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PTSD and Cardiac Surgery: A randomised, controlled pilot study to assess the effect of a brief psychoeducational intervention.

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Abstract

Cardiac surgery can be traumatic and stressful, and as a result many people experience psychological difficulties following treatment. Post Traumatic Stress Disorder (PTSD) is now being investigated in post-surgical populations with surprising results. Prevalence rates for PTSD following cardiac surgery range from 10% to 38%. Current knowledge regarding PTSD in post-surgical populations is limited, and many studies are concerned with risk factors and prevalence rates, and have not investigated the effects of psychological interventions. Thus, the magnitude of improvement in long-term outcomes resulting from the use of preventative interventions is unclear. With this in mind, the current study was created to investigate the effect of a brief psychoeducational intervention to prevent the symptoms of PTSD, and improve the adaptive coping behaviours of people who have survived cardiac surgery. This research question was addressed as a pilot study and utilised a randomised, controlled design that enlisted 33 participants awaiting cardiac surgery at a single site. The effectiveness of the intervention was evaluated by comparing it to the standard treatment patients are currently offered upon admission to the cardiac ward. Standardised self-report measures were collected during baseline, treatment and once at two-week follow-up. Results showed that, compared to pre-treatment levels, the majority of participants who received the intervention demonstrated a reduction in PTSD symptoms and an increase in adaptive coping behaviours related to recovery after cardiac surgery. Findings are interpreted in terms of previous literature and implications are discussed according to theory, research and clinical practice. Limitations of the study are outlined and recommendations for future research are discussed. Suggestions for future research include evaluating the effectiveness of the manual in a larger, more diverse group of people, extending follow-up periods and utilising more rigorous measures. Overall, preliminary findings support the effectiveness of the Coping After Cardiac Surgery Manual in treating people who have undergone cardiac surgery.

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Contents

List of Tables and Figures

Appendices

A: Impact of Events Scale – Revised

B: Brief COPE

C: Recruitment article from the North Shore Times Advertiser

D: Study Information Sheet

E: Consent to Participate Form

F: The Coping After Cardiac Surgery Manual

G: Approval letter from Health and Disabilities Ethics Committee, Northern A region

H: Letter from Massey University Māori Research Advisor

I: Letter from Helen Wihongi, Māori Research Advisor – WDHB

J: Institutional approval letter from Auckland District Health Board.

List of Abbreviations

ACH	Auckland City Hospital
ACS	Acute Coronary Syndrome
CABG	Coronary Artery Bypass Graft
CAPS	Clinician Administered PTSD Scale
CBT	Cognitive Behaviour Therapy
CDI	Cardioverter Defibrillator Implantation
CR	Cognitive Restructuring
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, 4.
EMDR	Eye Movement Desensitisation Reprocessing
ET	Exposure Therapy
HT	Heart Transplant
ICU	Intensive Care Unit
IE	Imaginal Exposure
IES-R	Impact of Events Scale – Revised
PMR	Progressive Muscle Relaxation
PTSD	Posttraumatic Stress Disorder
PTSS-10	Posttraumatic Symptom Scale – 10 items
SCID	Structural Clinical Interview for DSM – IV
STAI	State-Trait Anxiety Inventory
WHO	World Health Organization

Chapter 1: Introduction

Cardiac Surgery and Post Traumatic Stress Disorder

Cardiac surgery is an invasive medical procedure that carries a high-risk of serious complication, lowers quality of life and may even cause death (Tuman, McCarthy, March, Najafi, & Ivankovich, 1992). Cardiac surgery is a common medical procedure. More than 2 million coronary revascularizations are performed each year in the US alone (Hall, DeFrances, Williams, Golosinskiy, Schwartzman, 2010). New Zealand rates vary due to the different approaches in defining cardiac surgery, but according to the Ministry of Health (MOH; 2011) just over 3,000 people underwent coronary artery bypass graft (CABG) in 2010. This figure does not include those who elected to have privately funded surgery or other types of cardiac surgery such as heart transplant (HT). Despite numerous health and wellbeing campaigns, the rate of cardiovascular surgery is increasing each year. In New Zealand, the number of completed cardiac procedures increased by 7% between 2009 and 2011 (MOH, 2011). Short-term mortality rates have been estimated to range between 6% and 19% (Chan et al., 2009), and cardiac disease is considered the leading cause of death worldwide (World Health Organization [WHO], 2015). In light of this, it can be said that cardiac events and their requisite surgeries can be distressing and concerning for many patients.

In many cases surgery is performed under emergency conditions following an unexpected cardiac event. As a result, patients have little time to emotionally prepare for the life-threatening procedure. Many patients do not receive adequate information about the emotional consequences of undergoing major surgery (Novaes et al., 1999). Indeed, patients are often left with psychological difficulties that can last for a number of years (Duits et al., 1998). In fact, concerning emotional problems have been documented in cardiac survivors later than 3 years after surgery (Dew, Kormos, DiMartini, Switzer, Schulberg, Roth & Griffith, 2001). Depression and anxiety are

common following cardiac surgery, and this concept has been thoroughly discussed and described (e.g. Borowicz, Royall, Grega, Selnes, Lyketsos & McKhann, 2002). However, it has only been in the last decade that other psychological conditions have been considered among cardiac populations. The idea that Posttraumatic Stress Disorder can occur after major surgery is gathering momentum, particularly in studies that have investigated the trauma of Intensive Care Unit (ICU) treatment. As a result, it is now accepted among those involved in psychological research, that PTSD can result from the trauma of undergoing cardiac surgery.

A diagnosis of PTSD following cardiac surgery can have rather serious implications, such as an increased risk of mortality and morbidity (Dew et al., 2010). Research has shown that people who are diagnosed with PTSD adhere less to medication regimes (Shemesh et al., 2011), have poorer quality of life outcomes (Rothenhausler et al., 2005) and attend fewer rehabilitation programs than their healthy counterparts (Edmondson et al., 2012). It was reported in one study that HT patients diagnosed with PTSD were nearly 14 times more likely to have died 3 years following transplant, despite controlling for the accepted HT morbidity risk factors (Dew et al., 2010). In psychosocial terms, the cardiac patient is at further risk of harm because there is an association between PTSD and higher rates of drug and alcohol consumption (Favaro et al., 2011).

It seems plausible that an event such as undergoing cardiac surgery, where there is a genuine threat to life, would have a psychological impact on a number of people. Edmondson, Richardson, Falzon, Davidson, Mills, and Neria (2012), confirmed this assumption in a systematic review. The authors concluded that cardiac surgery often has a serious and persistent psychological effect on a significant number of survivors. This was evident from the prevalence rates revealed in the analysis, which fell between 8% and 18%.

PTSD is said to develop after exposure to one or more traumatic events (Herman, 1992). While the exact mechanisms of PTSD that underlies cardiac

surgery are unknown, there is evidence to suggest that a significant number of patients have traumatic experiences during both the surgical and recovery phases of treatment (Stoll et al., 2000). It is common for a cardiac patient to experience severe pain, respiratory distress, physical restraint, psychotic delirium and the administration of high doses of sedation (Schelling et al., 2003). In addition, rehabilitation in the ICU following surgery has been described as “terrifying” by some researchers investigating the surgical experience (Boyer et al., 2013, p. 175). Distress, anxiety and fear of death are all common emotional reactions to the surgical environment (Davydow, Zatzick, Hough, & Katon, 2013; DiMartini, Dew, Kormos, McCurry & Fontes, 2007; Talisayon, Buckley & McKinley, 2011). Keeping this in mind, it seems plausible that an event such as cardiac surgery could be traumatic enough to trigger the onset of PTSD.

Some degree of stress following trauma is normal, and in most cases people recover from trauma because they have adequate coping strategies to deal with the event (Ehlers, Clark, Hackman, McManus & Fennell, 2004). However for some people, cardiac surgery can be highly distressing and the ensuing difficulties can be severe and prolonged. Coping mechanisms play a profound role in how people recover psychologically from cardiac surgery (Chiavarino et al., 2012). In fact, Chiavarino supports the idea that people who actively engage in adaptive coping behaviours have better short and long-term outcomes following hospital discharge than their counterparts. Adaptive coping appears to buffer further psychological distress, promotes faster physical recovery and appears to increase levels of social support according to the authors.

Research has investigated how certain interventions can modify the psychological outcomes of cardiac surgery. For instance, Progressive Muscle Relaxation (PMR) appears to reduce some of the burden associated with surgery, and psychoeducation has proven to be a valuable tool in reducing related anxiety and distress. PMR is grounded in classic behavioural conditioning, and teaches an individual to counteract the negative physical changes that occur as a result of anxiety and tension. Psychoeducation is

among the most effective of evidence-based therapies to have emerged from both practice and research settings (Lukens & McFarlane, 2004). It assumes a self-management stance and is strengths-based. Moreover, psychoeducation promotes adaptive coping and encourages self-worth. While the efficacy of PMR and psychoeducation has been demonstrated in separate studies regarding cardiac populations, they have not yet been investigated as a combined treatment. There is a need to develop and investigate interventions that will address the growing problem of PTSD, which occurs as a result of experiencing a traumatic event such as cardiac surgery. Based on what is known from previous research, the interventions should focus on increasing adaptive coping and the provision of information about the risks of psychological distress following surgery as they these factors appear to moderate some of the symptoms of PTSD (e.g. Jones et al., 2010; Morris & Rao, 2013).

In summary, cardiac surgery can be a stressful and traumatic experience for some people. The combination of certain medical procedures and life-threatening experiences can elicit a trauma response that in some individuals may trigger PTSD. Patients who have less adequate coping skills may be more vulnerable to poorer outcomes after cardiac surgery. Therefore, interventions that address adaptive coping skills and aim to reduce PTSD following cardiac surgery should be further addressed.

The Study

The current study aimed to increase knowledge in relation to the emotional burden of undergoing cardiac surgery in a New Zealand setting. In order to do this, a psychological intervention was developed based on the principals of Cognitive Behaviour Therapy (CBT). The ‘Coping After Cardiac Surgery’ manual was developed from evidence that suggests that both PMR and psychoeducation are effective ways of reducing PTSD and increasing adaptive coping. The intervention in this study differs from any intervention currently in use because it combines cognitive and physiological elements into

a brief, self-administered intervention. This study then aimed to answer the following questions in relation to this recently developed intervention:

- How will this intervention modify the symptoms of PTSD following cardiac surgery?
- What will happen to adaptive coping behaviours after the intervention has been completed
- How many people will experience PTSD following cardiac surgery in a New Zealand context.

PTSD symptoms were measured once before surgery and three times following hospital discharge in order to gauge the effect of the intervention in reducing PTSD symptomatology. Baseline assessment was only gathered once because several of the participants were undergoing emergency surgery and it was not possible to collect data over a number of weeks. Likewise, adaptive coping was measured before the patient was admitted to hospital and again three times following the surgery with the aim of ascertaining the extent to which the intervention modified adaptive coping. In order to gather the prevalence rate of PTSD among cardiac patients in New Zealand, a widely recognised trauma questionnaire was used with an accepted cut off point. The following hypotheses were established in order to empirically test the efficacy of the intervention and to answer the study's key questions. They are as follows;

Hypothesis One: In a New Zealand sample of cardiac patients, it was hypothesised that prevalence rates of PTSD as measured on the Impact of Events Scale – Revised (IES-R), would be 15%. This figure is based on similar prevalence estimates conducted in the US, which indicate PTSD occurs in 11%-19% of the cardiac surgical population.

Hypothesis Two: After administration of the intervention, cardiac patients would show a reduction in PTSD-related symptoms on the Impact of Events Scale – Revised (IES-R) at post-treatment. It was expected that these gains would be maintained over a two-week follow-up period.

Hypothesis Three: It was hypothesised that adaptive coping scores on the Brief COPE (e.g. planning, seeking social support, positive reframing, acceptance and humour) will improve after the intervention has been completed. It was expected that these gains be maintained over a two-week follow-up period.

This study is unique in that it addresses PTSD in cardiac sample with a newly developed intervention. At the date of writing, the author was unaware of any other studies that aimed to reduce PTSD in this population with a treatment that is both easily administered, and completed in a relatively short timeframe. Thus, the current study provides new knowledge. It contributes to knowledge surrounding effective interventions that could buffer the traumatic effects of cardiac surgery, and provides evidence for prevalence rates in a previously unstudied group of New Zealand citizens. The findings of this study have the potential to guide the further development of psychologically based interventions that aim to reduce the psychological burden of having a major operation such as cardiac surgery.

Relevant Literature

This chapter reviews the literature related to the topics addressed in this thesis: PTSD, trauma and coping. As well, it summarises the important contributions that have shaped the body of literature concerning cardiac-related PTSD. As the literature concerning psychological distress after critical illness is somewhat elaborate and multi-theoretical, it is imperative to define the key concepts and terms that relate specifically to this study.

Posttraumatic Stress Disorder.

PTSD is a complex condition marked by symptoms that eventuate from exposure to a traumatic event (Yehuda, 2002). The individual may react to the event in several emotional, cognitive and physiological ways. In some

individuals, fear based, emotional and behavioural symptoms may by prominent, yet in others, mood states and negative cognitions are most apparent. Further individuals experience symptoms of arousal and reactive externalizing and others have overwhelming dissociative symptoms. Some people display various combinations of all these symptoms (American Psychiatric Association, 2013).

According to the forth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000) a diagnosis of PTSD is made when the symptoms have continued for more than a month following the traumatic event(s). PTSD is diagnosed when the symptoms cause clinically significant distress or impairment in the person's life. Criterion A of the DSM-IV-TR suggests that people may be diagnosed with PTSD after experiencing armed combat, physical assault, sexual violence, kidnapping, terror attacks, torture, incarceration, natural or man-made disasters, motor vehicle accidents or life-threatening illness. While the occurrence of a life-threatening illness is not necessarily considered a traumatic event, incidents related to the illness, which are sudden or catastrophic, are considered to be triggers (Schelling et al., 2003, p. 631).

The symptoms of PTSD have been grouped into three major clusters in the DSM-IV-TR; reexperiencing, avoidance and arousal. Reexperiencing involves intrusive, repeated and unwanted recollections of the event that include emotional, sensory or physiological aspects. Commonly they appear in the form of distressing nightmares related to some aspect of the event (Johnson, 2009). Further symptoms of reexperiencing include periods of dissociation, which may last from several seconds, to hours or even days. During this time, the individual may experience sensory intrusions, loss of reality or complete loss of awareness as certain aspects of the event are relived. Sensory intrusions can be upsetting and have been associated with prolonged psychological distress and heightened physiological arousal (Van der Kolk, 1994).

Often the person with PTSD will actively avoid any reminder of the traumatic event in an attempt to reduce negative arousal (Johnson, 2009). As a result, individuals often have reduced social interactions, which impact on quality of life and psychosocial outcomes (American Psychiatric Association, 2013). As well, individuals with PTSD may experience reduced interest in usual activities and persistent anhedonia. Individuals may have a heightened sense of arousal and engage in uncharacteristic reckless behaviours such as drug taking or excessive alcohol consumption (American Psychiatric Association, 2013). Heightened arousal and frequent nightmares often prevent the person with PTSD from achieving quality sleep, and concentration difficulties are commonly described. PTSD in community populations is associated with short and long term psychological, social and vocational implications, as well as extensive use of psychiatric and community services (Foa, Keane & Friedman, 2000). Further disability is seen in social and family relationships, work attendance, income status, occupational success, education levels and general quality of life (Brunello et al., 2001; Pagotto, Mendlowicz, Coutinho, Figueira, Luz, Araujo, & Berger, 2015).

Once thought to only occur in war veterans and victims of violence, it is now agreed that PTSD may occur as a result of ICU treatment (Jones et al., 2007), life-threatening illness (Smith, Redd, Peyser & Vogl, 1999) and is also recognised in families of cardiac patients (Stukas et al., 1999) as well as hospital staff (Mealer, Shelton, Berg, Rothbaum & Moss, 2007). PTSD is a relatively frequent experience for patients with cardiac syndromes; a recent meta analysis of 24 acute coronary syndrome (ACS)-induced PTSD prevalence studies showed prevalence estimates varied between 0% - 32% (Edmondson et al., 2012) and further studies have estimated similar rates in HT (17%; Dew et al., 2001) and myocardial infarction (24%; Pedersen, Middel & Larsen, 2003). Some patients experience PTSD immediately following an initial coronary event (Marke & Bennett, 2013), whilst in others PTSD becomes prominent later in recovery (Dew et al., 1996). Studies have found PTSD remaining at 6 months to 18 months after myocardial infarction (Kutz, Shabtai, Soloman & Neumann, 1994) and 3 years following HT (Dew et al., 2001). Furthermore, PTSD has been reported following other cardiac

surgeries such as cardioverter defibrillator implantation (Habibovic et al., 2012), and CABG (Dao et al., 2010). Overall, PTSD is a pervasive disorder that may follow exposure to a traumatic event. It can have overarching consequences for social, vocational and emotional functioning. PTSD has been well documented in community samples as well as those related to serious medical illness.

Coping

Coping refers to the way a person expends a conscious effort to resolve or master stress related to a difficult life situation. Various coping strategies have been defined and conceptualised in a manner of ways, but essentially they are theoretically similar. Terms such as active, avoidant, adaptive, maladaptive, problem-focused and approach coping, all refer to coping styles where individuals attempt to deal with life stressors. Coping strategies can be dichotomized in a variety of ways, but most commonly the literature refers to adaptive and maladaptive coping. Adaptive coping are strategies that engage the use of emotional support, problem solving, and planning. Maladaptive coping styles refer to the strategies people utilise to distance themselves (both physically and mentally) from the stressor, such as behavioural disengagement, substance use/abuse, and denial. Generally, adaptive coping is said to be positive and increase wellbeing, and maladaptive strategies are considered to be negative, and increase harm. However, some have pointed out that one coping style is not necessarily positive or negative, but rather it depends on the situation and the resulting outcome (Kershaw, Northouse, Kritpracha, Schafenacker & Mood, 2004).

Coping behaviours are important factors in how people recover after cardiac surgery (Chiavarino et al., 2012). Coping with the broader implications of life after surgery can be a difficult and lengthy process. Patients may adapt their coping behaviours to fit their new social role, or they may cope by reframing their experience in a more positive way in order to cope with the challenges associated with both the cardiac illness and the effects of surgery itself (Meyer, 2001). An examination of coping strategies suggests that adaptive,

behavioural coping styles are among the most helpful in terms of recovery after cardiac surgery (Wilson, 1981). For example patients using instrumental support styles, such as seeking assistance from other family members, improved scores on quality of life measures in Swedish cardiac patients (Kristofferzon, Marja-Leena, Löfmark, Rurik & Carlsson, 2005). Chung, Berger and Rudd (2008) also found that those who used acceptance-based coping styles had better health-related outcomes after cardiac surgery. Patients, who had accepted the surgery as an event that had happened, and could not be changed, appeared to report less comorbid psychological symptoms and recovered faster than their counterparts. In another study, patients who used an adaptive coping style and practiced relaxation both before and after their procedure had a shorter hospital stays, experienced less pain, and required less medication according to Wilson (1981). An adaptive coping style was also successful in reducing the levels of anxiety related to undergoing heart transplant surgery in an earlier study (Dew et al., 1996). Patients may find comfort and strength in spirituality or religion. For example, religious coping was associated with good medical adherence and better quality of life scores in medically ill patients (Ai, Hall, Pargament & Tice, 2013; Ai, Corley, Peterson, Huang & Tice, 2009; Kirov, Kemp, Kirov, & David, 1998). Other adaptive coping styles that appear to reduce the distress associated with critical illness are humour and optimism (Bedi & Brown, 2005). Focusing on the ironic or amusing elements of the experience have been associated with reductions in levels of anxiety, and increased levels of well-being and recovery (Bedi et al., 2005; Scheier, Magovern, Abbott, Matthews, Owens, Lefebvre & Carver, 1989). Overall, the current study defines coping as the cognitive processes and actions we take in order to deal with life stressors. For the purpose of assessing coping in cardiac populations, this study categorises coping into adaptive or maladaptive strategies.

Trauma

Several terms are used to describe the reaction people have to a traumatic stressor, making it difficult to identify a dominant term. There are also inconsistencies regarding the definition of some terms, and disagreements

regarding the use of certain terms, in particular those that relate to Criterion A of the Diagnostic and Statistical Manual of Mental Disorders IV-R (DSM-IV-TR; American Psychiatric Association [APA], 2000). This is in part due to the central role of exposure to trauma as the initial etiological factor for PTSD (Davidson & Foa, 1991). The primary debate involves the language used to describe trauma in Criterion A of the DSM-IV-TR and is centered around how broadly or narrowly trauma should be defined. For example, Weathers and Keane (2007) suggested that trauma may occur across a number of dimensions and may range from extreme catastrophes to daily hassles, and there is no clear distinction between the two poles. Furthermore, they suggest that trauma is prone to subjective appraisal, making it difficult to define independent of personal meaning making. Obviously then, achieving a consensus definition of trauma can be difficult.

Regardless of the debate, the DSM-IV-TR (APA, 2000) define trauma as an event that involves “actual or threatened death or serious injury, or a threat to the physical integrity of self or others” and that the person’s response involves “intense fear, helplessness, or horror ”. Weathers et al. (2007) suggested that this definition of trauma is “feasible…[and] when appropriately applied can effectively serve a wide range of clinical and research needs” (p.120). Further literature suggests that trauma generally includes a violation of basic human beliefs connected to the belonging of a social group (e.g. Horowitz, 1986), and will likely involved cognitions that the world in uncontrollable and unpredictable (Foa et al., 2000). Van der Kolk (2003) elaborated on this idea and suggested that some of the events likely to violate these assumptions include major illness or disability, physical or sexual assault, social humiliation, incongruence with one’s own moral code, bereavement, and involvement in an actual or threatened accident.

In cardiac and surgical environments, trauma has several meanings that are often used interchangeably. In surgical terms, trauma relates to an injury or assault on living tissue, which is caused by an extrinsic agent. In literature investigating cardiac surgery and PTSD, the term trauma remains somewhat undefined and when it is described, it is often in terms of measureable

outcomes. For instance, Schelling et al. (2003) described trauma as “a severe stress reaction resulting from an acute cardiac or pulmonary dysfunction such as respiratory distress, severe pain, anxiety and panic, or ICU therapy” (p. 1971). Yet, Mohta, Sethi, Tyagi and Mohta, (2003) define trauma in terms of emotional responses to surgery such as helplessness, humiliation and anxiety. Interestingly, the authors suggest a “medically traumatized” person is one who perceives and fears death, and who presents with a “wide range of behavioural problems and psychological symptoms” (p. 19). In light of these diverse interpretations the current study defines trauma in the same way that is outlined in the DSM –IV, and concedes that it is an emotional response that results from the stressful nature of undergoing surgery.

Now that the constructs of interest have been defined, the following sections describe how often PTSD occurs and why it is problematic for people who have survived cardiac surgery. Further descriptions review the evidence regarding the etiology of PTSD in cardiac populations. These sections are followed by an examination of the effectiveness of psychological interventions that aim to reduce the symptoms of PTSD and increase adaptive coping behaviours in cardiac samples.

Prevalence of PTSD in community populations

Kessler and Ustun (2005) found that twelve-month prevalence rates for PTSD among American adults is around 3.5%. In older adults the projected lifetime risk is higher at 8.7%. PTSD estimates are lower in European, most Asian, African and Latin American countries with rates occurring around .5%-1.0% (Hinton & Lewis-Fernandez, 2011). Rates of PTSD occur more frequently in populations where vocational aspects increase the risk of traumatic exposure, such as police and emergency personnel (de Terte, 2012; Kang, Natelson, Mahan, Lee & Murphy, 2003). The highest rates, according to Kessler et al., (1995) occur in survivors of rape, military personnel, or those who are subjected to ethnically-motivated torture, where one third to one half of all those exposed to trauma will develop PTSD.

Prevalence rates for PTSD in New Zealand populations appear to be around 6% according to the World Health Organization (WHO), who collected data from 200,000 respondents in 27 countries. Other studies have reported lower prevalence rates in New Zealand - the Te Rau Hinengaro/New Zealand Mental Health Survey (Wells, Oakley-Brown, Scott, McGee, Baxter & Kokaua, 2006) posits that 3% of the New Zealand population is affected by PTSD. The same study reported higher rates for some ethnic minorities, such as Māori, which was said to be around 9%. Prevalence rates for PTSD in the New Zealand Police and armed forces correspond with literature from the US, and appear to be around 13% (Stephens & Miller, 1998).

PTSD in cardiac populations

Several studies have reported on PTSD rates following cardiac surgery with varying outcomes (see Table 1.). Two prospective studies investigated PTSD in HT patients 1 to 3 years after transplant (Dew et al., 1996; Dew et al., 2001). The rates were similar across both studies; at one-year post transplant PTSD occurred in 17% of the sample, and at three years after surgery, the rates appeared to be 13%.

In a further study, Rothenhausler et al. (2005) evaluated PTSD in CABG patients. Using the Structural Clinical Interview of DSM-IV (SCID) they found that 17 % of their sample met the diagnostic criteria for PTSD. Doerfler, Pbert and DeCosimo (1994) also looked at prevalence rates following CABG and PTSD was reported in 15% of their sample. Stoll et al., (2000) included 80 patients in a cross-sectional study who had undergone CABG or mitral valve repair. They suggested that 15% of patients undergoing surgery met the criteria for PTSD. Stukas et al. (1999) reported the lowest prevalence rate of PTSD in survivors of cardiac surgery (10.8%), but interestingly, the authors deemed that a further 5% of the sample had “probable PTSD” in that they met symptom criteria but did not meet duration criteria.

Table 1.

Prevalence estimates for PTSD following cardiac surgery.

Study	Type	*N*	*Prev.*
Dew et al., 1996	Prospective	145	13.7%
Dew et al., 2001	Prospective	154	17%
Doerfler et al., 2005	Cross-Sectional	50	15%
Rothenhausler et al., 2005	Prospective	34	17.6%
Stoll et al., 2000	Cross-Sectional	80	15%
Stukas et al., 1999	Prospective	158	10.8%

The measures used in these studies vary considerably between self-report questionnaires and the more robust clinician-administered measures. Moreover, the time frame for the measurement of PTSD also varied from 3 months to 3 years following surgery. Despite this, there is some agreement that 15% prevalence rate for PTSD following cardiac surgery is credible (Marke et al., 2013; Schelling et al., 2003; Stukas et al., 1999). However, prevalence estimates in cardiac surgical populations should be interpreted with caution as they are limited by studies with small sample sizes and the heterogeneity of measures applied to detect PTSD. In studies investigating PTSD in myocardial infarction or acute coronary syndrome, studies that utilised clinical interviews yielded lower prevalence rates of PTSD (0% – 8%) than those gathering data from self-report measures. None of the studies investigating PTSD after cardiac surgery applied the Clinician Administered PTSD Scale (CAPS) diagnostic interview, which is considered to have "stringent psychometric and utility standards for diagnosing PTSD", and is a leading tool for both research and clinical applications. (Blake, Weathers, Nagy, Kaloupek, Gusman, Charney & Keane, 1995, p. 75).

To date, the author is not aware of any studies to determine the prevalence of PTSD in a New Zealand sample of cardiac patients. If estimates from other global areas are considered, as many 200 people each year may be suffering from PTSD as a result of cardiac surgery. The rates may be even higher for

ethnic minorities such as Māori, who are over-represented in both cardiac and mental health statistics. For example, Māori mortality and hospitalisation rates due to cardiac illness was four to five times higher than non-Māori in people aged 45-65 years, and twice that of non-Māori aged 65 and older (Riddell, 2005). Needless to say, there may be a greater risk for cardiac-related PTSD in these ethnic groups.

Etiology of PTSD

A number of theories have been proposed in relation to the etiology of PTSD, such as genetic predisposition (Broekman, Olff & Boer, 2007; Yehuda & LeDoux, 2007), temperament (Clark, Watson & Mineka, 1994), and neurobiological mechanisms (Medina, 2008; Newport & Nemeroff, 2000). However, PTSD has predominantly been considered to eventuate from dysfunctional cognitive processes and it is therefore widely recognised that cognitive theories play a significant role in the onset of this problem (Ehlers & Clark, 2000; Foa, Steketee & Rothbaum, 1989). Behavioural theories of PTSD are early studies and lay a framework for understanding the maintenance of PTSD symptoms such as anxiety and avoidance (Wirtz & Harrell, 1987). However, both cognitive and behavioural theories are thought to play a crucial role in the etiology and maintenance of PTDS symptomatology. Considering the focus of this study, the next section provides a brief overview of cognitive and behavioural theories of PTSD.

Behavioral theory: Classical Conditioning and Mowrer's Two-factor Theory of Learning.

Several researchers have proposed that Mowrer's (1960) two-factor learning theory of fear and anxiety can explain the clinical symptoms of PTSD (e.g. Keane, Fairbank, Caddell, Zimering & Bender, 1985). According to this theory, two types of learning are involved in the acquisition of fear and avoidance. In the first stage, fear is acquired through classical conditioning. In short, the unconditioned response (UCR) to a stressor (unconditioned stimuli or UCS)

becomes paired, during a traumatic event, to cues such as sights, smells or sounds (conditioned stimuli or CS). These cues can then trigger related or conditioned fear responses (CR) without the presence of real threat. The number of conditioned stimuli is further increased though the process of stimulus generalisation, whereby stimuli that are similar in nature to the original conditioning stimulus also elicit anxiety (Foa et al., 1989). The second stage of Mowrer's theory posits that learned responses such as those typical of avoidance, will reduce the amount of discomfort arising from the presence of a conditioned stimuli. Furthermore, the presence of heightened physiological responses and repeated intrusive thoughts in regard to traumatic events have also been attributed through the effect of classical conditioning to Mowrer's two-factor theory (Peri, Ben-Shakhar, Orr & Shaler, 2000). Wirtz and Harrell (1987) provide support for the process of classical conditioning in PTSD. They investigated people who were victims of violent assault and found that some experienced less psychological distress six months after the assault if they had been exposed to situations or stimuli that resembled the context of the original assault without experiencing another assault. In contrast, victims who had not been exposed to the same stimuli maintained a high level of distress in the same time period.

Cognitive Theory: Appraisal and Information Biases

Ehlers and Clark, (2000) suggested that two key processes are responsible for the development of PTSD in their cognitive model. The first is the way in which the individual appraises trauma, and the second involves the nature of the memory for the event, and its link to other autobiographical memories. Once activated, the perception of the threat is associated with emotional responses such as arousal, anxiety and symptoms of intrusion. The perceived threat also drives a series of behavioural and cognitive responses that are intended to reduce perceived threat and distress in the short-term. However, they have consequences and instead of alleviate distress, prevent cognitive change and maintain the disorder. Individuals with PTSD are unable to see the traumatic event as a time-limited and therefore assume that it will always impact on their future negatively. Individuals then appraise the events of the

trauma negatively, which in turn creates a current sense of threat. This threat can be with either external (e.g. the world is a more dangerous place) or, very commonly, internal (e.g. the view that ones self is incapable of coping).

Various negative appraisals of the sequelae of trauma can elicit a sense of current threat and maintain PTSD. These include the interpretation of one's own PTSD symptoms, the way others interpret the event, and appraisals of the event itself in relation to other domains of functioning (such as vocational consequences). Individuals may interpret the symptoms of PTSD as being permanent and appraise them as a threat to their psychological and physical wellbeing. This style of appraisal contributes to PTSD by encouraging the person to engage dysfunctional behaviours in order to cope. For example a person who feels like they are losing control of their mind will most likely suppress any recollections of the event. However, thought suppression has a paradoxical mechanism and often encourages intrusive thoughts (Foa et al, 1989). In a similar manner, negative appraisal of other people's reactions to the event may help to maintain the disorder. For instance, thinking that others do not care about the event may encourage social avoidance and isolation, further taxing a persons' coping abilities.

Etiology of PTSD following cardiac surgery

Stukas et al., (1999) describe the experience of cardiac surgery quite adequately when they suggest that it is "outside the range of usual human experience" (p. 212). Some of the features of cardiac surgery are rather distressing and cognitive appraisal has been shown to play a role in the development of PTSD. For example, Boyer et al., (2013) investigated fear appraisal in 110 patients awaiting emergency cardiac surgery. They observed that PTSD was more prevalent in those who perceived the event as overly life-threatening. Juergens, Seekatz, Moosdorf, Petrie and Rief, (2009) assessed fear appraisal in another sample of cardiac patients and found that those who perceived the event as life threatening had a higher incidence of PTSD.

Jones, Griffiths, Humphris and Skirrow (2001) provide support for this idea when fear appraisal was measured 5 days after surgery. They found that high levels of fear in regard to the surgery corresponded with higher scores on the Impact of Events Scale – Revised (IES-R).

Several PTSD risk factors have been associated with PTSD after cardiac surgery including those that stem from the cardiac event itself, the surgical process, the intensive care environment and sociodemographic factors. Bennett, Conway, Clatworthy, Brooke and Owen (2001) investigated the risk factors associated with PTSD in patients who had experienced a myocardial infarction. They reported that low mood at the time of hospital admission and the degree of fright experienced during the cardiac event was related to greater symptom levels of PTSD. They also suggest that the presence and intensity of unwanted intrusive thoughts was mediated by the degree of fright that the patient experienced during their previous heart failure. Furthermore, the degree of physiological arousal experienced during the intrusive thoughts was ameliorated by a low mood during hospital admission and also predicted high avoidance scores on the IES-R. This finding suggests that intense fear, low mood, and dissociation during the event are related to the severity of later emotional problems and the onset of PTSD.

Roberge, DuPuis and Marchand, (2010) describe how a history of psychiatric treatment was significantly associated with both the presence and intensity of PTSD symptoms following a heart attack. Having a history of depression was the strongest predictor of PTSD in this case. The authors note that PTSD onset is related to feeling helplessness or horror, intense fear, and the perception of a threat to life during the cardiac event. Although this study is one of the larger cardiac studies to recently emerge (N 477), the results should be interpreted with caution as a considerable number of the diagnostic interviews were conducted over the phone.

A pathophysiological model can be used to explain the biological mechanisms that contribute to PTSD following cardiac surgery. A cardinal feature of PTSD is very strong and intrusive memories for the event (Foa et al., 1989). During

this time, a number of stress hormones are released in the brain, which is shown to increase memory consolidation in non-human studies. Some have suggested that during a period of intense fear the brain is flooded with a release of stress hormones, which in turn may over-consolidate memories for the event (Hauer et al., 2009). In experimental studies, the administration of lipophilic beta-blockers such as propranolol, were found to oppose the potentiation of memory consolidation in stressful situations. This notion was supported by Bhuvaneswar et al. (2014), who hypothesised that the administration of a lipophilic beta-blocker at the time of the cardiac surgery would reduce the symptoms of PTSD. As predicted, patients who received the beta-blocker had 35% less PTSD symptoms than their counterparts.

Predictive factors of PTSD in cardiac populations have extended to levels of social support and sociodemographic features. For example, Bennett et al. (2002) explored the ameliorating elements of social support on PTSD in cardiac patients. They found that higher levels of PTSD at three months post-surgery was associated with lower levels of social support. Dayvdow et al. (2008) conducted a systematic review of the risk factors associated with PTSD in survivors of myocardial infarction, and observed that female gender and younger age were consistent predictive risk factors.

Finally, considering that cardiac surgery requires rehabilitation in the ICU, it is imperative to address the literature concerning the predictive factors of PTSD in these populations. PTSD risk has been attributed to intraoperative awareness a phenomenon where the patient remains conscious after general anesthetic sedation, but is essentially paralyzed and unable to communicate. PTSD rates as high as 50% have been documented in some intraoperative studies (e.g. Mashour, 2010). Jones et al., 2007, described higher incidences of PTSD in patients who had received heavy sedation with benzodiazipines during rehabilitation in the ICU, and Hauer et al., (2009) noted that experiencing respiratory distress during ICU care was related to high PTSD symptom scores. High rates of PTSD are frequently associated with the experience of delirium in ICU populations. For example Roberts, Rickard, Rajbhandari and Reynolds (2007), determined that there were more cases of

PTSD in a group of people who had experienced vivid and traumatic hallucinations during delirium than their counterparts. In sum, the predictive factors of PTSD in cardiac populations are related to a variety of mechanisms. Research has shown that there are risk factors associated with the cardiac event itself, certain surgical procedures, sociodemographic aspects, and the nature of ICU care.

Interventions to address PTSD in cardiac populations

There have been several studies to recently emerge that have evaluated the efficacy of psychological treatments to address PTSD in people who have survived cardiac surgery. Arabia, Manca and Solomon (2011), compared eye movement desensitization and reprocessing (EMDR) with imaginal exposure (IE) during a 4-week treatment program with 42 cardiac patients. Data was generated on PTSD, anxiety and depression at baseline, post-treatment and 6-month follow-up. Both treatments were effective in reducing psychological distress, but as predicted, EMDR performed significantly better than IE over all treatment variables. Some limitations of this study warrant caution when interpreting the results. No diagnostic assessment was completed during the study, so it cannot be said with certainty how many patients would have received a diagnosis of PTSD. In this regard, it is not possible to conclude that EMDR was an effective treatment for post-cardiac psychological distress. Furthermore, both the IE and EMDR treatment in this study involved hour-long sessions over 4 weeks, with 1 – 3 hours of daily homework. In terms of real-world applicability, this would involve commitment at the patient level, and a clinical specialist to administer the program. Many hospitals and cardiac facilities simply do not have the time or resources to support this type of treatment (Shapiro & Forrest, 1998).

In a further study, Dehdari, Heidarnia, Rumezankhani, Sadeghia and Ghofranipour (2007) evaluated the effect of Progressive Muscle Relaxation (PMR) training to reduce anxiety and improve quality of life outcomes in patients who had undergone CABG. The study compared the results of data from patients who were allocated to receive either exercise and lifestyle

training with PMR, or just exercise and lifestyle training alone. The PMR group showed significant reductions across all measures of anxiety ($p<.01$), and had better quality of life scores than the non-relaxation group. However, there were some limitations with the study, namely a small sample size (55), and short duration of follow-up. Furthermore, the study was an open, un-controlled trial where participants had self-referred and may have been more motivated to improve their outcomes. The authors concluded that PMR training was not only effective in reducing anxiety, but was also a cost-effective treatment that can be administered with minimal training, and easily incorporated into existing cardiac rehabilitation programs.

The use of diary keeping has been investigated in ICU populations with some success (Jones et al., 2010). In a large randomised controlled trial, the authors evaluated 352 patients who were in ICU for seventy-two hours or more. The patients in the experimental group were given a diarised account of their time in intensive care that included photographs and entries from both medical staff and family members. The Post Traumatic Stress Syndrome 14 (PTSS-14) was utilised to measure the incidence of PTSD at baseline, post treatment and follow-up at three months. In the study the incidence of new-onset cases of PTSD was reduced in the intervention group compared to the control group (13% versus 5%, $p = 0.02$). The diaries work on the premise that ICU patients often have gaps in their memory and find it difficult to place certain recall for the event into context. It has been hypothesized that recall for traumatic memories in the ICU plays a role in the development of PTSD (Jones, Griffiths, Humphris, 2001). The study had several limitations making it difficult to confirm the variable that was responsible for bringing about change. Following the completion of the diary, an experienced nurse is expected to debrief the patient and explain all the processes that took place during the ICU admission. This discussion was un-structured and was it was not determined how this may have affected the results. Considering the study was conducted over 12 different sites, there would have been a certain amount of variability in the delivery of this discussion. Furthermore, the study relied on commitment from the nursing staff to write in the diary every day, and take

photographs during the course of the treatment. The amount or quality of input would also have varied in this case.

Peris et al., (2007) provided an intervention to cardiac patients at the point of ICU admission with some success. The treatment, which was delivered by clinical psychologists, was CBT-based and provided emotional support as well as the promotion of adaptive coping strategies with the aim of reducing PTSD, anxiety and depression. There were non-significant reductions in levels of anxiety and depression in the intervention group compared to the control group, and significantly less incidences of PTSD in patients who had received early clinical psychologist support ($p< 0.0001$). Furthermore, at 12-month follow-up, significantly more patients required medication for psychological distress in the control group than the intervention group (41% versus 8%, $p<0.0001$). During the research, there were differences in sedative drug administration that would have affected the results of this study and should therefore be considered as a limitation. Levels of sedation have been shown to have a considerable effect on psychological and functional outcomes in several large-scale studies (e.g. Jackson et al., 2010). Further limitations include the fact that significantly fewer patients from the intervention group were available at 12-month follow-up than in the control group, and this may have impacted on the findings. Nevertheless, the authors suggest that early psychological care should be a routine part of care for patients who undergo major surgery.

Overall, research has suggested that EMDR and IE appear to reduce the symptoms of PTSD after cardiac surgery, but they are time-costly and require a clinician to administer. PMR and patient ICU diaries have also reduced PTSD symptoms in cardiac patients, but results from these studies are open to interpretation due to methodological limitations. Evidence for the efficacy of early intra-psychiatric care has been reported and is recommended for people undergoing surgery in order to reduce the associated psychological burden.

Chapter Summary

This chapter has highlighted several important points. Firstly, PTSD appears to be present in approximately 15% of the post-cardiac surgical population, with some estimates reaching as high as 38%. ICU care, fright at the time of the event, perceived threat to life, high levels of sedation and social isolation may all contribute to this phenomenon. Patients with PTSD are susceptible to poorer outcomes following surgery including greater physical symptom burden, les adherence to rehabilitation programs, poorer social connections and reduced vocational opportunities. These findings have considerable implications for public health, but most importantly, PTSD is highly distressing for the individual. Of the studies that have investigated psychological treatments for postcardiac PTSD, many have shown that intervention, both prior to and following surgery, may help to alleviate some of the associated difficulties. However, there has only been a handful of such studies, and to date, none have investigated a brief intervention that combines the principals of CBT with relaxation and psychoeducation training. All the interventional studies addressed in the current study have incorporated lengthy or costly applications that require commitment from hospital or psychiatric staff. Thus, the magnitude of improvement in long-term outcomes resulting from brief, preventative interventions is unclear. With this in mind, the aim of the current study was to develop and evaluate an intervention that would address PTSD in cardiac populations with the aim of reducing symptom burden. The next chapter presents the methodology used to investigate this intervention among people who have undergone cardiac surgery in a New Zealand setting.

Chapter 2: Method

The following chapter describes the research design and the study's participants. A rationale behind the use of the study's psychometric measures is then discussed, and an outline of the statistics applied in this study is also given. The ethics that guided the study are outlined, followed by a description of the data and power analysis.

Research Design

Using a prospective, randomised controlled design, the current study was based on the scientist-practitioner model of clinical research to investigate the effect of an intervention to reduce PTSD in people who have undergone cardiac surgery. The rationale for this design and small size was due to this being a pilot study of a brief treatment manual, which was developed specifically for this study. The purpose of conducting this pilot study was to examine its feasibility with regard to further research on a larger and more diverse scale. Randomised controlled studies are said to be useful in that they allow for a realistic examination of the intervention, as well as recruitment, randomisation and assessment procedures (Leon, Davis & Kraemer, 2011). Furthermore, this type of study is particularly illuminating for psychological interventions, in that the control group's experience is also documented.

Participants

In total, 33 adults aged between 54 and 80, who were on hospital waitlists for cardiac surgery participated in this research. Seven sets of data were not returned and 6 participants were still awaiting surgery at the data collection cut-off date in January 2015. Therefore, data is only available for 20 responders (see Table 2). Investigation of the participant profiles revealed that all of the patients were similar in their age and experience of cardiac surgery. Of the 33 participants, 24 were New Zealand European, 5 Māori, 2

European/Māori, 1 Pacific Islander, and 3 people were documented as "other".

Table 2.

Participant Characteristics for study sample

	N	%
Male	28	84.8
Female	5	15.2
Age (Mean)	59.9	
Ethnicity		
European	24	72.7
Māori	5	15.2
Pacific Island	1	3.1
Other	3	9.0
Cardiac Procedure		
CABG	11	33.3
Mitral Valve Repair	4	12.1
Multiple Procedures	18	54.6

Measurement

Initially, the author administered a structured questionnaire, which was completed by all of the recruited participants. This was carried out to determine eligibility for the study, and to collect personal data such as age, gender and ethnicity. To evaluate the efficacy of the intervention manual, a selection of psychometric instruments was applied as described in the literature relating to coping and the treatment of PTSD (Chung et al., 2008; Creamer, Bell & Failla, 2003; Meyer, 2001; Sundin & Horowitz, 2002). This included self-report measures to assess PTSD symptomatology and coping across baseline, post-intervention and follow-up stages.

Measuring PTSD

The IES-R (Weiss & Marmar, 1997) is a 22-item scale developed to measure subjective distress. It is still one of the most widely used instruments in PTSD research (Tagay, Herpertz, Langkafel, & Senf, 2004). Furthermore, the IES-R has been successful in measuring stress reactions in both cardiac and critically ill populations (e.g. Doerfler et al., 2011). Items for the IES-R were derived from the documented experiences most frequently used to describe distress by people who had undergone a traumatic event (Creamer et al., 2003). Following the format of the DSM-III-R (1987), the items on the questionnaire are divided into 3 symptom clusters; intrusion, avoidance and hyperarousal. The IES-R provides sub-scores for each of these response sets, as well as a total subjective stress score. The questionnaire is rated on a 4-point scale according to how frequently each symptom has occurred over the last 7 days (0= Not at all, 1= Rarely, 2= Sometimes, 3= Often, and 4= Extremely). Scores on the IES-R range from 0 – 88 with higher scores relating to higher levels of PTSD.

Good psychometric properties for the IES-R have been widely reported for use in both community and veteran samples (Creamer et al., 2003; Rash, Coffey, Baschnagel, Drobes & Saladin, 2008). Furthermore, the psychometric properties of the IES-R have been validated and supported in cardiac research (Baumert, Simon, Gundel, Schmitt & Ladwig, 2004). Good internal consistency was found with coefficient alphas of .96 for the total score, (.90) for the avoidance cluster, (.86) for the hyperarousal cluster, and (.85) for re-experiencing cluster, additionally (Beck, Grant, Read, Clapp, Coffey, Miller & Palyo, 2008). According to Sundin et al. (2002) test-retest reliability coefficients on the sub-scales of the IES-R range from moderate to excellent (.51 to .94). They also suggest that in terms of parallel-forms reliability, the IES-R correlates well to the PTSD checklist with a coefficient alpha of .84. Similar psychometric properties have been demonstrated by investigators using the IES-R amongst survivors of critical illness, for example women with breast cancer (Thewes, Meiser & Hickie, 2001). Internal consistency analyses

were conducted using Cronbach's alpha for the scales used in the current study. Coeffieciency alphas were determined for the overall IES-R scores, and for each of the sub-scales. The results are shown below, in Table 3.

Table 3.
Internal consistency coefficients for the current study – IES-R, including the avoidance, intrusion and hyperarousal subscales.

Scale	Alpha
Overall PTSD Score	0.91
Subscales	
Avoidance	0.86
Intrusion	0.72
Hyperarousal	0.84

As with many self-report measures, clinical cutoff scores have varied across populations and constructs (Arabia et al., 2011). For example, von Kanel et al. (2011) used the IES-R with a cut-off score of 25 in their study of cardiac patients, and Corrigan, Samuelson, Fridlund and Thome (2007), found that a upper limit of 30 provided optimum sensitivity and specificity in their study ICU patients. In the current study, a score above 33 was used as an indication of clinically significant PTSD. This is in line with literature from the developers, who suggest that this score provides the best diagnostic accuracy (Creamer et al., 2003).

The IES-R was developed and validated using a specific traumatic event as the reference in the instructions to patients responding to the questionnaire. In the present study, the term "traumatic event" was replaced with "your pending surgery" for baseline measures, and "your recent cardiac surgery' for all measures thereafter. Wilson and Keane (2004) noted that "Any use of the measure requires that the traumatic event be made explicit by the person

administering the measure and that respondents are clear about what specific event they are reporting on" (p. 180) in reference to modifying the wording on the IES-R. Therefore, the participants were instructed to read the following paragraph before answering any of the items on the IES-R (see Appendix A): "Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you during the past seven days with respect to your recent cardiac surgery – how much were you distressed or bothered by these difficulties? This assessment is not intended to be a diagnosis. If you are concerned by your results in any way, please speak with a health professional".

Other measures were investigated for this study. The Post Traumatic Symptom Scale (PTSS-10) is a 10 item brief screening tool developed to assess PTSD symptoms. It is a Likert scale that ranges from 1 (no symptoms) to 7 (always) with a total score ranging between 10 and 70. Scores greater than 35 indicate the presence of considerable PTSD symptoms. However, according to Einsle, Kraft & Köllner, (2012) the PTSS-10 appears to indicate PTSD at consistently higher rates than both the IES-R and the Structured Clinical Interview for DSM-IV (SCID; 29% compared to 7% and 4% respectively). The IES-R was favoured over both the SCID and the PTSS-10 for the current study because it has good psychometric properties, is easily administered, and can be targeted specifically toward cardiac related PTSD.

Measuring Coping

Carver (1997) developed the Brief COPE to predict clinically relevant outcomes across many life-stressors and populations. The instrument is a shortened version of the original 60-item COPE first developed in 1989 by Carver, Scheier, and Weintraub. The major advantage of the shortened version is the reduction of participant burden, which is crucial in post-surgical research (Meyer, 2001). Also advantageous, the brief version was found to have superior psychometric properties, such as internal consistency coefficients, when compared to the original version (Carver, 1997). The Brief COPE has been translated into multiple languages and is often considered a

useful and meaningful instrument (Cooper, Katona, & Livingston, 2008; Muller & Spitz, 2003). The Brief COPE asks responders to indicate the extent to which each of the statements included in the item applies to them in relation to their ways of coping during the stressful situation. The measure includes 14 scales, each of which has a specific conceptual focus. The scales are captured by 2 items each, and responses are recorded on 4-point scales ranging from 1 – *"I haven't been doing this at all",* to 4 – *"I've been doing this a lot".* An example of an item is: "I've been saying things to let my unpleasant feelings escape" (see Appendix B).

Many studies have utilised both the COPE and the Brief COPE to measure coping behaviours within a range of samples such as severe mental illness (Meyer, 2001), carers of people with dementia (Cooper et al., 2008), international students attending US colleges (Miyazaki, Bodenhorn, Zalaquett & Ng, 2008), women with breast cancer undergoing chemotherapy (Yusoff, Low, & Yip, 2010), and in patients after cardiac surgery (Shen, McCreary & Myers, 2004; Shen, Myers & McCreary, 2006). These studies, and several others all provide support for the psychometric strength of both the COPE and the Brief COPE. Carver reviewed the psychometric properties of the Brief COPE in a study of 162 hurricane survivors. It was shown that the Brief COPE scales had acceptable internal consistency coefficients ranging between .50 and .90. Further investigations reveal that the scales exhibit strong convergent and discriminate validity in that they correlate with other theoretically based scales such as optimism, self-esteem and hardiness (Meyer, 2001). Cronbach's alpha coefficients analyses were conducted for each of the sub-scales of Brief COPE for the current study. They are shown below, in Table 4.

Table 4.

Internal consistency coefficients for the current study - Scales of the Brief COPE.

Scale	Alpha
1. Active Coping	0.70
2. Planning	0.82
3. Positive Reframing	0.65
4. Acceptance	0.50
5. Humour	0.79
6. Religion	0.82
7. Using emotional support	0.76
8. Using instrumental support	0.71
9. Self Distraction	0.68
10. Denial	0.51
11. Venting	0.52
12. Substance Abuse	0.92
13. Behavioural Disengagement	0.71
14. Self Blame	0.64

Of the 14 Brief COPE scales, the first 8 (active coping, planning, positive reframing, acceptance, humour, religion, using emotional support, using instrumental support) are intended to capture adaptive coping strategies, and the remaining 6 (self distraction, denial, venting, substance abuse, behavioural disengagement, self blame) are said to assess maladaptive coping (Meyer, 2001). Evidence suggests that an adaptive style of coping is associated with better outcomes than maladaptive coping, which has been linked with more undesirable outcomes (Carver et al., 1993). The goal of the current study was to explore how an intervention would modify adaptive coping following cardiac surgery. Therefore, the scales on the Brief COPE were grouped and scored according to adaptive versus maladaptive coping.

The measure was not adapted and followed the format as outlined by the original author. Overall, the Brief COPE was selected for the current study due to its sound psychometric properties, usefulness in assessing coping in cardiac populations, and because it reduces the time-burden for respondents.

Procedure

Recruitment

The sample was drawn from patients awaiting cardiac surgery at Auckland City Hospital (ACH), Auckland, New Zealand, and from an article that was published in an Auckland newspaper (see Appendix C.). ACH is operated under the Auckland District Health Board and is New Zealand's largest public hospital. The participants recruited from ACH were approached during a pre-surgical meeting that takes place 1 to 4 weeks before the patient is due to undergo their cardiac procedure. Cardiac patients visiting ACH for a pre-surgical meeting were approach by the author and given an information flyer outlining the study and its requirements (see Appendix D). If the individual agreed to take part, they then had a structured interview with the author to gather personal information and review the inclusion and exclusion criteria. If the individual met the inclusion criteria, they were invited to review and sign the study protocol and Consent to Participate form (see Appendix E). The meeting took approximately one hour during which the author outlined the study, explained the requirements of the intervention and guided the participant through the consent process. After signing the consent form the participants were asked to complete their first set of self-report measures, including the IES-R and Brief COPE, which accounted for the baseline measures for this study. Individuals recruited from the newspaper article were invited to make contact with the study's author and a meeting was arranged at the participant's home. The recruitment process then followed the same outline as those who were recruited from the hospital meeting. The sample was recruited from August to December 2014.

Inclusion criteria for this study included people who were due to have cardiac surgery, were willing to sign the Consent to Participate form, and were aged between 21 and 85. Individuals were excluded if they presented with significant current or previous mental health problems. As well, it was imperative that the awaiting surgery was not related to any prior traumatic experience (e.g. motor vehicle accident), as this may have affected the results regarding the effectiveness of the intervention. Likewise, patients were excluded if they had undergone previous cardiac surgery or intensive care treatment. This meant that patients with substantial exposure to extraneous stressors were excluded. Individuals wishing to take part could not be engaged in another study, or taking part in any psychological therapy. This ensured that any effect seen in the data was the result of the current intervention and not another treatment. Finally, it was essential for participants to be fluent in English, have a fixed address, and not have any limitation of care at the time of enrolment, as these represent significant barriers to prescribed outcome evaluations. Of those people who agreed to take part, 2 were excluded because they did not meet the inclusion criteria. For example, one adult presented with chronic major hearing and comprehension difficulties, and the other was taking part in a clinical trial related to arthritis medication. All of the 33 participants recruited signed the Consent to Participate form indicating their agreement to take part. As previously mentioned 6 are still awaiting their surgery and will not be included in the results of this study. This was due to the fact that participants were recruited from hospital waiting lists that indicated a wait of approximately three months. Unfortunately, these people were still waiting for surgery a number of months after the initial timeframe had passed. This is a common problem within the New Zealand public health domain (Siciliani & Hurst, 2005; Seddon, French, Amos, Ramanathan, McLaughlin & White, 1999).

Setting

The first baseline measures and assessment procedures were carried out at the pre-surgical clinic of the cardiovascular department at ACH, and in the home for those who were recruited via the newspaper article. The remaining

measures, treatment manual and follow-up measures were given to the participant at the time of recruitment and included instructions for their completion following surgery. The 7-day treatment was completed in the participant's home in a quiet area free from distractions. All measures except for those collected at baseline were posted back to the author after follow-up in a provided envelope.

Informed consent

If the patient met research criteria, informed consent for participation in the study was gained in writing from the individual. Potential participants were informed both verbally and in writing that participation was voluntary. Before written consent was obtained, information sheets were provided to the potential participant, which outlined the nature of the research and what would be expected if they took part. Once consent was obtained, each participant was randomly assigned to either the experimental or the control group by using a random allocation software package. After baseline measure was obtained, the respondents were given three copies to take home and complete at various stages throughout the study. They were asked to return the completed questionnaires by post within a month of completing the study.

Treatment Manual and Materials

Treatment was based on the Coping After Cardiac Surgery Manual (2014), which is a 30-page document divided into two sections (see Appendix F). The first section is administered to the participant prior to their cardiac surgery, and the second section is started one week after hospital discharge. The treatment manual is a self-help tool based on cognitive behavioural theory that incorporates psychoeducation and (PMR) to reduce the symptoms of PTSD. It is structured and outlines the goals and actions required to successfully complete the treatment. There are four stages of the treatment manual as follows;

Stage 1: Psycho-education (pre-surgical). This stage includes an outline and full instructions for the completion of the manual and the associated exercises. It provides a timetable to follow and includes instructions for further contacts in case of emergency. During this stage, the IES-R and Brief COPE are completed by the participant before they are administered any psycho-education. Most importantly, stage one includes information about some of the emotional responses people have following surgery and addresses sedative-induced hallucinations and delusions. The importance of this treatment and a discussion of psychoeducation are outlined further in the chapter.

Stage 2: Psycho-education (PTSD). This stage includes a comprehensive discussion of PTSD and covers the potential symptoms, triggers and etiology. Further details of PTSD arising after cardiac surgery and treatment in the ICU are also discussed, as well as an explanation of how the 'Fight or Flight' response is elevated in people with PTSD. Emphasis is placed on assisting the participant to understand the disorder in relation to medical surgery. Furthermore, the aim of psychoeducation in this condition is to help the patient view their symptoms as part of a normal reaction to trauma.

Stage 3: Progressive Relaxation. This stage includes psychoeducation around relaxation to reduce the symptoms of PTSD. Further in the stage, diaphragmatic breathing is introduced and the relaxation technique is discussed and demonstrated. Relaxation tasks are then introduced in audio format, which requires the participants to learn and practice PMR techniques for one week. The relaxation training takes the participant through muscle group relaxation, then relaxation-by-recall, and ends with paired or cue-controlled relaxation, which is used as a coping strategy. The audio recording plays for approximately 25 minutes (see further in the chapter for a more detailed discussion of PMR).

Stage 4: Record Keeping and Homework. In this stage the participant is required to identify and record any potential symptoms of PTSD. In this way, the patient learns to identify any potential triggers of stress, and how this may

affect their actions later on. Included in the manual is a relaxation diary, where the participant is asked to record their daily practice. It serves to both ensure adherence to the study's requirements and helps the participant to gauge their emotional reactions to the relaxation.

Development of the Treatment Manual

The current study utilised PMR and psychoeducation in a manualised treatment that aimed to reduce the symptoms of PTSD in people who have survived cardiac surgery. Evidence has shown that psychoeducation is a particularly effective method of reducing the fear and anxiety that is associated with CABG, major medical procedures and recovery in the ICU (Jones et al., 2010; Shahmansouri, Janghorbani, Salehi Omran, Karimi, Noorbala, Arjmandi & Nikfam, 2014). Furthermore, psychoeducation was effective in reducing PTSD symptoms in various groups and populations such as African refugees (Neuner, Schauer, Klaschik, Karunakara & Elbert, 2004), battered women (Kubany & Watson, 2002), and cancer survivors (Fawzy & Fawzi, 1994). Psychoeducation is a treatment that combines therapeutic and educational therapies into a more holistic approach that stresses coping, empowerment and collaboration (Dixon, 1999). It is strengths focused and is based in the present (Lukens & McFarlane, 2004). It is based on the idea that the patient is equally responsible and knowledgeable for their care, and assumes that this will encourage more positive health-related outcomes. Psychoeducational techniques assist the individual to comprehend their illness in terms that are easy to digest, and encourages them to use the information in a meaningful way (Lukens et al., 2004). Psychoeducation assumes that when people take control of a life-stressor or illness, their negative focus is naturally interrupted (McFarlane, 2002). Furthermore, there are a number of well-documented evidence-based studies to back up the claim that psychoeducation is associated with improvements across many domains of psychosocial functioning (e.g. Jones et al., 2010).

Progressive Muscle Relaxation (PMR) appears to be successful in treating a variety of ailments and states including cancer patients experiencing anxiety

and depression (Holland et al., 1991), headaches (Blanchard et al., 1990), hypertension (Sheu, Irvin, Lin & Mar, 2003), and even the management of behavioural disturbances in Alzheimer's disease (Suhr, 1999). Edmund Jacobson first developed PMR in the 1920s. His argument was that the complete relaxation of muscle fibers was in direct opposition to tension and was therefore a logical intervention for anxiety (McCallie, Blum & Hood, 2006). He found that by systematically tensing and releasing all of the major muscle groups as well as attending to the associated sensations, a person could experience complete and deep relaxation. Through his research, Jacobson revealed that relaxation responses have broad benefits, specifically on somatic stress, negative emotion and anxiety (1929).

PMR training has been researched in many populations including those affected by insomnia, pain, psychological distress, nausea, and physiological symptoms relating to medical intervention. It has been compared to other stress reducing techniques such as meditation and yoga (Smith, Hancock, Blake-Mortimer & Eckert, 2007), and has been investigated as a substitute for pharmacological therapies (Andrews, MacMahon, Austin & Byrne, 1982). PMR has also been investigated as a treatment for people who have suffered cardiac arrest and was reported to be an effective therapy for improving quality of life and psychological outcomes in patients recovering from cardiac events in Iran (Dehdari et al., 2009). Similarly, another study assessed a course of PMR that was administered prior to cardiac surgery (Leserman, Stuart, Mamish & Benson, 1989). The participants were evaluated for variables including tension, depression and anger. Results of the study suggested that PMR was effective in reducing tension and anger but not depression. Further research suggests that PMR also significantly reduces pain after surgery (Good, Stanton-Hicks, Grass, Anderson, Choi, Schoolmeesters & Salman, 1999), improves post-surgical wound healing (Holden-Lund, 1988) and increases strength, energy and postoperative epinephrine levels (Wilson, 1981).

The relaxation recording in the current study was developed and recorded by Associate Professor Paul Merrick, a Clinical Psychologist from Auckland, New

Zealand. The recording is based on Jacobsen's original concept of relaxation but follows a modified format of PMR. The recording is 25 minutes long and includes paired or cue-controlled relaxation techniques to promote the self-management of relaxation away from the recording. This concept works on the idea that individuals can condition relaxation responses to easily self-produced signals whenever anxiety arises. This step involves repeated pairings with an imaginal word, which in the case of the current study is "relax", with a relaxed muscular state. The intention then is that the cue will acquire stimulus control over relaxation and anxiety levels will reduce.

Data Analysis

Various statistical procedures were conducted both prior to and during the analysis of the data set. Initially, a priori power analysis was conducted using the software program G* Power 3 before the experiment was performed. This is a necessary part of conducting social research because it gives an indication of the sample size needed in order to achieve adequate power (Cohen, 1988). After collection of all the completed participant questionnaires, the survey data was entered into the Statistical Package for the Social Sciences (SPSS) version 22, for data analysis. Coefficiency alphas were then analysed before any data analysis took place. The author then used descriptive statistics investigate the data set. Independent *t* tests were used to determine the difference in scores across the sample on the IES-R and the Brief COPE, for example IES-R scores were compared at various stages between the groups. Effect sizes were determined using a Cohen's *d* calculation. Results of these investigations are presented in the following chapter.

Ethics

The current research project was conducted in accordance with the Code of Ethics for Psychologists Working in Aotearoa/New Zealand (CEPWANZ) and the Massey University Human Ethics Committee Code. Ethical approval to conduct this study was reviewed and approved by the Northern A Health and

Disability Ethics Committee (HDEC) with a decision made through the HDEC-Full Review pathway (see Appendix G). Institutional consent was obtained from the Auckland District Health Board in August, 2014 (reference 14/NTA/85). Key ethical considerations important to the present study included issues relating to the non-treatment of patients in the control group, maintaining confidentiality, and ensuring no harm to the participants.

As with all experimental studies involving human subjects, there is a risk of harm for the members of the control group who receive no intervention (Freedman, 1987). This is an ethical concern when the researcher has some idea that their intervention may help to alleviate some of the distress associated with the construct being investigated. In the current study, the equipoise standards were met because, to date there has been no published evidence to support the combination of psychoeducation and PMR as an effective treatment for people who have survived cardiac surgery in New Zealand. However, there is some evidence surrounding the active control, which suggests that hospital-administered rehabilitation programs may indeed be effective (Milani, Lavie & Cassidy, 1996). Furthermore, the treatments have similar risks and benefits in that they both address recovery after cardiac surgery, are low-risk and involve the promotion of wellbeing.

Confidentiality was maintained for all 33 participants who enrolled to take part in this study. Prior to enrolment, potential participants were given a statement to read, which outlined both the commitment of the principal researchers and any concerns that were likely to be treated as an exception (such as safety issues). To maintain confidentiality, numerical codes were given to each participant. These codes were numbered participant 1001 through to 1033 and were used in all research reports and publications. The returned data was stored in a locked cabinet and was only accessible by the lead researcher. As per the recommendations of the New Zealand Psychologists Board (2002), any data generated from this study will be held for a period of ten years, after which time it will be destroyed by the author.

No research should ever cause harm to any potential human participant (New Zealand Psychologists Board, 2002). This research was conducted in accordance with this principal, and was considered to be of low-risk to the participants. Potentially, the intervention manual could have increased anxiety in the participants due to there being reminders of the recent surgery. The intervention asked the participants to read about and review certain aspects of their surgery, which could have triggered an anxiety response (Corrigan et al., 2007). To reduce the risk of this happening, the participants were given information where they could seek further advice, such as emergency mental health contacts. Furthermore, a registered clinical psychologist was available for the researcher to consult if there appeared to be any safety concerns.

All peoples and persons in the current study were shown respect and granted dignity as part of their common humanity (New Zealand Psychological Society, 2002). Cultural consultation was sought with a Maori research advisor from both Massey University and Auckland District Hospital Board to ensure that cultural standards were being met and the study was implemented in a culturally sensitive way (see Appendix H, and Appendix I).

Chapter 3: Results

This chapter describes the results of the current study in relation to the outlined hypotheses. It begins with a discussion on data screening, followed by a summary of the descriptive statistics. Each hypothesis is separately discussed and the findings are reported. The chapter ends with a summary of the results.

Data Screening

The responses were screened for missing and invalid data, and those detected were either corrected or excluded from the study. Included were two complete sets of questionnaires that were not returned to the researcher. Missing data was then analysed before any further statistical analyses was performed. In the current study, data was missing because the participant either chose not answer, omitted answers or in one case, a questionnaire was returned with a page missing. In some cases, responders circled two answers. Six participants (18%) did not correctly answer 176 questions, totalling (.04%). Expectation maximisation was used to correct missing values in the data since this method appears to reduce the likelihood of producing biased estimates or untrue assumptions about the data (Little & Rubin, 1989). Where respondents gave two or more answers to an item requiring only one, averaging was used to determine the score. Averaging the available items appears to be a “stable” method of treating incorrect responses in this manner according to Schafer and Graham (2002, p. 151). Screening was then conducted using SPSS to identify values that exceeded the range for each variable. No data input errors were detected.

Descriptive Statistics

A total of 33 patients were randomised into one of two groups: 15 to the intervention group and 18 to the control group (see Table 5). Five participants from the intervention group and one from the control group had not undergone surgery at the cut off point in January 2015 for this study. One participant from the control group could not be reached and it is unknown whether they had completed the study. Two participants returned incomplete data (i.e. entire questionnaires were not returned) and they were excluded from the results of the study. Competed questionnaires were finally available for 18 participants (51.5% of all eligible responders). The mean age was 59.9 years (SD = 7.1, range 54 to 80), and 77.7% were men. The two groups were generally equal at baseline with regard to age, however there were significantly more females in the experimental group. Mean age was 56.6 years (SD = 6.6) in the intervention group and 60.8 years (SD = 4.8) in the control group.

Table 5. Baseline characteristics of the study's participants who received an intervention or routine care.

	Treatment group at Baseline			
	Intervention	Control Group		
	(*n* = 9)	(*n* = 9)	Differences	*d*
Characteristics	Mean (SD)	Mean (SD)	(95% CI)	
Age	56.6 (6.6)	60.8 (4.8)	4.2 (-10.0 – 1.5)	.72
Overall PTSD score	13.3 (8.1)	12.9 (6.5)	-.47 (-7.7 – 6.8)	.05
Subscales				
Intrusion	5.1 (3.7)	5.7 (2.9)	.57 (-2.7 – 3.8)	.18
Avoidance	5.7 (2.7)	3.4 (2.0)	2.35 (-4.7 - 0.3)	.96
Hyperarousal	2.3 (2.2)	3.9 (2.6)	1.33 (-3.8 – 1.1)	.66
	No. (%)	No. (%)		
Men	5 (55.5)	8 (88.8)	33.3	

Overall Mean Results

Impact of Events Scale – Revised (IES-R)

Mean PTSD scores on the IES-R at baseline were 13.7 (SD = 7.6) in the intervention group, and 12.9 (SD = 6.5) in the control group. There was no statistically significant difference between the two groups at baseline on overall scores $t(16) = -.35$, $p > .72$. An effect size was calculated using Cohen's *d,* and this was shown to be small (0.11). According to Cohen (1988), an effect size demonstrates the magnitude of the difference between two data sets. Cohen suggested that between 0 and 0.3 is small, 0.3 and 0.6 is medium and over 0.6 is considered to be a large effect size. The baseline scores ranged from 1 to 23, and no scores met the cut off for PTSD (33), indicating that there were no cases of pre-existing trauma related distress.

Figure 1 shows that for both the control and intervention group, the mean IES-R scores increased from baseline over hospital discharge, then decreased at post-treatment. IES-R scores then decreased slightly again over a two week follow-up period. Within the control group, the overall mean IES-R scores increased from 12.55 during baseline, to 16.11 after hospital discharge, and decreased over treatment to 14.33 and 11.66 over follow-up (on a scale of 0-88). The standard deviations were 6.93, 6.69, 6.78 and 5.39 for the baseline, following hospital discharge, post-treatment and follow-up stages respectively. Overall mean scores within the intervention group increased from 13.77 during baseline, to 19.44 after hospital discharge, and decreased over treatment to 11.77 and 11.00 over follow-up (on a scale of 0-88). The standard deviations were 7.67, 9.9, 5.51 and 6.18 for the baseline, hospital discharge, post-treatment and follow-up stages respectively.

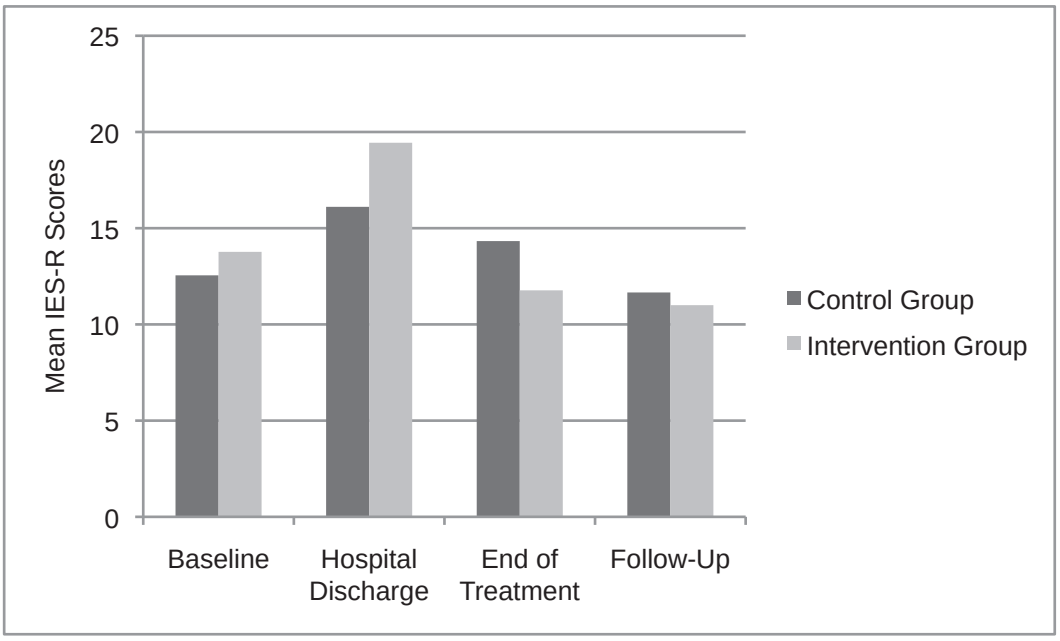

Figure 1. IES-R mean scores across baseline, hospital discharge, post-treatment and follow-up stages.

IES-R: Avoidance, Intrusion and Hyperarousal

Control Group:

Table 6 shows that the mean IES-R avoidance sub-scores for the control group increased from 1.08 during baseline, to 1.12 after surgery and then decreased over treatment 1.03 and decreased again .84 over follow-up (on a scale of 0-4). The standard deviations were 0.53, 0.54, 0.44 and 0.49 for the baseline, following hospital discharge, post-treatment and follow-up stages respectively. The overall self-reported IES-R intrusion sub-scores increased from 1.24 during baseline, to 1.35 following surgery, then decreased over treatment 1.09 and finally increased slightly 1.16 over the follow-up stage (on a scale of 0-4). The standard deviations were 0.24, 0.65, 0.46 and 0.55 for the baseline, following hospital discharge, post-treatment and follow-up stages respectively. The overall self-reported IES-R hyperarousal sub-scores increased from 1.0 at baseline, to 1.29 following hospital discharge, then remained stable at 1.29 following treatment and decreased to 0.97 during

follow-up (on a scale of 0-4). The standard deviations were 0.45, 0.23, 0.21 and 0.59 for the baseline, hospital discharge, post-treatment and follow-up stages respectively.

Table 6. Comparison of *t* test results between control group and intervention group.

Evaluation	Control (SD) (*n* = 9)	Intervention (SD) (*n* = 9)	*t*	*d*
IES-R Overall Score				
Baseline	12.55 (6.93)	13.77 (7.67)	-.35	-.16
Hospital Discharge	16.11 (6.69)	19.44 (9.90)	-.83	.39
Post-Treatment	14.33 (6.78)	11.77 (5.51)	.87	.41
Follow-Up	11.66 (5.39)	11.00 (6.18)	.24	.11
IES-R Sub-scores				
Avoidance				
Hospital Discharge	1.12 (0.54)	1.42 (0.50)	.24	.57
Post-treatment	1.03 (0.44)	0.86 (0.51)	.46	.35
Follow-Up	0.84 (0.49)	0.94 (0.57)	.70	.13
Intrusion				
Hospital Discharge	1.35 (0.65)	1.64 (0.42)	.27	.52
Post-treatment	1.09 (0.46)	1.14 (0.17)	.76	.14
Follow-Up	1.16 (0.55)	0.93 (0.35)	.31	.49
Hyperarousal				
Hospital Discharge	1.29 (0.23)	1.34 (0.31)	.69	.18
Post-Treatment	1.29 (0.21)	1.02 (0.50)	.16	.70
Follow-Up	0.97 (0.59)	1.11 (0.18)	.51	.32
Posttraumatic Stress Disorder % (score over 33)		11%		

*Statistical analysis was performed using Student's t test. P < 0.05. * = statistical at p<.05 ** statistical at p<.001*

Intervention group:

Table 6 shows that the mean IES-R avoidance sub-scores for the intervention group increased from 1.38 during baseline, to 1.42 after surgery and then decreased over treatment to 0.86 and then increased slightly to 0.94 over

follow-up (on a scale of 0-4). The standard deviations were 0.32, 0.50, 0.51 and 0.57 for the baseline, hospital discharge, post-treatment and follow-up stages respectively. The mean IES-R intrusion sub-scores increased from 1.04 during baseline, to 1.64 following surgery, then decreased over treatment to 1.14 and decreased again to 0.93 over follow-up (on a scale of 0-4). The standard deviations were 0.42, 0.42, 0.17 and 0.35 for the baseline, hospital discharge, post-treatment and follow-up stages respectively. Intervention group mean hyperarousal sub-scores increased from 1.06 at baseline, to 1.34 over hospital discharge, and then decreased to 1.02 at post treatment. The scores then increased slightly to 1.11 over follow-up (on a scale of 0-4). The standard deviations were 0.67, 0.31, 0.50 and 0.18 for the baseline, hospital discharge, post-treatment and follow-up stages respectively.

Comparison of IES-R scores between groups.

Table 6 shows the sample size, mean and standard deviations for each scale, and for the overall score. Independent sample t-tests were performed to compare control group and intervention group scores on each variable. The t-values of these as well as Cohen's *d* effect sizes are included in the table. Continuous variables were analysed using a two-tailed *t* test.

There was no statistical difference between the control group and intervention group for overall PTSD scores at hospital discharge, $t(16) = .83$, $p > 0.41$, post-treatment $t(16) = .87$, $p > 0.39$, or follow-up stages $t(16) = .24$, $p > 0.81$. However, the mean control group PTSD score was smaller (16.11) than the intervention group (19.44) at hospital discharge. The effect size was .39 indicating a medium statistic for this difference. There was also a difference between mean scores at post-treatment, with control group scores higher (14.33) than the intervention group (11.77). A medium effect size of .41 was shown for this result. At follow-up, the control group scores were slightly higher than the intervention group (11.66 versus 11.00). There was a small effect size for this difference ($d = .11$).

Comparison of IES-R scores within groups.

Table 7 shows a non-significant reduction between control group IES-R scores at hospital discharge (*M* = 16.11, *SD* = 6.69) and those recorded at post-treatment (*M* = 14.33, *SD* = 6.78; *t*(16) = .55, *p*< .58). The effect size (*d*) was .26, indicating a small statistic for this difference. The control group scores reduced again after post-treatment over follow-up (*M* = 11.66, *SD* = 5.39). Statistical analysis showed a non-significant effect for this trend, *t*(16) = .92, *p*< .37. Cohen's *d* showed a medium effect for this difference (.31).

Table 7. Comparison of scores within the control and intervention groups on the IES-R.

	Control Group *N = 9*			Intervention Group *N = 9*		
Measure	*M, (SD)*	*t*	*d*	*M, (SD)*	*t*	*d*
IES-R						
Baseline	12.55 (6.93)			13.77 (7.67)		
Hospital Discharge	16.11 (6.69)	1.10	.52	19.44 (9.90)	1.35	-.64
Post Treatment	14.33 (6.78)	.55	.26	11.77 (5.51)	2.02*	.95
Follow-up	11.66 (5.39)	.92	.45	11.00 (6.18)	.28	.13

*Note: IES-R = Impact of Events Scale, Revised. Statistical analysis was performed using Student's t-test, t = t test statistic, d = Cohen's d. * = p< .05*

An independent *t* test calculation showed that the intervention group IES-R scores reduced from hospital discharge (*M* = 19.44, *SD* = *9.90*) over post-treatment (*M* = 11.77, *SD* = 5.51). Analysis showed a significant finding for this result *t*(16) = 2.02, *p*>.03. The effect size (*d*) was .95, which is a large statistic for this difference. Intervention group scores reduced slightly again over follow-up (*M* = 11.00, *SD* = 6.18). The difference in scores was non-significant *t*(16) = .28, *p*> .37, with a small effect (*d* = .13).

The Brief COPE.

Meyer (2002) investigated correlations among the coping scales of the Brief Cope and found that there was considerable overlap between several of the scales. For instance, overlap was observed between emotional support seeking and instrumental support seeking, $r = .65$, $p < .01$, and between active coping and planning, $r = .76$, $p < .01$. In order to reduce the number of variables, Meyer aggregated the scales into two summary scales – adaptive and maladaptive coping. The author then conducted internal consistency analysis and found scores of .81 and .57 for the adaptive and maladaptive scales respectively. The current study followed this example and means were evaluated along with independent *t*-tests to assess the potential differences between the control and intervention groups.

Between Groups Analysis

Table 8 presents descriptive statistics for the total sample as well as the control and intervention groups. Patients who had received the intervention differed from those in the control group on the adaptive and maladaptive coping scales.

Table 8. Comparison of scores on the Brief COPE between the control and intervention groups

Measure	Control Group (N = 9) M (SD)	Intervention Group (N = 9) M (SD)	*t*	*d*
Brief COPE				
Adaptive Coping				
Baseline	2.00 (.43)	1.92 (.46)	.63	.17
Hospital Discharge	1.97 (.51)	2.11 (.50)	1.07	.27
Post-treatment	2.02 (.42)	2.31 (.46)	1.82	.65
Follow-up	2.16 (.50)	2.40 (.41)	1.50	.52
Maladaptive Coping				
Baseline	1.42 (.35)	1.30 (.34)	.82	.34
Hospital Discharge	1.61 (.53)	1.42 (.38)	1.03	.41
Post-Treatment	1.45 (.38)	1.36 (.40)	1.01	.23
Follow-up	1.54 (.31)	1.37 (.36)	1.16	.50

Note: *Statistical analysis was performed using Student's t-test. * = p< .05*

There was no statistical difference between the control group and intervention group for overall Brief COPE adaptive coping scores at hospital discharge, $t(30) = 1.07$, $p < 0.45$, post-treatment $t(30) = 1.82$, $p < 0.07$, or follow-up stages $t(30) = 1.50$, $p < 0.14$. The largest effect for differences between the groups was seen at post-treatment, where the intervention group adaptive coping scores were larger than the control group's. Cohen's *d* statistic was .65, indicating a large effect for this difference. Maladaptive coping scores differed between the groups slightly, with the intervention group having lower scores over all stages of the study. However, none of the differences were significant as was seen at hospital discharge $t(30) = 1.03$, $p < .31$, post-treatment $t(30) = 1.01$, $p < .16$, and follow-up $t(30) = 1.16$, $p < .25$.

Within Groups Analysis

Table 9 shows the results of *t* test calculations conducted for the control and intervention group's scores on the Brief COPE. The control group mean adaptive coping scores decreased non- significantly from baseline over hospital discharge $t(30) = .89$, $p < 0.48$, and increased slightly over post-treatment $t(30) = .78$, $p < .88$. Then the control group adaptive coping scores increased again over follow-up $t(30) = .83$, $p < .40$. Cohen's *d* effect sizes were .06, .10 and .30 for the hospital discharge, post-treatment and follow-up stages respectively. Intervention group mean adaptive coping scores increased non-significantly from baseline over hospital discharge $t(30) = 1.13$, $p < .27$, then increased again over post-treatment $t(30) = 1.40$, $p < .16$. This trend was also observed at follow-up where adaptive coping scores increased again non-significantly $t(30) = .48$, $p < .78$. Cohen's *d* effect sizes for these results were .39, .41, and .20 for the hospital discharge, post-treatment and follow-up stages respectively. It is worth noting that while there were no significant results recorded for the intervention group adaptive scores over baseline and hospital discharge, there was a significant increase in scores when they were compared at baseline and post-treatment $t(30) = 2.62$, $p < .01$. Cohen's *d* statistic showed that this effect was large, $d = .84$.

Table 9. Within groups analysis of scores on the Brief COPE for the intervention and control groups

	Control Group			Intervention Group		
	M, (SD)	*t*	*d*	*M, (SD)*	*t*	*d*
Brief COPE (Adaptive Scores)						
Baseline	2.00 (.43)			1.92 (.46)		
Hospital Discharge	1.97 (.51)	.89	.06	2.11 (.50)	1.13	.39
Post-treatment	2.02 (.42)	.78	.10	2.31 (.46)	1.4	.41
Follow-up	2.16 (.50)	.83	.30	2.40 (.41)	.48	.20
Baseline/Post-treatment		.14	.04		2.62*	.84
Brief COPE (Maladaptive Scores)						
Baseline	1.42 (.35)			1.30 (.34)		
Hospital Discharge	1.61 (.53)	1.03	.42	1.42 (.35)	.83	.34
Post-treatment	1.45 (.38)	.81	.34	1.36 (.40)	.72	.15
Follow-up	1.54 (.31)	-.57	.14	1.37 (.36)	.95	.02

*Note: Statistical analysis was performed using Student's t-test. * = P < 0.05.*

The control group maladaptive coping scores increased steadily from baseline to follow-up. At hospital discharge a non-significant increase from baseline could be seen $t(22) = 1.03$, $p < .31$, and from hospital discharge over post-treatment there was another non-significant increase $t(22) = .83$, $p < .42$. From post-treatment, the control group maladaptive coping scores increased once more over follow-up $t(22) = -.57$, $p < .34$. Cohen's *d* statistics for these results revealed low to medium effect sizes with the hospital discharge, post-treatment and follow-up results being .42, .34 and .14 respectively. The intervention group maladaptive coping scores increased from baseline over hospital discharge $t(22) = -.84$, $p < .40$, then reduced over post-treatment $t(22) = .35$, $p < .72$, and remained relatively stable over two-week follow-up $t(22) = -.06$, $p < .95$. The Cohen's *d* statistics for these results were .34, .15 and .02 for the hospital discharge, post-treatment and follow-up stages respectively.

Hypothesis Testing.

Hypothesis 1: Consistent with previous literature, the prevalence rate of PTSD among cardiac surgical patients in New Zealand will fall between 10% and 15%. In the current study a score greater than 33 on the IES-R indicated there was a high probability of PTSD. A score above 33 correlates with a diagnosis of PTSD when using clinical interview formats such as the SCID, and indicates symptoms severe enough to warrant clinical treatment (Jones et al., 2007). To test hypothesis 1, a frequency analysis was completed to assess what percentage of the sample in the current study had IES-R scores above 33. In this case, 11% of the sample had scored over the cut off point. This finding is consistent with Habibovic et al, (2012) who reported PTSD in 12% of their cardiac surgical sample, when assessing symptoms using the Posttraumatic Stress Diagnostic Scale (PSD; Foa, 1995). However, Stoll et al., (2000) found that PTSD occurred in 15% of their cardiac sample using the PTSS-10, and Dew et al, (2001) found that PTSD was prevalent in 17% of their HT patients when assessing symptomatology with the SCID.

The following results are also relevant to hypothesis 1. The greatest overall mean scores on the sub-scales of the IES-R were seen on the intrusion scale at hospital discharge (1.64, on a scale of 1-4). Thirty seven percent of the sample indicated a score greater than 3 on the intrusion items, indicating that they experienced severe intrusive symptoms (Sundin & Horowitz, 2002). Bennett et al., (2001) also found higher intrusive symptoms in their study of cardiac patients, as did Talisayon et al., (2011). Twenty four percent of the current sample recorded scores greater than 3 on hyperarousal items, indicating that they had experienced severe symptoms such as feeling irritable, angry and on-guard. The most common complaint amongst the sample related to sleep. Seventy eight percent of the sample indicated that they had experienced sleep complaints ranging from “a little bit” to “extremely” both prior to and immediately following surgery. This figure reduced to forty two percent after treatment. These observational results combined with results from the frequency analysis confirms hypothesis 1.

Hypothesis 2: Cardiac patients would see a reduction in PTSD-related symptoms on the IES-R after intervention with the Coping After Cardiac Surgery Manual. It is expected that these gains be maintained over two-week follow-up. Results relating to hypothesis 2 showed there was a significant reduction in overall IES-R scores for the intervention group between hospital discharge and post-treatment $t(16) = 2.02$, $p < .03$. The effect size (d) found for this result was large (.95), which provided corroborative evidence for a reduction in PTSD symptomatology following the intervention. Further analysis revealed that compared to control group scores on the IES-R, the intervention group scores were equivalent at baseline and hospital discharge, but decreased further than the control group at post-treatment $t(16) = .87$, $p < .39$. suggesting that the Coping After Cardiac Surgery Manual may have moderated PTSD symptoms in the current study. Further investigation showed that post-treatment results were maintained and/or improved at two-week follow-up.

Further results relating to hypothesis 2 showed that there were greater reductions for the intervention group IES-R sub-scale scores for intrusion, avoidance and hyperarousal, than were seen in the control group. The greatest reductions were seen on the hyperarousal scale at post-treatment where the effect size was large ($d = .70$). These improvements were also maintained over follow-up at two weeks. Visual inspection of the data revealed that the greatest reduction in scores related most often to intrusion items such as 6) “I thought about it (the surgery) when I didn’t mean to” and 9), “Pictures about it popped into my head”. Further observable reductions were seen on the hyperarousal item relating to sleep disturbance 15), “I had trouble falling asleep”. These observations, combined with the statistical analysis results recorded at post-treatment, provide evidence for overall improvement in PTSD-related symptoms after intervention with the Coping After Cardiac Surgery manual thereby confirming hypothesis 2.

Hypothesis 3: There will be improvements on the adaptive coping scores of the Brief COPE after intervention with the Coping After Cardiac Surgery Manual. It is expected that these gains will be maintained over two-week follow-up. Those who had received the intervention were more likely to cope adaptively in that they endorsed items such as planning, active coping, seeking emotional support and acceptance on the Brief COPE (see Figure 2). When compared to control group scores, the intervention group scores were lower in their endorsement of the maladaptive coping items such as denial, substance use and self-blame. Results relating to hypothesis 2 showed that at baseline both the control group and the intervention group were equivalent $t(16) = .63$, $p<.34$, with a small effect size displayed for the difference $d = .17$ (See Table 8). However, when compared to control group scores, the intervention group had greater increases on the Brief COPE over hospital discharge, post-treatment, and two-week follow-up. When comparing the groups, the largest effect was seen at post-treatment, where there was a certain trend towards significance, suggesting that the treatment may have been effective in increasing adaptive coping scores $t(16) = 1.82$, $p<.07$. Further investigation showed that the effect size for this finding was large $d = .65$. At two-week follow-up, the intervention group adaptive coping scores had further increased on the Brief COPE, indicating that the treatment was effective in maintaining these improvements.

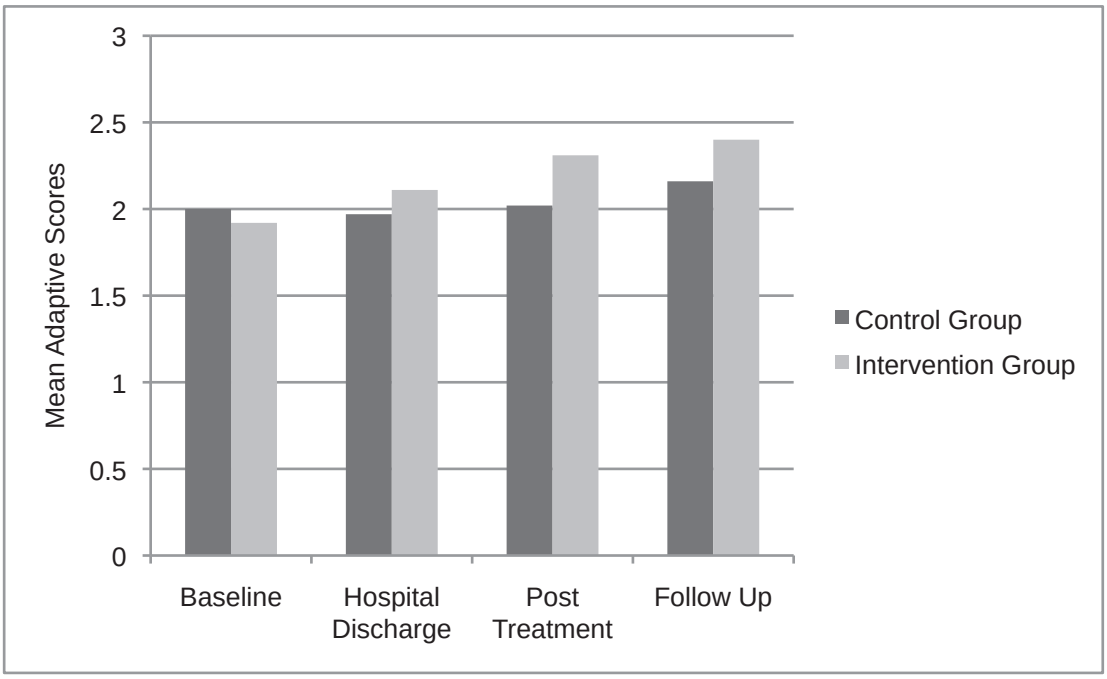

Figure 2. Mean adaptive coping scores on the Brief COPE for the control and intervention groups.

A within groups analysis showed that the intervention group adaptive coping scores increased steadily from baseline over hospital discharge, post-treatment and follow-up. There was a significant increase in adaptive coping scores between baseline and post-treatment for the intervention group $t(30) = 2.62$, $p < 0.01$. Control group adaptive coping scores decreased at hospital discharge and then increased slightly over post-treatment and follow-up. This result, combined with those found over hospital discharge and post-treatment provide support for the intervention in increasing adaptive coping scores and therefore hypothesis 3 is confirmed.

Summary of Results.

The aim of the current study was to develop and evaluate a brief intervention that would increase coping behaviours and reduce the level of PTSD symptoms that occur following cardiac surgery. The study was designed as a pilot to investigate this manualised approach, with the intention that it be developed further into a clinically relevant tool to reduce distress in cardiac surgical populations. Participants included 33 patients who were awaiting

cardiac surgery at Auckland Hospital, and who were randomised to either receive the intervention or receive standard hospital-based care.

Results indicated that, compared to baseline levels, the majority of patients in the intervention group demonstrated: a) a reduction in PTSD symptoms, b) increased adaptive coping behaviours, and c) treatment gains were maintained over a two-week follow-up period. Further results showed that PTSD occurs in 11% of the population who undergo cardiac surgery. Overall, the results of the current study are promising and provide evidence in support of the efficacy of the Coping After Cardiac Surgery Manual.

Chapter 4: Discussion

Overview

The main finding of this study is that in a postcardiac surgery population, a brief psychoeducational intervention may have had a role in reducing the symptoms of PTSD and improving adaptive coping. These improvements, although not all statistical, were maintained over follow-up and provide evidence for the idea that there were differences between the group that received the treatment and the group that received standard care.

The following information in this chapter discusses these key findings. Each hypothesis is addressed and discussed in relation to similar literature and theory. Practical applications of the study are discussed and the research limitations are addressed. Finally, directions for the further development of the intervention are discussed.

Hypothesis 1: The prevalence rate of PTSD among cardiac surgical patients in New Zealand will fall between 10% and 15%. A key objective of the current study was to establish the prevalence of clinically significant PTSD among people undergoing cardiac surgery in New Zealand. To date, the author is unaware of any such research, and so it seems important to establish prevalence rates in order to accurately estimate the emotional impact of cardiac surgery among New Zealand patients. Establishing the prevalence of PTSD among cardiac patients reveals the seriousness of the disorder, and highlights the need for resources to further address interventions that will aim to reduce psychological distress.

The rate of 10%-15% was chosen as a testing criterion for this hypothesis because it was consistent with existing studies investigating cardiac surgery and PTSD (e.g. Doerfler, 1997). Studies that had found prevalence rates below 10% were generally those that had assessed PTSD more than a year after surgery (e.g. Rocha et al., 2008). Furthermore, there appears to be a

trend whereby lower prevalence rates are detected using clinical diagnosis, and higher results are recorded using self-report measures (Edmondson et al., 2012). In fact, this finding may explain some of the significant heterogeneity found in meta-analysis studies, where estimates ranged from 0 – 32% (Edmondson et al., 2012). In contrast to the prevalence rates recorded for those who have undergone cardiac surgery, rates among community populations are estimated to be approximately 3.6% for men and 9.7% for women (Kessler, Chiu, Demler, Merikangas & Walters, 2005).

Eleven percent of the current sample scored higher than 33 on the IES-R, which signified a probable diagnosis of PTSD, and therefore hypothesis 1 was confirmed. The percentage of people with clinically significant PTSD in this sample was consistent with Edmondson et al., (2011), who found that 11% of their sample met the diagnostic criteria for PTSD after undergoing CABG. The authors investigated PTSD with the IES-R so the percentage estimates will be comparable with the current study. The findings of the current study are also comparable to those of Stukas et al, (1999), who investigated PTSD in patients for 6 years following cardiac surgery. At 12 months, 10.5% of the sample met the diagnostic criteria for PTSD, with an additional 5% estimated to have 'probable PTSD'. Further similar prevalence estimates were seen in 4 studies conducted by Dew et al., (1996, 1999, 2000 & 2001), who reported clinically significant PTSD in 9% - 15% of adult patients who had undergone heart transplant surgery. Dew et al., assessed PTSD with several different clinical instruments including the SCID and the Composite International Diagnostic Instrument (CIDI). Dew described their findings as " concerning" and further suggested that PTSD is a "prominent anxiety disorder in this population" (p. 310; 2001). In light of this comment and keeping in mind the prevalence findings of the current study, it seems reasonable to describe PTSD as a prominent concern for people undergoing cardiac surgery in a New Zealand setting. The fact that many of the participants in the current study reported experiencing moderate to severe symptoms of PTSD highlights the distressing impact cardiac surgery had on the sample.

Cuthbertson et at, (2004) found prevalence rates similar to those of the current study in ICU survivors (14%), and Taylisayon et al., (2011) revealed that 19% of their sample who had undergoing mechanical ventilation met the diagnostic criteria. The latter study possibly found higher rates of PTSD than this study due to having a lower cut off point on the IES-R (25 vs 33).

Osterman, Hopper, Heran, Keane and van der Kolk, (2001), found much higher rates of PTSD among cardiac patients but unlike the current study, the authors focused on the experience of intra-operative awareness during surgery. Intraoperative awareness is an experience that leaves a patient paralysed on the operating table, but conscious and aware of their surroundings. People have reported feeling terrified yet unable to communicate, and this experience often leaves patients with significant post-operative distress (Osterman et al, 2001). It is reasonable to suggest that this experience, combined with the trauma of having cardiac surgery may account for the extremely high PTSD rates found in this study (56.3%). Furthermore, the study was small in size (N = 16), three of the patients questioned were children at the time of surgery, and 75% of the study's sample was women. PTSD is known to occur at higher rates among children (Ackerman, Newton, McPherson, Jones & Dykman 1998), and the female gender (Resnick, Kilpatrick, Dansky, Saunders & Best, 1993). In a further study of patients undergoing cardiac surgery, Rothenhausler et al. (2005) observed that 20% of their cardiac surgical sample developed PTSD after experiencing acute delusions during recovery. Delusions that involve life-threatening events are often re-experienced after surgery and in some cases, have met the DSM-IV criteria for PTSD (DiMartini et al., 2007). This may account for the higher prevalence rates of PTSD seen in the study. Overall, the prevalence rates found in the current study provide evidence that PTSD has a profound effect on meaningful proportion of people who undergo cardiac surgery in a New Zealand context. The reduction in scores on IES-R will now be discussed.

Hypothesis 2: Cardiac patients would see a reduction in PTSD-related symptoms on the IES-R after intervention with the Coping After Cardiac

Surgery Manual. It is expected that these gains be maintained over two-week follow-up. The current study attempted to conduct a randomised controlled trial to evaluate the benefit of a brief intervention to reduce the symptoms of PTSD after cardiac surgery. The results of this study showed that all of the participants responded positively to treatment with the Coping After Cardiac Surgery manual with regard to improvement in PTSD scores on the IES-R. Although the intervention group had non-significantly elevated IES-R scores at baseline, their overall outcomes were better than those who had not received the manual. Greater reductions were seen across post-treatment and follow-up despite having higher PTSD scores at hospital discharge. Most importantly, these improvements were maintained over follow-up measures, indicating that the treatment had an enduring effect. Although the results of analysis between the two groups were non-significant, this finding must be taken in the context of the fact that the study was considerably underpowered and therefore it was difficult to detect significant differences between the groups.

The participants who received the intervention had significantly less PTSD symptoms from hospital discharge over post-treatment, suggesting that the treatment was successful in reducing some of the distress associated with undergoing cardiac surgery. During this period, the most observable reductions were seen in symptoms relating to sleep disturbance and this may have been due to the effect of PMR. PMR has been shown to be a successful intervention in several cases where problems relating to sleep quality, latency and duration have been successfully addressed (e.g. Demiralp, Oflaz & Komurcu, 2010). Furthermore, as Jones et al., 2010 suggested, undergoing cardiac surgery can be a traumatic event that can initiate or exacerbate the occurrence of nightmares. Research findings suggest that nightmares not only affect sleep quality, but they are associated with overall increases seen in posttraumatic stress symptoms (Davis & Wright, 2005). Although the specific mechanism for change is unknown at this time, PMR appears to reduce the frequency and intensity of nightmares through the reduction of arousal, and therefore the overall quality of sleep is improved (Davis et al, 2005).

The findings of the current study are consistent with several other studies that have investigated PMR as an intervention for post-cardiac surgical distress. Dehdari et al, (2007) observed that levels of both state and trait anxiety significantly reduced on the STAI following a course of PMR. In contrast to the current study, the PMR in the Dehdari study was administered over a much longer period and was preceded by a clinician-administered 40-minute training session. This, combined with a larger sample size (N = 110), may explain why the authors found a significant result when the current study did not. In a further study, quality of life outcomes were significantly improved in cardiac patients who had undergone treatment with PMR (Chang, Hendricks, Zhao, Rothendler, LoCastro & Slawsky 2005). The PMR in this study consisted of a 15-week course of relaxation training combined with instructions for the patient to complete at home relaxation twice every day.

The provision of psychoeducation in this project may also have contributed to the reduction seen in PTSD scores for the treatment group. Education surrounding the nature of cardiac surgery, the stress related to the procedure, and what emotions to expect may all have assisted in the reduction of symptomatology. The intervention in the current study was separated into two parts. The first consisted of information intended as a pre-briefing, whereby patients would be prepared for the onset of hallucinations and delusions, and be educated about some of the common emotional reactions to major surgery. The logic behind this was that if people are given appropriate information about trauma before they experience it, they may find it less disturbing (Wessely, Bryant, Greenberg, Earnshaw, Sharpley & Hughes, 2008). The second part of the intervention covered many educational aspects of PTSD in order to empower the participants with information that will allow them to recognise and investigate the onset of psychological symptoms. This concept is supported by evidence, which shows that people, who perceive their symptoms as normal, in the sense that they are to be expected, may feel more reassured (Wessely et al., 2008). Reword this

Although to date no studies have specifically evaluated a psychoeducational program for patients undergoing cardiac surgery, the results of the current

study are consistent with two studies investigating psychoeducation for ICU survivors. Jones et al. (2010) demonstrated the efficacy of diary keeping during ICU treatment, and Jones et al, (2003) evaluated a 6-week self-help program for people who had survived prolonged hospital admission following critical illness. In both of the studies, psychoeducation was shown to reduce the amount of distress associated with major surgery, and appeared to ameliorate the symptoms of PTSD.

Overall, the findings of the current did not show any significant differences between the IES-R scores of the intervention group when compared to the control group. However, the intervention group mean scores were lower over post-treatment and follow-up stages than the control group, suggesting that the treatment did have some effect in reducing PTSD symptomatology. These results are encouraging, and suggest that the intervention is worthy of further development and investigation.

Hypothesis 3: Adaptive coping scores on the Brief COPE (e.g. planning, seeking social support, positive reframing, acceptance and humour) will improve after the intervention has been completed. It was expected that these gains be maintained over a two-week follow-up period. This study investigated the effect a brief intervention had on adaptive coping, as measured by the Brief COPE, in a sample of cardiac surgical patients. After receiving treatment with the Coping After Cardiac Surgery manual, the cardiac patients in this study scored higher on adaptive coping, including all facets such as social support seeking, planning, acceptance and active coping, than the controls. The findings of the current study are in line with Dehdari et al., (2009) who found that PMR significantly improved adaptive coping. However, the PMR is this case was delivered over a 6-week period and included extensive training from an experienced clinician. This may explain the presence of significant findings in the Dehdari study and not the current project. Draine and Solomon (1995) also found evidence to suggest that psychoeducation significantly improved adaptive coping in a sample of seriously mentally ill family members. In this case, the program was delivered

as a group therapy over 4 weeks, and the family members were self-referred, and thus motivated to improve.

The long-term aim of research on coping among cardiac patients is to inform and direct intervention strategies (Chiavarino et al., 2012). Whilst evidence suggests that coping-based interventions are often effective in reducing PTSD in community samples, very little research has confirmed this in populations who undergo cardiac surgery. However, based on the current findings, coping-based interventions should focus on enhancing adaptive coping strategies. In other studies PMR has been shown to improve coping strategies. For instance, in studies of pain management, PMR was shown to be associated with higher scores of adaptive coping and reduced levels of subjective pain (Roditi & Robinson, 2011). PMR may have increased adaptive coping in the current study by interrupting the entrenched pattern of non-adaptive coping that people who live with chronic illness often develop. Many patients who live with ongoing illness attempt to avoid exacerbating their situation by remaining inactive (Boersma & Linton, 2005). Indeed this is seen in many cardiac patients who fear that over exertion will cause another cardiac event (Jones et al., 2010). This phenomenon becomes a major psychosocial variable that impacts on lives by reducing social interactions, lowering active engagement, and by increasing levels of anxiety (Thorne & Dixon, 2007). Evidence has found that individuals can benefit from relaxation training in that it helps patients to respond appropriately to physical cues via biofeedback. Relaxation training also reduces levels of pain, and may considerably reduce levels of anxiety. In turn, activities that were once considered off limits due to fear of over-exertion are re-established, breaking cycles of social isolation and gaining pleasure from rewarding activities (Thorne et al., 2007). Adaptive coping, such as the seeking of emotional support, is increased through greater life-engagement. Further evidence suggests that within cardiac populations, the presence of social support reduces the overall burden of undergoing major surgery, in that they experience less psychological distress, and have fewer cardiac reoccurrences than those who have reduced social support (Holahan, Moos, Holahan & Brennan, 1995).

Practical Application

The treatment in the current study was developed to occur in the cardiac-specific setting, at the point where patients are seen prior to their surgery. This is an important aspect of the intervention as it serves to educate and prepare patients for the emotional impact of cardiac surgery prior to the procedure. For patients administered under emergency conditions, the intervention may still be useful when applied at the point of hospital discharge, although more research is required to understand this idea fully.

Whilst the author advocates for cardiac psychologists in health care settings in New Zealand, the reality is that these clinics often operate under considerable financial and time constraints, and on site mental health professionals are not always available. Therefore, the manual was intended as an intervention that could be rapidly administered by nursing and other health staff, without the need of specialised services. This practicality makes the intervention very useful, and in light of the current findings, must be investigated further with the view of being implemented into all cardiac facilities in New Zealand. There is a dearth of information regarding the author any such hospital-based interventions that specifically aim to reduce PTSD among this population.

The current study highlights the need for immediate and ongoing intervention for people who have undergone cardiac surgery. This study provided evidence for the accuracy of the suggested prevalence rates. Therefore, more than 200 people each year may be left with clinically significant symptoms of PTSD after CABG alone, keeping in mind that there is only data available in NZ for this type of surgery. Many other cardiac patients could be expected to have symptoms severe enough that they impair some aspect of their daily functioning. Evidence to suggest that the symptoms of PTSD will naturally regress in patients who have undergone major surgery (Dew et al., 1996) is encouraging. However, related evidence also indicates that distressing symptoms remain over time and many patients do not seek help until the

symptoms become extreme and debilitating many months after the initial trauma (Jones et al., 2010). Therefore, intervention is required in order to reduce distress and increase coping amongst cardiac patients in New Zealand. From the results of the study it appears that the Coping After Cardiac Surgery manual may help people to recognise the symptoms of PTSD, understand some of the emotional reactions they may have, and learn to recognise the physiological signs of anxiety and distress as they arise. These concepts are important for patients undergoing cardiac surgery, and although hospital based rehabilitation programs are good at increasing physical aspects in the patients, they do not address the emotional aspects. The intervention in the current study can be developed further to accommodate this area of medical care.

Study Limitations

The current study has several limitations. Initially, the author aimed to recruit upwards of 30 patients into each group. However, fewer participants were recruited because of administrative issues at one of the sites that placed a time restriction on the recruitment process. Furthermore, of those who were recruited for the study, a substantial proportion were still on a hospital waiting list at the time of data collection cut off in 2015. In fact, some of the participants who had been recruited in August the previous year were still awaiting surgery in January, 7 months later. This had the effect that the study was underpowered. With a small sample size, there is a risk of obtaining a select group of patients that may increase or decrease both the outcome measurements and prevalence results (Spindler et al., 1980).

The intervention was administered within days of the patient leaving hospital and returning home, which occurred on average 3 days after hospital discharge. Technically, the intervention would have been started at a time point that would not qualify for a diagnosis of PTSD, and therefore, it is not comparable to other intervention studies where treatment began 3 months after an initial traumatic event (e.g. Peris et al., 2011). Indeed, it would be reasonable to expect minimum symptom duration of three months to minimise

the chance of natural recovery occurring amongst the groups. However, the treatment in the current study was based on research that had demonstrated efficacy for interventions that were applied during hospital admission and prior to surgery (e.g. Jones et al., 2010). At the time of writing there were no other studies that the author was aware of, which addressed PTSD in cardiac patients with a brief, hospital-based intervention. Therefore, the process of comparing similar findings was difficult.

This study only used self-report questionnaires to gather data from its responders. Self-report questionnaires are problematic in that they are susceptible to several response biases. Social desirability refers to the tendency of participants to give socially desirable responses instead of selecting those that reflect their true feelings (Grimm, 2010). An example in the current study may be a male patient who thinks that having emotional feelings about the surgery is a sign of weakness, and therefore responds that he had no intrusive thoughts. Ideally, it is desirable to measure the extent to which a bias has influenced the results of a questionnaire by including a social desirability scale in the study, and measures such as The Marlowe-Crowne Social Desirability Scale (Crowne & Marlow, 1960) are available. However, it was decided that the addition of another questionnaire would be too burdensome for the already unwell participant, and would also contribute towards increased invalid responding and non-completion rates.

The IES-R is a self-report measure that utilises rating scales to gather responses. Rating scales can be problematic in that people interpret the meaning of scale points differently. Research has suggested that some people are ‘extreme responders’ and like to use the outer limits of the scale, whereas others tend to respond only in the middle and rarely use outer most points (Austin, Gibson, Deary, McGregor & Dent, 1998). Indeed, this phenomenon produces variance in the scores between responders that reflects a construct other than what the questionnaire was intends to measure. Self-report measures are considered inferior to clinical interview for assessing and diagnosing PTSD (Steel, Dunlavy, Stillman & Pape, 2011). Clinical interview has the advantage that the respondent can have questions

clarified, and the clinician is able to make observational notes that will enhance the strength of the diagnosis.

Directions for future research

Several suggestions for the future aim of this research came from the limitations outlined previously, and the overall results of the study. This discussion outlines what focus the study should take to address the limitations and provides a number of ideas that would increase the applicability of the manual assuming there were greater resources and less time restraints.

Predominantly, future research should conduct studies on a larger, more diverse sample of people in order to increase the study's ability to make generalisations. As well, there should be a series of systematic replication studies conducted on a more diverse range of people from different cardiac centers around New Zealand. While the sample was generally representative of the current New Zealand population in terms of ethnic diversity, only four people identified as Māori, one as Asian, and one Pacific Islander. Investigating the Coping After Surgery Manual in other cultures highlights how appropriate the intervention is, and what changes could be made to further increase its usefulness within other cultures including Māori, Pacific Island and other people who migrate to New Zealand. Cultural differences in terms of PTSD and fear appraisal are important factors to consider when developing the manual further. In fact, Māori models of health, such as Te Whare Tapa Whā (Durie, 1994) would need to be considered in order to make the treatment appropriate for Māori. Furthermore, there appears to be a cultural element to coping that warrants further investigation. Indeed, Taylor-Piliae and Molassiotis (2001) found that among Chinese men awaiting cardiac surgery, successful coping strategies included appealing to a supernatural power and adopting and ideal that would allow fate to take its course. These are in contrast to Lazarus' list of coping strategies, which are commonly adhered to in Western versions of coping literature. The manual then, would need to have different aims in terms of enhancing ideal coping behaviours.

The intervention in the current study can be developed in order to be useful for other groups of people in a hospital setting. PTSD has been documented in breast cancer patients (Shelby, Golden-Kreutz, & Andersen, 2008), people who have severe surgical complications (Schelling, 2002) and people who experience intraoperative awareness during any type of surgery that involves anesthetic agents (Mashour, 2010). There is also evidence to suggest that patients develop PTSD after being diagnosed with suspected lung cancer, even after confirmation of the cancer being benign (Onishi et al., 2003). Hence, the manual can incorporate a psychoeducational element that is appropriate for a range of patients, not just those having cardiac surgery.

In further research, this study should be replicated using more rigorous psychometric tools in order to enhance the validity of the findings. Whilst self-report measures are useful in terms of ease of use, they are, as pointed out previously, subject to several biases. Clinician-administered surveys such as the CAPs and SCID would provide a more comprehensive assessment of PTSD (Weathers, Ruscio & Keane, 1999), and would provide more accurate view of the prevalence of PTSD. In addition, observational measures administered by a trained clinician would give a more accurate indication of the treatment's effect. Furthermore, the development of measures that assess PTSD and coping in different cultures are also important. Likewise, the manual should be tested for efficacy at various stages throughout the rehabilitation process in order to evaluate the optimal timing of the intervention. For example, in the current study the intervention began within a week of hospital discharge. Research is needed to confirm that this is the optimal time frame. The administration of psychometric measures should also be extended in a further study to assess the efficacy of the intervention over follow-up. In order to be comparable with other studies, follow-up assessments need to be performed at 3, 6 and 12 months following intervention.

Further research should investigate which techniques of the manual were active in reducing the symptoms of PTSD and encouraging adaptive coping. There are unanswered questions surrounding whether the changes were a

result of the psychoeducation or the PMR, and how they were particularly helpful. Isolating each treatment variable and assessing them individually using a randomised, between subjects experimental design study, could do this. Likewise, PMR should be evaluated in terms of duration and number of applications, as similar research has found significant results when it was administered over 6 weeks, or practiced more than once a day. In some cases, PMR training was given over several days before the participants were instructed to take the recording home and complete it (Dehdari et al., 2009). It is reasonable to expect that more practice would equate to greater reductions in symptom-related distress, however keeping in mind the brief nature of the current study, it would not have been appropriate to offer training over several days.

One other point worth discussing is the idea that social support may buffer the onset of PTSD and increase adaptive coping (Koivula et al., 2002; Lindsay, Smith, Hanlon & Wheatley, 2001). Higher levels of social support have been associated with better recovery outcomes, greater medical adherence and improved scores on quality of life measures for people who had experienced major cardiac events (Kristofferzon et al., 2005). The intervention could be further developed to promote social support interactions by involving family or friends in the relaxation exercises and psychoeducation aspects. This would not only increase family cohesion, but would also allow the partners of cardiac patients to see the importance of providing a relaxed, quiet environment for the patient to practice PMR, hence improving the results. The psychoeducation element could encourage open discussion of feelings with family members in order to promote understanding of the emotional reactions patients may be having. Literature suggests that men, especially the older adult, is often reluctant to discuss emotions as it is may appear as a sign of weakness, or ego-centric (Bennett, 2007).

Conclusion

The current study involved the development and evaluation of a brief psychoeducational intervention to reduce the symptoms of PTSD and

increase adaptive coping in people who had undergone cardiac surgery. This study was a pilot of the treatment manual ‘Coping After Cardiac Surgery’, and was investigated using a controlled, randomised design. Taking into account the limitations of the study, initial findings offer support for the effectiveness of the manual in a group of adults who had undergone cardiac surgery. The most important findings were that the intervention reduced the symptoms of PTSD to a greater extent than those people who had not received the intervention. This effect was also seen on measures of adaptive coping where participants who had received the treatment had better adaptive coping scores and had overall lower maladaptive coping scores after treatment. Further important findings suggest that cardiac surgery has a profound effect on the psychological well being of patients. This is evident from prevalence evaluations, which showed that 11% of the sample reported having symptoms that met the diagnostic criteria for PTSD. Many more participants reported symptoms to a degree that would impact on their daily functioning and impair their ability to recover from major surgery well.

The findings of this study relate to several gaps in the current literature. Most importantly, the intervention manual included a brief psychoeducational program that other researchers had not previously incorporated when addressing the emotional outcomes related to cardiac surgery. The findings of the study suggest that the symptoms of PTSD can be alleviated, and adaptive coping increased by practicing PMR and gaining knowledge through psychoeducation. The findings of this study also contribute to knowledge in a New Zealand context, as no previous studies have investigated the prevalence of PTSD among people who have undergone cardiac surgery.

Many important issues concerning PTSD and coping among cardiac patients remain unresolved, and in order to increase knowledge relating to these issues, especially in a New Zealand setting, further research is required. In particular, the prevalence of PTSD in cardiac populations requires further investigation in larger, more diverse samples across various regional centers with more rigorous measures. Furthermore, evaluation of the intervention manual requires rigorous testing in studies with much larger samples, over

greater follow-up intervals. In order to broaden the study even further, PTSD should be investigated in other surgical populations, with a view to developing the manual so that it is appropriate for all people who are facing major, invasive surgery.

In conclusion, this study contributed to knowledge surrounding psychological interventions for patients who undergo cardiac surgery in a New Zealand setting. It provides a foundation with which future research can be based, and offers a unique insight into the emotional consequences of major surgery. Overall, while there were no significant findings between the two groups in terms of change following the intervention, the treatment did make an observable difference to those who received it. The findings of the study are still valid in the field of empirical research, and highlight the need for further research to both confirm the study's findings and develop the treatment further.

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Appendices

Appendix A: Impact of Events Scale - Revised.

Questionnaire 2

Date: **ID Number:**

Please complete this form when you have:

Hello,

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you **DURING THE PAST SEVEN DAYS** with respect to your recent cardiac surgery – how much were you distressed or bothered by these difficulties? This assessment is not intended to be a diagnosis. If you are concerned by your results in any way, please speak with a health professional.

1. **Any reminder brought back feelings about it.**

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

2. I had trouble staying asleep.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

3. Other things kept making me think about it.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

4. I felt irritable and angry.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

5. I avoided letting myself get upset when I thought about it or was reminded of it.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

6. I thought about it when I didn't mean to.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

7. I felt as if it hadn't happened or wasn't real.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

8. I stayed away from reminders about it.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

9. Pictures about it popped into my head.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

10. I was jumpy and easily startled.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

11. I tried not to think about it.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

13. My feelings about it were kind of numb.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

14. I found myself acting or feeling like I was back at that time.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

15. I had trouble falling asleep.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

16. I had waves of strong feelings about it.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

17. I tried to remove it from my memory.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

18. I had trouble concentrating.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

20. I had dreams about it.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

21. I felt watchful and on guard.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

22. I tried not to talk about it.

- ☐ Not at all
- ☐ A little bit
- ☐ Moderately
- ☐ Quite a bit
- ☐ Extremely

Please keep this questionnaire until you have completed ALL the questionnaires and then place them together into the self-addressed envelope and post them back to the principal researcher.

THANK YOU

Appendix B – The Brief COPE

Questionnaire 1

Date: **ID Number:**

Please fill out this form when you have:

Hello,

You have recently undergone cardiac surgery and have stayed in hospital for treatment. This experience is very stressful for many people. I would like to ask you about the ways you have been coping with the stress associated with this experience. There are many ways to deal with such stress. These items ask what you've been doing to cope with it. Obviously, different people deal with things in different ways, but I am interested in how you've tried to deal with the stress associated with your recent surgery. Each item says something about a particular way of coping. I want to know to what extent you've been doing what the items say. How much or how frequently. **Don't answer on the basis of whether it seems to be working or not – just whether or not you're doing it**. Try to rate each item separately in your mind from the others. Make your answers as true for you as you can.

Please circle a number between 1 and 4 under each question below.

1 = I haven't been doing this at all
2 = I've been doing this a little bit
3 = I've been doing this a medium amount
4 = I've been doing this a lot.

Please make sure you answer all 28 questions.

If you are unsure what to do, or how to fill in this questionnaire please contact the principal researcher, Fleur Bethell by email: bethell@windowslive.com or phone 0276411886.

Please remember that when you have completed Questionnaire 1, you need to complete Questionnaire 2 as well.

1. I’ve been turning to work or other activities to take my mind off things.

   1 2 3 4

2. I’ve been concentrating my efforts on doing something about the situation I’m in.

   1 2 3 4

3. I’ve been saying to myself this isn’t real.

   1 2 3 4

4. I’ve been using alcohol or other drugs to make the situation better.

   1 2 3 4

5. I’ve been getting emotional support from others.

   1 2 3 4

6. I’ve been giving up on trying to deal with it.

   1 2 3 4

7. I’ve been taking action to try to make the situation better

   1 2 3 4

8. I’ve been refusing to believe that this has happened.

   1 2 3 4

9. I’ve been saying things to let my unpleasant feelings escape.

   1 2 3 4

10. I’ve been getting advice and help from other people.

    1 2 3 4

11. I’ve been using alcohol or other drugs to help me get through it.

    1 2 3 4

12. I’ve been trying to see it in a different light, to make it seem more positive.

    1 2 3 4

13. I’ve been criticizing myself.

1 2 3 4

14. I’ve been trying to come up with a strategy about what to do.

1 2 3 4

15. I’ve been getting comfort and understanding from someone.

1 2 3 4

16. I’ve been giving up the attempt to try to cope.

1 2 3 4

17. I’ve been looking for something good in what is happening.

1 2 3 4

18. I’ve been making jokes about it.

1 2 3 4

19. I’ve been doing something to think about it less such as going to the movies, watching TV, reading, daydreaming, sleeping or shopping.

1 2 3 4

20. I’ve been accepting the reality of the fact that it has happened.

1 2 3 4

21. I’ve been expressing my negative feelings.

1 2 3 4

22. I’ve been trying to find comfort in my religion or spiritual beliefs.

1 2 3 4

23. I’ve been trying to get advice or help from other people about what to do.

1 2 3 4

24. I’ve been learning to live with it.

1 2 3 4

25. I’ve been thinking hard about what steps to take.

1 2 3 4

26. I’ve been blaming myself for things that happened.

1 2 3 4

27. I’ve been praying or meditating.

1 2 3 4

28. I’ve been making fun of the situation.

1 2 3 4

Please keep this questionnaire until you have completed ALL the questionnaires and then place them together into the self-addressed envelope and post them back to the principal researcher.

THANK YOU

Appendix C – Recruitment Article, North Shore Times Advertiser.

Internet candidate adds colour

ELECTION 2014

By SIMON MALDE

Prime Minister John Key is expected to hit away challengers in the Helensville electorate.

Key, whose personal popularity in the electorate exceeds his party's, is defending his seat for the fifth time.

In 2002, then a new MP, Key won the new Helensville electorate, gaining 56 per cent of electorate votes.

By the last election in 2011, now prime minister, Key gained nearly 70 per cent of electorate votes, 10 per cent more than National received in party votes from the electorate. Key's 2011 winning margin was 20,347.

But portions of the electorate have been shaved off to create a new seat which could have some effect in the 2014 margin.

Key, who has a home in Parnell, says that when he has some spare time he likes to spend it with his family, cooking, playing golf and watching rugby.

Key, who is also National's top list candidate, is facing spirited competition from his political antagonists.

Avowed opponent of the Key Government Kim Dotcom, who lives in the electorate, has largely funded the Internet Party, which is running party leader Laila Harre in the seat.

Harre, a political veteran who lives in Mt Eden, says she returned to politics because she wants to encourage young people to vote and to reconnect disenfranchised people with the political system.

A former cabinet minister and trade unionist, Harre, who is also the party's top list candidate, is a keen runner who likens election campaigns to marathon running.

Labour candidate Corie Haddock says he works every day with the homeless and has witnessed first-hand the poverty and inequality that is now widespread in New Zealand. Haddock strongly believes in achieving a fairer and more just society.

The Greens' Kennedy Graham, who is also number seven on its party list, is also standing in Helensville.

John Key

Laila Harre

HELENSVILLE ELECTORATE DETAILS

Created in 2002, the Helensville electorate extends from Muriwai Beach in the south west to South Head on the Kaipara Harbour, and to Albany's eastern border.

Census figures show the electorate has experienced a significant increase in population and now has more than 60,000 residents.

Helensville is older and wealthier than surrounding electorates – the median age and income of residents are 41 and $35,000 respectively.

Most of its voters live in Helensville, Kumeu, Whenuapai, Hobsonville, North Harbour and Albany.

Housing intensification in the historically rural area is a big issue for many voters.

Surgery stress study subjects being sought

Fleur Bethell is calling for people who are having cardiac surgery to take part in her study.

The Clinical Psychology Masters student is researching the prevalence of post-traumatic stress disorder in cardiac patients.

She says cardiac surgery or treatment in the intensive care unit can be as stressful as other situations that pose a threat to life.

"People usually consider post-traumatic stress disorder is associated to soldiers when they return from war or when someone is sexually assaulted.

"But as many as one in three people may develop post-traumatic symptoms as a result of cardiac surgery and that's even higher in heart transplant patients."

The Bayswater resident says typically many people don't recognise the symptoms.

"People often present with anxiety, fearfulness, become socially withdrawn and experience flashbacks."

Bethell is now taking registrations for participants in the study.

"If you are awaiting surgery at Auckland City Hospital and want to take part you will be asked to practise relaxation for one week."

Participants must be undergoing surgery before the end of October.

Email cardiacresearchgroup@gmail.com for more information.

Appendix D – Study Information Sheet

Assessing the effectiveness of a brief educational intervention to reduce Post Traumatic Stress Disorder following cardiac intensive care.

Participant Information Sheet

You are invited to take part in a study evaluating the effectiveness of a brief educational intervention to address the symptoms of Post Traumatic Stress Disorder (PTSD) in people who have survived cardiac surgery and Intensive Care Unit (ICU) treatment. Whether or not you take part is your choice. If you do not want to take part, you do not have to give a reason, and it will not affect the care you receive. If you do want to take part now, but change your mind later, you can withdraw from the study at any time.

This Participant Information Sheet will help you decide if you would like to take part. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide you may want to talk about the study with other people, such as family, whānau, friends or healthcare providers. Feel free to do this.

If you agree to take part in this study, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 8 pages long, please make sure you have read and understood all the pages. Further contact information is listed on the last page of this handout.

Aim of the Study.

The aim of this study is to assess how a brief intervention will change the symptoms of PTSD that may arise after cardiac surgery and intensive care treatment. Some of the more common symptoms include nightmares, trouble sleeping, disturbing memories, anxiety, and feeling 'on-edge'. We would like to know how you are feeling before the intervention and again when the intervention has finished.

It is widely recognised in medical literature that cardiac surgery and intensive care treatment can be traumatic for some people, and may cause them to feel distressed. Unfortunately, these people may also face other psychological problems such as depression, anxiety and PTSD during their recovery.

We know from research that the earlier an intervention is provided to people with PTSD, the more likely they are to recover faster and with less ongoing effects. However, we do not know a great deal about which interventions work the best, and more studies are urgently needed in order to gauge this. With more research we can design interventions that are effective in reducing psychological distress after surgery, and therefore, the long-term care of cardiac patients will be greatly enhanced.

This study is independently funded and is not affiliated in any way with the Auckland District Health Board or any other health care providers. Fleur Bethell is completing this study in order to complete the requirements of a Master of Arts degree, majoring in psychology at Massey University.

What will my participation in the study involve?

People awaiting cardiac surgery at Auckland Hospital will be invited to take part. The participants will be assigned randomly to one of two groups. The experimental group will receive a pack that they can take home and will include relaxation exercises, education about PTSD, some basic psychological exercises and information about their surgery. The second group will also be given a pack to take home that will contain less information

and they will not be required to complete the relaxation or psychological exercises. If you choose to take part in this study you will be asked to complete several questionnaires. The questionnaires will include questions about your sleep habits, how you are feeling and any emotional or physical reactions you may be having. They are easy to do and take around 10 minutes each to complete. Once you are back at home, and a few days prior to your surgery, you are asked to read a couple of pages of information. After your operation, you are once again required to complete two questionnaires and read through some more material. If you are in the experimental group you will read approximately 20 pages of information. You will be asked to practice some relaxation exercises that will be provided and these take around 25 minutes to do each time. You are asked to complete the relaxation exercises once a day for five days. The relaxation exercises involve you sitting in a comfortable position and doing deep breathing and progressive muscle relaxation. **The entire intervention takes seven days to complete.** If you are in the non-experimental group you will have some brief information to read through and will not need to practice the relaxation or breathing exercises. Two weeks after the intervention has finished you are required to complete two more questionnaires, which are both brief in nature.

You may be asked questions about your psychological history such as whether you have ever had a psychiatric disorder. You will also be asked questions about the way you have been feeling recently, such as how you have been sleeping, getting along with others and how you are physically feeling.

After you have completed the study you will be required to post back the questionnaires and the intervention pack to the researcher in a pre-paid envelope. The information will be treated in confidence and will not allow you to be identified by any other parties.

<u>Please refer to the following timetable, which outlays what you will be required to do if you are assigned to the experimental group:</u>

Firstly!

Before you go in for surgery read pages 7 to 12 of the material. Stop when you reach Section 1 (page 13)

After you have returned home…

Begin to read **Section 1 of the material on page 13. Please begin this as soon as possible and no later than 5 days after discharge from hospital.**

Section 1 Timetable.

Day Number	Task
1	**Complete Questionnaire 1 and Questionnaire 2 before beginning to read any of the information. Then**… Read Section 1 of the study and stop at the heading 'Breathing and Relaxation' on page 22.
2	Read the information about breathing and relaxation on pages 22 to 26. Complete your first relaxation exercise by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.
3	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.
4.	Have a day off – nothing to read or exercises to complete.
5.	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.
6.	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.
7	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27. then… **Complete another copy of Questionnaire 1 and Questionnaire 2.**

8-13	No reading or activities to complete.
14	**Please complete a final copy of Questionnaire 1 and Questionnaire 2. This is the end of the study and the final task you are asked to do**.

Confidentiality

Please note that no information collected about you during this study will allow you to be identified, and no personal material will be distributed to any third party without your consent and knowledge. **Your privacy and right to confidentiality will be protected at all times.** Data collected during this research will be stored securely and will meet the requirements of the *Code of Ethics for Psychologists Working in Aotearoa/New Zealand, 2002.* The data will be kept securely for 10 years then destroyed.

Benefits and Risks.

The benefits of this study include you potentially reducing the risk of developing posttraumatic stress symptoms during the recovery phase of your surgery, and may increase your ability to cope with surgery-related distress. Potentially, this means that you may have a faster, less stressful recovery and your health-related quality of life after surgery may improve. There are potentially some risks to consider in this study; the psycho-educational intervention may have an adverse effect, or you may find fulfilling the requirements of the study causes you more stress. However, the benefits in this study are likely to outweigh the potential risks.

Are there costs involved?

If you decide to participate in this study no personal costs will be incurred to you. In the unlikely event that you are injured in this study, you would be eligible for compensation from ACC just as you would be if you were injured in an accident at work or at home. You will have to lodge a claim with ACC, which may take some time to assess. If your claim is accepted, you will

receive funding to assist in your recovery. For further details contact your nearest ACC office on 0800 101 996 or go online to www.acc.co.nz. If you have private health insurance or life insurance, you may wish to check with your insurer that taking part in this study won't affect your cover.

Your Rights.

- You are free to change your mind and withdraw from the research at any time without affecting your care and treatment
- You have the right to access any information collected about you as part of the study
- You will be informed of any new adverse or beneficial information relating to the study that may have a bearing on your health
- Your personal information will be kept private and securely stored
- You are able to ask questions and raise concerns at any stage of the study and have these answered as quickly as possible

After the Study.

- The research will be published online at Massey University and may be submitted for publication in an academic journal
- The results will be made available to you from July 2015.
- If you were a participant in the group that didn't receive the intervention, you will be given a copy at the end of the study along with full instructions for its use.

If you would like to talk to someone who isn't involved with this study, you can contact an independent health and disability advocate on:

Phone:	0800 555 050
Fax:	0800 2 SUPPORT (0800 2787 7678)
Email:	advocacy@hdc.org.nz

You can also contact the health and disability ethics committee (HDEC) that approved this study on:

Phone: 0800 4 ETHICS (0800 438 4427)
Email: hdecs@moh.govt.nz

If you require Māori cultural support talk to your whānau in the first instance. Alternatively, you may contact the administrator for He Kamaka Waiora (Māori Health Team) on:

Phone: 09 486 8324 ext 2324.

If you have any questions or complaints about the study you may contact the Auckland and Waitematā District Health Boards Māori Research Committee or Māori Research Advisor on:

Phone: 09 486 8920 ext 3204.

Thank you for your time considering this study. If you have any questions or comments please feel free to contact me using the details below.

Yours sincerely,
Fleur Bethell

Contacts:

Fleur Bethell, Master of Arts Student, Massey University. Phone 0276 411886 or email, bethell@windowslive.com

Dr. Ian de Terte, Academic Supervisor, Senior Lecturer, Massey University Wellington. Phone (04) 805799 ext. 62033 or email i.deterte@massey.ac.nz

Statement of Approval: This study gained ethical approval from the Northern A Health and Disability Ethics Committee, reference number: 14/NTA/85

Appendix E – Consent to Participate Form

Assessing the effectiveness of a brief educational intervention to reduce Post Traumatic Stress Disorder following cardiac intensive care.

Consent Form (2 pages).

I have read, or have had read to me in my first language, and I understand to Participant Information Sheet,

I have been given sufficient time to consider whether or not to participate in this study,

I have had the opportunity to use a friend, whānau/family support person, or legal representative to help me ask questions and understand the study,

I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet,

I understand that taking part in this study is voluntary and that I may withdraw from the study at any time without this affecting my medical care,

I consent to the research staff collecting and processing my information, including information about my health. This includes the Principal Researcher and her Academic Supervisor.

If I decide to withdraw from the study, I agree that the information collected about me up to the point when I withdraw may continue to be processed,

I consent to my GP or current provider being informed about my participation in the study and of any significant abnormal results during the study,

I agree to an approved auditor appointed by the New Zealand Health and Disability Ethic Committees, or any relevant regulatory authority or their

approved representative reviewing my relevant medical records for the sole purpose of checking the accuracy of the information recorded for the study,

I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study,

I know whom to contact if I have any questions about the study in general,

I understand my responsibilities as a study participant,

Declaration by participant:

I hereby consent to take part in this study.

Participant's name:_____

Signature:_____Date:_____

Declaration by member of research team:

I have given a verbal explanation of the research project to the participant, and have answered the participant's questions about it.

I believe that the participant understands the study and has given informed consent to participate.

Researcher's name:_____

Signature:_____Date:_____

☐ Please tick this box if you would like to receive a copy of the results from this study.

Appendix F – The Coping After Cardiac Surgery Manual

Coping After Cardiac Surgery

A brief psycho-educational intervention to address Post Traumatic Stress Disorder afte cardiac surgery and treatmen in the Intensive Care Unit.

Fleur Bethell, Massey University, New Zealand, 2014.

Contents

Introduction.

Hello,

Thank you for agreeing to take part in this research project. I am a student from Massey University who is conducting this study to complete a Master of Arts in Psychology. This study is independent of the Auckland District Health Board and Auckland City Hospital but if you have any comments or complaints they can assist you. Their contact details are listed on the Participant Information Sheet that accompanies this manual.

This study aims to investigate how we can make psychological outcomes better for people who have undergone cardiac surgery. This is an important study because research has shown that as many as 35% of people who have cardiac surgery may suffer from Post Traumatic Stress Disorder (PTSD), a psychological condition characterised by upsetting intrusive memories, feelings of being constantly on edge and disruption to sleep patterns.

This research manual is a brief intervention that is based on scientific evidence that reduces PTSD. The aim is to see how it will affect outcomes for a specific group of cardiac patients.

This study asks you to read through the provided material and complete the relaxation exercises provided on the CD every day for five days. If you are having trouble completing the requirements of this study please contact the Principal Researcher Fleur Bethell by phone 0276411886 or email bethell@windowslive.com as soon as possible. Remember that you are in no way obliged to take part in this study and that you may withdraw at any time with no consequences.

The contact details of the Principal Researcher and her Academic Supervisor from Massey University are listed below. Please feel free to contact either person if you have any questions or comments regarding this research.

Finally, thank you so much for participating in this study. Your participation is very valuable to us. Your contribution to this research will help us improve the lives for people who have undergone cardiac surgery.

Fleur Bethell

Study Timetable

Please begin this study within 5 days of your hospital discharge. If you are feeling too unwell to start the study please contact the Principal Researcher, Fleur Bethell by email: bethell@windowslive.com or by phone: 0276411886. The following timetable outlines how you should progress through the material and what is required of you.

Firstly! **Before you go in for surgery** read pages 7 to 12 of the material. Stop when you reach Section 1 (page 13)

After you have returned home…

Begin to read **Section 1 of the material on page 13. Please begin this as soon as possible and no later than 5 days after discharge from hospital.**

Section 1 Timetable.

Day Number	Task
1	**Complete Questionnaire 1 and Questionnaire 2 before beginning to read any of the information. Then**… Read Section 1 of the study and stop at the heading 'Breathing and Relaxation' on page 22.
2	Read the information about breathing and relaxation on pages 22 to 26. Complete your first relaxation exercise by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.
3	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.
4.	Have a day off – nothing to read or exercises to complete.
5.	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.

Day Number	Task (continued)
6	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27.
7	Practice breathing using the technique you read about on page 22 and 23. Then complete the relaxation training by listening to the provided recording. Make an entry into the 'Daily Relaxation Record' on page 27. then… **Complete another copy of Questionnaire 1 and Questionnaire 2.**
8-13	No reading or activities to complete.
14	**Please complete a final copy of Questionnaire 1 and Questionnaire 2. This is the end of the study and the final task you are asked to do**.

Before we begin…

This information does not replace the information you will receive from your doctor and health care team. The information you are about to read relates specifically to the research that you have agreed to take part in and should be used in conjunction with the information given to you by the cardiac health care team. If you have any questions about your surgery or are feeling unwell please contact your health care provider.

Knowing when to ask for help.

People who have experienced cardiac surgery have an elevated risk of suffering from psychological difficulties such as depression, anxiety and PTSD. If you are feeling very down or feel that you want to harm yourself you should immediately make contact with your doctor, friend or family member, or local emergency mental health team. The numbers are listed below:

- In an emergency dial 111 or go to your nearest Emergency Department
- Lifeline Free phone 0800 543 354
- Suicide Prevention Helpline 0508 828 865
- Local DHB Mental Health Crisis Team;

West Auckland	09 822 8500
North Shore	09 487 1400
Central Auckland	0800 800 717
Manakau	09 270 9090
Waikato	0800 505 050

Research contacts.

If you have any questions regarding this manual, the questionnaires or any aspect of the research, please contact

- Fleur Bethell (Principal Researcher) by phone, 0276411886 or by email bethell@windowslive.com
- Dr. Ian de Terte (Academic Supervisor) by phone 04 801 5799 ext. 62033 or by email ideterte@massey.ac.nz

If you would like to contact the Auckland District Health Board regarding any aspect of this study, or would like advice on any areas of the research that relate specifically to Māori, please refer to your Participant Information Sheet for contact details.

This manual is divided into 2 sections; The '*Before Surgery'* section and the '*After Surgery'* section.

Please read the 'Before Surgery' section prior to arriving at the hospital for your surgery.

When you are discharged from hospital please begin the 'After Surgery' section of the manual (Section 1). The latter section contains readings and activities that you do at home, after you have had your surgery.

Before Surgery.

In this section…

- Two questionnaires to complete
- Undergoing heart surgery
- Hallucinations and delusions

Getting started.

This manual is an intervention that is intended to change the way you feel after cardiac surgery. In order to monitor any change we need to assess how you are feeling at certain points during the study. Included in the pack you were given are two questionnaires. They are numbered Questionnaire 1 and Questionnaire 2 (there are three copies of each). ***We ask that you complete one copy of Questionnaire 1 and one copy of Questionnaire 2 now.*** Questionnaire 1 requires that you read through the instructions at the top of the page and fill in your answers as you go. There are 28 questions in Questionnaire 1.

Questionnaire 2 is similar in format but has 22 questions to complete. Please read the instructions at the top of the questionnaire page carefully. Note that these surveys are designed to assess how you are feeling at a certain point in time and that there are no right or wrong answers. Please try to answer every question on the survey as honestly as possible. Once you have completed the surveys, keep them all together until you have completed them all. Then you need to put then in the self-addressed envelope that is included with this pack and post them back to the lead researcher.

Please complete Questionnaire 1 and Questionnaire 2 now, before you go any further.

Undergoing Heart Surgery.

There are many types of heart surgery. Different surgeries involve different kinds of medications, require lengths of stay in hospital and include a variety of procedures. Therefore, one person's experience prior to surgery can be very different from another's experience.

For some people, their surgery is planned and they are able to carefully organise their surgery with their doctor. They know exactly when and how their surgery will happen. For others, heart surgery may be more urgent and there is no time to plan. For example, they may have been diagnosed with blocked coronary arteries and admitted to surgery under emergency conditions.

If you are having planned cardiac surgery, your doctor and health care team will prepare you for the surgery and explain what will happen. They will tell you how you can prepare and what to expect.

After your surgery you can expect to experience many kinds of feelings. Some of the feelings you will have relate to the procedures you underwent in the hospital, and other feelings will be related to your personality, coping style or life experiences. ***It is important to remember that it is perfectly normal to experience a wide range of feelings after surgery***. Some of the feelings that other people have reported after surgery include;

- Feeling afraid
- Feeling vulnerable
- Relief that surgery is over
- Excited for the future
- Frustrated
- Anxious
- Emotionally empty
- Feeling physically tired
- Worried that my heart will stop at any time
- Worried about being a burden to others
- Feeling depressed and sad
- Feeling stressed

Some medications used during cardiac surgery cause people to have unusual emotional responses. Crying, laughing, aggression, anger and depression are all fairly common emotions immediately after surgery. Thankfully, most of these feelings will subside fairly quickly as the medications wear off. Some people have reported feeling depressed or sad for several days after the surgery. These feelings will generally ease within a week of surgery.

Hallucinations and delusions.

People undergoing cardiac surgery have an increased risk of experiencing hallucinations and delusions after surgery. In fact, studies have shown that between 13 and 52% of people may experience one or both of these, and people who are over 65 are even more at risk.

A hallucination is something you see, hear, taste, smell or feel that is not really there. These can be mild and good-humoured, such as flying pigs or they can be more sinister. A delusion is a false belief or thought, and while many can also be good-humoured, it is common to experience persecutory delusions following surgery. A persecutory delusion involves the person believing they are being harmed, followed or ridiculed in some way.

The exact cause of hallucinations and delusions after surgery is unknown, but researchers have discovered that some of the procedures and medications used during surgery may cause people to have these reactions. For example, people who were heavily sedated during surgery had more hallucinations than those who were lightly sedated. Other factors include the person's age and state of health at the time of the surgery. Hallucinations and delusions for some people can seem very real and they have trouble distinguishing dreams from reality. For some, hallucinations and delusions are very strong and the experience is terrifying. In contrast, other people's hallucinations and delusions are very peaceful and serene. Some other people's experiences include:

> *"I made the nurse get my wife at 3 a.m. so I could tell her that the nurses were trying to kill me and she had to get me out of the hospital. I was convinced that my brother had been murdered and that I had been moved to a house on a lake and medically abused."*
>
> *"My hallucinations were me walking around my bed in ICU looking at myself lying in the bed, being taken to a female nurse's house to be cared for, thinking I was actually staying in a hotel, having a Disney parade loop through my brain over and over, thinking that the defibrillator box was a bomb…"*
>
> *"I most vividly remember diving into a beautiful golden lake with a pattern of diamonds every time I received IV push pain medication".*

Whilst most people will forget about their hallucinations quickly, others may find that thinking about them afterwards is distressing. It may help you to discuss some of your feelings and experiences with a friend or family member so they can help you to distinguish fact from fiction.

In conclusion, hallucinations and delusions are fairly common after cardiac surgery. They are usually friendly, but many can also be sinister, and they may cause some people distress. Talking to a family member or friend about the experience may help you to question the reality of the thoughts, and see the hallucinations and delusions for what they really are. If you are struggling to cope after experiencing hallucinations or delusions you may need to seek further support. Contact your doctor or health care provider if you have ongoing concerns.

Section 1.

After Surgery.

Please complete section 1 (this section) of the manual. You are required to read through the information on the following pages and practice the relaxation exercises that are provided for you on the CD included in this pack. You are asked to complete the relaxation exercises **every day for five days over a 7-day period** (i.e. please do not take two weeks to practice 5 sessions of relaxation)**.** Please record each time you complete the exercises in the 'Daily Relaxation Record' on page 27. You should allow approximately half an hour per day to complete the exercises. **Please read through the information on the following pages before you begin the relaxation exercises.** At the completion of five relaxation practices you are asked to once again complete two questionnaires. Further instruction for this is given at the end of the Section 1.

In this section…

- People's feelings after cardiac surgery
- Psychoeducation
- What is PTSD?
- What are the symptoms of PTSD?
- What are traumatic events?
- How does PTSD happen?
- Fight or flight
- PTSD and cardiac surgery
- How can therapy help?
- Task: Identify your symptoms
- Breathing
- What is relaxation training?
- Why practice relaxation?
- Physical changes that take place
- Recognising tension
- Relaxation – Lets get started!
- What if I have problems doing the exercises?
- Daily Relaxation Record

People’s feelings after cardiac surgery.

People have various emotional reactions after they have had cardiac surgery. Some people leave hospital feeling comforted, well cared for and feel happy to be going home. They may look forward to their recovery and generally have a positive outlook. Other people leave hospital feeling nervous, afraid for the future and have confused memories about their stay. They often experience overwhelming anxiety and have trouble adjusting back at home. Some of the more common feelings people have include;

- Feeling vulnerable
- Feeling dread, fear and anxiety
- Feeling powerless
- Despair
- Have feelings about being gone forever
- Feel like giving up
- Humiliation

Some people have strong and vivid recollections of their hospital stay. Unfortunately these recollections are not always correct and many people leave hospital confused and with distorted memories. For example, when under sedation it is common for people to confuse a medical procedure (such as the insertion of a catheter) as someone trying to harm them. As a result people can leave the ICU feeling anxious, confused and distressed. Some of these feelings will pass during the course of recovery, but for some, the stressful memories will remain and become more distressing as time goes on. When a person has experienced a stressful and traumatic event such as major heart surgery, memories, recollections and feelings about the event can cause a person to have emotional difficulties and may even lead to depression, anxiety or PTSD.

This research is only focused on one aspect of emotional difficulty after cardiac surgery and therefore will only address PTSD. If you need more information about depression or anxiety please contact your local health care provider.

Psychoeducation.

This manual is a form of psychoeducation, which as the name suggests, is education about a certain state or condition that causes psychological stress. There are many ways of dealing with psychological stress, and one that is particularly effective is learning about it. When a person better understands their condition or situation they feel more in control and are able to manage stress more effectively. In other words, psychoeducation can reduce psychological stress.

People who partake in psychoeducation are more likely to be an active participant in their recovery, self-management and relapse prevention. As well, they experience positive changes to their self-esteem and self-efficacy.

There are many forms of psychoeducation. Usually a health professional or an expert in the condition that is being experienced administers them. This study is a brief form of psychoeducation that includes education about the psychological aspects of cardiac surgery, PTSD, traumatic events, breathing and active relaxation.

What is PTSD?

Post Traumatic Stress Disorder is a psychological condition, which is triggered by either experiencing or witnessing a traumatic event. It causes the person have intrusive and recurring thoughts about the event, severe anxiety, sleep disturbances and nightmares. People with PTSD often feel emotionally numb because they attempt to overcome the intrusive thoughts and memories by suppressing their feelings. PTSD may cause people to have a foreshortened sense of the future, and often people experience symptoms of depression.

Many people with PTSD repeatedly re-live the trauma through nightmares and intrusive recollections during the day. The nightmares or recollections may come and go, and a person may have no recollections or nightmares for many weeks only to have them return daily, for no apparent reason. They also become easily startled and feel on edge – a condition typically known as hyperarousal. People with PTSD may lose interest in things they previously enjoyed and have trouble feeling any affection for others. They can feel irritable, become aggressive or even violent. Reminders of the traumatic event can be very distressing, and this may lead people to avoid certain situations, people or places that remind them of the incident. For example, war veterans with PTSD find loud bangs distressing because it reminds them of combat. Others who have been in a serious car accident may avoid driving or traveling down a certain road.

Most people who experience a traumatic event have difficulty adjusting for a while, but with good self-care, usually return to normal after a couple of months. However, some people do not return to their normal selves and find it difficult living with the effects of the trauma. The symptoms of PTSD usually occur within a couple of weeks of the trauma and gradually worsen. However,

in some cases symptoms do not appear until several months after the event, or in some cases several years. This is known as delayed onset PTSD, and it is usually triggered by a further stressful event in the person's life. For a diagnosis of PTSD to be made, the person should have been experiencing their symptoms continually for more than a month.

What are the symptoms of PTSD?

Post Traumatic Stress Disorder has three main clusters of symptoms; intrusion, arousal, and avoidance. The presence and intensity of these symptoms may vary from person to person. Some people may have these symptoms immediately following the trauma or they may not occur until some weeks, months or years following the event. People can experience all of the symptoms of PTSD while others only have one or two. Nevertheless, any of the symptoms can be distressing and interfere with a persons daily functioning.

Listed below are the three components and their associated symptoms.

Symptom Category	Description
Intrusion	Memories from the event, which appear as - Dreams or nightmares - Flashbacks - Daytime memories
Avoidance	Avoiding the things that are reminders of the trauma. For example, - Places - Sounds - People - Smells - Feelings/Emotion - Becoming emotionally detached from your family/friends and past interests. - No interest in the future
Arousal	Increased arousal, such as; - Jumpy, on-edge (hypervigilance) - Increased physical symptoms (heart rate, breathing). - Sleep disturbances - Irritability, outbursts of anger, violence

What are traumatic events?

Many people experience very stressful events. When that event(s) causes a great deal of distress, it is known as a traumatic event. Research suggests that between 50 and 65 % of all adults will have experienced a traumatic event in their lifetime.

Traumatic events can occur in many situations. For example, flood, fire, earthquake and tsunami are some of the naturally occurring traumatic events. Other traumatic events can be violence-related such as an assault or sexual attack. However, researchers are now beginning to understand how traumatic events may be related to serious illness or stressful medical intervention such as treatment in the Intensive Care Unit (ICU).

People respond to traumatic events in different ways for different reasons, and some traumatic events are more likely to evoke strong emotional responses than others. As a general rule though, a traumatic event is likely to result in personal feelings of terror, helplessness and intense fear, which may trigger both emotional and physical responses.

The table below shows some of the more common types of trauma;

Natural:	Earthquake, tsunami, landslide, hurricane, flood.
Accident:	Motor vehicle accident, plane crash, workplace accident.
Assault	Being attacked, held hostage, shot.
Sexual Assault	Rape, torture, sexual abuse in childhood.
Witness	Seeing a death, serious accident or assault.
Medical	Surviving a life-threatening illness or serious medical intervention.

It is normal to feel upset and stressed following a traumatic event, however for most people these feelings will disappear after a few days or weeks.

For some people though, the stressful symptoms last longer and may be more severe. This may interfere with peoples recovery from the trauma, relationships and quality of life for many months or even years after the initial trauma.

How does PTSD happen?

People recover from trauma in different ways. Some people have no ongoing effects whilst others experience a great amount of difficulty. There is no single explanation for why this is. Researchers suggest that how we respond to trauma is a combination of the nature of the trauma, our genes and our previous life experiences.

When we experience a traumatic event we are overwhelmed with a lot of information that is difficult to understand. Often the events challenge our self-perception or world-view (e.g. bad things do not happen to me).

Feeling distressed about an event can lead us to avoid any reminders of that event. When we actively avoid places, people or situations that remind us of the event, we avoid thinking about the trauma and therefore we are unable to make sense of it.

Avoiding any reminders of the event only works for a short time as the memories will return and require further processing. This is where a cycle begins; intrusive memories and thoughts recur and certain behaviours are used to avoid thinking about them. The avoidance behaviours work for a while, but in the end the thoughts are not processed. The unprocessed thoughts reappear in the form of intrusive flashbacks and memories, which are in turn suppressed, and once again avoided. The avoidance behaviours that people with PTSD use interfere with daily life. For example, a person who was randomly attacked in the street may not want to leave home for fear of it happening again, and is therefore unable to go to work and loses their job.

Fight or Flight.

Everyone will encounter some kind of stressful or threatening situation at some stage of his or her lives. Thankfully, our body has an in-built mechanism to handle dangerous situations called the ‘fight or flight’ response. Understanding this natural response to danger can help us to better understand PTSD.

Feeling scared or anxious about a situation is a helpful and natural response, and the human race would not exist if we were not alert to danger. Feeling anxious or fearful provides us with information, which informs the body that danger is near and we need to act quickly.

When you sense danger your body undergoes a number of changes to help you react quickly to threat;

- The heart and breathing rate increases
- Blood pressure increases
- Digestion is slowed
- Muscles become tense
- Hearing and vision are heightened

These changes are collectively known as the ‘fight or flight’ response and as the name implies, they prepare your body to flee, freeze or fight. These automatic changes are essentially designed to keep us alive. However, there is a downside to this response.

Fear and anxiety are good responses when there is a genuine threat of danger, but unfortunately it does not always work this way. For example, many people feel fear in social situations like meeting someone new or going to a party. A person with PTSD can experience fear or anxiety when they leave the house, or go into crowded spaces. Obviously, these situations are not dangerous and they are not normally considered a threat to a person’s survival. This happens because of the way we evaluate the situation. Our body cannot always tell real threat from imagined threat, so when we think of a situation as threatening, our bodies respond accordingly.

The Fight or Flight Response and PTSD.

After a person has experienced a traumatic event they may think the world is no longer a safe place. They may feel that their life is continually at risk. As a result, a person who has experienced trauma may be constantly afraid, anxious or alert. Most people can switch off the response after they have been alerted to danger, but those who have PTSD find it difficult. They often feel on edge for most of the day because they are overly sensitive to further danger. The following diagram demonstrates this:

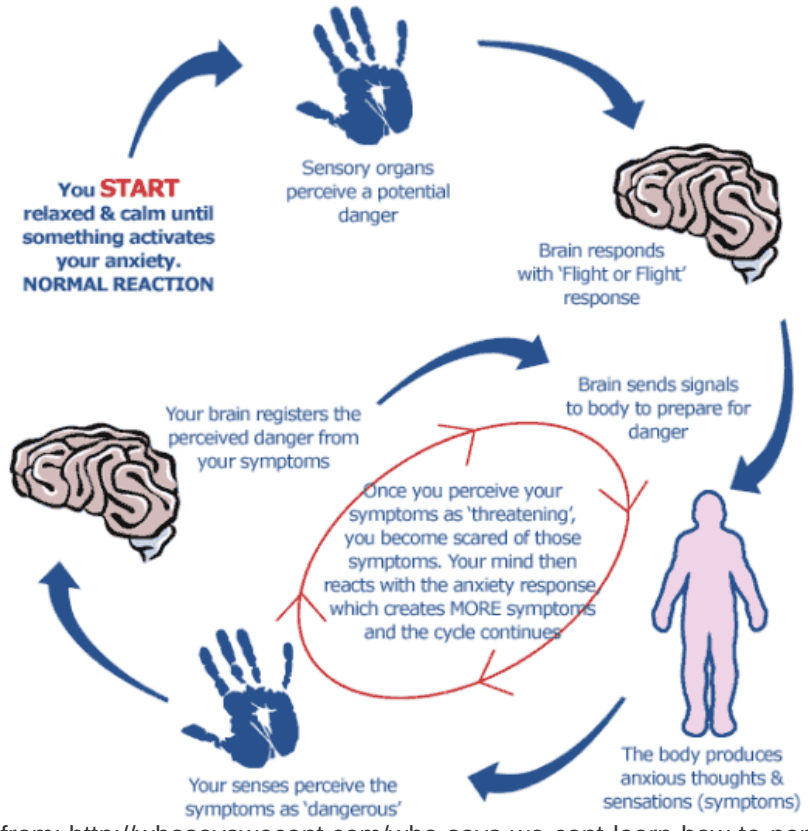


Image taken from: http://whosayswecant.com/who-says-we-cant-learn-how-to-panic-no-more

PTSD and cardiac surgery.

Studies have found quite different rates of prevalence for PTSD after intensive care treatment, but there is some agreement that between 10 and 36% of people will develop PTSD, or symptoms of PTSD following cardiac surgery.

Initially, it was thought that PTSD only arose after a traumatic event where there was a distinct and serious threat to life. In the past decade, it has been recognised that PTSD may occur after treatment in the ICU and following cardiac surgery. There are several theories that describe why this happens. Researchers believe that some of the medical procedures used during cardiac surgery are painful and frightening for some people. For example, there is an elevated risk of developing PTSD if you have had mechanical ventilation. Other researchers have found that some medications may cause people to have frightening hallucinations, which can be confusing and some people have difficulty determining the reality of their thoughts. Still other theories suggest that a combination of frightening procedures, unusual smells and sounds, and feeling alone may contribute to a diagnosis of PTSD after cardiac surgery. Cardiac patients may be more at risk of developing PTSD after surgery than other patients because they may also have suffered a heart attack. Heart attacks themselves can be frightening and people feel like there has been a real threat to their lives.

How can therapy help?

There are many therapies that can help with the symptoms of PTSD. Evidence from current research tells us that the most effective form of therapeutic treatments are those that combine psycho-education, cognitive behaviour therapy (CBT), and anxiety management. Psycho-education provides information about nature of PTSD, the typical human response to trauma and ways of reducing and managing stress. For example, research has shown that people who learn about the nature of their disorder may recover faster than those who do not. CBT assists the individual to identify unhelpful thoughts and suggests ways of modifying these thoughts. Anxiety management helps to manage stress and anxiety by learning to breathe properly and by actively relaxing. Deep breathing and active relaxation can change and manage some of the physically responses that the body uses during times of stress.

Task #1. Identify your symptoms.

The following list contains some of the more common symptoms of PTSD. Carefully think about the questions and answer yes to any symptoms you may have felt since your operation. By doing this exercise, you are learning to assess your current condition and identify any symptoms that you may have. This increases your self-awareness and may help you to manage the triggers of stress or anxiety. These questions are adapted from a well-researched tool that is used to identify the symptoms of PTSD.

PTSD Symptoms Checklist – 17 questions in total.

1. Do you have repeated, disturbing memories, thoughts or images of your visit to hospital? Yes/No

2. Do you have repeated, disturbing dreams about your hospital visit? Yes/No

3. Do you suddenly feel like any aspects of your hospital visit are happening again (as if you are reliving it?)? Yes/No

4. Do you feel very upset when something has reminded you of your hospital visit? Yes/No

5. Do you have physical reactions (heart pounding, trouble breathing or sweating) when you are reminded of the hospital visit? Yes/No

6. Have you been avoiding talking about or thinking about your hospital visit? Yes/No

7. Have you been avoiding activities or situations because they remind you of the hospital visit? Yes/No

8. Do you have trouble remembering any important parts of the hospital visit? Yes/No

9. Have you lost interest in some of the things that you used to enjoy? Yes/No

10. Do you feel distant or cutoff from other people? Yes/No

11. Do you feel emotionally numb or are unable to have loving feelings for those close to you? Yes/No

12. Do you feel as if your future will be somehow cut short? Yes/No

13. Do you have trouble falling or staying asleep? Yes/No

14. Have you been feeling irritable or having angry outbursts? Yes/No

15. Are you having difficulty concentrating? Yes/No

16. Have you been feeling super-alert or watchful on guard? Yes/No

17. Have you been feeling jumpy or easily startled? Yes/No

If you answered YES to any of the above questions, think about how they are affecting your life at the moment. For example, if you answered YES to having trouble sleeping, how is this affecting your mood during the day? What sorts of things can you do to lessen the impact of your symptoms? You may wish to make some notes on how these symptoms affect you or those around you. Sometimes this will help you to identify any patterns in your mood and assist you to identify and manage your symptoms as they arise.

Breathing and Relaxation.

Breathing and relaxation techniques work by reducing the amount of stress we experience. Research has shown that practicing relaxation and breathing can also improve a person's quality of life, increase natural immunity and reduce pain. Breathing and relaxation has been widely used as a treatment for PTSD as it can reduce the amount of anxiety a person feels, and help the person to gain control over the physical responses to stress. PTSD is characterised by fear-associated memories, which often leave people feeling on edge and out of control. Gaining back some of this control is the first step in reducing feelings of anxiety

Breathing.

When we are anxious our breathing becomes shallow, and our breath quickens. This causes an imbalance of oxygen and carbon dioxide, which the body will then take action to compensate for. As a result, you may feel nauseous, light-headed, and tight chested, have blurred vision, or numbness in your fingers and toes. Learning to deep breath will help to reduce these symptoms.

Firstly, you can check your breathing by doing a simple rate-of-breathing exercise.

1. Find a timer with a 60 second counter
2. Over 60 seconds count how many breaths you took
3. Check the breathing chart to compare your result

Breaths (per minute)	Description
Less than 7	Slower than average
8 – 10	Average
11 or more	Faster than average

Your breaths should also be deep and air should be inhaled from your diaphragm. A simple way of checking this is to place one hand on your stomach and one hand on your chest when you are seated. When you take a breath in, the hand on your stomach should rise and fall, as well as the hand

on your chest. If the hand on your stomach does not rise, this may indicate that you are only taking shallow breaths. Over the course of this study, you should aim to check your breathing every day for five days. You may wish to do this right before you complete the relaxation exercises. Please record each time you check your breathing in the ‘Daily Relaxation Record’ on page 27.

Refer to the following diagram for an example of chest breathing versus diaphragmatic breathing:

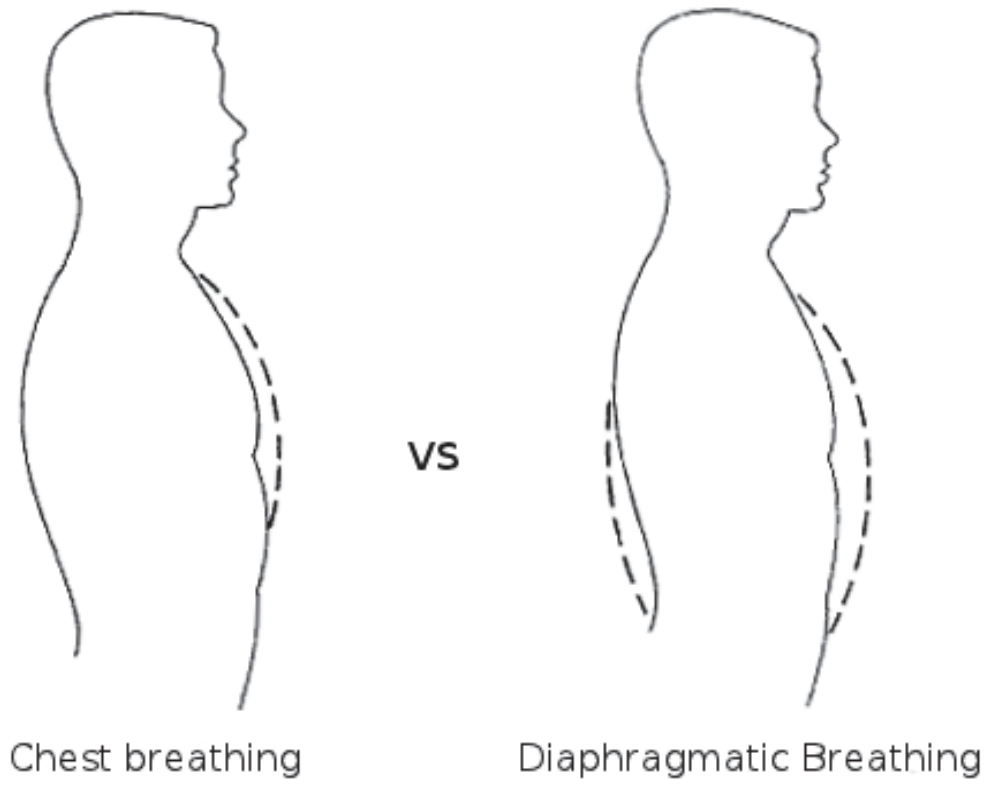


Image taken from: http://choirly.com/how-to-breathe-with-your-diaphragm/

What is Relaxation Training?

Relaxation Training teaches you to voluntarily let go of tension. Tension can be physical, which occurs in the muscles or it can be psychological. When we actively relax, the messages that are produced in the nerves of the muscles change some of the signals that are sent to the brain. The changes allow us to feel calm, and both physically and mentally relaxed. The following section will outline the ways of identifying tension, how to actively relax and how to use these skills in everyday situations. In order to get the greatest benefit from deep relaxation, you need to be committed to daily practice.

Why practice relaxation?

As you will have read in the ‘fight or flight’ section, the activation of muscle tension allows us to perform many tasks efficiently. Under normal conditions, a person will tense and relax their muscles several times a day, depending on the need of the situation. Therefore, a person may show fluctuating patterns of tension throughout the day, but this person would normally be considered to be suffering from tension. When a person has been anxious for a long time, they often do not allow their muscle tension levels to deactivate, and eventually they are unable to reduce tension through normal relaxation.

Tension makes people feel ‘keyed up’ or on edge. They become jumpy, irritable and worried for much of the time. This may also account for why many people with tension report having headaches, backache or feeling generally unwell. Feeling constantly keyed up can make people feel overly sensitive to non-threatening events and situations. When you learn to relax, you are able to gain a better perspective of these events and control worrying thoughts or anxiety.

Physical changes take place during active relaxation.

During the relaxation training there are some changes that take place; some of them you will notice, and others you will not. Note that many of these changes are opposite to the responses that are produced during the ‘fight or flight’ response. Some of these changes are:

- The mind becomes calm
- Levels of some hormones are reduced
- Breathing rate decreases as less oxygen is needed
- Blood pressure reduces, heart rate drops
- Sweating decreases
- Muscles relax

Recognising Tension.

People often become used to feeling tense and they forget what it was like to feel relaxed. Being tense in a way becomes normal and they may even feel like they are relaxed in comparison to the times they feel extremely anxious. High levels of tension are concerning because stress, worry and anxiety can easily be bought on by small, trivial events. To identify tension, think about the following:

<u>Where do you feel tension?</u>

- Are your fists clenched?
- Do you notice tension in your face or jaw, e.g. frowning or clenching teeth?
- What other parts of your body feel tense?

What does tension feel like?

- Do your muscles feel tired?
- Do your muscles feel sore?
- Are you having trouble maintaining a straight posture?
- Do your muscles feel hard and contracted?

Which events cause you to feel tension?

- Stress/Worry?
- Becoming angry?
- Running late?
- Events at work?
- Other family members/relationships?
- Thinking about your finances?
- Your health?

Relaxation – Lets get started!

Active relaxation is a skill that is learned over time and with practice. The aim is that you will begin your relaxation training at home in a comfortable place but with practice, you will be able to actively relax, anywhere and at anytime.

For this particular study, you are required to complete the relaxation 5 times over the course of 7 days. Please do not take any longer than 7 days to complete 5 exercises. For example, your relaxation and breathing exercises should mirror the following timetable:

Monday:	Read the material for the study
Tuesday:	Practice breathing & listen to relaxation recording
Wednesday:	Practice breathing & listen to relaxation recording
Thursday:	No practice, no reading.
Friday:	Practice breathing & listen to relaxation recording
Saturday:	Practice breathing & listen to relaxation recording
Sunday:	Final day – practice breathing and listen to relaxation recording. Complete questionnaires***.***

Please do the exercises in a quiet room, free from distraction so that you can give your entire attention to relaxing. Choose a comfortable chair that provides good head and neck support (or use cushions propped up against a wall). Some people like to do the exercises lying down, but this position should not be used if you are likely to fall asleep. The aim of the exercises is to teach you to relax, which you cannot do if you are asleep!

It is important that you have nothing else to think about while you are doing the exercises. So, if you are hungry, needing to take medication or waiting for a visitor, it is a good idea to get these things attended to before you start the exercises. When you are completing the relaxation exercises you should be aware that there is nothing that requires your urgent attention.

When you are doing the muscle tension exercises avoid over-tensing the muscles as it may be difficult to relax them or you may get cramp. It is recommended that around 70% of your maximum tension is applied. Please do not practice your relaxation exercises anywhere you need to be paying attention, such as driving a car or operating machinery.

When you have finished your relaxation session do not try to stand up quickly as you may feel slightly dizzy. Allow yourself to sit forward and get up slowly, remaining in your relaxed state for as long as possible. Attend to your activities in a slow and relaxed manner.

If possible, try to complete the exercises at similar times during the day and not just before you go to bed. Mid-morning or mid-afternoon are ideal times to practice relaxation. **Please record your practice on the 'Relaxation Record Sheet' on page 27.** If you are unsure of what you are required to do please refer back to the 'Study Timetable' on page 5 or contact the Principal Researcher, Fleur Bethell by email; bethell@windowslive.com or phone 0276411886.

What if I have problems doing the exercises?

Some people report that they have trouble attending to the relaxation exercises or in some cases, people do not like the feelings associated with relaxation. Some people even feel guilty that they are spending time doing "nothing". Learning to relax is an important part of the rehabilitation process after cardiac surgery – just think of these exercises as an important part of the healing process. Research has strongly shown that people who attend to relaxation exercises following cardiac surgery recover faster than those who do not.

It is important to understand that doing the relaxation exercises will not harm you even though you may feel light headed or dizzy after completing them. Sometimes people worry about these feelings and stop doing the exercises. If you have concerns about doing the exercises, or any of the physical feelings you have after completing them please contact the Principal Researcher Fleur Bethell by email bethell@windowslive.com or phone 0276411886. If you experience ongoing dizzy feelings, tightness in your chest or shortness of breath, contact your health care provider immediately.

Please complete the relaxation exercises by listening to the CD provided in this pack. It will play on your PC, Mac or CD player of a stereo system. The exercises are approximately 25 minutes long and we ask that you listen to and complete the exercises fully.

Please complete the relaxation exercises over 7 days as outlined in the Study Timetable on page 5 of this manual before moving on to the next page (End of Section 1).

Please record your relaxation practice on the following form.

Daily Relaxation Record.

The first line is completed as an example for you.

Day number	Date	What was practiced and comments. (e.g. How did you feel?)
E.g. 1	14 July 2014	Read through material – found it useful and informative.
1		
2		
3		
4		
5		
6		
7		

End of Section One.

Congratulations! You have made it to the end of section one. We thank you again for your participation in this research and hope you have enjoyed the material so far.

The key points of the past week are:

- Many people at some stage during their life are likely to experience a traumatic event.
- Traumatic events are varied, and include those related to medical intervention such as the ICU.
- The way people respond to trauma differs from person to person, some will move on with no long-term effects, while others will have some problems related to the trauma.
- Our in-built survival system is responsible for the way we react to trauma, letting go of this response is vital to recovery.
- There are 3 main components of PTSD symptoms; intrusion, arousal and avoidance.
- Therapy can help a person deal with the effects of PTSD effectively.
- Regularly think about the symptoms on the PTSD Symptom Checklist, are there any that you recognise in yourself?
- Learning to take deep breaths and actively practice relaxation will help you to gain control over any anxious feelings.

By now you should have read through all the provided material and completed the relaxation exercises once every day for five days. In order to see if the intervention has had any effect on you, we now ask that you complete another 2 questionnaires. You will notice they are they same surveys you completed before you began the intervention.

Please fill in one copy of Questionnaire 1 and one copy of Questionnaire 2 now. Ideally you should do this on the final day of the relaxation training (day 7) and place them with the other completed questionnaires that need to be posted.

Please note the date that you have completed the questionnaires because **you are required to complete the final two questionnaire copies in 14 days time.** Please refer to the Study Timetable on page 5 if you are unsure

about any of the requirements or timing of this study. You will also receive a reminder phone call on the day that you are required to complete the final two questionnaires. Once again, we remind you that all of the questionnaires are to put into the provided envelope and placed in the post. It would be appreciated if you were able to do this as soon as possible after you have completed each questionnaire in order for the data to be gathered and analysed.

Please remember that all of the information you have provided is completely confidential and will not be used in anyway that allows you to be identified. Your personal information such as name and contact details is only seen by the Principal Researcher and is confidentially stored.

Thank you again for participating in this research – your time and effort is greatly appreciated. By participating in this research you are potentially helping other people who have undergone cardiac surgery and are at risk of developing PTSD. The findings of the research will add to knowledge of treatments and interventions for people like you. If you indicated that you would like to see the results of the research, you will receive this in due course. Please note that there will be a significant delay between the end of this study and the publishing of any results. This is due to the time it takes to write up the study and its findings.

Please refer to the 'Quick Checklist' on the next page to make sure that you have fulfilled all of the requirements of this study.

Quick Checklist.

Have you…?

- Completed Questionnaire 1 & 2 prior to reading section 1? ☐
- Read through Section 1? ☐
- Completed the tasks in section 1 such as ‘Identify your symptoms’ and ‘recognising tension’? ☐
- Practiced the breathing and relaxation exercises for 5 days? ☐
- Filled out the ‘Daily Relaxation Record’? ☐
- Completed Questionnaire 1 & 2 again on day 7 of the relaxation exercises? ☐
- Completed Questionnaire 1 & 2 again two weeks following day 7 of the relaxation exercises?
- Posted all of the information including the Relaxation Record? ☐
- Given yourself a pat on the back because you did an amazing job! ☐

Appendix G – Ethical Approval Letter from HDEC, Northern A Region.

Health and Disability Ethics Committees
Ministry of Health
C/- MEDSAFE, Level 6, Deloitte House
10 Brandon Street
PO Box 5013
Wellington
6011

0800 4 ETHICS
hdecs@moh.govt.nz

25 July 2014

Ms Fleur Bethell
26 Norwood Road
Bayswater
Auckland 0622

Dear Ms Bethell

Re:	**Ethics ref:**	**14/NTA/85**
	Study title:	A randomised controlled study to evaluate the effect of a brief psycho-education intervention in cardiac Intensive Care Unit survivors with post-traumatic stress symptomatology.

I am pleased to advise that this application has been ***approved*** by the Northern A Health and Disability Ethics Committee. This decision was made through the HDEC-Full Review pathway.
The Committee appreciates the effort put in to comprehensively complete the conditions requested of you.

Conditions of HDEC approval

HDEC approval for this study is subject to the following conditions being met prior to the commencement of the study in New Zealand. It is your responsibility, and that of the study's sponsor, to ensure that these conditions are met. No further review by the Northern A Health and Disability Ethics Committee is required.

Standard conditions:

1. Before the study commences at *any* locality in New Zealand, all relevant regulatory approvals must be obtained.

2. Before the study commences at *any* locality in New Zealand, it must be registered in a WHO-approved clinical trials registry (such as the Australia New Zealand Clinical Trials Registry, www.anzctr.org.au).

3. Before the study commences at *a given* locality in New Zealand, it must be authorised by that locality in Online Forms. Locality authorisation confirms that the locality is suitable for the safe and effective conduct of the study, and that local research governance issues have been addressed.

After HDEC review

Please refer to the *Standard Operating Procedures for Health and Disability Ethics Committees* (available on www.ethics.health.govt.nz) for HDEC requirements relating to amendments and other post-approval processes.

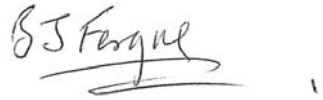
Your **next progress report** is due by **25 July 2015.**

Participant access to ACC

The Northern A Health and Disability Ethics Committee is satisfied that your study is not a clinical trial that is to be conducted principally for the benefit of the manufacturer or distributor of the medicine or item being trialled. Participants injured as a result of treatment received as part of your study **may** therefore be eligible for publicly-funded compensation through the Accident Compensation Corporation (ACC).

Please don't hesitate to contact the HDEC secretariat for further information. We wish you all the best for your study.

Yours sincerely,



Dr Brian Fergus
Chairperson
Northern A Health and Disability Ethics Committee

Encl: appendix A: documents submitted
appendix B: statement of compliance and list of members

Appendix H: Letter from Massey University Māori Research Advisor Trish Young.

2/6/2014

Morena Fleur

Well this is a really interesting study! I have been through all of the documentation that you have sent through and it is well done. With regard to issues for Māori, I see no significant problems, I have a few thoughts for you to consider.

Recruitment

You have mentioned that Māori are over-represented in cardiac health statistics and hospital admissions and I'm wondering if you have considered putting a figure to this and trying to achieve an equivalent percentage for your study?

Some specific comments in the HDEC application form:

Question: p.4.2: cultural issues

You have mentioned that the psycho-education pack in the study may not be culturally relevant for Māori because of the strong individual focus. My views on this may be different from others, but I do believe that even though some Māori still retain a collective perception of themselves in today's society, they are still individuals and can still benefit from the knowledge and skills contained within your educational pack.

I feel that many Māori become ill in today's society because they do not hold as strongly to those collective values and ways of being, and are less connected with their family, whanau, land and spirituality, and it is better not to assume that these strong connections still exist. I believe that most Māori would appreciate any help or guidance given in an environment like ICU and/or

cardiac care.

I wonder if a potential cultural issue could arise with the limited access for whanau members to be with their family member in ICU cardiac care. In my experience my family members when in ICU and high dependency units like to have someone with them. I'm not sure if this is of relevance to your study, but it seems to me it may possibly be an issue in reducing feelings of stress and anxiety.

The only other potential area to consider for this section could be with the information sheet. The use of language in the information sheet assumes that readers have quite a lot of prior knowledge. For example, at the bottom of page 3 of the information sheet you have a sentence about "… your mental health functioning…". While you and I may know that this seems to be a fairly simple term, to those who are not at all used to this it is like a foreign language. At recruitment will you be taking these information to each potential participant, or will others be distributing these for you? I feel that you may need to spend some time explaining these terms to your potential participants to help with recruitment. I know that this may sound rather patronising, but I've been working with some Māori women who are new to education and they have been 'teaching' me about the use of language. They have shown me that when they are not used to terms they tend 'to switch off' and do not 'hear' what I'm talking about or presenting. It is not that they are unintelligent, just that they are not used to new terms or ways of talking. Generally, they have lacked confidence in learning new things, but tend to pick things up pretty quickly. This has heightened my awareness of words and how they are presented. I get around this by constantly checking with them that they understand and can repeat back to me what is required. I'm not sure how relevant this will be for you and your potential participants, but I do see it as a possible issue for Māori patients.

Question: p.4.3.1: consultation process:

You have stated that you will be seeking consultation from a

Massey University Māori clinical psychologist – if this is referring to me I'm not a clinical psych, I have a community psychology background and am employed by Massey as a Research Advisor – Māori.

If on the other hand you were not referring to me but another clinical psych, that's fine!

I would also suggest that in here you state that you will establish contact with Māori liaison and/or kaumatua at Auckland Hospital at the commencement of your study. Having set up this relationship you will then be in a better position to state that if any potential issues occur during the study with any Māori patients you can then seek guidance from them in your work with these patients.

The Impact of events scale and Brief Cope seem fine to me.

If you have any questions or comments here do not hesitate to get back to me - I do not mind if we continue the conversation.

Na

Trish Young

Appendix I: Letter from Waitemata District Health Board Māori Research Advisor Helen Wihongi.

5 June 2014

Fleur Bethell
26 Norwood Road
Bayswater
Auckland 0622

Re: A randomized controlled study to evaluate the effect of a brief psycho-education intervention in cardiac Intensive Care Unit survivors with Post Traumatic Stress Disorder symptomatology

Thank you for telephoning me and for providing the ethics application, the study protocols, the participant information and consent form, and the Māori consultation email. The study is part of an academic degree seeking to recruit 40 participants from the Auckland District Health Board.

The study is of interest to Māori as Māori have a high incidence of cardiovascular disease and could benefit from the intervention. Given this how many Māori do you think might be part of this study.

The District Health Boards are tasked with addressing inequalities. While I understand no inferences can be made, would it be possible to provide an analysis of data from Māori participants. I would be interested in knowing how many find the intervention useful.

I note in the ethics application that the tools used are not Māori specific. Sir Mason Durie noted in 1995 that Māori exist in diverse realities and as such there will be some Māori who will benefit from the intervention being used.

The Research Advisor – Māori from Massy University has been consulted and recommendation made incorporated into this study.

Please add the following to the participant's information and consent form:

- If you require Māori cultural support talk to your whānau in the first instance. Alternatively you may contact the administrator for He Kamaka Waiora (Māori Health Team) by telephoning 09 486 8324 ext 2324
- If you have any questions or complaints about the study you may contact the Auckland and Waitematā District Health Boards Maori Research Committee or Maori Research Advisor by telephoning 09 4868920 ext 3204

On behalf of the Maori Research Committee at the Waitematā and Auckland District Health Boards the study has been approved.

Heio ano

H.A Wihongi

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Appendix J: Institutional Approval from Auckland District Health Board

Research Office
Level 14, Support Bldg
Auckland City Hospital
PB 92024, Grafton, Auckland
Phone: 64 9 307 4949 Extn. 23854
Fax: 64 9 307 8913
Email: mwoodnorth@adhb.govt.nz
Website: www.adhb.govt.nz/ResearchOffice

Date 22 August 2014

Institutional Approval

Fleur Bethell
26 Norwood Rd
Bayswater
Auckland 0622

Dear Fleur

RE: Research project A+ 6343 (14/NTA/85) A pilot study to evaluate the effect of a brief psycho-education intervention in Cardiac Intensive Care Unit survivors with Post Traumatic Stress Disorder symptomatology.

The Auckland DHB Research Review Committee (ADHB-RRC) would like to thank you for the opportunity to review your study and has given approval for your research project.

Your Institutional approval is dependent on the Research Office having up-to-date information and documentation relating to your research and being kept informed of any changes to your study. It is your responsibility to ensure you have kept Ethics and the Research Office up to date and have the appropriate approvals. ADHB approval may be withdrawn for your study if you do not keep the Research Office informed of the following:

- Any communication from Ethics Committees, including confirmation of annual ethics renewal
- Any amendment to study documentation
- Study completion, suspension or cancellation

More detailed information is included on the following page. If you have any questions please do not hesitate to contact the Research Office.

Yours sincerely

On behalf of the ADHB Research Review Committee
Dr Mary-Anne Woodnorth
Manager, Research
ADHB

c.c. Andrew McKee, Wendy Hoskin, Rachel Parke

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