform the task, they said they understood that the daily check was an essential part of nursing practice that ensured patient safety. Nancy suggested that they "*should check every shift*" (Nancy, line 116) and Yvonne said, "*I think we do need to check thresholds more often than once*" (Yvonne, line 268).

The transcript showed that some participants were recognizing the importance of this clinical practice. Ruby shared that she began to recognize the significance of temporary epicardial pacing care after a temporary pacemaker battery went flat on a fully pacing dependent patient. She said,

I think that epicardial pacing wires is really crucial part in our area, because patients are sick and the heart sometimes struggle little bit… I think that's important. This is what's keep some people alive… but I haven't really processed that part in my head until this situation happened (Ruby, line 73-76).

Linda's transcript illustrated her realization of the heavy responsibility and limited support exacted on her. Following the realization, she was more cognizant of the responsibility inherent in everyday epicardial pacing practice. She said,

We do hold a lot of that responsibility. Because it is our responsibility to check them… and we do have to troubleshoot to get it working properly…Some doctors probably have no idea if it wasn't working. I've never thought about like that. But I guess we do… anyway, it's scary… maybe I should take more time to be familiar with that actual things… (Linda, line 71-78)

Andrew shared his perception that in order to take the responsibility for the risk inherent in caring for patient with epicardial pacing the nurse needed to be comprehensively educated for delivering the care. He said,

I think it is very valuable therapy we can use it if used appropriately to optimize the patient recovery, but I think you have to understand your patient pathophysiology, if you are going to take the responsibility (Andres, line 279-282).

He believed that providing temporary epicardial pacing is beneficial for patient only when the participants performed the clinical practice skillfully and based on a comprehensive understanding of the care and patient for whose care they had the responsibility.

In summary the theme, 'Risky business' emerged from participants' everyday experiences of delivering temporary epicardial pacing care. The transcripts suggested that

all participants were ‘scared’, ‘nervous’ and ‘worried’ and wanted ‘not to cause harm’ to patients. However, several participants reacted by avoiding daily checks because they were under stress when dealing with patient who were fully defendant on epicardial pacing or when they were put in situation of responsibility for epicardial pacing without adequate backup support they could rely on. Furthermore, the transcript demonstrated that all participants were conscious of the potential risks of temporary epicardial pacing care and aware of the serious consequences of inappropriate management of epicardial pacing. Amy said, “…*you don’t know what you don’t know*” (Amy, line 316). However, some participants described that they became more thoughtful of managing temporary epicardial pacing after they either experienced a serious epicardial pacing situation or were placed in situation of limited support. Following these situations these participants became aware of the importance of having a broad comprehensive understanding of the clinical situations in which patients required epicardial pacing.

Theme two: Take time to own

The participants’ experiences related to this theme emerged from analysis of all eight interviews. In this theme, the participants described everyday experiences of becoming more comfortable, competent and confident in delivering temporary epicardial pacing care. Although some participants became more confident about their clinical performance than others, all eight participants described becoming more skilled and efficient in delivering this therapy. All participants described that it took time for them to utilize the practice appropriately for delivering optimal epicardial pacing to this patient group. Five sub themes were identified for this theme: 2.1) being (been) there, 2.2) experience and knowledge deficit, 2.3) not so risky if following rules, 2.4) looking for support and 2.5) enhanced responsibility.

Sub theme 2.1 Being (been) there

The participants described that they were often on a learning curve when exposed to temporary epicardial pacing care on a daily basis and when they encountered variable pacing situation. Moreover, the participants constantly reflected on their clinical performance, the decisions they made, their roles and responsibilities in delivering temporary epicardial pacing. Frequent exposure to epicardial pacing care was described by the participants as increasing their comfort level, with some participants reporting they remained feeling nervous in complex pacing situations. With more exposure to epicardial pacing, the participants experienced a sense of accomplishment which not only increased their comfort level, but also make them feel more competent and confident in this therapy. In Roy's transcript, he suggested,

I improved the confidence with continuously just checking them…temporary epicardial pacing care would become less foreign… if [people were] repeatedly exposed [to the practice] (Roy, line 29, 189,191).

Ruby also agreed that she was "*doing better*" (Ruby, line 263) after being more involved in different pacing care, and she believed that her checking sensitivity practice became easier as she did more and saw the beneficial effects. Roy added:

…especially when you start getting more exposure to people, more pacing dependent to improve haemodynamics… and you see sort of senior staff utilizing those techniques… (Roy, line 233-235)

The transcripts showed that the participants were learning from variety of situations they encountered and subsequently using the skills in similar pacing situation. For example, Ruby said, after temporary pacemaker battery went flat on fully pacing dependent patient,

I check every box pretty early, after that… they are certainly high priority, like I write on my sheet 'check (Ruby, line 72, 79).

Moreover, Yvonne said,

Since I'm doing TLing, [Team leading], I do have more exposure, before I had only one patient to check everything, now I have six patients… also variety that I am getting as a TL (Team leader), every patient can be different (Yvonne, line 37-138, 160-161)

Yvonne's account suggested that working in a team leader role, she was constantly exposed to many different pacing situations which provided opportunities to practice and learn temporary epicardial pacing care. Like Yvonne, Nancy agreed "*the biggest learning curve I made*" (Nancy, line 146) was when she managed temporary pacing more frequently; she said, "*it's good because it forces you to learn and troubleshoot*" (Nancy, line 144). Nancy shared an example of the situation:

I had an experience where somebody was requiring pacing because of complete heart block, and pacing thresholds were high, and we couldn't actually get a capture… it was good because it made you think about everything (Nancy, line 19-21, 23)

Amy described her temporary epicardial pacing experience;

…it's all experience years of doing something and learning… as you get more in your years you get less nervous about that stuff (Amy, line 126, 130).

Andrew concluded meaning of being (been) there as he had been exposed to all different clinical situations possibly happen to cardiothoracic patients in managing temporary epicardial pacing;

We've been working in this unit for many years, and we probably have been exposed to almost everything that could happen to a patient post cardiac surgery. So, chances we've seen [the situation before is high] … whatever comes up, [nothing we would have never seen before] …" (Andrew, line 82-84).

The point that should not be missed in the sub theme 'being (been) there' is that the sense of accomplishment participants feels when they have dealt with an epicardial pacing situation well. When Nancy had to commence temporary epicardial pacing for a deteriorating patient, her experience was;

…very happy that I checked patient's thresholds earlier. Because I knew exactly what the patient needed (Nancy, line 111-112).

Also, Amy remembered.

… [that moment of having a] good experience… [I set the pacemaker] it worked well, I felt it helped the patient as the patient's haemodynamics improved (Amy, line 22,29).

'Being (been) there' played an important part in becoming competent in epicardial pacing care. All participants acknowledged that their epicardial pacing care improved with 'being there'. They felt doing the task of daily checks and troubleshooting of temporary epicardial pacing became easier. This was because they were exposed to numerous aspects of temporary epicardial pacing. Moreover, with growing exposure to managing temporary epicardial pacing the participants feeling of achievement grew which further encouraged their confidence in this therapy.

Sub theme 2.2 Experience and knowledge deficit

Of those participants who were increasingly exposed to managing temporary epicardial pacing, some felt that they continued to lack the necessary experience and knowledge to deal with certain temporary epicardial pacing situations. All eight participants expressed they wanted to have more experience and knowledge to deliver optimal care and shared ideas with the researcher about the ideal way of getting more experience and education. For example, because of her inexperience, Amy was concerned about safely removing epicardial pacing wires:

I haven't really done it much. So, I don't know how much resistance you meant to feel and what's normal… I'm not really sure…I can pull the underwater seal drains out my eyes closed because I have done it so many time, but I haven't really pulled out wires…

that makes me nervous. Because I really haven't done that much… (Amy, line 105, 247-249, 261-262)

Amy thought she "*needed to have more education on troubleshooting*" (Amy, line 211). Roy worried about his "*knowledge gap*" (Roy, line 75), and said,

…understood the theory and how to do the task [he was] still not overly confident [deciding] which mode might be the best for the patient… (Roy, line 16-17, 21).

His suggestion to improve knowledge on advanced mode of temporary pacing was *"regular theory education and keeping up with education*" (Roy, line 104). Nancy mentioned,

…the postgraduate critical care course was quite basic in terms of cardiac, and I learnt more about pacing on the ward rather than through the university… (Nancy, line 26-28).

Although Nancy had learnt the theory of temporary epicardial pacing, she wanted to have knowledge of not just threshold testing but she wanted *"to see the big picture of pacing*" (Nancy, line 162). Yvonne's transcript showed she acknowledged her lack of appropriate cardiac knowledge to start thinking of epicardial pacing as a whole:

My knowledge is not that high to say that patient is definitely not beneficial from pacing. It could be because the patient has some sort of pathophysiology in the heart muscles that I don't understand. This patient may benefit from higher pacing which I may not actually understand why (Yvonne, line 287-288, 291-293).

Yvonne thought that "*getting a postgraduate diploma in cardiac*" (Yvonne, line 315) would help her to understand the whole pacing situation better. Again, Linda confirmed that she needed more theoretical knowledge in cardiac than the postgraduate education provided to perform epicardial pacing care safely.

But I don't have really in depth understanding and in the course (critical care course), we were doing our clinical component, the pacing was like the extra you don't even have to do it. Literally optional things to get ticked off (Linda, line 54-56, 94)

Moreover, Linda believed

…double guessing myself in checking sensitivity because I do not do them often enough so that the practice is not ingrained… (Linda, line 32-33).

Linda felt she lacked both the theoretical knowledge and clinical experience, and her suggestion to solve this issue was "*refresher and in-services like hands on teaching from senior staff*" (Linda, line 86, 129). Ruby also mentioned her lack of theoretical knowledge about temporary epicardial pacing;

my education was not optimal… the ideas and the theories behind the pacing in order to be able to troubleshoot (Ruby, line 41, 44-45).

She describes it was "*daunting*" (Ruby, line 11) for her when she had to troubleshoot a pacing issue quickly. Ruby wanted to *"know exactly what I am doing*" (Ruby, line 88),

and she said, continuous education on pacing regularly would improve her management of temporary epicardial pacing;

little bit of information at a time and one bit later and another bit next week like sequential, because it is a lot of information at once (Ruby, line 253-255).

Susan felt that she had not cared for enough patients with complex pacing requirement. Susan's solution was to improve the deficit of experience and knowledge by

…simulation of different rhythms, different problems and how to troubleshoot these different issues… this would bring me to higher lever… (Susan, line 169-171).

Andrew concluded the sub theme of 'experience and knowledge deficit';

Education from university is a good foundation, but it is not at proficiency level or expert level. I think the specialty of cardiac knowledge you get from a cardiac grad dip is not present in the critical care grad dip. I mean from what I see, nurses who did critical care grad dip… when they fished the course, they still have a huge gap in cardiac knowledge… I mean if you don't understand why, I think it impacts on your confidence to manage them (Andrew, Line 89-90, 97-98, 127, 369)

Andrew believed "*knowledge from formal study but also knowledge gained from experience*" (Andrew, line 81-82) were important in managing temporary epicardial pacing.

Sub theme 2.3 Not so risky if following rules

When participants delivered temporary epicardial care, but they were not competent or confident to do so due to experience and knowledge deficit, the participants said they relied on protocols, guidelines and instructions to ensure they were performing care correctly. The participants believed that as long as they followed the guidelines (OWI – organization wide instruction) that gave them step by step instructions they felt less confused and believed potential risks of temporary epicardial pacing to the patient would be minimized.

Yvonne shared her experience of following protocols when checking sensitivity checking and removing pacing wires:

With sensitivity, I will try to bring out the instruction, just in case I do something wrong. I will need to at least read the steps and then do it. I definitely need the OWI (organization wide instruction), then I can do myself... there is OWI for removal as well (Yvonne, line 96-97, 110-111, 231).

Yvonne was less worried when she followed protocols for checking sensitivity and removing epicardial wires. Linda was also more comfortable when she used organizational wide instructions in managing temporary epicardial pacing wires. She said,

OWI is pretty good, and I am comfortable and the protocol is fairly straight forward and tells you everything that you have to do (Linda, line 81, 249).

Amy also confirmed,

…the protocol itself is useful… actually most people print it out before they pull out the wires. I just want to make sure I don't miss anything… (Amy, line 276-277).

However, Andrew worried that people were dependent on protocols without understanding the rationale behind the practice:

If the reason they wanted an OWI was because they aren't confident or they felt they couldn't do it without an OWI, that would concern me. If they have to second guess themselves without an OWI, I would be concerned (Andrew, line 209-212).

The participants did not need protocols for every episode of temporary epicardial pacing practice. Checking sensitivity and removing epicardial wires were the two main clinical practices that many participants required an OWI for. They needed the OWI to ensure that they did not make an error. Although following step by step OWI instruction assured patient's safety, it was thought not to be an ideal way to manage temporary epicardial pacing. The participants thought the nurse also needed to understand the rationales behind the practice. Furthermore, Andrew believed, theoretical and clinical knowledge in addition to the OWI were required to troubleshoot complex temporary pacing situations.

Sub theme 2.4 Looking for support

The study showed when participants lacked theoretical knowledge and clinical experience about temporary epicardial pacing some resorted to protocols to ensure their practice was safe. When they were not sure about their performance and feared to deal with the

situation some sought out expert nursing support. This gave insight to the sub theme 'looking for support'. This sub theme formed another essential part of their experience. Participants were aware that experienced expert nurses were a valuable support that they leant from. The participants used words such as 'senior nurses', 'clinical champion' and 'more experience' to demonstrate they had insight into who they need to seek out.

Amy shared:

I always think, when Mary is on, I think oh good Mary is on if I have any issues, Mary will be able to fix it. Because I think Mary have more advanced understanding… and CTSU (cardiothoracic surgery unit) registrar showed me good technique of removing wires which was very helpful actually, I like the way how he did… (Amy, line 227-230, 253)

Amy felt safe when Mary was on the same shift because she thought Mary as a senior could help her when she needed it. Moreover, Amy was happy to be supported and learn new technique of removing epicardial wires from experts such as the cardiac surgical registrar. Roy described similar experiences. Roy was assured

When I confirmed with more senior clinicians that I was doing the right thing, my confidence was built up because my competence was backed up by having a support network (Roy, line 31, 84-85).

Moreover, Yvonne said,

I was very reluctant to check thresholds because that is high risk unless there was senior staff or doctor …. (Yvonne, line 336-337).

In Linda's case, she said,

…not confident enough to check sensitivity myself, therefore, would always ask somebody more senior who had more experience to come and help (Linda, line 26-27,43).

Susan who seemed to be competent and confident in her pacing practice said,

[would seek] help from more senior nurses and cardiothoracic surgeons if the troubleshoot was out of my level (Susan, line 144-145).

Furthermore, Susan believed

…the same level colleague could support me with brainstorming to see if I had forgotten anything [in terms of troubleshooting] (Susan, line 151-152).

In addition, the supporting system was described not only for safe practice, but also to help support participants emotionally. Nancy said,

Probably make me feel the best, I guess, to make sure I do have enough support around me (Nancy, line 57-58).

It was interesting that Nancy used the word 'trust' in her interview when she talked about the supporting system. She did not want to check output threshold of fully pacing dependent patients "*if I had nobody to trust in particular on that shift"* (Nancy, line 52). If Nancy did not trust the skill of the senior person she was working with, rather than checking the output threshold herself, she would ask the other nurse to do so. Also, Nancy said,

I've done it [checking threshold on fully pacing dependent patient] twice with people that I trust next to me (Nancy, line 51).

The data showed that in everyday temporary epicardial pacing practice, the participants believed that senior nurses with many years of experience and cardiothoracic surgeons provided them with clinical and emotional support to practice safely. The participants believed the theoretical knowledge gained from university studies and the clinical knowledge gained from experience could not prepare them for all temporary epicardial pacing situations they faced in everyday practice, and they relied on the local support system described above to deliver safe care.

Sub theme 2.5 Enhanced responsibility

All the participants in this study had completed postgraduate study in cardiac or critical care nursing and had responsibility for management of temporary epicardial pacing care in the research setting. This included daily pacemaker checks, troubleshooting and decision making related to optimal pacemaker function for individual patient or if assigned a role of team leader for a group of six patients. In addition, the participants felt that they were expected to also provide pacing support to their team members. Initially,

this theme seemed to overlap with the sub theme 'stress' because the participants felt increased pressure from the expectation. However, the sub theme 'enhanced responsibility' was more about the participants' learning to deal with the increase responsibility rather than feeling stressed.

Nancy shared her experience of the responsibility:

… the realization… you can't pass the bucket anymore, you can't hide behind other people, I feel some people are depending on me. I still don't feel like have enough answers for anybody. Initially it was safety… was my big concern… and now, my concern is people want to depend on me. They want to ask me questions; I need to have response for them… (Nancy, line 143, 145,148-152).

Although Nancy was concerned that she would not be very useful resource to junior nurses, she was aware of her heavy responsibility. Linda described her levels of responsibility that had changed since she was qualified in managing temporary pacing:

…you are the one generally check all of them if you don't have crit care. you have to go around and check everyone's thresholds, make sure they are functioning… you were there to help them out if stuff goes wrong (Linda, line 183-185, 223).

Linda was expanding her role from feeling safe to becoming a resource person to others delivering temporary epicardial pacing care. Initially Linda found the increased responsibility "*overwhelming*" (Linda, line 216). However, she quickly recognized that "*the responsibility is on me*" (Linda, line 222). In Roy's case, he was clearly aware that

team leaders "*needed to be quite solid in temporary epicardial pacing knowledge*" (Roy, line 99) to assume the responsibility. This is illustrated in Roy's comment,

…when bedside nurse couldn't deliver appropriate pacing, then I as a team leader would take that role… (Roy, line 100-101).

Ruby summarized this sub theme of 'enhanced responsibility'.

…because the responsibility has been enhanced… you are the next port of call, you need to know what to do exactly… (Ruby, line 62-64).

Overall, the transcripts showed the participants accepted the enhanced responsibility role, and they wanted to strengthen their knowledge and clinical expertise in managing temporary epicardial pacing so that they could provide support to others.

In summary, the theme 'take time to own' suggests as the participants became more exposed to varied epicardial pacing situations the more immersed they felt in temporary epicardial pacing practice. The immersion in frequent exposure and involvement in the practice resulted in the participants feeling comfortable and competent in the therapy. This theme suggests that in order to minimize the risk of harm to patients, some participants followed protocols. However, the experiences all participants narrated clearly showed they took their responsibility seriously and in order to enact the responsibility they were seeking to improve their theoretical and practical epicardial pacing knowledge while being supported by others.

Theme three: Zeroing in

Unlike the other two themes, the theme 'zeroing in' showed that some participants were focused on more than the tasks associated with temporary epicardial pacing care. While other participants concentrated on ensuring the daily safety checks were done, these participants were using temporary epicardial pacing therapy to optimize patients' recovery. These participants described themselves as self-motivated to learn more advanced temporary epicardial pacing functions. They also had an in depth cardiac knowledge that enabled them to set the pacemaker in such way that it would optimizes patients' progress. These participants were less concerned with following an OWI and were more focused on adjusting temporary pacing function in response to patients' clinical status. The participants who zeroed in saw temporary epicardial pacing as holistic care rather than elemental or procedural. 'Zeroing in' allowed the participants to think critically in their assessments of patients and in making clinical judgement. These participants made clinical decisions and 'did (do)' act upon their decisions.

The sub themes related to 'zeroing in' were 3.1) self-directed learning motivation, 3.2) don't follow rules, 3.3) optimizing clinical status and 3.4) Do.

Sub theme 3.1) Self-directed learning motivation

The sub theme 'self-directed learning motivation' overlapped with the sub theme 2.2) experience and knowledge deficit. The participants felt they lacked experience and knowledge to deliver safe care because they were unsure they were performing tasks correctly. Moreover, they wanted to have more experience with troubleshooting to deal with difficult and complex pacing situations. Unlike the sub theme, experience and knowledge deficit, the sub theme self-directed learning motivation, emerged from participants' accounts in which they describe their desire to learn more. They describe

their desire being motivated by professional interest, not by feeling incompetent or from the pressure felt due to the expectation by others.

Yvonne described "*motivation*" (Yvonne, line 125) as people not being passive in their learning and not waiting for sessions or support from seniors. Yvonne said, "*go check online… there are so many things online*" (Yvonne, line 127). She stresses the importance of self-directed learning motivation and being proactive on learning. Moreover, Andrew commented on different levels of clinical performance of two nurses despite the same education and the same years of work experience, he believed,

[the reason of] variable in proficiency… proactive in their learning (Andrew, line 135, 141).

Furthermore, Andrew described himself as

I'm the type of person that if I come across the shift something that I don't know about or I'm not confident about, I go home and I research it. I know not everybody does that. Some just rely on whatever doctor tells them or senior nurse tells to do. I am not. I will get that opinion, but I actually do my own research on it. So, I think that's the proactive thing (Andrew, line 145-149).

The sub theme 'self-directed learning motivation' emerged from participants' everyday experiences of having a proactive learning attitude. These participants wanted to know more than what the education and support systems such as doctors or senior nurses taught them. Their motivation was not only from the safety concerns of performing tasks.

Sub theme 3.2 Don't follow rules

The sub theme 'don't follow rules' showed that as participants gained more clinical experience and theoretical knowledge, they became more competent and confident. When this occurred their practice transformed from 'not so risky if following rules' to 'don't follow rules'. In other words, their focus shifted from avoiding risk to utilizing optimal temporary epicardial pacing modes that were appropriate to specific patients' scenarios including pacing emergencies.

For example, Andrew described the *"trial and error*" (Andrew, line 51) of temporary epicardial pacing. In this narrative account, Andrew talked about trying different modes to see which one the patients respond to best, rather than being concerned about following instructions or guidelines. He said,

By doing a holistic assessment on the patient, by looking at everything and then you put in those pieces of the puzzles together to determine. Sometimes you turn down the pacing and patient deteriorates, not significantly. May be small deterioration, sometimes it is trial and error (Andrew, line 47-51).

Andrew asserted that "*reassessing patient*" (Andrew, line 56) constantly is the key point that backs up his 'don't follow rules' decisions. He said,

I choose to take the responsibility because my focus is to optimize my patient recovery (Andrew, line 275-276).

Roy also commented that he learns more from trying something different:

Sometimes you learn a lot more from when things go wrong. When I say things go wrong, not necessarily adverse event… you learn more from that because you actually trying to something to improve it. If it does, it's good. If it doesn't, ok that's not best for them (patients). You are challenged by trying something different (Roy, line 260-261, 266-269).

Roy did not use the word 'optimizing' or 'holistic', however, his description evidently showed that 'try something different' was to 'improve something', and he was ready to accept the challenge of 'things going wrong'. Roy was not zeroed in on delivering temporary epicardial pacing care as much as Andrew. However, his aim of delivering care to patients was similar to Andrew's in wanting to 'improve' patient's condition. The provision of optimal temporary epicardial pacing care to patients was seen by some participants as moving beyond practice that was restricted to protocols and rules.

Sub theme 3.3 Optimizing clinical status

The sub theme 'optimizing clinical status' appeared in all eight participants' experiences. Although the data showed the participants had different levels of skills, education and years of experience, all were concerned with 'optimizing' temporary epicardial pacing care. However, the participants were achieving the optimization to different levels. Some participants were already providing epicardial pacing care based on critical thinking and clinical judgement and were utilizing pacing as part of holistic care rather than procedural practice. Others had not reached that level yet, but, they knew they needed to focus on the whole picture rather than on the temporary epicardial pacemaker itself.

For example, Nancy used the word "*big picture"* (Nancy, line 162) when talking about pacing. While Nancy could not see the 'big picture' yet, due to lack of knowledge and experience, her comment suggested that temporary epicardial pacing was for patient's recovery process. On the other hand, Amy described her pacing practice as:

I know anatomy and physiology, cardiac cycle how pacing works, I understand where the wires seat, how they work… Knowing the behind of reasons why people need pacing, knowing the valves, where the conductivity is, where they (cardiac surgeon) suture the valve (during surgery), patient's risk… (Amy, line 135-137, 154-156).

Amy understood the patient's recovery following open-heart surgery. Consequently, she understood epicardial pacing was a tool used to stabilize her patient's condition. Moreover, Ruby shared her experience of temporary pacing care planned from a holistic approach. She said,

…when my daily thresholds pacing box are checked, I would assess the patient… you need to assess all the cardiovascular system as a whole… (Ruby, line 223, 226).

Also, Susan shared her experience of optimizing clinical status:

*…know patient's history and post op progress… and I have a picture of what this patient needs… and so I made informed decisions on how, what this patient needs at time… and seeing the patient was helped… how effect... the blood pressure and rhythm… (*Susan, line 55-57, 81)

Andrew showed that he was zeroed in on managing temporary epicardial pacing by describing his perception of pacing:

I think the physiology of the patient's heart or the pathophysiology of the patient's heart needs to be understood as far as the cardiac structure goes because the pacing can have huge impact on that or vice versa the structure of patient's heart can impact on what type of pacing required in order to optimize the patient's condition (Andrew, line 7-11).

Furthermore, Andrew commented on the role of education in having a holistic view of pacing,

…education cannot just focus on pacing in isolation. We need to talk about the pacing in the context of patient's pathophysiology because it has huge impact on how you pace the patient… (Andrew, line 226,228,230).

Several participants considered the tasks associated with temporary epicardial pacing as essential but minor part of patients' recovery. These participants were focused more on epicardial pacing as a way of 'optimizing clinical status' of patients. Those participants who used temporary epicardial pacing to optimize patients' clinical status, did so by thinking critically when making clinical judgement. Susan's experience provided one example:

Postoperatively patients come out and paced like DDD, and the rate starts coming through, we check the underlying rhythm, and they have own rhythm with adequate rate,

then you know, we have to think about turning it down to backup pacing… (Susan, line 4-7).

Firstly, Susan checked the patient's underlying rhythm because she saw the patient having extra beats in addition to the pacing beats. She did not ignore the extra beats. She wanted to see what the patient's heart was trying to do. Susan started to think whether the patient needed pacing or not, and started to plan to turn the pacing setting down to a backup rate only. She did this because she knew that patients are always better in their native rhythms. Yvonne also shared the same experience as Susan;

…if it looks like sinus rhythm, then I would turn down the pacing rate and see what patient is actually at. If they have better blood pressure in their own rhythm, I would not try to pace them… (Yvonne, line 279-281).

Amy showed she was thinking critically and linking all the pieces of clinical information together;

…you have pacing wires, if the patient is hypotensive [low blood pressure] and has low urine output, you can increase cardiac output [blood pressure], [to] improve their haemodynamics [blood pressure]… (Amy, line23-24).

In Susan's account there was evidence that she was using critical thinking to try to dissuade a doctor from following a particular course of action she believed would not optimize the patient's condition:

But the patient needs to be paced at that stage, we ended up filling him and pacing the patient at the end of my shift. But it caused the patient to have swinging blood pressure, when he could be stable with being paced, give him more time, may be more filling, improve his haemodynamic status first, then see he tolerates slower rate, but instead of stable, it was up and down and up and down. Patient needed to be pace at that state… (Susan, line 39, 41, 45-48).

The transcript showed that Andrew's skill in optimizing patients' conditions by temporary epicardial pacing was much higher than that of other participants:

When I think about patient pacing to optimize their recovery, I never do that without looking their echo report. If patient have diastolic heart failure or concentric hypertrophy and I see the patient is ventricular paced, I might try turn down the pacing. Because these patients are very dependent on atrial kick and they actually response better on lower heart rate. Same as systolic heart failure and diastolic heart failure. They are going to respond very differently. Also depends on the filling status of patient (Andrew, line 14-15, 23-27, 241-242, 244).

Moreover, Andrew commented *"so everything I do. I won't do unless I have evidence to back up"* (Andrew, line 66). His evidence meant theoretical knowledge, practical knowledge, patient's cardiac pathophysiology and his interpretation of diagnostic tests such as echocardiogram and haemodynamic assessment.

In summary, although the transcript showed that the participants all had varying experiences; they were all aware that their focus should be on the whole patient rather

than on the temporary epicardial pacemaker itself. The transcripts showed that some participants recognized that epicardial pacing was only one part of a bigger picture of optimizing patients' clinical status, while others were just beginning to do so. All eight participants said they needed to think critically in making clinical judgement on epicardial pacing.

Sub theme 3.4 Do

The sub theme 'Do' refers to the participants' 'zeroing in' on temporary epicardial pacing proactively. Some participants did this by making decisions on changing pacing mode or settings depending on patients' need. They evaluated temporary pacing situations constantly and discussed these with the team in an attempt to provide appropriate temporary pacing care at all times. Not all participants were at this level as the 'Do' action required extensive knowledge and understanding of the patient, their surgery, the recovery process as well as advanced temporary pacemaker functions.

Andrew shared:

If I come on to the shift and I see inappropriately done (pacing modes or settings), I will approach the doctors and I will talk to them about it. I won't go in there and just change it, but I will say it is not going to optimize the condition for these reasons… (Andrew, line 73-76).

Andrew did not hesitate to share with the doctors his decision making about how to use pacing to optimize the patient's condition. Amy also addressed an issue of inappropriate pacing with doctors because she *"had confidence in her own practice*" (Amy, line 116).

Ruby expressed that she would be "*relatively comfortable making decisions*" (Ruby, line 208), however she said,

I wouldn't be able to make the decision prior to seeing the patient and checking the pacing box first… but if I decided to do something different, I would do it as long as [I felt] the patient is safe. I would then talk to the medical staff to find out if they were on the same page (Ruby, line 208-209, 229).

Susan also mentioned the 'Do' action:

If patient needs it I will do, then I will find the doctor, and explain this is what I have done, based on the patient's history, surgery patient had, rhythm issues… probably still needs filling… (Susan, line 86-88).

The sub theme 'Do' showed that the participants' main interest was optimizing patients' condition. The 'Do' action required extensive understanding of the patient, the surgery, the recovery and the temporary pacemaker itself. Not all the participants were 'doing'. However, the sub theme 'optimizing clinical status', suggested regardless of skill level all the participants were thinking critically in making clinical judgement and this became their rationale for 'doing'.

In summary, the theme 'zeroing in' showed the participants trying to use temporary epicardial pacing to optimize patients' recovery. Some participants were already zeroed in on managing temporary epicardial pacing while other were not quite there yet. However, the theme reveled the participants' view on temporary epicardial pacing was

changing from a procedural task to a part of whole of the patient's recovery, which was the first step of 'doing'.

Summary

Findings from analysing the transcripts of the lived experience of delivering temporary epicardial pacing of eight participants were presented in this chapter. Three main themes and their sub themes emerged from studying patterns across the eight interviews. All participants recognized temporary epicardial pacing as a risky business. Some participants were scared and stressed while others managed their fear. Moreover, the participants' experiences showed they took time to own temporary epicardial pacing practice. They learnt about epicardial pacing in their involvement in varying pacing situations. Some participants used protocols to feel safe, with all participants wanting more experience and knowledge and looking for supporting system to improve. As the participants gained more experience, their responsibility was enhanced. Those participants who thought critically about pacing showed they were thinking about the process of zeroing in on delivering optimal temporary epicardial pacing, but only two participants demonstrated 'doing' (delivering optimal temporary epicardial pacing proactively). The data showed that the participants' view on epicardial pacing was changing from a procedural practice to a part of optimizing patient's recovery overtime. Furthermore, participants were practicing critical thinking and clinical judgement at varying levels. Interpretation of these findings will be presented in next chapter.

Chapter Six – Interpretation

Introduction

The purpose of this interpretive phenomenological study was to explore how nurses make sense of the experience of managing temporary epicardial pacing. Smith's IPA method was used to analyze transcripts from interviews held with eight nurses who manage temporary epicardial pacing on a daily basis. 'Risky business', 'Take time to own' and 'Zeroing in' emerged as main themes from the analysis. In this chapter, the researcher firstly presents the five skill levels articulated by Benner. Next, the themes and subthemes that emerged through the IPA analysis of the transcripts will be interpreted through the five-skill acquisition level lens. Subsequently the researcher will draw conclusions about the experience of nurses managing temporary epicardial pacing from the interpretation.

Benner's skill acquisition theory

Dr Patricia Benner is a noted nurse researcher who established the definition of expert skill acquisition in clinical nursing practice. Her theory is widely accepted, and in her book 'From novice to expert', Benner (1984) explains that in acute care settings, high patient acuity, technology and specialisation require highly experienced nurses to ensure safe care. Consequently, capturing the expertise of clinical nursing practice is necessitated to support and guide non-expert levels of nurses to improve their nursing practice (Benner 1984). According to Benner (1984), expert nursing practice is very complex to formalize, define or generalize. In this study, Benner's five levels of capabilities: novice, advanced beginner, competent, proficient and expert were used to understand a particular cardiac intensive care nurses' experience of delivering temporary epicardial pacing care. The determinant of the participant's skill level within this study was made according to

Benner's performance characteristics of each skill level. For example, if a participant's experience of managing temporary epicardial pacing practice was heavily rule dependant, this performance characteristic would be in accordance with the advanced beginner skill level.

Risky business

'Risky business' emerged as one of three main themes from the data analysis. In addition, three subthemes, 'avoidance', 'stress' and 'recognize risk' were identified within this theme. The theme 'risky business' and its subthemes referred to the care required by patients with temporary epicardial pacing. Applying Benner's interpretive lens revealed that all participants interviewed in this study, experienced managing epicardial pacing as risky. However, the risk was experienced in a variety of ways depending on the skill level of each participant. No novice practitioners were identified. This was believed to be due to the fact that participants had five to nine years' experience in the specialty where epicardial pacing was a common therapy and between two months to six years' experience in managing temporary epicardial pacing for a group of patients.

Advanced beginner level practitioner

The interpretation showed participants at the advance beginner level 'avoided' daily temporary epicardial pacemaker checks, were 'stressed' by the procedure, but 'recognized the risk' the associated risk. The advanced beginner participants avoided checking thresholds of epicardial wires for number of reasons. Firstly, because patients with rapid heart rates, needed to be paced at a higher rate than their own heart rates during threshold checks. Secondly, because they were worried that the temporary

pacemaker's rhythm would compete with the patient's own rapid rhythm during the check and lead to a fatal fast rhythm. Thirdly, the participants avoided checking sensitivity thresholds and setting temporary pacemaker sensitivity because they felt they did not know enough to do this safely. The participants were aware if they checked the sensitivity incorrectly this would result in the sensitivity being set incorrectly with potential for the pacemaker to induce a fatal rhythm in the patient. Fourthly, advanced beginner participants described avoiding performing certain checks because they did not want their marginal performance to result in a negative consequence for the patient. "*It's better to be safe than sorry*", one advanced beginner participant said (Linda, line 275). It was important to note advanced beginner participants were happy to perform the required checks, but with adequate support such as higher level nurses.

In addition to avoiding pacemaker care, advanced beginner participants described being scared to perform pacemaker care. The reasons they gave for being scared were the same reasons they gave for avoiding pacemaker checks. For example, advanced beginners were scared to perform required checks because they did not want their performance to result in a negative consequence for the patient. Interestingly, however advanced beginners only recognized the risk associated with performing the required checks, not the risks associated with not performing the required checks. According to Benner (1984) this might be because advanced beginners learned from previous experiences. If not previously exposed to situations where patients experienced negative consequences as a result of not performing the required checks and not setting pacemakers correctly, advanced beginners would not anticipate inadequately checked/set pacemakers causing fatal rapid heart rhythms or very low or no blood pressure. In other words, advanced beginners would not know that there were risks associated with performing, but also not

performing the required checks. A participant acting from an advanced beginner level could not "*see the big picture*" (Nancy, line 162).

Competent level practitioners

An interpretation using Benner revealed unlike the advanced beginners, competent level practitioners did not avoid performing required pacemaker checks. However, like the advanced beginners, the participants who were at the competent skill level described feeling 'stressed' in managing temporary epicardial pacing. While the advanced beginners felt stressed because they feared the negative consequences of performing the required checks incorrectly, the competent practitioners feared not "*troubleshooting quickly enough*" (Ruby, line 46) and being in situations where they had inadequate backup support for pacing emergencies. Participants at the competent skill level, 'recognized risk' but the risk was more associated with the speed of and lack of support for troubleshooting and emergencies of temporary epicardial pacing.

Proficient and expert practitioners

Further interpretation using Benner's theory of skill acquisition exposed participants at the proficient and expert skill levels 'recognized the risks' associated with the practice. However, at these levels the participants were not as personally stressed, nor did they avoid the practice because they understood the situation and were able to troubleshoot and act appropriately in emergencies. At these levels participants referred to risk as suboptimal recovery and identified comprehensive knowledge of physiology of the patient's clinical condition, the surgery and the recovery process as mitigating the risk. For example, assessment of the patient based on comprehensive knowledge enabled the participants to make "*informed decision*" (Susan, line 57) about the "*type of*

pacing…required" (Andrew, line 11) to optimize pacing therapy to achieve a required goal. These characteristics of performance were described in Benner's proficient and expert skill levels as seeing situations as wholes, and this holistic understanding helping decision making (Benner 1984).

Take time to own

The theme 'take time to own' was the second theme that emerged from the initial analysis. In addition, five subthemes were identified in this theme; 'being there', experience and knowledge deficit', 'not so risky if follow rules', 'looking for support' and 'enhanced responsibility'. A further interpretation indicated this theme was experienced in variety of ways depending on the skill level of the participant.

Advanced beginners and competent level practitioners

The interpretation showed in order to own the practice, participants at the advanced beginner and competent levels needed time to overcome 'experience and knowledge deficit'. With time firstly, the participants were exposed [and 'been there'] to numerous temporary epicardial pacing situations. Secondly with time, the participants came to a realization that pacing care was not so risky if the organization wide instruction was followed. Thirdly, the experience gained with exposure to numerous pacing situations, helped the participants develop the skills and knowledge commensurate with advance beginner and competent skill level practice. The interpretation suggested that skilled management of temporary epicardial pacing was not instantly available to the practitioners following completion of postgraduate studies, but developed over time in with experience in real clinical settings. The interpretation showed that advanced beginner participants gained a sense of accomplishment from completing daily checks

without difficulties, but remained nervous in complex pacing situations, Participants at the competent skill level "*felt good*" (Amy, line 31) when their temporary epicardial pacing care "*worked*" (Amy line 22). The interpretation showed the feeling of achievement was a step toward competent level practice.

At advanced beginner level, the participants were seeking guidelines and instructions to ensure they were performing the care correctly. The step by step instructions made them feel more confident and the participants believed their practice would not be so risky if they followed rules and guidelines. Benner (1984) suggested the lack of clinical experience necessitated practice guidelines, so nurses could learn meaningful patterns of a particular clinical situation. According to Benner (1984), guidelines could not be definitive in all situations. Therefore, the participants needed to know the rationale behind the care to judge what the most relevant action in real pacing situations.

The interpretation disclosed practitioners at the advanced beginner and competent skill levels, were looking for 'support systems", but in different situations. The advanced beginner level practitioners were looking for support for the task and wanted more education and experience in performing the checks in order to become competent. According to Benner, the nurses do "not know what they do not know, and have a limited understanding of how to go about learning it" (Benner 1984, p. 185). Therefore, supporting systems need to be a tool for to guide nurses to learn from clinical experience. The competent level participants wanted support in learning, and exposure to various pacing situations. At the competent skill level the participants were seeking situational back up support from cardiothoracic surgical registrars and higher level nurses to ensure the care they delivered met the patients' needs. The participants built their clinical skills from the emotional and clinical back up support, from the suggestions made by higher level practitioners and from the clinical decision making they observed in others. The

advanced beginner level practitioners looking for support with the task and the competent level practitioner seeking situational support are both in keeping with Benner's performance characteristics of the two skill levels.

Novice level practitioners in team leading role

The interpretation showed novice skill level nurses felt an 'enhanced responsibility' for managing temporary epicardial pacing care. Novice skill level nurses in this study, referred to nurses who were being exposed to the responsibility of the team leader role for the first time; a role they had no prior experience in. In this research setting, once nurses have completed their postgraduate studies such as critical care or cardiac course, they are allocated as a team leader to be a charge of six patients and the bedside nurses. As novices in the team leader role the nurses had no experience in the situation of supervising six nurses who were each managing temporary epicardial pacing for their patients and were asking the novice level team leader's support with the care. The interpretation showed the novice level team leaders felt their responsibility in managing temporary epicardial pacing was enhanced in this situation. The novice level team leader might be still at a skill level in which they themselves required support, but now found themselves in a situation in which they needed to support others. The novice level team leaders described the experience of enhanced responsibility as "*you can't pass the buck anymore*" (Nancy, line 143) and "*you are the next port of call*" (Ruby, line 64). The enhanced responsibility motivated the novice level team leader to reach a level of competence themselves that enabled them to support others.

Zeroing in

The theme 'zeroing in' was the final theme that emerged from the initial analysis. In addition, four subthemes were identified in this theme; 'self-directed learning motivation', 'don't follow rules', 'optimize clinical status' and 'do'. A further interpretation indicated this theme was experienced by only two of the eight participants; one participant was at the proficient level, the other at the expert level. The interpretation revealed they each experienced zeroing in slightly differently.

Proficient and expert level practitioners

As mentioned above, the interpretation of the analyzed data exposed that participants who were at the proficient and expert skill levels 'recognized the risks' associated with temporary epicardial pacing practice and were able to 'zero in' on pacing therapy to optimize patients' recovery. The participants were able to 'zero in' on problems because they had a 'self-directed' attitude toward learning and were 'motivated' to learn. For Benner, learning was about practitioners discovering 'a fruitful area of necessary learning' (Benner 1984, p30) as their gains from clinical experience grew over time. 'Self-directed learning motivation' was shown in the interpretation to transcend participants beyond the competent skill level. Moreover, proficient and expert level participants who had comprehensive pacing knowledge used that knowledge when planning and evaluating the effects of temporary epicardial pacing therapy with the goal to use the therapy to its full therapeutic potential. The participants were seeing the temporary epicardial pacing situations as wholes, and they thought critically in their assessments of patients and in making clinical judgement.

For example, assessment of the patient based on comprehensive knowledge enabled proficient and expert level participants to make "*informed decision*" (Susan, line 57)

about the "*type of pacing…required"* (Andrew, line 11) to optimize pacing therapy towards a required goal. These characteristics of performance were described in Benner's proficient and expert skill levels as seeing situations as wholes, and this holistic understanding helping decision making (Benner 1984). In addition to 'self-directed learning motivation' and 'optimiz[ing] clinical status', proficient and expert level participants 'Do' pacing therapy. The interpretation disclosed that 'Do' referred to proficient and expert level practitioners making proactive decisions to utilize temporary epicardial pacing in urgent situations, "*off my own bat*" (Andrew, line 32).

The interpretation showed expert level nurses 'don't follow rules', and 'do' pacing with an intuitive grasp of the situation. The interstation revealed experts use "*trial and error*" (Andrew, line 51) to 'zero in' on finding the optimal therapy that the patient responds to best. This is in keeping with Benner's theory, who maintains expert nurses do not require rules or guidelines to perform appropriate practice of the situation because such nurses have an 'intuitive grasp' (Benner 1984, p. 32) of each situation. According to Benner, experts realized they needed to be flexible in using guidelines because guidelines do not capture all. (Benner 1984).

Drawing conclusions from the interpretation

The interpretation revealed skill acquisition factors that were either external or internal to the individual. The external skill acquisition factors were identified as experience managing patients with temporary epicardial pacing, clinical exposure to varied pacing situations, and support from more senior colleagues. Theses external factors helped participants merge previous experiences gained from managing temporary epicardial pacing into troubleshooting and making management decisions in simple pacing situations. Benner (1984) described this as competent skill level. The interpretation

showed at this level the participants could not troubleshoot and respond to complex pacing issues. Importantly the interpretation revealed that advancement beyond the competent skill level involved more than just experience. Once competent, Benner (1984) says, further experiences of present situations of learning are key to advanced skill acquisition and that indeed 'not all nurses will be able to become experts' (Benner 1984, p. 35). However, the interpretation disclosed advancement to proficient and expert levels rested with internal skill acquisition factors; identified in the interpretation as being proactive and motivated in self-directed learning. This study proposes that internal motivation (to use pacing at its optimal best) may be more influential than intuition in the development of an expert, the key characteristic defined by Benner (1984).

Summary

The purpose of this chapter was to interpret themes that emerged from transcripts of interviews held with eight nurses who manage temporary epicardial pacing on a daily basis. Benner's skill acquisition theory was used as the interpretive lens to generate a deeper meaning of the themes and subthemes. The themes and subthemes described the lived experience of nurses managing temporary epicardial pacing. The experience varied depending on the performance skill level of the participant. Both external and internal skill acquisition factors were instrumental in attaining proficiency and expertise in pacing management. The interpretive findings collaborated and were extended through past research by Benner (1984); the implications of these findings will be discussed in the final chapter.

Final Chapter - Discussion

Introduction

This chapter discusses the implications of the themes and summarizes the strengths and limitations of the study. Implications of the findings on clinical practice and education will be offered. Moreover, recommendations for potential further investigation arising from this research will be discussed.

Strengths and limitations of the study

The study contributes to understanding of nurses' experiences of managing temporary epicardial pacing, understanding that is lacking in the research literature. An interpretive phenomenological framework was used to generate rich and descriptive data of this little known phenomenon. The framework mandates in depth description and interpretation of an experience and consequently in depth interviews with a small sample size of eight participants was employed in the study. The strength of a small sample size according to Smith, Flowers and Larkin (2009) lies in the richness of the data obtained and in the opportunity to explore the data and generate meaningful understanding of the experience. While a small sample size is considered strength of interpretive phenomenology it may also be a limitation of this approach. The limitations apply to the lack of generalisability of the findings to other groups of nurses who deliver temporary epicardial pacing. Moreover, the study sample size was gender imbalanced, with six females of the eight participants however this is often the case in nursing research. The findings generated from this study may have been different if more male participants were represented in the interviews. Additionally, all the participants involved in this study worked in the same

setting. Data collected from multiple settings may show a contextual influence on the experience and the findings and subsequent interpretation may be different.

Furthermore, the sample was restricted to eight participants due to the scale and time limitations imposed by a masters' thesis. Customarily, the end point of interviews is data saturation (Whitehead & Whitehead 2016). While time did not allow for further interviews had the researcher conducted more interviews, the findings of this study may have been different.

The analysis and interpretation of this study may be to some degree unsophisticated due to the researcher being the sole investigator in this study and a novice in conducting phenomenological research. Furthermore, the study is limited to one group of nurses at a specific point in time. Repeated in five or ten years of time, the study may yield different data and the interpretation of the experience may not be the same.

This study used interviews to collect the data, and this may have limited the data for a number of reasons. The participants may have only shared what they wanted to share about a particular experience. If a participant did not want to share particular part of the experience with the researcher, it was not possible to capture the hidden experience. Moreover, the data relies on the participants recalling the exact meaning of the experience at time of the interview. Some participants were sharing experiences that were few weeks or months old and consequently the recollection of the experience may have changed from the time of experience.

The participants were asked to recall their experiences of managing temporary epicardial pacing. The researcher was interested in how temporary epicardial pacing performance was influenced by the participants' knowledge, clinical experience, skill, familiarity and capability. The interview questions did not probe into the participants' motivation and orientation toward self-directed learning, although experience regarding these factors

emerged from some participants. Being proactive, motivated and self-directed towards learning, appeared to have had an influence on performance advancement to proficient and expert skill levels. Therefore, it is acknowledged that these factors may play a significant role in the development of expert clinical performance in temporary epicardial pacing practice. Future research may possibly explore motivational processes that drive performance.

Implication for clinical practice and education

For clinical practice

The research literature suggests that specialised groups of nurses manage temporary epicardial pacing in specialist cardiac surgical settings. However, missing from the literature is the definition of the required scope of the specialisation. This study interviewed eight participants all of whom had specialist post graduate qualification in cardiac or critical care nursing and routinely managed temporary epicardial pacing in daily practice. The findings revealed that despite similar education and years of clinical experience, the participants performed temporary epicardial pacing care on a spectrum of skill level ranging from advanced beginner to expert.

The research challenges the expectations we have in the research setting's critical care that nurses who hold specialist critical care qualifications can manage temporary epicardial pacing care competently and develop proficiency and expertise with clinical experience over time. In the first instance this study shows some post graduate qualified nurses who have worked in the research setting for at least five years are at the advanced beginner and higher levels of specialist critical care practice. They are fearful and cautious in delivering temporary epicardial pacing therapy and need support to deliver basic pacing care. Others are at the competent skill level and although able to deliver

basic pacing care continue to need support with complex pacing problems. The skill to perform competently is assumed as inherent in the post graduate qualification as is the anticipated development of expertise with experience over time. This study suggests clinical experience over time does not necessarily translate to proficiency or expertise. The end point of postgraduate studies completion is another milestone with the expectation that after a period of consolidation, the specialist nurse will assume the role of team leader, supervising, supporting and educating others in care delivery. The study shows that in this role the specialist nurse may still need support, yet the expectation is they will support others. Implications for practice include the need in critical care settings to firstly determine the performance characteristics nurses need to demonstrate before they can safely care for temporarily paced patients. Secondly there needs to be a decision made regarding the skill level specialist nurses need in order to enact the team leader role. Thirdly processes for achieving the required performance characteristics must be identified. Fourthly, tools to measure the required performance characteristics must be delineated. Finally, clinical subspecialisation in cardiac critical care nursing may be advantageous, in that it provides an opportunity to learn about the process of acquiring advanced clinical knowledge in discrete domains of critical care practice.

For education

Clinical subspecialisation also provides a basis for future post graduate curriculum planning that prepares nurses more comprehensively for the required scope of their sub specialisation. Consideration should be given to developing pacing simulation training platforms that include case presentations and small group discussions that train specialist nurses to a level at which the nurse performs efficiently, in a coordinated fashion and with confidence, is able to contemplate pacing problems consciously and abstractly and

plan the care deliberately. This skill level reflects performance characteristics commensurate with Benner's competent clinical skill level. Once competent however, nurses are still required to learn new theories and techniques for complex problems according to Higham and Arrowsmith (2013) and this according to the author may help them become expert. Analytical problem solving says Gobet and Chassy (2008) is the hallmark of expert practice.

It is important to acknowledge the implications for practice and education raised above only refer to external factors that can drive nurses toward skill acquisition and enhanced performance. However, this study highlights that proficient and expert level performance is motivated by an interest in pacing that exists within the individual nurse rather than relying on external pressures and factors as suggested above. The study findings suggest pacing practice could be improved by recognizing and fostering individuals who are intrinsically motivated to engage willingly in pacing as well as working autonomously to improve their skills and increase their capabilities.

Area for future research

The experiences of the majority of the participants in the study reveal a number of similarities in how they experience managing temporary epicardial pacing care. The majority experience management of temporary epicardial pacing as progression of skill acquisition and performance to a competent level, driven by external motivations, such as procedures, protocols and the team leader role. These motivations come from outside the individual participants. However, the experience of two participants suggests that an internal motivation to learn is what prompts participants to advance beyond the competent level and to develop an inclination to use pacing to optimize care. The small sample size and homogeneity of the group make the findings difficult to be generalized.

Possibly a similar study with a larger sampling that is gender balanced and in a different setting may provide further insights to the study findings. Therefore, it is recommended for future investigations which address the identified limitations above, would provide more quality of this research or may offer a different view. A study that explores the motivation to develop temporary epicardial pacing skills might also be interesting and provide an alternative understanding of the experience.

Concluding thoughts

This research represents the experience of temporary epicardial pacing care from the perspective of one group of nurses. It is important to note that it is one of many possible interpretations. This research adds the previously untold nurses' lived experience of managing temporary epicardial pacing to the existing body of literature on temporary epicardial pacing. Furthermore, it joins other researchers, namely Higham and Arrowsmith (2013) and Gobet and Chassy (2008) in provoking additional thought on the development of clinical expertise. Higham and Arrowsmith (2013) suggest the clinician once competent, still needs to learn new theories and techniques for complex problems and this will help them become an expert. Gobet and Chassy (2008) claim intuition that Benner (1984) believes is used by expert practitioners, underestimates the analytic problem solving skill at the expert level. This study proposes that internal motivation (to use pacing at its optimal best) may be more influential than intuition in the development of an expert, the key characteristic defined by Benner (1984).

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Appendices

Appendix A – Ethics approval letter

Government of South Australia
SA Health

Central Adelaide Local Health Network
Royal Adelaide Hospital Human Research Ethics Committee
Level 4, Women's Health Centre
Royal Adelaide Hospital
North Terrace
Adelaide, South Australia, 5000
Telephone: +61 8 8222 4139
Email: Health.CALHNResearchEthics@sa.gov.au

Approval Date: 18 November 2016

HREC Reference number: HREC/16/RAH/481

CALHN Reference number: R20161116

Ms Matilda Han
Intensive Care Unit
Royal Adelaide Hospital

Dear Ms Han

Project Title: Nurses' lived experience of delivering temporary epicardial cardiac pacing care: an Australian cardiothoracic intensive care finding.

Thank you for submitting the above project for ethical review. This project was considered by the Chairman of the Royal Adelaide Hospital Human Research Ethics Committee. I am pleased to advise that your protocol has been granted full ethics approval and meets the requirements of the National Statement on Ethical Conduct in Human Research (2007) incorporating all updates. The documents reviewed and approved include:

Document	Version	Date
Covering Letter	-	17 November 2016
LNR Ethics and Governance Application Form	-	17 November 2016
Protocol	-	17 November 2016
Patient Information Sheet	-	November 2016
Consent Form	-	November 2016
Recruitment Flyer	-	November 2016
Data Analysis Guide	-	-

Sites covered by this approval:

- Royal Adelaide Hospital, SA : CPI – Ms Matilda Han

GENERAL TERMS AND CONDITIONS OF ETHICAL APPROVAL:

- Adequate record-keeping is important. If the project involves signed consent, you should retain the completed consent forms which relate to this project and a list of all those participating in the project, to enable contact with them in the future if necessary. The duration of record retention for all clinical research data is 15 years.
- You must notify the Research Ethics Committee of any events which might warrant review of the approval or which warrant new information being presented to research participants, including:
  (a) serious or unexpected adverse events which warrant protocol change or notification to research participants,
  (b) changes to the protocol,
  (c) premature termination of the study.
- The Committee must be notified within 72 hours of any serious adverse event occurring at this site.
- Approval is valid for 5 years from the date of this letter, after which an extension must be applied for.
- Confidentiality of the research participants shall be maintained at all times as required by law.
- Investigators are responsible for providing an annual review to the RAH REC Executive Officer each anniversary of the above approval date, within 10 workings days, using the Annual Review Form available at: https://www.rahresearchfund.com.au/rah-research-institute/for-researchers/human-research-ethics/
- The REC must be advised with a report or in writing within 30 days of completion.

Should you have any queries about the HREC's consideration of your project, please contact Ms Heather O'Dea on 08 8222 4139, or Health.CALHNResearchEthics@sa.gov.au.

You are reminded that this letter constitutes ethical approval only. You must not commence this research project at a SA Health site until governance authorisation at that site has been obtained. Please contact the CALHN Research Office Health.CALHNResearchLNR@sa.gov.au

This Committee is constituted in accordance with the NHMRC's *National Statement on the Ethical Conduct of Human Research* (2007).

The HREC wishes you every success in your research.

Yours sincerely,

A/Prof A Thornton

CHAIRMAN
RESEARCH ETHICS COMMITTEE

Appendix B – Governance approval

Government of South Australia
SA Health

Approval date: 28 November 2016

Central Adelaide Local Health Network
Research Office

Level 4, Women's Health Centre
North Terrace, Adelaide SA
Australia 5000
T : 08 8222 3337

Ground Floor, Basil Hetzel Institute for Translational Research
28 Woodville Road, Woodville SA
Australia 5000
T : 08 8222 6841

Ms Matilda Han
Critical Care Services
Royal Adelaide Hospital

Dear Ms Han

Project title: Nurses' lived experience of delivering temporary epicardial pacing care: an Australian cardiothoracic intensive care finding

MyIP ref: 8642
CALHN ref: R20161116
HREC ref: HREC/16/RAH/481
SSA ref: SSA/16/RAH/484

RE: Governance authorisation

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to commence at the Royal Adelaide Hospital, SA.

The following conditions apply to the authorisation of this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval to this project:

1. Authorisation is limited to the site/s identified in this letter only.
2. Project authorisation is granted for the term of your project outlined in the Low/Negligible Risk Ethics and Governance Application Form, or until the project is complete (whichever date is earlier).
3. The study must be conducted in accordance with the conditions of ethical approval provided by the lead HREC, SA Health policies, and in conjunction with the standards outlined in the *National Statement on Ethical Conduct in Human Research* (2007) and the *Australian Code for the Responsible Conduct of Research (2007)*.
4. Proposed amendments to the research protocol or conduct of the research which may affect both the ongoing ethical acceptability of the project and the site acceptability of the project are to be submitted to this Research Governance Office after a HREC decision is made.
5. Proposed amendments to the research protocol or conduct of the research which only affects the ongoing site acceptability of the project, are to be submitted via email to this Research Governance Office;
6. For all clinical trials, the study must be registered in a publicly accessible trials registry prior to enrolment of the first participant.
7. A copy of this letter should also be maintained on file by the Coordinating Principal Investigator as evidence of project authorisation.
8. Notification of completion of the study at this site is to be provided to this Research Governance Office.

All future correspondence regarding this study must include the MyIP reference number and CALHN reference number in the subject header.

We wish you every success in your research project.

Yours sincerely

Bernadette Swart
Manager, CALHN Research Office
Ph: 8222 3890

Appendix C - Information sheet

PARTICIPANT INFORMATION SHEET

PROJECT TITLE: Nurses' lived experience of delivering temporary epicardial cardiac pacing care: an Australian cardiothoracic intensive care finding

HUMAN RESEARCH ETHICS COMMITTEE APPROVAL NUMBER: CALHN Ref: R20161116

PRINCIPAL INVESTIGATOR: Matilda Han

STUDENT'S DEGREE: Master of Nursing Science

Location: Royal Adelaide Hospital Intensive Care Unit

Dear Participant,

You are invited to participate in the research project described below.

What is the project about?
The aim of this study is to explore the experience of nursing staff that manage temporary epicardial cardiac pacing in a large South Australian hospital. Greater understanding of the nurses' experience of delivering temporary pacing care may assist in creating strategies that help to support this area of cardiothoracic intensive care practice.

Who is undertaking the project?
This project is being conducted by Matilda Han.
This research will form the basis for the degree of Master of Nursing Science at the University of Adelaide under the supervision of Dr Frank Donnelly and Ms Melissa Chamney.

Do I have to take part in this research project?
This is a research project and you do not have to be involved. If you do not wish to participate, your employment will not be affected in any way. Also, you may withdraw from the project at any time after you have commenced.

What will I be asked to do?
As this is a qualitative research, one to one and face-to-face interviews will be conducted to cover research topic by guided questions. The interview will take place in a private setting within the hospital away from the clinical area and will be audio-recorded to enable data transcription. All data will be de identified at the time of data collection to ensure anonymity.

How much time will the project take?
The estimated time of the interviews is 30 to 45 minutes.

Are there any risks associated with participating in this project?
There are no foreseeable risks of this research. However if there are any questions related to interviews, participants are encouraged to contact the researcher.

What are the benefits of the research project?
There is not any direct benefit to participants. However, cardiothoracic intensive care is a highly specialised environment where nurses manage complex equipment with significant life threatening implications. This research has the potential to generate data that may elucidate current practice and assist in creating strategies that help to support cardiothoracic nurses in the delivery of temporary epicardial pacing. Implementing strategies that improve cardiothoracic nurses' delivery of temporary epicardial pacing may translate to safer care for future patients.

Can I withdraw from the project?
Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time.

What will happen to my information?
To reduce the risk of accidental identification, demographic data will be reported as group data. All data will be de-identified at the time of data collection and audio-recording transcription; therefore data analysis and reporting of findings in the study will ensure anonymity. The study documents and data will be stored in a password-protected digital file.

Who do I contact if I have questions about the project?
To ask any questions about the project, please contact the researcher at matildas.han@student.adelaide.edu.au or alternatively ring on mobile 0421601292.

What if I have a complaint or any concerns?
This project will be carried out according to the National Statement on Ethical Conduct in Human Research (2007) incorporating all updates. This statement has been developed to protect the interests of people who agree to participate in human research studies.

The study has been approved by the Human Research Ethics Committee of the Royal Adelaide Hospital. If you wish to speak to someone not directly involved in the study about your rights as a volunteer, or about the conduct of the study, you may also contact the Chairperson, Research Ethics Committee, Royal Adelaide Hospital on 8222 4139.

Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?
If you do decide to participate in this study, please contact me to sign consent form and arrange for booking appointment.

Yours sincerely,
Matilda Han

Appendix D – Consent form

CONSENT FORM

1. I have read the attached Information Sheet and agree to take part in the following research project:

Title:	Nurses' lived experience of delivering temporary epicardial pacing care: an Australian cardiothoracic intensive care finding
Ethics Approval Number:	CALHN Ref: R20161116
Principal Investigator	Matilda Han
Student's degree	Master of Nursing Science, Adelaide Nursing School, University of Adelaide
Location	Royal Adelaide Hospital Intensive Care Unit

2. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

3. Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.

4. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

5. I understand that I am free to withdraw from the project at any time.

6. I agree to the interview being audio-recorded. Yes ☐ No ☐

7. I am aware that I should keep a copy of this Consent Form.

Participant to complete:

Name: Signature: _ Date:

Researcher to complete:

I have given a verbal explanation of research project, it procedures and risks, and the implications of withdrawal from the research project and I believe that the participant has understood that explanation.

Signature: Position: Date: