

**Behaviour Change Maintenance Following
a Myocardial Infarction**

**A thesis presented in partial fulfilment
of the requirements for the degree of**

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Abstract

The purpose of this research was to measure the effect of a self-determined lifestyle behaviour change on cardiac risk factor profile, quality of life and behaviour change maintenance for people who have had a myocardial infarction within the preceding six months.

This was a randomised controlled trial. Thirty-two participants were recruited from the local District Health Board's cardiac rehabilitation service. Participants were randomised into either the Intervention or Usual Treatment group. Initial and final data collection included a risk factor profile and quality of life assessment using the Quality of Life after Myocardial Infarction II questionnaire. Behaviour change sustainability was also examined from three open ended questions included in the questionnaire. Treatment fidelity was used to strengthen the validity of the intervention.

Descriptive statistics were used to analyse and summarise the data. The findings showed that the majority of participants in both groups improved their risk factor profile and reduced their risk of a further myocardial infarction, with a slightly greater improvement for the Intervention group. It appeared that increasing physical activity was the easiest behaviour change to make and sustain compared with other behaviours. The majority of participants in both groups improved their quality of life, with the Intervention group making a slightly greater improvement than the Usual Treatment group. However, there were no statistically significant differences between the groups on any of the measures.

It is recommended that health professionals engage with individuals who have had a myocardial infarction on a level that empowers them to self-manage their health. Strategies to support self-management include supporting a self-determined lifestyle behaviour change, the inclusion of self-monitoring and regular follow-up contact with individuals by health professionals during the behaviour change journey.

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Table of Contents

Abstract	ii
Acknowledgements	iii
Table of contents	iv
List of tables	viii
List of figures	ix
Chapter One: Introduction	1
1.0 Introduction	1
1.1 The global cost of coronary artery disease	1
1.2 The national cost	2
1.3 Local population	2
1.4 Coronary artery disease	3
1.5 Myocardial infarction	4
1.6 Modifiable risk factors	4
1.7 Research question	4
1.8 Purpose of the research	5
1.9 Significance of the research	5
1.10 Overview of the thesis	5
Chapter Two: Literature review	7
2.0 Introduction	7
2.1 Search strategy	7
2.2 Chronic disease	7
2.3 Coronary artery disease	8
2.4 Biomedical model	9
2.5 Self-care management	10
2.6 Interpersonal health relationships	12
2.7 Behaviour change	13

2.8	Quality of life	16
2.9	Summary	18
	Chapter Three: Methodology	20
3.0	Introduction	20
3.1	Research design	20
3.2	Research question	21
3.3	Research aim	21
3.4	Setting	21
3.5	Sample	21
3.5.1	Inclusion criteria	22
3.5.2	Exclusion criteria	22
3.6	Recruitment	22
3.7	Data collection	22
3.7.1	Limitations	25
3.7.2	Delimitations	26
3.8	Ethical considerations	26
3.9	Potential risks	26
3.10	Reliability and validity	27
3.11	Management of data	27
3.12	Data analysis	27
3.13	Summary	28
	Chapter Four: Results	29
4.0	Introduction	29
4.1	Response	29
4.2	Demographic characteristics of the Intervention and Usual Treatment group	29
4.2.1	Age	29
4.2.2	Gender	30

4.2.3 Ethnicity	30
4.3 Risk factor profiles	30
4.4 Risk factor scores	32
4.4.1 Intervention and Usual Treatment group initial and final risk factor scores	32
4.4.2 Risk factor change scores	33
4.5 Risk factor categories	34
4.6 Behaviour change focus groups	35
4.6.1 Increasing physical activity	36
4.6.2 Reducing weight	36
4.6.3 Modifying diet	37
4.6.4 Reducing stress and anxiety	38
4.6.5 Becoming smoke-free	38
4.7 Risk factor scores for behaviour focus groups	39
4.7.1 Physical activity	39
4.7.2 Reducing weight	40
4.7.3 Modifying diet	40
4.7.4 Reducing stress and anxiety	40
4.7.5 Becoming smoke-free	41
4.8 Quality of life	41
4.8.1 Initial and final quality of life scores	41
4.9 Quality of life change difference scores	43
4.9.1 Emotional domain	44
4.9.2 Physical domain	44
4.9.3 Social domain	45
4.10 Focus group quality of life scores	45
4.11 Differences between the Intervention and Usual Treatment group	46
4.12 Lifestyle behaviour change maintenance	46
4.13 Comparison between focus groups	49

4.14 Treatment fidelity	49
4.15 Summary	49
Chapter Five: Discussion	51
5.0 Sample demographics	51
5.1 Risk factor profiles	51
5.2 Risk factor profile scores and risk category	52
5.3 Focus groups	53
5.4 Quality of life	54
5.5 Statistical analysis	55
5.6 Maintenance of behaviour change	55
5.7 Hawthorne effect	56
5.8 Empowerment	57
5.9 Treatment fidelity	57
5.10 Implications for nursing	57
Chapter Six: Summary and recommendations	59
6.0 Introduction	59
6.1 Aims of the research	59
6.2 Summary of the research	59
6.3 Recommendations for practice	61
6.4 Recommendations for further research	62
6.5 Conclusion	62
References	63
Appendices	
Appendix 1. Research Ethics and Approvals Committee Eastern Institute of Technology	72
Appendix 2. Hawke's Bay District Health Board Research Office approval letter	73
Appendix 3. Letter of support Māori Health service	74

Appendix 4. Information for research participants	75
Appendix 5. Quality of life questionnaire	77
Appendix 6. Treatment fidelity plan	81
Appendix 7. Participant self-log sample	82

List of Tables

Table 1. Risk factor profile weighting table	23
Table 2. Intervention group participants initial risk factor profile data	30
Table 3. Intervention group participants final risk factor profile data	31
Table 4. Usual Treatment group participants initial risk factor profile data	31
Table 5. Usual Treatment group participants final risk factor profile data	32
Table 6. Initial risk factor profile for focus group 'increasing physical activity'	36
Table 7. Final risk factor profile for focus group 'increasing physical activity'	36
Table 8. Initial risk factor profile for focus group 'reducing weight'	37
Table 9. Final risk factor profile for focus group 'reducing weight'	37
Table 10. Initial risk factor profile for focus group 'modifying diet'	37
Table 11. Final risk factor profile for focus group 'modifying diet'	38
Table 12. Initial risk factor profile for focus group 'reducing stress and anxiety'	38
Table 13. Final risk factor profile for focus group 'reducing stress and anxiety'	38
Table 14. Initial risk factor profile for focus group becoming 'smoke-free'	39
Table 15. Final risk factor profile for focus group 'becoming smoke-free'	39
Table 16. Quality of life change difference scores for individual focus behaviour groups	46
Table 17. Treatment fidelity checklist for the Intervention group	49

List of Figures

Figure 1. Ages of the Intervention and Usual Treatment group participants	29
Figure 2. Initial and final risk scores Intervention group participants	33
Figure 3. Initial and final risk scores Usual Treatment group participants	33
Figure 4. Risk factor change difference score Intervention and Usual Treatment group	34
Figure 5. Initial and final study risk categories for the Intervention group	34
Figure 6. Initial and final study risk categories for the Usual Treatment group	35
Figure 7. Behaviour change focus groups	35
Figure 8. Initial and final risk scores for focus group increasing physical activity	39
Figure 9. Initial and final risk factor scores for focus group reducing weight	40
Figure 10. Initial and final risk scores for focus group reducing stress and anxiety	41
Figure 11. Initial quality of life scores for the Intervention group participants	42
Figure 12. Final quality of life scores for the Intervention group participants	42
Figure 13. Initial quality of life scores for the Usual Treatment group participants	43
Figure 14. Final quality of life scores for the Usual Treatment group participants	43
Figure 15. Change difference score emotional domain Intervention and Usual Treatment group	44
Figure 16. Change difference score physical domain Intervention and Usual Treatment Group	44
Figure 17. Change difference score social domain Intervention and Usual Treatment group	45

Chapter One – Introduction

1.0 Introduction

The inspiration for this study came from providing nursing care for people with coronary artery disease (CAD) within an acute and outpatient cardiology setting. There is a growing emphasis towards self-management for chronic conditions (Davies, 2010; Francis, Feyer, & Smith, 2007; Jordan & Osborne, 2007; Masters et al., 2013; Ministry of Health, 2014c) to reduce the progression of disease and mortality, reduce hospital admissions and lengths of stay and improve quality of life (Liddy & Mill, 2014). The growing trend toward self-management of chronic disease from the literature provides a foundation for this study.

1.1 The Global Cost of Coronary Artery Disease

CAD is a non-communicable disease which lies within a group of disorders that affect the heart and blood vessels. This group is referred to as cardiovascular disease (World Health Organisation, 2015a). CAD is the most common cause of death worldwide (Harbman, 2014) and is one of the leading causes of premature death globally for men and women (World Health Organisation, 2014). In 2012, CAD was responsible for 7.4 million deaths globally, with three quarters of deaths in low to middle income countries (World Health Organisation, 2015a).

Cardiovascular disease as well as cancer, chronic respiratory diseases and diabetes are the four main groups of non-communicable diseases. Low to middle income countries are disproportionately represented in global statistics for CAD accounting for three quarters of all NCD deaths, in comparison with higher income countries (World Health Organisation, 2015b). The World Health Organisation (2015b) state socially disadvantaged individuals are at a greater risk of becoming exposed to unhealthy lifestyle behaviours including smoking and unhealthy diets. They develop poor health and die earlier from non-communicable diseases such as CAD than those people within a higher socioeconomic group. Low income groups have less access to health services and resources to support their health (World Health Organisation, 2015b). Furthermore people within low income groups may not have the financial resources to pay for health care, which can affect a person's ability to work and earn, further impacting on their health and well-being (World Health Organisation, 2015b).

A study on the global burden of CAD by Moran et al. (2014) showed that more people surviving acute myocardial infarctions, along with an ageing and growing population are contributing to years lost from disability due to CAD. It is recommended that health

systems no longer solely focus on the individual surviving a myocardial infarction, but provide health care that supports them to live with the effects that CAD may have on their life, including improving their quality of life (Moran et al., 2014). Moran et al. (2014) discuss the need for public health systems to ensure that secondary prevention treatments, such as provision of basic medications to reduce symptoms of angina, are provided with an emphasis on quality of life for people living with CAD.

1.2 National Cost

In New Zealand, cardiovascular diseases (which include coronary artery disease, stroke and peripheral vascular disease) account for 30% of all deaths. CAD accounts for one death every 90 minutes (Heart Foundation New Zealand, n.d.). CAD was the leading cause of health loss within New Zealand in 2006. Health loss is the gap between a current population's health and that of an ideal population who live a long life and free from disability (Ministry of Health, 2013b).

The 2006 New Zealand burden of disease study (Ministry of Health, 2013b) discussed the need to focus on prevention of modifiable risk factors including cigarette smoking, diet, physical activity, alcohol consumption, obesity and diabetes in reducing the burden of CAD. The National Health Committee (2013) reported CAD in adults as being a priority condition for the New Zealand Health System. In 2011/12, 5.5% of the adult population over the age of 15 years were diagnosed with CAD, which equated to 193,000 New Zealanders, with a cost of 228 million dollars per year to the health system. Statistics by the Ministry of Health (2015a) report Māori mortality rates from CAD are more than twice as high as non-Māori. Māori hospitalisation rates for CAD are 1.3 times higher than non-Māori. Māori males have a greater risk for developing CAD including mortality and hospitalisation than Māori females (Ministry of Health, 2015a). Māori undergo more revascularisation procedures for CAD including coronary artery bypass surgery and coronary angioplasty than non-Māori, as they have a greater prevalence of developing the condition (Ministry of Health, 2015a).

1.3 Local Population

The population within the study region in 2013 was 151,179 (Statistics New Zealand, 2013). In 2013, 34,662 Māori usually lived within the local region, representing 5.8% of the New Zealand Māori population (Statistics New Zealand, 2013). Compared with New Zealand averages, the local population has a greater concentration of Māori than non-Māori (26% vs 15%), a greater number of people over 65 years (17% vs 15%) and higher numbers of people living in deprivation (26% vs 20%). People in deprivation

tend to access health services less frequently (Hawke's Bay District Health Board, 2014).

Locally, CAD is the leading cause of death for men and women and a leading cause of premature preventable death for Māori and Pacific people. Māori death rates from CAD are four times higher than those of non-Māori, with similar prevalent rates for Pacific people (McElnay, 2014). Locally there are disproportionate rates of health inequities, which are higher for Māori and Pacifica as well as people who have a lower socioeconomic status (McElnay, 2014).

1.4 Coronary Artery Disease

Atherosclerosis is a slow and progressive disease (Grossman & Porth, 2014), which starts as early as childhood (Cross & Underwood, 2013). The development of coronary atherosclerosis occurs from complex inflammatory processes with the development of plaque formation within the intimal layer of one or all three of the major epicardial coronary arteries (Grossman & Porth, 2014; Kumar & Clark, 2004). Although atherosclerotic plaques may occur anywhere within these arteries, they tend to predominately form in the proximal left anterior descending and proximal left circumflex arteries or anywhere along the length of the right coronary artery (Grossman & Porth, 2014). When atherosclerotic plaques occlude 50-75% of the arterial lumen, distal arterial blood supply can lead to reversible myocardial ischaemia or stable angina, which is induced by physical exertion (Cross & Underwood, 2013). An acute myocardial infarction can occur when an unstable atherosclerotic plaque ruptures, resulting in thrombus formation from activation of the coagulation cascade. This leads to partial or full occlusion of the coronary artery, causing myocyte necrosis (Cross & Underwood, 2013).

Atherosclerosis begins as a result of injury to the endothelial layer of the arterial wall. Inflammatory cells as well as low density lipoproteins (LDL) enter the intimal wall of the artery and form plaques. Macrophages combine with lipids to form foam cells. Foam cells die through apoptosis, which deposit their lipids into an ever increasing lipid core. This inflammatory response is followed by tissue repair. A fibrous cap forms over the lipid core from intimal smooth muscle production. Micro vessel haemorrhage within the plaque, particularly in mature plaques can increase the size of the plaque, such that it then protrudes into the vessel lumen manifesting in clinical symptoms of angina (Cross & Underwood, 2013).

1.5 Myocardial Infarction

Myocardial infarction is a manifestation of CAD and is often the first sign that a person has the condition. Globally, it is a significant cause of death and disability particularly within developing countries (Thygesen, Alpert, & White, 2007). A myocardial infarction occurs following myocardial ischaemia leading to myocyte necrosis. Plaque rupture can spontaneously occur, however it is thought to usually be triggered by haemodynamic factors affecting blood flow and vessel tension. A sudden increase in sympathetic nervous system activity leading to increased heart rate, blood pressure and myocardial contractile force, with increased coronary blood flow may lead to plaque rupture (Grossman & Porth, 2014). A myocardial infarction may be a minor event in that it affects only a small area of myocardium or a catastrophic event causing sudden death (Thygesen et al., 2007).

1.6 Modifiable Risk Factors

CAD affects men and women of all ethnicities and of all ages in all regions of the world (Salim et al., 2004). A large global study on the effect of modifiable risk factors for myocardial infarction (Salim et al., 2004) found that abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, lack of physical activity, alcohol consumption, psychosocial factors and low consumption of fruit and vegetables, are risk factors for myocardial infarction. Salim et al. (2004) also suggest that 80% of the cardiovascular disease burden is in low to middle income countries. However, it is developed countries that have the greatest understanding of the association of modifiable risk factors with the development of CAD (Salim et al., 2004).

In New Zealand, cigarette smoking and a high body mass index (BMI) were reported as the leading risk factors for a reduction in years lived in full health and dying earlier compared with people without these risk factors (Ministry of Health, 2013b). Lifestyle behaviours including a high salt, sugar and saturated fat diet and low vegetable and fruit intake are also contributing factors for CAD (Ministry of Health, 2013b).

1.7 Research Question

For this project the research question is “For people who have had a myocardial infarction in the last six months, what is the effect of a twelve-week self-determined lifestyle behaviour change on risk factor profile, quality of life and behaviour change maintenance?”

1.8 Purpose of the Research

This research will provide information which nurses and other health professionals (HP) may use to reflect on the process of supporting people with lifestyle behaviour changes with the aim to reducing the progression of CAD.

1.9 Significance of the Research

This research will focus on the maintenance of lifestyle changes using self-care management principles for people who have had a myocardial infarction. The research may be relevant to health professionals working with people who have had a myocardial infarction, but also with all chronic conditions, where patients require support to change lifestyle behaviours.

This research sets out to look at what is important to the individual in regards to lifestyle change and the impact their self-determined choices have on their life. The findings from this research may be used in the development of local care pathways for CAD, as well as teaching purposes for nurses that work with patients following a myocardial infarction.

1.10 Overview of Thesis

Chapter One:

This chapter has discussed the researchers interest in this topic and motivation for undertaking this research. The global, national and local impact that CAD and myocardial infarction has on the population and health services, including attributable risk factors to its development have been discussed. The research question, purpose and significance of the research on nursing practice had also been included.

Chapter Two: Literature Review

This chapter comprises a review of international and national literature on CAD with a focus on lifestyle behaviour change, self-care management and quality of life. The search strategy undertaken for the review is included. The findings from this review suggest that patient empowerment and promoting self-care management are important in supporting individuals with a chronic condition, which underpins the basis for this research.

Chapter Three: Methodology

The design used for the research is an experimental randomised control trial with a pre and post-test design. The reasoning for this design is discussed along with the sample, data collection and analysis. Ethical issues and reliability and validity of the research is also included.

Chapter Four: Results

This chapter will present the results, which will be categorised into sections to follow the objectives of the research. The results will be reported using discussion, tables and figures.

Chapter Five: Discussion

This chapter will discuss the findings and outcomes for the participants in this study. Sample demographics, risk factor profiles, scores and categories, quality of life and behaviour change maintenance findings will be compared with the international and national literature.

Chapter Six: Summary and Conclusions

This chapter summarises the study, concludes the findings and provides recommendations for nursing practice and further research.

Chapter Two - Literature Review

2.0 Introduction

A literature review provides a critical analysis of the body of knowledge related to the proposed research topic (Schneider, Whitedhead, LoBiondo-Wood, & Haber, 2013). The purpose of this chapter is to critically discuss the literature relating to self-care management, lifestyle behaviour change and quality of life following a myocardial infarction.

2.1 Search Strategy

Databases searched for this literature review included Proquest, Primo, PubMed, Scopus and CINAHL. Search limits were used to include only research from 1990 onwards, in academic journal articles in the English language. Search terms included, chronic disease, coronary artery disease, self-care, self-care management, quality of life, behavioural change and motivation, self-determination, voluntary, intervention and myocardial infarction. Additionally, literature has been sourced from published text, reference lists of journal articles and websites.

2.2 Chronic Disease

An acute illness or disease is short limited, but may be severe in nature, compared to a chronic disease, which is a continuous process until death. Chronic disease is the most common form of illness in the western world (Germov, 2009). Chronic disease manifests as either exacerbations or an increase in severity of symptoms, or remission, or decrease in symptoms (Grossman & Porth, 2014). Modern medicine enables people to survive and live with their condition, however medical knowledge and treatments may not necessarily provide a cure for their disease (Germov, 2009).

Globally, chronic disease, including cardiovascular disease, cancers, diabetes and respiratory disease are responsible for 59% of the 57 million deaths annually (Jepson, Harris, Platt, & Tannahill, 2010). There is an increasing level of chronic disease amongst the population for the proposed study, with a need to address health issues and support people living with chronic conditions (McElnay, 2014). People with chronic conditions have increased presentations to emergency departments, decreased quality of life and increased mortality rates (Liddy & Mill, 2014). The mismanagement of chronic disease accounts for 80% of preventable deaths in New Zealand, which incurs significant health costs to the government (National Health Committee, 2007).

2.3 Coronary Artery Disease

The World Health Organisation (2015a) states that smoking, unhealthy diets, lack of physical activity and harmful use of alcohol are the most important lifestyle behaviours for the risk of a myocardial infarction. Management for people with CAD through the use of medications following secondary prevention guidelines and supporting people to make lifestyle changes is important for the prevention of further cardiac events (Page, Lockwood, & Conroy-Hiller, 2005). People with established CAD are at a higher risk of re-infarction and death (Sol, van der Bijl, Banga, & Visseren, 2005). With the advancement in treatments for CAD and people surviving initial heart attacks, there is an increasing demand on health providers internationally to provide services to support people with managing their health (Sol et al., 2005).

A large international case control-study by Salim et al. (2004) assessed the importance of risk factors for CAD worldwide. A strength of this study is that it includes multiple ethnic groups representing a diverse demographic population. The study identified nine risk factors which are associated with more than 90% of the risk of having a myocardial infarction, regardless of age, ethnicity, geographical location or gender. Risk factors identified in this study include smoking, diabetes, hypertension, reduced fresh fruit and vegetable intake, regular alcohol consumption, reduced physical activity, psychosocial factors including stress and depression, obesity and dyslipidaemia. Similarly Jepson et al. (2010) and Newsom et al. (2012), identified a lack of physical activity, obesity, cigarette smoking and alcohol consumption as identified risk factors for poor health and increased morbidity and mortality. However, these authors suggest that these risk factors are more prevalent in industrialised countries.

A review of the literature on cigarette smoking by Bullen (2008) notes that although cigarette smoking rates are declining in western countries, it still remains the leading preventable cause of cardiovascular disease. In 2013, tobacco smoking rates in New Zealand for Māori were 33%, Pacifica, 23% and all other ethnicities 15%. The New Zealand government has set a target for New Zealand to become smoke free by the year 2025 (Ministry of Health, 2014b).

A population based case control study in New Zealand by Wells, Broad, and Jackson (2004) on the contribution of alcohol consumption to the burden of CAD in adults aged 35-74 years, concluded that people who consumed small to moderate amounts of alcohol more than once per month, had a significantly lower risk of CAD, than non-drinkers. Limitations of this study included exclusion of Māori and Pacific people, which does not provide a demographic representation of New Zealand. Conversely, in

the Sellman, Connor, Robinson, and Jackson (2009) review of the literature, political, economic and ideological views were noted as playing a role in the way alcohol has been studied and its effects reported. They recommended that people should not start to consume alcohol for cardio-protective effects as there is uncertainty on what the safe consumption thresholds are.

Guidelines for New Zealanders on eating, alcohol consumption and physical activity levels by the Ministry of Health (2015b) to support good health recommend that to reduce the harmful effects of alcohol, men should not consume more than three standard drinks per day and women no more than two standard drinks per day. Both men and women should have two alcohol free days per week. It is recommended that a diet low in saturated animal fat, sugar and salt and high in fibre, vegetables and fruit be consumed. They recommend that individuals consume at least three units of vegetables and two units of fruit per day to support good health. A unit refers to a half a cup of non-starchy vegetables or salad or mixed vegetables or a piece of fruit or half a cup of fruit (Ministry of Health, 2015b). Although the World Health Organisation (2003) do not include starchy vegetables as part of a healthy diet, the Ministry of Health (2015b) acknowledges the use of starchy vegetables in the New Zealand diet including cultural or traditional use for Māori and Pacific people. Along with dietary guidelines, the author recommends that adults engage in a minimum of two and a half hours of physical activity per week to support their health.

Although the use of evidence based secondary preventive therapies have increased for CAD, optimisation of therapy is not consistent (Holt, Johnson, & de Belder, 2000). Areas that are suboptimal include smoking cessation, adherence to medication treatments over long periods, lack of physical activity and poor attendance to cardiac rehabilitation programmes (Macintosh, Lacey, & Tod, 2003; Harbman, 2014). It is important that people are provided with education, which is easily understood to support their understanding of their condition. HP's must provide consistent health messages which will support the reduction of disease progression (Thomas, Bryar & Mekanjuola, 2008).

2.4 Biomedical Model

The biomedical model originates from the theory by Robert Koch (1843-1910) that specific microorganisms cause disease (Germov, 2009). The biomedical model is based on an assumption that each disease has a specific cause and affects the human body in a predictable way. The human body has been viewed by the medical fraternity as a machine made up of different parts or systems, which can be fixed (Germov,

2009). Over the twentieth century, the medical fraternity focused on medical research, practice and training to identify, prevent and treat disease caused by specific microorganisms only. This paradigm of medicine, removed the social determinants of health as an important contributing factor for poor health (Germov, 2009). Anderson and Funnell (2005) discuss how doctors and nurses have become socialised to think and practice within the paradigm of an acute illness. A paradigm is “a world view that is essentially an interrelated collection of beliefs shared by scientists” (Khun, 1970, as cited in Anderson & Funnell, 2005). Anderson and Funnell (2005) argue that people with chronic disease become disempowered within the biomedical model and lose the ability to self-manage their health. The authors suggest that HP’s who work within the biomedical model who treat people with chronic disease, may feel frustrated when people do not follow their recommendations to prevent the progression of their condition. Conversely the authors also suggest that people who do not follow treatment recommendations may feel blamed and judged for not following their HP’s advice including lifestyle changes.

2.5 Self-Care Management

Internationally, governments are implementing policies which are placing an emphasis on self-care management to address increasing rates of chronic conditions and financial burden on health systems (Jordan & Osbourne, 2007, Davies, 2010). People who have been given the tools to self-manage their chronic condition make more effective use of a HP’s time and have enhanced self-care practices (Jordan & Osborne, 2007).

Self-care management is defined as “engaging in activities that protect and promote health, monitoring and managing of symptoms and signs of illness, managing the impact of illness on functioning, emotions and interpersonal relationships and adhering to treatment regimes” (Department of Health and Aged Care, 1999 as cited in Masters et al., 2013, p. 315). For individuals who live with a chronic condition, self-management becomes part of their everyday life. It enables independence, self-worth and prevents disease progression (Davies, 2010). Collaborative goal setting and self-efficacy techniques between individuals, families and HP’s enable people with chronic disease to become better resourced to manage their condition. This includes managing daily activities and the emotional impact that can occur with a chronic condition. HP’s have the ability to support people in self-managing their condition by working with them to set goals, assess progress and problem solve (Liddy & Mill, 2014).

A systematic review by Simmons, Wolever, Bechard, and Snyderman (2014) on patient engagement highlights the importance of actively working to engage patients in their care for the successful management of their condition. They also support the inclusion of patient engagement in chronic disease care models. Their review on patient engagement is very similar to the principles of self-management and could be interpreted as a similar concept. Simmons et al. (2014) define patient engagement as “understanding the importance of taking an active role in one’s health; having knowledge, skills, and confidence to manage health/chronic conditions; and performing health promoting behaviours” (p.9.). The review has identified that supporting peoples’ understanding of their condition, encouraging people to take an active role in the management of their health and having the confidence and skills to perform behaviours that support good health are important measures that improve health outcomes (Simmons et al., 2014).

An Australian qualitative study by Jowsey, Pearce-Brown, Douglas, and Yen (2014) looked at what motivated/demotivated indigenous, non-indigenous people and immigrants with chronic disease, to engage in self-management. This study was conducted over a six-month period and covered a diverse population demographic with a cohort of 56 participants. One factor this study found that moved people away from self-management was depression. This is supported by O’Neil, Sanderson, and Oldenburg (2010), who state that untreated depression, significantly impacts on recovery from a myocardial infarction and can reduce quality of life. The Jowsey et al. (2014) study found that people were motivated by an intrinsic drive to remain independent and maintain control over and optimise their condition. They did this by actively seeking advice and following recommendations from HP’s as well as involving family members in supporting them with their health needs. The Newsom et al. (2012) longitudinal study on health behaviour change supports this. People with diabetes who sought education on their condition from a HP, increased their physical activity levels. In comparison, those who reduced their amount of physical activity did not actively seek information on their condition. Remaining positive and having a strong personal belief in optimizing their health, were reported as motivating factors for practicing self-management by the study participants. The authors concluded that actively addressing risk factors including increasing physical activity and following a healthy diet promoted self-management. They also found that the fear of complications from disease, pain and suffering and the possibility of dying were motivating factors to practice self-management.

Research by Jowsey et al. (2014) concluded that the development of patient and HP rapport and relationships were important factors for fostering self-care management. Similarly, Fox and Chesla (2008) found that women living with chronic conditions had more confidence, security and motivation from connected relationships with their HP. A limitation of the Fox and Chesla (2008) study was people were not directly asked what motivated them to self-manage their health, but instead relied on emerging motivational factors from interviews.

Similarly, a randomised control trial by Masters et al. (2013) examined spousal involvement for people 60 + years of age in self-care management programmes over a six-month period. The study noted the benefits of interpersonal communication between spouse and partner in supporting self-efficacy which increased self-care management behaviours. Spouses were encouraged to explore their role with regards to involvement with self-care management for their partners. For example, a person's spouse could prepare their daily medications to take, thereby increasing medication adherence. The authors recommended that both the individual and their spouse receive support on self-management during consultations by health providers (Masters et al., 2013).

2.6 Interpersonal Health Relationships

The Anderson and Funnell (2005) review on patient empowerment and diabetes care, discussed the impact on people who do not have any personal control over the management of their health. The authors suggest that people lose autonomy of their lives when not included in the decision making on their health care. They also note that people may feel personally criticized by HP's when they lack the ability to manage their health. The authors conclude that people who do not comply with recommendations to improve their diabetes, do so to regain personal control over their lives and well-being. They propose that it is the underlying philosophy that HP's have on health care that will ultimately impact on an individual's health outcomes, regardless of the different types of interventions provided. Similarly, Lawn, Delany, Sweet, Battersby, and Skinner (2014) argue that a HP's behaviour towards a person in regards to control, power and collaboration within the client relationship can enhance or provide a barrier for people to manage their overall health.

The Lawn et al. (2014) Australian critical discourse analysis study of 19 participants with chronic conditions, found that people who were empowered to make shared decisions on their health needs during a consultation with their health provider, were more engaged in self-management practice. The authors note that communication

styles including language used during consultations by a HP and the sharing of information between the client and HP is a critical factor for the development of self-management. The study found that although HP's may have good intentions to promote self-management, unintentional use of disempowering communication styles can occur. The authors concluded that a client who is empowered, is more likely to form stronger relationships with their health provider, enhancing self-management practice. Lawn et al. (2014) recommended that HP's receive training on communication styles and learn awareness on how the power of their role, communication and workplace systems can act as a barrier to people engaging in self-management.

Pulvirenti, McMillan, and Lawn (2011) suggest that although there is a perception that health care systems and HP's hold all of the knowledge and power to manage a person's chronic disease, it is the person with the chronic disease who has the power to make decisions on their health. Haggman-Laitila (1997) recommends that it is important for nurses to understand an individual's lived experience of chronic disease. For nurses to support people with their health care they need to be able to provide care in a way that is meaningful to the individual (Haggman-Laitila, 1997).

Interestingly findings from Kaphingst et al. (2014) study indicate the benefits of having a respectful workforce on patient engagement. This study telephone surveyed over 3000 English speaking adults in Missouri, America and measured self-reported outcomes on increased understanding on personal health and changes in health behaviours following engagement with their primary health care provider. The study found people who had positive encounters with front desk staff and those that brought questions with them to their general practitioner reported learning from their doctor and making better health choices over those patients that did not. The authors place importance on individuals visiting their general practitioner with prepared questions on their health and experiencing positive encounters with practice staff as contributing factors to improved health outcomes, rather than solely having increased health literacy skill levels.

2.7 Behaviour Change

The Trans Theoretical Model (TTM) is a seminal work of intentional behaviour change, which provides insight into an individual's experience of the behaviour change process (Prochaska & Di Clemente, 1982). The TTM is a process by which an individual must move through five separate stages in order to maintain a behaviour change. The five stages are pre-contemplation, contemplation, preparation, making the change and

maintaining the change. Prochaska and Di Clemente (1982) suggest that there may be many factors in an individual's life that can impact on their ability to make a behaviour change. For example, a person transitioning through a new developmental life stage can trigger them to make a new change. Social pressures and environmental changes can also be contributing factors for making a behaviour change. People may also become defensive when pressured by others to change their behaviours and resist change.

The New Zealand Guidelines Group (2012) review of international and national literature on effective health behaviour change in long term conditions found no literature supporting a specific intervention for people with CAD. They note that there have been more studies looking at interventions for individuals with diabetes, than any other chronic condition. However, the review did find that interventions based on social learning theory and TTM as well as interventions with no theoretical framework were the most effective at increasing physical activity, self-efficacy and quality of life. Their review also suggests that there is no single health behaviour intervention that works for all conditions, behaviour changes or outcomes. The authors recommend health providers implement careful planning and programme support to maximise the effect of new health interventions.

Cigarette smoking, physical activity and alcohol consumption are among the most important behavioural determinants for developing cardiovascular disease (World Health Organisation, 2015a). An American longitudinal study by Newsom et al. (2012) examined the behavioural changes of over 11,000 people following a diagnosis of a chronic disease which included CAD. The study focused on changes in smoking, alcohol use and exercise. Results showed that the majority of people diagnosed with a chronic condition did not change their lifestyle behaviours. However, the largest change was made by people diagnosed with CAD, with 40% of individuals becoming smoke free. There were no significant increases in the amount of physical activity per week following diagnosis, but the authors suggested that this may be related to the functional inability of participants. However, the authors did conclude that there was a reduction in alcohol consumption across all conditions. Although the authors note that this was likely in part due to a reduction in regular or occasional binge drinking.

In a response to address the impact of tobacco smoke on the population's health, the New Zealand Ministry of Health have set health targets to action the cessation of smoking. Targets include 95% of all people in public hospitals who smoke will be visited by a HP and offered brief advice and support to stop smoking. All patients enrolled in a Primary Health Organisation who smoke will have been offered help to

quit smoking by a HP in the last 15 months and 90% of pregnant women who smoke are offered brief advice by their Lead Maternity Carer or public hospital employed midwife (Ministry of Health, 2016).

Jepson et al. (2010) reviewed interventions which change health behaviours and found that if workplace and community settings support healthy lifestyle behaviours including promoting healthy food choices, providing the opportunity to engage in physical activity and promoting smoke-free environments, then people were more likely to change their behaviours. The review concluded that medical advice at the individual level on smoking cessation, physical activity, healthy food choices and reducing alcohol consumption was also effective in supporting healthy lifestyle behaviours. The authors recommended that interventions be directed at the individual and community level to increase knowledge, attitude and promote healthy behaviour. Although Jepson et al. (2010) noted the benefits of one on one advice by medical doctors on lifestyle change, a qualitative study by MacGregor et al. (2006) on primary physician's discussing action plans with patients suggested that doctors inconsistently provide health behaviour change advice to their patients.

A retrospective cohort study by Twardellaa, Loewa, Rothenbachera, Stegmaierb, and Zieglerb (2006) concluded that smoking cessation rates improved for people who were diagnosed with a life threatening condition such as myocardial infarction and stroke. The authors noted the combination of lifestyle advice from a person's doctor as well as explaining to the individual the detrimental effects that smoking can have on their health as ways of promoting smoking cessation.

A meta-analysis of interventions to increase physical activity in older people with chronic disease by Conn, Hafdahl, Brown, and Brown (2008) concluded that supervised exercise programmes were the most common intervention provided. However, they were no more effective than educational sessions and motivational interviewing. They also note that supervised exercise programmes require specialist staff to facilitate them and add cost to health services. However, Conn et al. (2008) suggest there may be some benefit to supervised programmes such as safety for patients with heart failure. The Conn, Valentine, and Cooper (2002) meta-analysis of interventions to increase physical activity in older aged people support the inclusion of self-monitoring when providing physical activity behaviour change interventions. Interestingly, the Fjeldsoe, Neuhaus, Winkler, and Eakin (2011) systematic review of behaviour change maintenance did not support self-monitoring of behaviour maintenance.

The Fjeldsoe et al. (2011) systematic review comment on the limited amount of literature reporting on behavioural change maintenance, which may result from insufficient research funding beyond the completion of studies. They make reference to the possibility of publication bias for successful interventions. This is a limitation to their review. Their review on behavioural change maintenance following physical activity and dietary interventions, found that less than one third of studies assessed behaviour modification for twelve months or longer. The authors comment on the lack of importance placed on behavioural change maintenance. People were more likely to maintain their behaviour change if interventions occurred over twenty-four weeks, they had face to face contact and received more than one strategy to change their behaviour. A key finding was that brief contact following the end of the intervention supported behavioural change maintenance. Similarly, a review of the literature by Cobb, Brown, and Davis (2006) on effective lifestyle change intervention following a myocardial infarction and revascularisation procedures also recommend that health providers arrange regular follow-up to monitor their patients' progress. Fjeldsoe et al. (2011) recommended that future interventional studies on behaviour change should include behaviour maintenance reporting.

2.8 Quality of life

Roebuck, Furze, and Thompson (2001) suggest that there is no internationally agreed definition of quality of life, however, it is becoming increasingly recognised as an important determinant of clinical decision making for people and their families.

Theofilou (2013) defines quality of life as encompassing an individual's "emotional reactions to life occurrences, disposition, sense of life fulfilment and satisfaction, and satisfaction with work and personal relationships" (p.151).

Lim, Johnson, O'Connell, and Heller (1998) acknowledge the impact that surviving a myocardial infarction has on quality of life with studies showing that low quality of life following a myocardial infarction is linked to poor health outcomes for individuals.

Wenru and Devi (2012) discuss the impact of a myocardial infarction on people. These authors state that experiencing a myocardial infarction can be a frightening time for the individual and their family members. They suggest that it is important that they learn to come to terms with what has happened and make appropriate lifestyle changes as well as manage any psychological effects of their experience. They conclude that people who do not make lifestyle changes or learn to manage the psychological effects following a myocardial infarction, are more likely to be preoccupied with their

symptoms, have a loss of self-confidence, low quality of life and incur increasing health costs.

Bagheri, Memarian, and Alhani (2007) acknowledge that normal symptoms of fatigue for an individual following a cardiac event may be perceived as a direct symptom of their heart not functioning adequately. They suggest that this can lead to reduced physical and social activities. A person may become physically deconditioned and more lethargic which can increase anxiety levels.

A study by Fenk et al. (2013) assessed the quality of life of 1799 people in Germany following a myocardial infarction at baseline and 1085 people at four years, compared to matched familial controls. The authors concluded that perceived reduced physical quality of life did not resolve despite long term survival. Bagheri et al. (2007) suggest that people may be more susceptible to further ischaemic events who have reduced physical quality of life, compared with those that have a higher physical quality of life. The authors randomised controlled trial studied participants who attended a group counselling session following their myocardial infarction. The authors used the Quality of Life after Myocardial Infarction questionnaire to assess participant's quality of life. Bagheri et al. (2007) found quality of life scores significantly increased over all three quality of life domains including emotional, physical and social function, for the intervention group, compared to the control group who had no change in their quality of life scores.

The systematic review by O'Neil et al. (2010) on depression as a predictor for not returning to work following a myocardial infarction recognised the impact that depression has on recovery time, function and reduced quality of life. There was also an association between depression and increased morbidity and mortality. People who were assessed as having depression on admission and two months following their event were more likely to not return to work at six to 12 months, further reducing their quality of life.

A descriptive analytical study by Sevinç and Akyol (2010) of 270 participants who were diagnosed with CAD within the previous six months, used the Quality of Life after Myocardial Infarction questionnaire to assess quality of life. They found a correlation between participants who had high risk factors for CAD and low quality of life. A limitation of this study was that it was set in only one hospital in Turkey and may not be representative of other people with CAD. The long term effects of low quality of life was also evident in a quantitative study conducted by Lim et al. (1998). Their research on quality of life following discharge with CAD and health outcomes over a 24-month

period in Australia, concluded that low quality of life appears to be an independent factor for increased morbidity, including readmission to hospital with subsequent myocardial infarction or/and congestive heart failure and death. The New Zealand health strategy by the Ministry of Health (2000) states that it is not only an individual's determinants of health which are important for good health, but also broader determinants including supporting an individual's ability to cope with their condition and creating supportive health environments for their wellbeing.

A prospective randomised control trial by Hanssen, Nordrehaug, Eide, and Hanestad (2009) studied the impact of follow-up telephone calls over an 18-month period following a myocardial infarction on quality of life. Impact on long term secondary endpoints including exercise and smoking habits, return to work and readmission to hospital with chest pain were also studied. A nurse initiated call was made weekly for the first month, then subsequently at six, eight, 12 and 24 weeks. The 36-point short form health survey (SF-36) was used to assess quality of life. The authors concluded that telephone follow up had a significant positive impact on quality of life as well as frequency of exercise, compared with usual care, but quality of life and frequency of exercise were not sustained after 12 and 18 months, and was comparable with the usual care group. There were no added effects from telephone intervention on return to work, readmission to hospital from chest pain or smoking rates beyond six months compared with the usual care group.

An English qualitative study by Roebuck et al. (2001) examined the quality of life of 31 people following a myocardial infarction, using semi-structured interviews. They concluded that physical symptoms and the inability to complete normal daily activities had the greatest impact on a person's quality of life. Other issues that were reported by participants as having a major impact on their quality of life included the fear of aggravating symptoms, having another myocardial infarction, feeling vulnerable and insecure and experiencing overprotection from family members. Limitations of this study as discussed by the researchers were that only one interview was conducted six weeks following the participant's myocardial infarction as well as no participants attended a cardiac rehabilitation programme. Of note there is no mention of other educational resources on CAD being provided, which may have had an impact on results.

2.9 Summary

A review of international and national literature has been completed relating to self-care management, lifestyle behaviour change and quality of life following a myocardial

infarction and chronic disease. The review has found individuals must be empowered and supported by HP's and health services to engage in self-management of their health and that strong interpersonal relationships between the health provider and individual are important for this to occur. The literature concludes that behaviour change can be a difficult process for individuals following a myocardial infarction with limited literature on the maintenance of a behaviour change. There is limited literature on interventions to support behaviour change for individuals who have CAD and no literature was found discussing self-determination or voluntary lifestyle changes. The literature recognises the importance of quality of life for an individual's recovery following a myocardial infarction. Conclusions drawn from the review include that individuals and their families need be well educated, informed, supported and inspired in the management of their health, following their heart event.

Chapter Three - Methodology

3.0 Introduction

This chapter will discuss the design and methodology of the research. The sample group including inclusion and exclusion criteria will be discussed. Ethical and cultural considerations as well as data collection will be covered.

3.1 Research Design

Quantitative methodology is used to identify factors that influence outcomes, the use of an intervention or understanding predictors of outcomes to answer a research question (Creswell, 2009). Quantitative research derives from positivism. This philosophy focuses on an objective reality being qualified or measurable in some way (Schneider et al., 2013). A quantitative research design measures variables of interest (Schneider et al., 2013) tests hypotheses and enables the researcher to observe if there is a relationship between variables (Hoe & Hoare, 2013).

For this study, an experimental randomised control trial with a pre and post-test design was used, as this is suitable for testing cause and effect relationships (LoBiondo-Wood & Haber, 2010, Walker, 2005). This design will provide objective and measurable data to test if self-management principles support behaviour change maintenance.

An experimental design reduces bias through randomisation between an intervention group and control group (LoBiondo-Wood & Haber, 2010). Randomisation is designed to ensure that participants are similar in both the intervention and control group and that it is the intervention that has an effect on participants outcomes (Schneider et al., 2013). Randomisation prevents the researcher(s) from allocating people to the intervention group who they feel would benefit from the intervention and potentially influence the findings of the study (Seers & Crichton, 2001).

Experimental designs can be complicated and expensive to undertake. They may not be suitable to certain clinical environments. This can occur in hospital settings, where HP's may talk about the study and the intervention. Having inadequate participants in the accessible population has also been identified as a weakness with experimental designs (LoBiondo-Wood & Haber, 2010).

Seers and Crichton (2001) discuss the importance of blinding in a randomised control trial to further reduce bias. Blinding of the participants, researcher (s) and reporting on the data, helps prevent bias. Within this study, there was no blinding as the researcher knew which participants had been randomised to each group. A lack of blinding in this study may be a threat to the validity of the study through the Hawthorne effect, where

the participants may be aware that they are being observed and change their behaviour (Walker, 2005). Double blinding is often reserved however for randomised controlled trials where the intervention can be disguised, such as a drug trial (Walker, 2005).

3.2 Research Question

The research question is: “For people who have had a myocardial infarction in the last six months, what is the effect of a twelve-week self-determined lifestyle behaviour change on risk factor profile, quality of life and behaviour change maintenance?”

3.3 Research Aim

The aim of this research was to examine the effect of a twelve-week voluntary lifestyle behaviour change on a person’s health following a myocardial infarction.

Objectives

1. To measure the effect of a voluntary lifestyle change on cardiac risk factor profile.
2. To measure the effect of a voluntary lifestyle change on quality of life.
3. To explore the impact of a voluntary behaviour change on the maintenance of that behaviour.

3.4 Setting

This study was conducted in a regional centre of New Zealand and all participants received treatment for a myocardial infarction by the regional hospital up to six months prior to the study commencing.

3.5 Sample

People who had a myocardial infarction within the last six months and were treated at the regional hospital within the study region were invited to participate. A convenience sampling method was used to recruit participants for this study. Sedgwick (2010) describes convenience sampling as being convenient to the researcher with participants being selected in a non-random manner. Convenience sampling enables easy access to participants, with participants being readily available to partake in a study. The author also notes that convenience sampling may not be representative of the population. This sampling method was chosen to enable the researcher easier access to potential participants who had had a myocardial infarction and invite them to participate in the study. A convenience sampling method, as discussed by LoBiondo-Wood and Haber (2010) may be the most appropriate method for a study, despite it

being a weak sampling method and incurring a greater chance of bias over any other sample method. LoBiondo-Wood and Haber (2010) also suggest that convenience sampling can affect the external validity of a study's findings, by reducing the generalisability of the evidence to the target population.

3.5.1 Inclusion Criteria

To qualify for inclusion in the study, potential participants needed to be aged between 30 and 75 years, have had a myocardial infarction between 01/01/2015 and 01/07/2015, had been treated at the local regional hospital and lived within 20 minutes driving distance of the regional hospital. The criteria for distance from the regional hospital was set as the researcher had to drive to each participant's home prior to and following the study period for data collection.

3.5.2 Exclusion Criteria

Participants were excluded from this study if they were functionally incapacitated on a physical level and relied on other people to care for them and/or had cognitive impairment. Persons living more 20 minutes driving time from the regional hospital were excluded.

3.6 Recruitment

The sample was sourced from patient referrals made to the regional hospitals cardiac rehabilitation service. Invitations seeking volunteers to participate in the study were posted out to people who met the inclusion criteria. They were asked to respond via a pre-paid self-addressed envelope, indicating if they would like to be contacted with further information on the study. A reminder letter was sent to those people that had not responded within a two-week period.

When responses were received, the unopened envelope was numbered and randomised into either the Intervention or Usual Treatment groups by the researcher's principal supervisor. The envelope was then opened and if the participant requested further information, they were telephoned to discuss what the study would involve for them. For all participants in both groups who verbally consented to participate, a time was arranged for them to be visited at home by the researcher to commence the study.

3.7 Data Collection

The researcher arranged to visit each participant in both groups in their own home for the purpose of initial study data collection. Each participant was provided with The

Quality of Life after Myocardial Infarction II Questionnaire (QLMI-2) (Valenti, Lim, Heller, & Knapp, 1996).

The researcher explained to each participant how to complete the questionnaire and to fill it out in their own time and return it in the pre-paid self-addressed envelope that was supplied. Each participant in both groups had a myocardial infarction risk factor profile assessment performed by the researcher at their home at the beginning of the twelve-week study period.

The risk factor assessment included data on their age, diabetic status, weight and height, body mass index (BMI), waist circumference, blood pressure (BP), smoking status, level of physical activity, alcohol consumption, units of fresh fruit and vegetables consumed per day and amount of processed foods consumed high in saturated fats, salt and sugar. A risk score was given to each participant, indicating their risk of a further myocardial infarction. On completion of the initial risk factor profile, each participant in both the Intervention and Usual Treatment groups were informed of their risk factor profile as this is usual practice at the regional hospital following a myocardial infarction (Table 1).

Table 1. Risk factor profile weighting table. Alcohol consumption. One standard drink refers to 30 millilitres of spirit, 330 millilitres of beer, 100 millilitres of wine. (each is equivalent to 10 grams of alcohol). One unit of fruit refers to one piece of medium sized fruit, for example one apple or plum or ½ cup of fresh fruit salad or ½ cup stewed fruit (fresh frozen or canned). One unit of vegetables refers to ½ cup of mixed vegetables or ½ cup of cooked non-starchy vegetables for example carrots, silver beat, broccoli, bok choy, taro leaves. Starchy vegetable intake includes for example one medium sized piece of kumara (135 grams) or similar sized potato, tawea (Maori potato), yam or taro. Processed food consumption including highly processed foods refers to any food which is highly refined and high in salt (sodium), sugar and saturated fats. Included in this category is any added salt and sugar to prepared foods, sugary drinks and animal products high in saturated animal fat (Ministry of Health, 2015b). Abbreviations years (yrs), body mass index (BMI) systolic blood pressure (SBP) millimetre of mercury (mmHg), centimetre (cm), minutes (mins)

Risk Factor	Score
Age	>60 yrs =1
Diabetic	yes=1
BMI	20-25=0 25-30=1 30-35=2 35-40=3 40-45=4 >45=5
SBP (mmHg)	<140=0 140-160=1 >160=2
Waist (cm)	(male) >100cm=1 (female) >90cm=1
Smoker	yes=2 ex<1yr=1
30 mins physical activity/day	<30mins/day=1
Alcohol consumption (standard drinks per day)	(male) 1-3=1 >3=2 (female) 1-2=1 >2=2
Units of fruit & vegetables/day	<5=1
Processed food consumption	very low/occasional=0 moderate=1 high= 2

Participants in the Intervention group were asked to choose one lifestyle behaviour change that they believed was important to their health. Participants were provided with six lifestyle behaviours to choose from, which are recognised as preventable risk factor behaviours for CAD (Salim et al., 2004). These included increasing physical activity, reducing weight, modifying diet (including increasing intake of fresh fruit and vegetables, reducing alcohol and processed food intake including salt, sugar and saturated animal fats), reducing stress and anxiety, becoming smoke-free and reducing alcohol intake. All participants in both groups were given two booklets on CAD published by the New Zealand Heart Foundation. These were “A guide to recovery after a heart attack” and “Taking control: My plan for heart health”. This is standard information provided to people when they are admitted to hospital with a myocardial infarction to support their understanding of CAD and recommendations for making lifestyle changes to reduce a further cardiac event.

Some participants in the Usual Treatment group explained that they would prefer to be in the Intervention group. The researcher explained that they had been randomly selected for the Intervention group independent to the researcher and could not be changed. However, participants in the Usual Treatment group were offered the option of receiving a two weekly telephone call to support a self-selected lifestyle behaviour change over a twelve-week period at the conclusion of the study.

The Intervention group were provided with 12 self-log templates, each covering a week, specific to their self-determined behaviour change (see Appendix 7 for a sample). Participants were asked to log their behaviour change on a daily basis using yes/no answers or with short written notes. Information on the daily log included specific questions pertaining to making the behaviour change. Included in each question were page references to the resource “Taking control: My plan for heart health”, to support participant’s understanding of the impact of their behaviour on their health. The Intervention group also received fortnightly telephone calls from the researcher to discuss their progress.

After completion of the twelve-week study period, participants in both groups were re-contacted by telephone and a time was arranged to meet the participant in their home or place that was convenient to them. A repeat risk factor profile assessment was made and all participants were asked to complete the QLMI-2 questionnaire again and asked to send it back to the researcher in a pre-paid self-addressed envelope.

The post intervention questionnaire for the Intervention group included three open ended questions to evaluate risk factor change maintenance.

1. Why did you choose the risk factor?
2. How easy was it to make the risk factor change?
3. Did you have any issues on maintaining the life style change that you chose, and what did you do to manage these issues?

Questionnaires have advantages and disadvantages for data collection (Schneider et al., 2013). Advantages include less financial cost to the researcher in administering the questionnaire, and does not require the researcher to be present with the participant when completing the questionnaire, which reduces interviewer bias. They also allow for the responder to consider each question more thoroughly (Schneider et al., 2013). Questionnaires enable access to a larger sample size, therefore increasing generalisation of the results (Schneider et al., 2013). Disadvantages include a potentially poor response rate, inability of the responder to ask questions or for the researcher to probe for further information as in open ended questions. It cannot be guaranteed that the target responder actually completes the questionnaire; instead it may be someone else (Gerrish & Lacey, 2010). Participants who are blind or illiterate are disadvantaged in completing written questionnaires (Gerrish & Lacey, 2010).

3.7.1 Limitations

Fjeldsoe et al. (2011) comment on the increased likelihood of behaviour change if interventions occur over twenty-four weeks. The time frame for this study was twelve weeks which may be a limiting factor when looking at behaviour change and maintenance. The sample size may also be too small to see statistically significant differences between those who received the intervention and those that did not (LoBiondo-Wood & Haber, 2010).

Internal threats to validity for this study could occur from selection bias (LoBiondo-Wood & Haber, 2010). The participants who did volunteer to participate may have been very motivated, which could have an effect on the study outcomes (LoBiondo-Wood & Haber, 2010). A convenience sampling method was used to gather the participants for this study. This form of sampling uses voluntary participation and is the weakest form of sampling method, as there is a greater risk of bias than any other sampling types (LoBiondo-Wood & Haber, 2010). Participants volunteered to participate in this study; which may have been a limiting factor in obtaining the final sample number.

3.7.2 Delimitations

Although convenience sampling was used, participants were randomised into an Intervention and Usual Treatment group. The researcher accessed people only within the local region and more specifically, who lived within twenty minutes of the regional hospital. Set inclusion and exclusion criteria were developed so that the sample groups were similar in regards to independence, functional capabilities and abilities to make informed choices.

3.8 Ethical Considerations

Ethical approval was obtained from the Eastern Institute of Technology Research Ethics and Approvals Committee. As all participants were sourced from the regional hospital, application to the Hawke's Bay District Health Board Research Office for locality approval was made, with approval gained. As part of the approval process, the research proposal was presented to the service manager for the Māori Health service to gain advice on culturally safe practice and etiquette when engaging with Māori participants who may be included in the study.

Participants received a written information sheet on the research study with their invitation letter, and were asked to complete a written consent form on the first home visit before they could participate in the study. All participants were informed of their right to withdraw from the study at any time up until 01/12/2015. Anonymity of participants remained with the researcher with each participant receiving a number for purposes of data entry, analysis and inclusion in the findings. All identifiable participant hard copy information was stored at the researcher's home in a locked filing cabinet as well as electronic data on a username/password secure computer.

All participants who were included in the study indicated they wished to receive a copy of the findings from the study so that they could read the effects that individual choices on lifestyle change had on cardiac risk factors and quality of life.

3.9 Potential Risks

There were no potential risks foreseen in the development of this study. A statement on the participant information sheet recommended they talk to their primary health practice staff in the first instance should completing the quality of life questionnaire, revive uncomfortable feelings about their experience of having a myocardial infarction.

3.10 Reliability and Validity

Treatment fidelity refers to strategies used to manage and enhance the reliability and validity of an intervention specific to behavioural and social studies. (Resnick et al., 2005). Incorporation of treatment fidelity procedures into a study enables the researcher to design processes to ensure each participant receives the intervention intended in a standardised way, which will strengthen internal validity (Resnick et al., 2005). For this study, the researcher developed a check list for the intervention, including explanations of the intervention. A telephone log was developed to document fortnightly telephone calls and a diary was used to document future telephone call dates (see Appendix 6 for the treatment fidelity plan). This ensured that every participant received the intended intervention and scheduled telephone calls.

The QLMI II questionnaire (Valenti et al., 1996) was used to gather initial and final quality of life scores for the Intervention and Usual Treatment groups. Schneider et al. (2013) indicate that a tool should generate the same or similar results if repeated with the same group at a later date. Consistency in results from using the tool, reflects the tools reliability (Ingham-Broomfield, 2014). Valenti et al. (1996) comment on the QLMI II being reliable and having good construct validity across two separate studies.

3.11 Management of Data

A participant sample management list was developed and stored on the researcher's personal computer under username and password security. The list detailed the participants study number, randomised group, telephone number, if a reminder letter was sent, if they accepted or declined the study, or if there was no reply at all.

3.12 Data Analysis

Data for each risk factor profile and quality of life questionnaire were entered into Microsoft Excel™ in order to describe and summarize the data using descriptive statistics (LoBiondo-Wood & Haber, 2010). Initial and final risk factor profile and change difference scores were calculated and represented in tables for both the Intervention (including focus behaviour groups) and Usual Treatment groups. Average scores for the three domains (emotional, physical and social) of the quality of life questionnaire for participants in both groups are represented in tables. An unpaired t-test was used to assess statistical significance of data between the intervention and control groups for initial and final risk factor scores, BMI, systolic blood pressure, waist circumference, units of daily fruit and vegetable consumption and quality of life domain averages. Statistical significance was set at 0.05.

Qualitative answers for the three open ended questions on issues or barriers to behaviour change have been used to support the numerical data and to provide information on behaviour change maintenance.

3.13 Summary

In this chapter the methodology and design of the research has been discussed. For the purpose of this research, an experimental randomised control trial with a pre and post-test design has been used (LoBiondo-Wood & Haber, 2010). The sample was sourced from patient referrals made to the regional hospital's cardiac rehabilitation service following a myocardial infarction. Participation in the twelve-week study was voluntary and consent to participate was obtained prior to commencement. In Chapter Four the results of the research will be presented.

Chapter Four - Results

4.0 Introduction

This chapter will present the findings of the research. The results are presented using descriptive statistics. Results of the initial and final scores for risk factor profile and quality of life for the Intervention (including focus behaviour groups) and Usual Treatment groups are provided. Results from the three open ended questions on the quality of life questionnaire will be used to support findings for the Intervention group.

4.1. Response

Seventy-five invitations to participate in this research were sent to people who met the inclusion criteria. Fifty-one invitations were returned which gave an initial response rate of 68%. Nineteen participants declined to partake in the study. The remaining cohort of 32 participants were randomised into the Intervention group (n=17) and Usual Treatment group (n=15). This gave a final response rate of 43% for the study.

4.2 Demographic Characteristics of the Intervention and Usual Treatment group

4.2.1 Age

The age range of participants in the Intervention group was 42-75 years with an average age of 62.6 years, while for the Usual Treatment group was 44-75 years with an average age of 61.8 years (Figure 1).

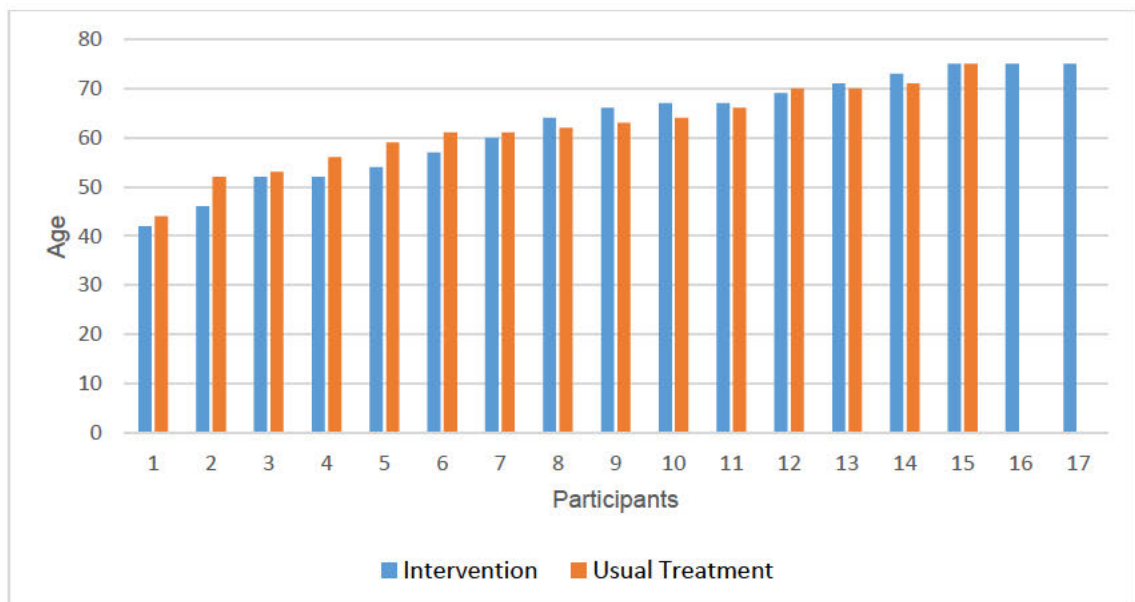


Fig 1. Ages of the Intervention and Usual Treatment group participants.

4.2.2 Gender

The intervention group was 88% (n=15) male and 12% (n=2) female, compared with 60% (n=9) male and 40% (n=6) female in the Usual Treatment group.

4.2.3 Ethnicity

Ethnicity data from the participants' electronic health record at the regional hospital showed 53% (n=9) of the Intervention group participants identified as New Zealand European, 18% (n=3) identified as Māori and 29% (n=5) identified as European other. For the Usual Treatment group 86 % (n=13) identified as New Zealand European, 7% (n=1) as Māori and 7% (n=1) as European other.

4.3 Risk Factor Profiles

The risk factor tables below present the initial and final data on risk factor profiles for the Intervention and Usual Treatment groups.

Table 2 presents the initial risk factor profile data for the Intervention group. The majority of participants had a high BMI and a large waist circumference, but scored low for all other risk factors within their risk profile. The average risk factor score was 4.9.

Table 2. Intervention group participants initial risk factor profile data. For the alcohol consumption column, the information has been recorded verbatim from the participant's questionnaires. Abbreviations include Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centimetres), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 mins exercise/day	Alcohol consumed	Units fruit & vegetables/day	Processed foods consumed
1	no	82.5	24.6	140	93	no	yes	occasional	5	low
2	no	103.9	32.4	128	109	no	yes	15 units/week	5	low
3	no	114.4	36.5	130	130	no	yes	no	5	moderate
4	yes	98.7	36.3	172	123.5	no	yes	occasional	6	low
5	Yes	85.3	32.9	144	107.5	no	no	occasional	2	low
6	no	83.3	29.5	140	103	no	no	occasional	5	low
7	yes	75.3	25.8	184	103	no	yes	7.5 units/week	5	low
8	no	102.9	34.0	116	105	yes	yes	no	2	low
9	no	116.1	44.2	124	132	ex<1yr	no	occasional	5	moderate
10	no	90.4	27.0	141	95.5	no	yes	no	5	moderate
11	no	86.2	30.5	148	104	no	yes	8 units/week	7	low
12	no	84.3	27.5	134	91	no	yes	no	6	moderate
13	no	74.9	24.5	100	88.5	no	yes	7 units/week	5	moderate
14	no	68.6	23.9	138	88	ex< 1 yr	yes	occasional	4	moderate
15	no	97.3	32.5	128	107	no	no	7 units/week	5	moderate
16	no	88.1	27.2	130	104	no	yes	6 units/week	4	low
17	no	77.1	25.5	164	99	no	yes	no	5	low

Final risk profile data (Table 3) for the Intervention group shows there was an overall reduction in processed foods, an increase in fruit and vegetables and an increase in the recommended amount of daily exercise. There was a small reduction in waist

circumference and BMI, but the majority remained above the recommended values.

The average risk factor score at the conclusion of the study was 4.4, a decrease of 0.5 from the start.

Table 3. Intervention group participants final risk factor profile data. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centimetres), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP		Smoker	30 mins exercise /day	Alcohol consumed	Units fruit & vegetables/day	Processed foods consumed
				(mmHg)	Waist(cm)					
1	no	86.1	25.7	160	96	no	yes	occasional	5	low
2	no	103.1	32.2	112	108	no	yes	15 units/week	5	low
3	no	114.8	36.6	134	130	no	yes	no	5	low
4	yes	101.9	37.4	126	127.5	no	yes	occasional	6	low
5	yes	83.2	32.1	144	102	no	yes	occasional	4	low
6	no	82.4	29.2	124	101	no	yes	occasional	5	low
7	yes	71.8	24.6	158	95	no	yes	7.5 units/week	8	low
8	no	102.8	34.0	126	105	yes	yes	no	4	low
9	no	120.3	45.8	118	133	ex<1yr	yes	very little	5	moderate
10	no	85.7	25.6	118	92	no	yes	no	7	low
11	no	85.2	30.2	139	100	no	yes	8 units/week	7	low
12	no	84.2	27.5	118	91	no	yes	no	6	moderate
13	no	72.7	23.7	102	84.5	no	yes	7 units/week	7	moderate
14	no	71.9	25.0	184	92	ex<1 yr	yes	1 unit/day	6	moderate
15	no	95.7	32.0	120	106	no	yes	4 units/week	7	very low
16	no	85.1	26.3	134	101	no	yes	6 units/week	5	low
17	no	79.3	26.2	146	102.5	no	yes	no	5	low

Table 4 shows the initial risk factor profile for the Usual Treatment group. The data shows that the majority of participants had a higher BMI and larger waist circumference than the recommended guidelines, but scored low in other risk factors. The average risk score was 5.3.

Table 4. Usual Treatment group participants initial risk factor profile data. Abbreviations Wt (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centimetres), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP		Smoker	30 minutes activity/day	Alcohol consumed	Units fruit & vegetables/day	Processed food consumed
				(mmHg)	Waist(cm)					
1	no	78.9	28.0	124	99	no	yes	7 units/week	5	low
2	no	99.6	38.9	126	116	no	no	low	5	low
3	yes	90.9	29.7	164	105	no	yes	low	4	low
4	no	90.2	30.1	120	106	no	yes	no	2	moderate
5	no	69.2	26.9	150	87.5	ex<1 yr	yes	no	6	low
6	no	98.9	31.2	128	102.5	ex<1 yr	yes	1 unit/week	5	low
7	no	79.4	27.2	108	98	no	yes	7 units/week	5	low
8	no	100.1	29.6	132	110	ex<1 yr	no	2 units/week	7	low
9	yes	111.2	45.1	148	126	ex<1 yr	yes	no	3	high
10	no	85.1	26.6	114	98	no	no	9 units/week	5	moderate
11	no	60.5	22.5	104	81	no	yes	7-14 units/week	5	low
12	no	83.9	25.6	110	96	no	yes	no	5	low
13	no	82.4	29.9	170	102	no	yes	22 units/week	3	moderate
14	no	107.8	39.6	118	109	no	yes	no	4	moderate
15	yes	133.9	44.2	136	139	no	yes	no	7	high

Final risk factor profile data for the Usual Treatment group, shows the majority increased their daily physical activity, intake of fresh fruit and vegetables and reduced their intake of processed foods. The majority made a small reduction in their BMI and waist circumference (Table 5). The average risk factor score at the conclusion of the study was 4.9, a decrease of 0.4.

Table 5. Usual Treatment group participants final risk factor profile data. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centimetres), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 minutes exercise/day	Alcohol consumed	Units fruit & vegetables/day	Processed foods consumed
1	no	76.2	27.0	102	98	no	yes	7 units/week	5	low
2	no	96.6	37.7	126	112	no	yes	low	7	low
3	yes	87.5	28.6	170	100	no	yes	low	5	low
4	no	88.1	29.4	118	105	no	yes	no	5	low
5	no	67.5	26.2	132	84.5	ex<1 yr	yes	no	6	low
6	no	95.9	30.3	118	99.5	ex<1 yr	yes	no	5	low
7	no	77.5	26.5	142	95.5	no	yes	7 units/week	5	low
8	no	98.7	29.2	136	109	ex<1 yr	yes	nil	7	low
9	yes	110.9	45.0	144	125.5	ex<1 yr	yes	no	3	high
10	no	83.4	26.0	124	96	no	yes	9 units/week	8	low
11	no	61	22.7	116	83.5	no	yes	7-14 units/week	5	low
12	no	82.5	25.2	114	95	no	yes	no	5	low
13	no	83	30.1	152	105	no	yes	22 units/week	3	moderate
14	no	107.8	39.6	138	109	no	yes	no	4	low
15	yes	138.1	45.6	146	141	no	yes	no	4	moderate

4.4 Risk Factor Scores

The risk factor profile for each participant in both the Intervention and Usual Treatment groups was assessed prior to and on completion of the study period. A risk factor score for a further myocardial infarction was calculated for each participant, with each participant being categorised into a risk group thereafter. Participants with a risk factor score of zero to three were associated with having a small chance of a future myocardial infarction, four to six was associated with having a moderate chance of having a myocardial infarction and a risk factor score greater than six was associated with having a high chance of having a myocardial infarction in the future.

4.4.1 Intervention and Usual Treatment group initial and final risk factor scores

Initial risk factor scores for the Intervention group ranged from zero to eight, with an average score of five and final risk scores ranged from two to nine with an average score of four (Figure 2). Risk scores worsened for three participants, remained the same for five and improved for nine following the study.

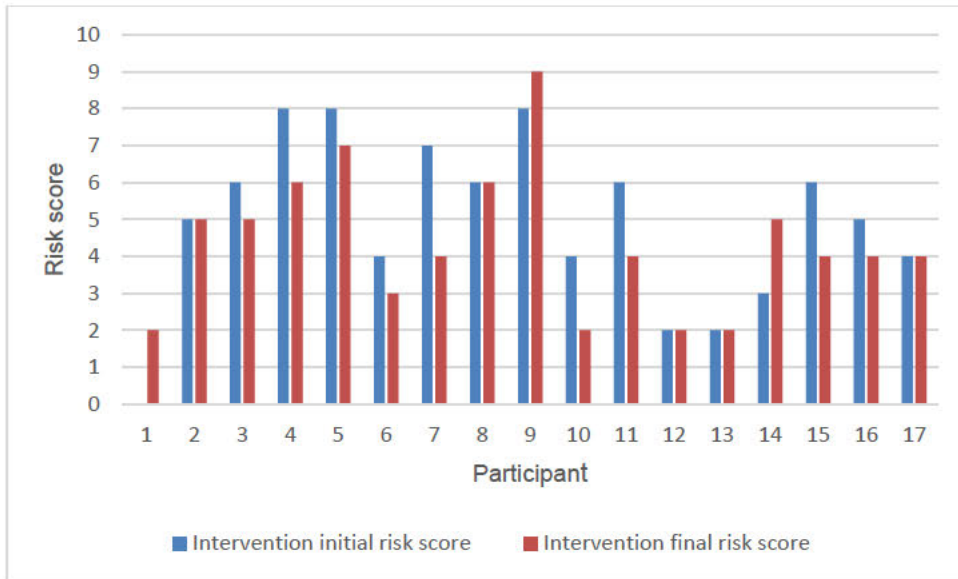


Fig 2. Initial and final risk scores Intervention group participants.

Initial risk factor scores for the Usual Treatment group ranged from two to twelve with an average score of 5.3 (Figure 3). Final risk factor scores for the Usual Treatment group ranged from two to twelve with an average score of 4.9. Two participants worsened their risk factor score, five remained the same and eight improved following the study.

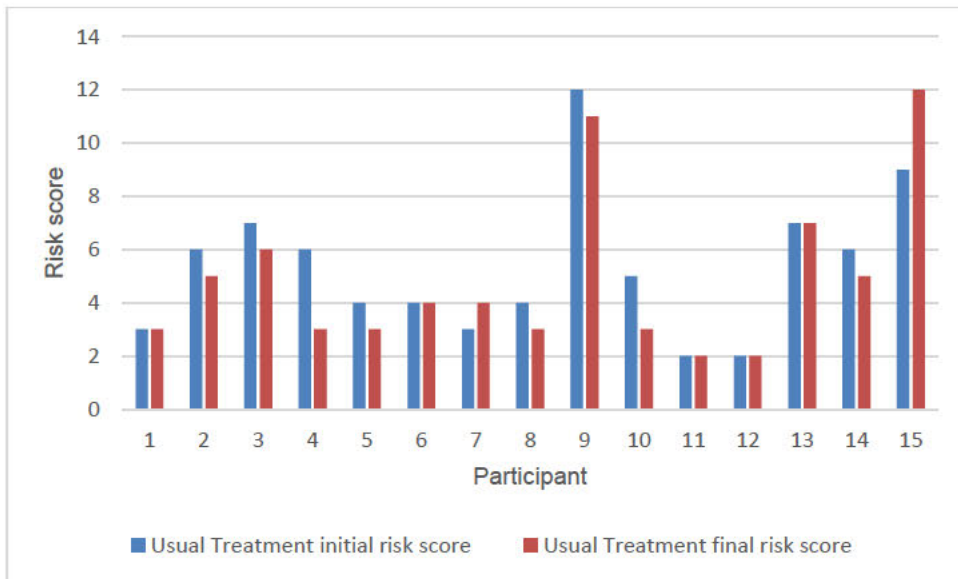


Fig 3. Initial and final risk scores Usual Treatment group participants.

4.4.2 Risk factor change scores

Risk factor score changes were calculated by subtracting final risk factor scores from initial risk factor scores. For the purposes of interpreting risk factor score changes, zero represents no change in risk factor score, a negative risk factor score represents a

decrease in risk for a future myocardial infarction and a positive score represents an increase in risk of a future myocardial infarction (Figure 4).

Following the study, the same number of participants in each group had no change in their risk factor scores. The average change in risk factor score was slightly greater for the Intervention group compared to the Usual Treatment group (-0.59 vs -0.47).

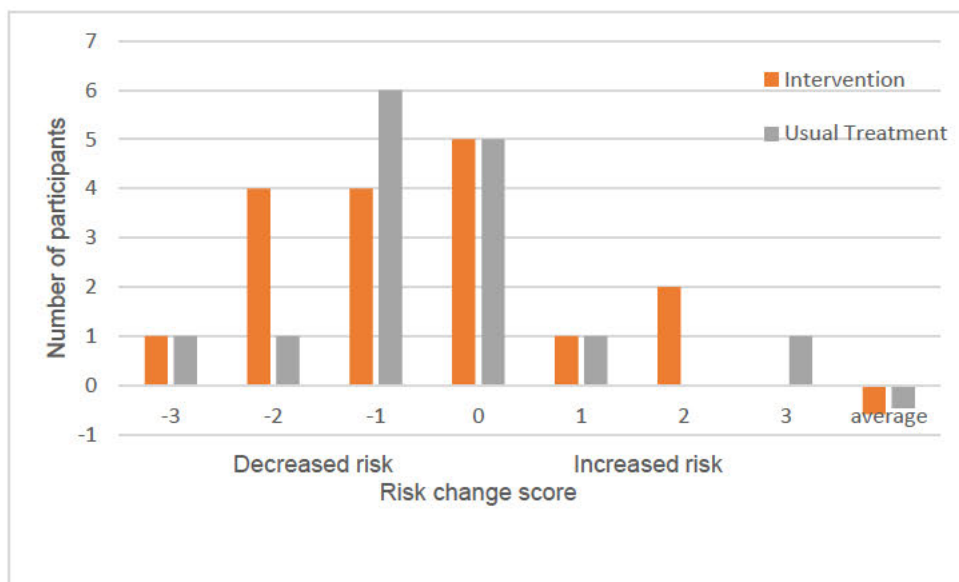


Fig 4. Risk factor change difference score Intervention and Usual Treatment group.

4.5 Risk Factor Categories

Figure 5 shows the number of Intervention group participants who were categorised into low, moderate and high risk for a future myocardial infarction. At the conclusion of the study there were a greater number of participants in the low and moderate risk categories than at the the beginning of the study.

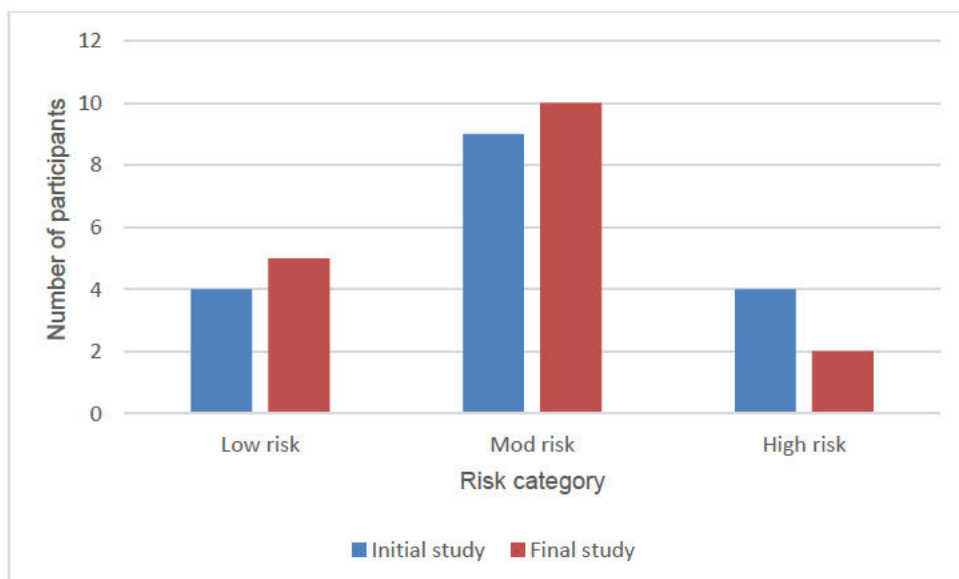


Fig 5. Initial and final study risk categories for the Intervention group

Figure 6 shows the number of Usual Treatment group participants who were categorised as low, moderate and high risk prior to and on conclusion of the study. The majority of participants had a moderate risk at the beginning of the study with fewer participants in the moderate and high risk categories at the end of the study period.

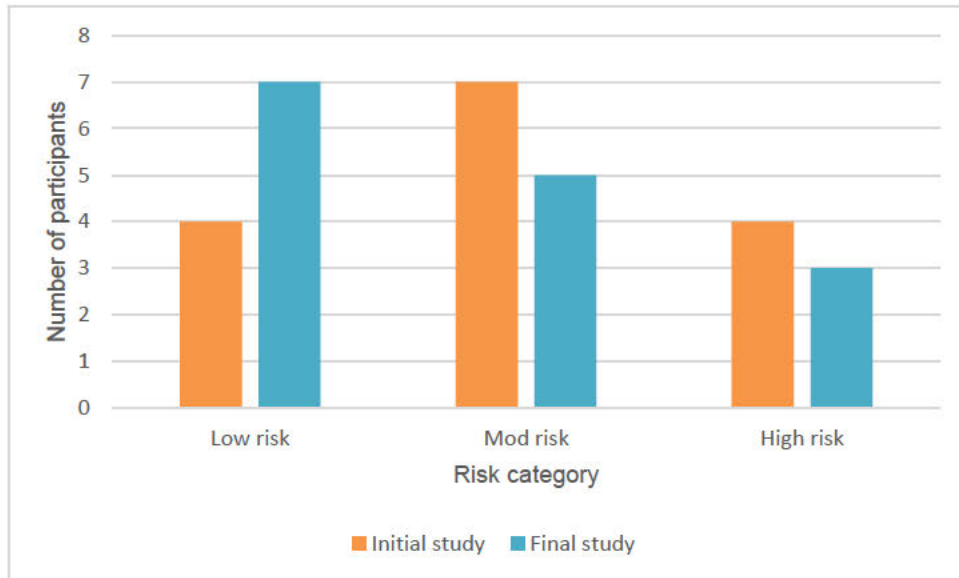


Fig 6. Initial and final study risk categories for the Usual Treatment group.

4.6. Behaviour Change Focus Groups

As can be seen in figure 7, the majority of Intervention group participants chose to either increase physical activity or reduce their weight.

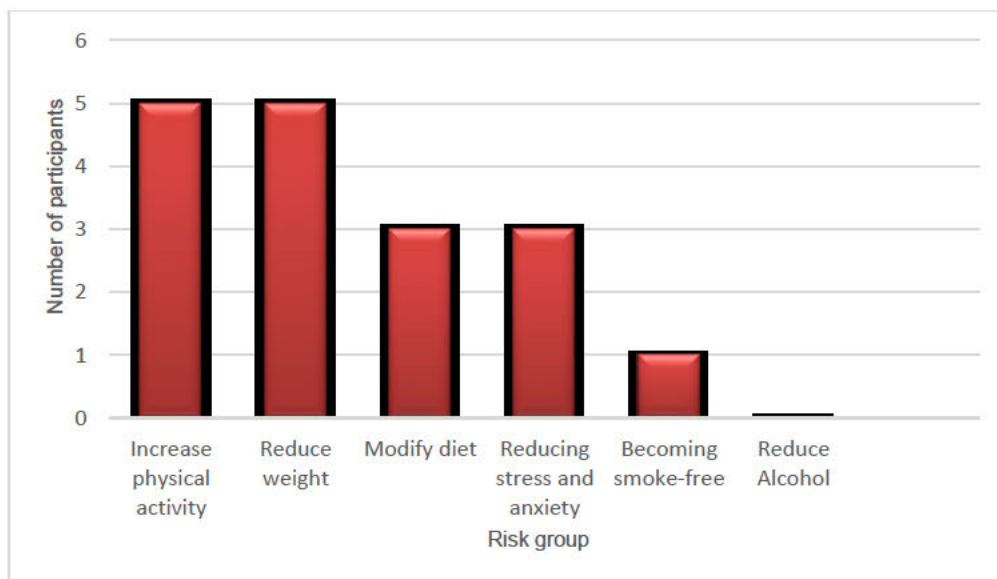


Fig 7. Behaviour change focus groups.

4.6.1 Increasing physical activity

Initial study data (Table 6) shows three of the participants who chose to increase their physical activity were not initially meeting the recommended levels of daily activity. At the end of the study, all participants had increased their daily levels and were meeting the recommended daily level of physical activity. In addition, four of the five had decreased their BMI and waist measurement (Table 7).

Table 6. Initial risk factor profile for focus group 'increasing physical activity'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centimetres), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist (cm)	Smoker	Alcohol consumption	30 mins physical activity/day	Units fruit & vegetables/day	Processed foods consumed
1	no	82.5	24.6	140	93	no	occasional	yes	5	low
5	yes	85.3	32.9	144	107.5	no	occasional	no	2	low
6	no	83.3	29.5	140	103	no	occasional	no	5	low
7	yes	75.3	25.8	184	103	no	7.5 units/week	yes	5	low
15	no	97.3	32.5	128	107	no	7 units/week	no	5	moderate

Table 7. Final risk factor profile for focus group 'increasing physical activity'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centimetres), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist (cm)	Smoker	Alcohol consumption	30 mins physical activity/day	Units fruit & vegetables/day	Processed foods consumed
1	no	86.1	25.7	160	96	no	occasional	yes	5	low
5	yes	83.2	32.1	144	102	no	occasional	yes	2	low
6	no	82.4	29.2	124	101	no	occasional	yes	5	low
7	yes	71.8	24.6	158	95	no	7.5 units/week	yes	5	low
15	no	95.7	32.0	120	106	no	7 units/week	yes	5	moderate

4.6.2 Reducing weight

The majority of participants in this group were consuming the daily recommended intake of fresh fruit and vegetables and had a low intake of processed food, with three of the five participants consuming alcohol regularly at the beginning of the study (Table 8).

Three of the five participants who chose the focus behaviour 'reducing weight' had a reduced BMI and waist circumference at the end of the study. Two participants had increased their BMI and one had increased their waist circumference (Table 9).

Table 8. Initial risk factor profile for focus group 'reducing weight'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 mins exercise/day	Alcohol consumption	Units fruit & vegetable/ day	Processed food consumption
2	no	103.9	32.4	128	109	no	yes	15 units/week	5	low
3	no	114.4	36.5	130	130	no	yes	no	5	moderate
9	no	116.1	44.2	116	132	ex<1yr	no	very little	5	moderate
11	no	86.2	30.5	148	104	no	yes	8 units/week	7	low
16	no	88.1	27.2	128	104	no	yes	6 units/week	4	low

Table 9. Final risk factor profile for focus group 'reducing weight'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 mins exercise/day	Alcohol consumption	Units fruit & vegetable/ day	Processed food consumption
2	no	103.1	32.2	112	108	no	yes	15 units/week	5	low
3	no	114.8	36.6	134	130	no	yes	no	5	low
9	no	120.3	45.8	118	133	ex<1yr	no	very little	5	moderate
11	no	85.2	30.2	139	100	no	yes	8 units/week	7	low
16	no	85.1	26.3	134	101	no	yes	6 units/week	5	low

4.6.3 Modifying diet

All of the participants who chose this focus behaviour were non-diabetics. All participants had a BMI less than or equal to 27. Initially, all reported consuming moderate or low amounts of processed foods and two of the three participants consumed the recommended daily intake of fresh fruit and vegetables. The data shows two did not drink alcohol at all and one drank occasionally prior to commencing the study. One participant began consuming alcohol daily over the study period.

Table 10. Initial risk profile for focus group 'modifying diet'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 mins physical activity/day	Alcohol consumed	Units fruit & vegetables/day	Processed food consumption
10	0	90.4	27.0	124	95.5	no	yes	no	5	moderate
14	0	68.6	23.9	138	88	no	yes	occasional	4	moderate
17	0	77.1	25.5	164	99	no	yes	no	5	low

Table 11. Final risk factor profile for focus group 'modifying diet'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 mins physical activity/day	Alcohol consumed	Units fruit & vegetables/day	Processed food consumption
10	0	85.7	25.6	118	92	no	yes	no	5	moderate
14	0	71.9	25.0	184	92	no	yes	7 units/week	4	moderate
17	0	79.3	26.2	146	102.5	no	yes	no	5	low

4.6.4 Reducing stress and anxiety

Participants who chose to reduce their stress and anxiety levels initially had low to moderate scores across the three domains (emotional, physical and social) in their quality of life results. Two of the three participants had no other documented risk factors that increased their risk of a myocardial infarction for CAD (Table 12). After the intervention all participants had increased their quality of life, however one participant had increased their BMI and waist circumference (Table 13).

Table 12. Initial risk factor profile for focus group 'reducing stress and anxiety'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist (cm)	Smoker	30 mins physical activity/day	Alcohol consumed	Units fruit & vegetables consumed per day	Processed food consumption
4	yes	98.7	36.3	172	123.5	no	yes	occasional	6	low
12	no	84.3	27.5	134	91	no	yes	no	6	moderate
13	no	74.9	24.5	100	88.5	no	yes	7 units/week	5	moderate

Table 13. Final risk factor profile for focus group 'reducing stress and anxiety' Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist (cm)	Smoker	30 mins physical activity/day	Alcohol consumed	Units fruit & vegetables consumed per day	Processed food consumption
4	yes	101.9	37.4	126	127.5	no	yes	occasional	6	low
12	no	84.2	27.5	118	91	no	yes	no	6	moderate
13	no	72.7	23.7	102	84.5	no	yes	7 units/week	5	moderate

4.6.5 Becoming smoke-free

One participant smoked cigarettes, and chose to focus on smoking cessation (Table 14).

Table 14. Initial risk factor profile for focus group becoming 'smoke-free'. Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 mins physical activity/day	Alcohol consumed	Units fruit & vegetables consumed/day	Processed food consumption
8	no	102.9	34.0	116.0	105	yes	yes	no	2	low

Table 15. Final risk factor profile for focus group 'becoming smoke-free' Abbreviations Wt. (weight), Kg (kilograms), SBP (systolic blood pressure), mmHg (millimetres of mercury), cm (centre meters), mins (minutes).

Participant	Diabetic	Wt (kg)	BMI	SBP (mmHg)	Waist(cm)	Smoker	30 mins physical activity/day	Alcohol consumed	Units fruit & vegetables consumed/day	Processed food consumption
8	no	102.8	34.0	126.0	105	yes	yes	no	4	low

4.7 Risk Factor Scores for Behaviour Focus Groups

4.7.1 Physical activity

Figure 8 shows the initial and final risk scores for this focus group. Three of the five participants had high risk factor scores initially, with three participants not exercising for a minimum of 30 minutes per day. At the end of the study period four of the five participants had a reduction in their risk factor scores and all participants were physically active for 30 minutes per day. The average risk score difference was -1.

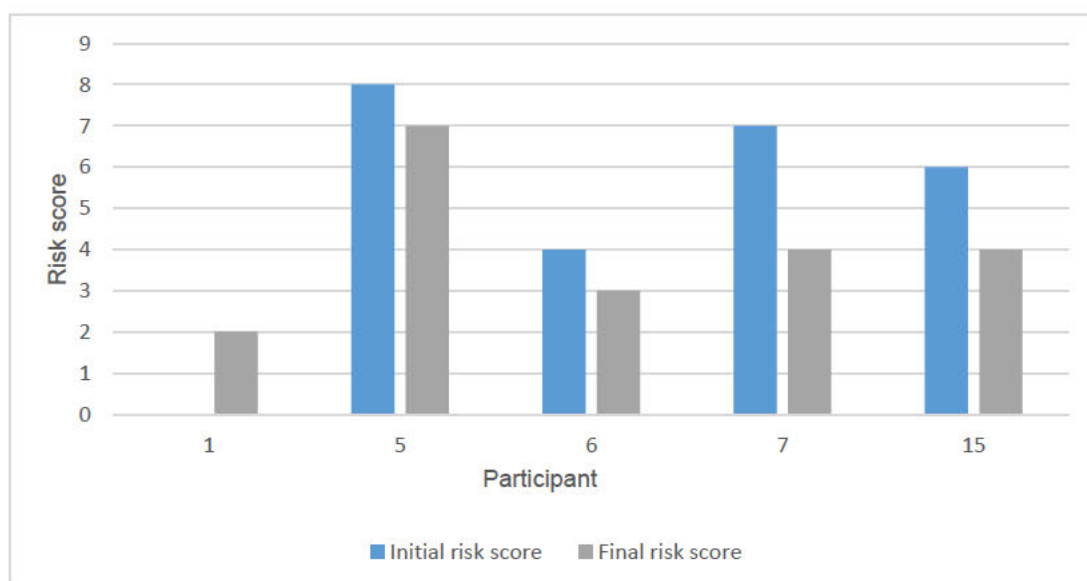


Fig 8. Initial and final risk scores for focus group increasing physical activity.

4.7.2 Reducing weight

All participants in this group had a moderate risk factor score. The majority of participants in this focus group reduced their risk factor score at the end of the study. Three out of five participants lost weight over the study period, but two had increased their weight (Figure 9). Overall there was an average decrease in risk factor score change of -0.6 for this group.

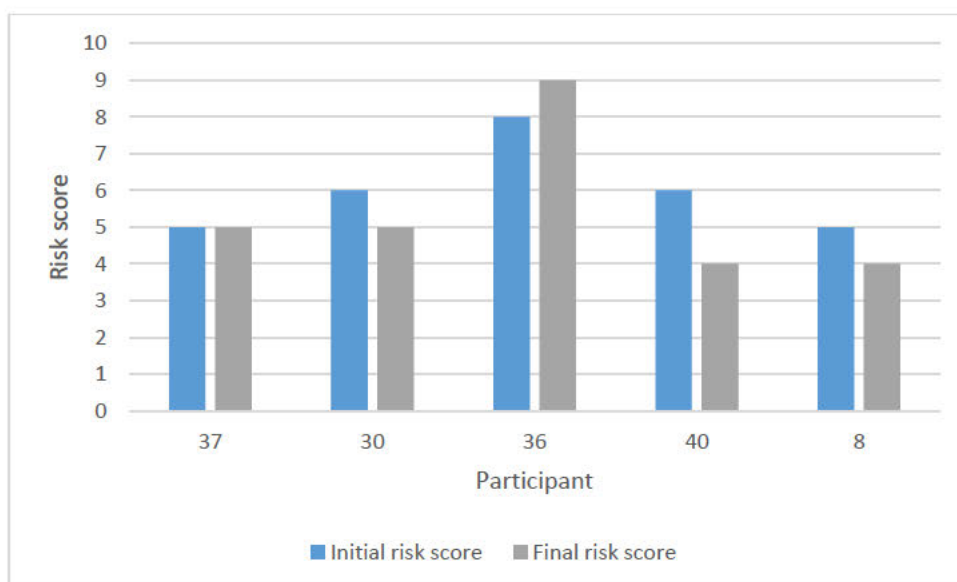


Fig 9. Initial and final risk factor scores for focus group 'reducing weight'.

4.7.3 Modifying diet.

Two of the three participants in this group had an initial risk score of four. One participant reduced their score by two, another increased by two and one was unchanged

4.7.4 Reducing stress and anxiety

Two of the three participants for this group had low initial risk scores (Figure 10). Final scores show only one participant reduced their score.

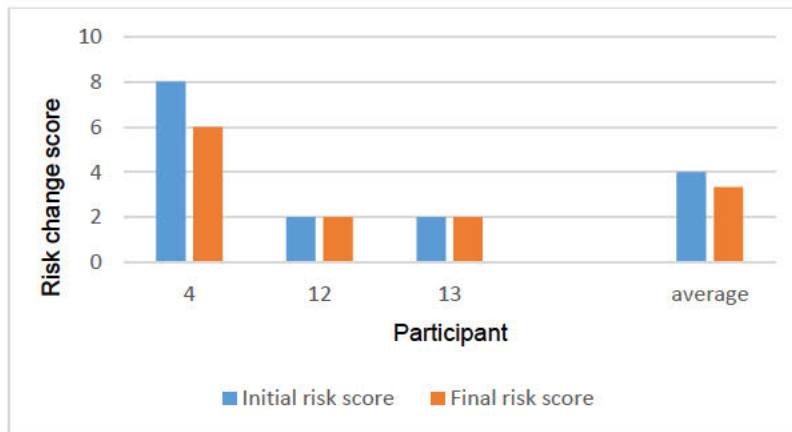


Fig 10. Initial and final risk scores for focus group reducing stress and anxiety

4.7.5 Becoming smoke free

One participant reported being a current smoker from the Intervention group. The initial and final risk factor score remained the same. This participant did reduce their cigarette smoking rate from twenty cigarettes per day initially, to three cigarettes per day at the conclusion of the study. This participant was categorised as being at moderate risk for a future myocardial infarction and this remained unchanged on conclusion of the study.

4.8 Quality of Life

The quality of life tool used for this study was the Quality of Life after Myocardial Infarction II (QLMI II) questionnaire. (Valenti et al., 1996). The questionnaire was self-administered by participants on the initial and final home visits. The questionnaire included 27 questions with a Likert scale response. Specific questions in the questionnaire reflect three domains of quality of life (emotional, physical, social). Each domain was measured by calculating average scores of the total questions answered specific to each domain. The Likert scale was numbered one to seven for questions one to 26. Number one on the Likert scale indicated that a participant's quality of life was limited and a seven indicated a participant's quality of life was not limited. For the purpose of question 28 on sexual activity, participants had the option to choose not applicable. (See Appendix 5).

4.8.1 Initial and final quality of life scores

Figure 11 shows the initial quality of life scores across the three domains for the Intervention group. Quality of life scores averaged 5.3 for the emotional and physical domains and 5.4 for the social.

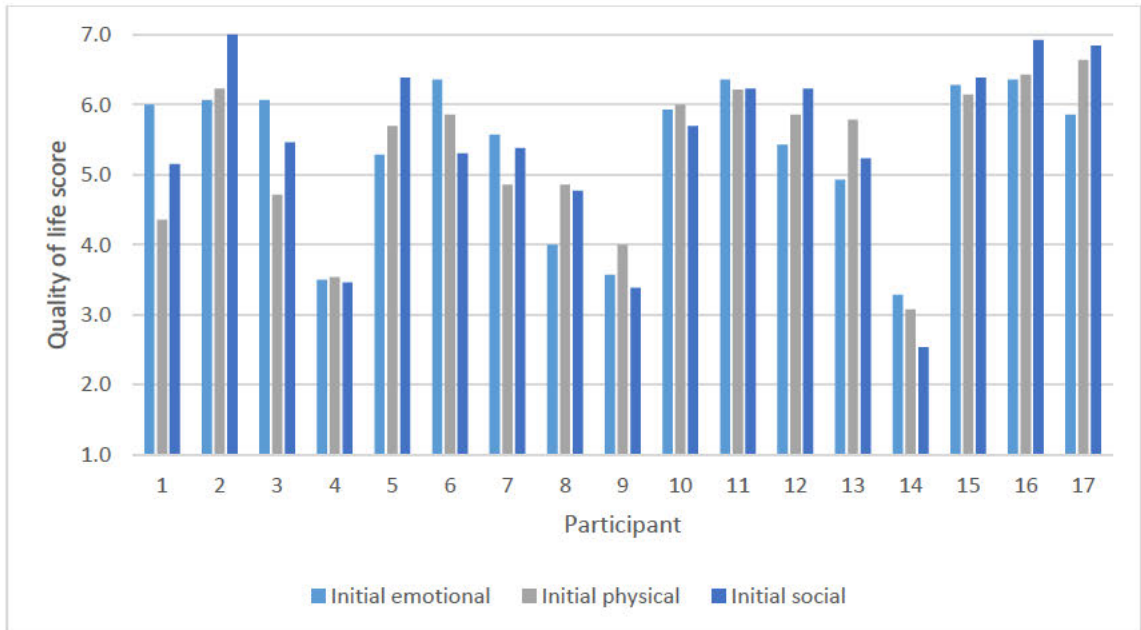


Fig 11. Initial quality of life scores for the Intervention group participants

The final quality of life scores increased across all three domains for the Intervention group emotional (6.0); physical (5.4); and social (6.2), reflecting fewer limitations on their quality of life. (Figure 12).

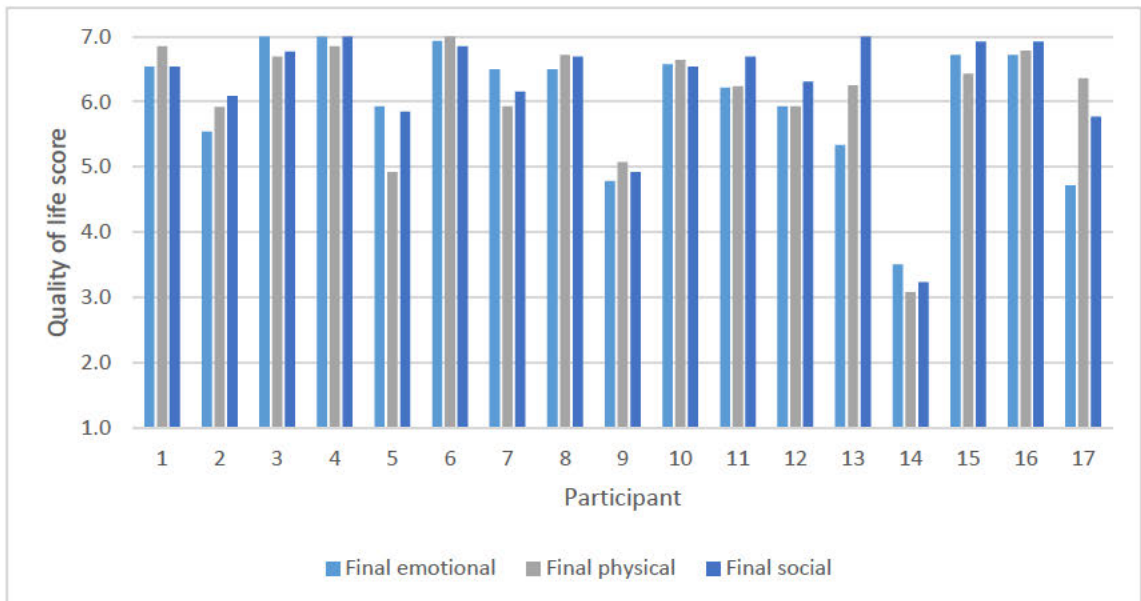


Fig 12. Final quality of life scores for the Intervention group participants.

The Usual Treatment group average quality of life scores at the beginning of the study across the three domains were emotional (5.2); physical (6.1); and social (5.6) (Figure 13).

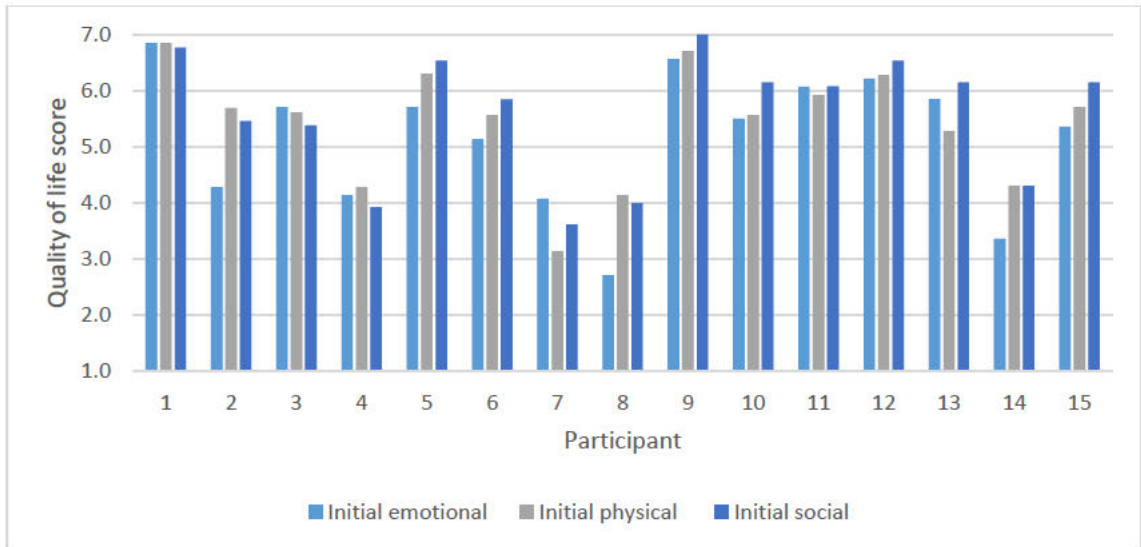


Fig 13. Initial quality of life scores for the Usual Treatment group participants

The Usual Treatment group had a small average increase in quality of life for their, emotional (5.5), and social (5.9) domains, but had an average decrease of their physical (5.6) domain, representing an increased limitation (Figure 14).

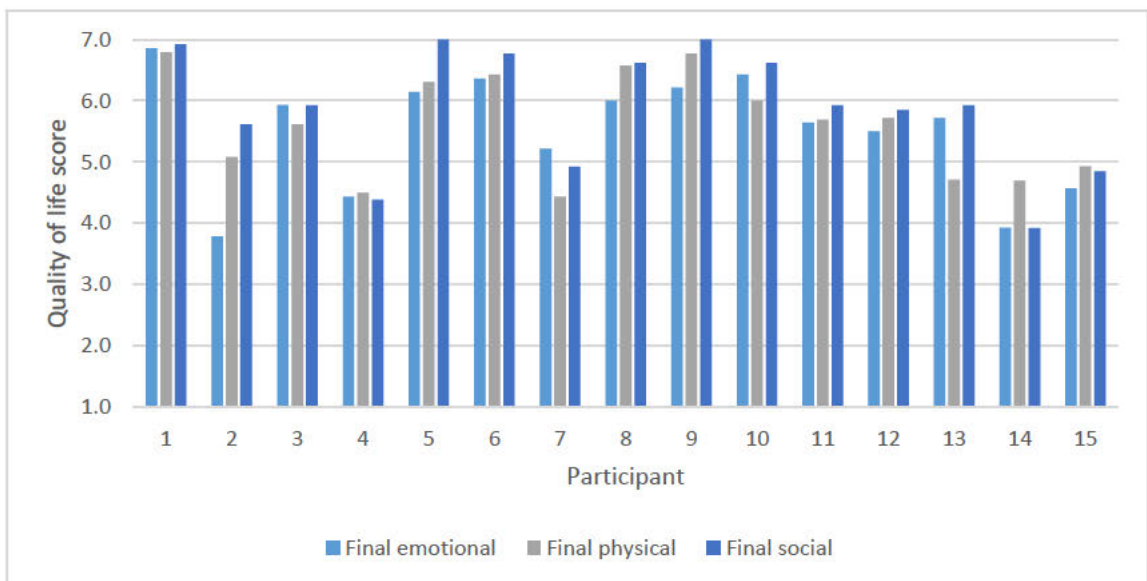


Fig 14. Final quality of life scores for the Usual Treatment group participants.

4.9 Quality of Life Change Difference Scores

Data comparing quality of life change scores for each domain are presented below for both groups. A positive change score represents an improvement in quality of life while a negative change score represents a decrease in quality of life for that particular domain.

4.9.1 Emotional domain

Both groups had an improvement in their average quality of life emotional scores. The Intervention group had a higher average change score (0.7) compared with the Usual Treatment group (0.3) (Figure 15).

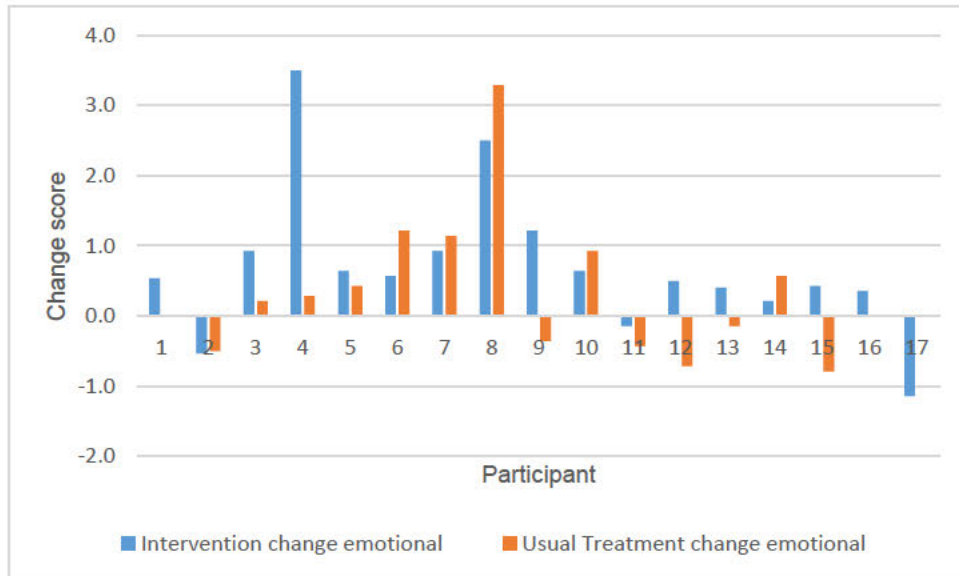


Fig 15. Change difference score emotional domain Intervention and Usual Treatment group.

4.9.2 Physical domain

Both groups had an improvement in their average quality of life physical scores. The Intervention group had a higher average change score for this domain (0.8), compared with the Usual Treatment group (0.19) (Figure 16).

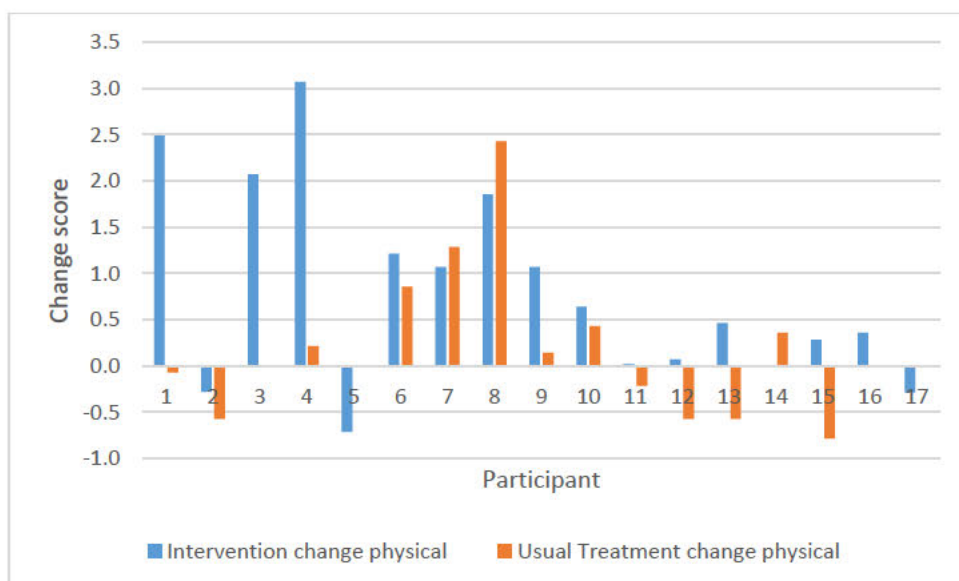


Fig 16. Change difference score physical domain Intervention and Usual Treatment group

4.9.3 Social domain

Both groups had an improvement in their average quality of life social scores. The Intervention group had a higher average change score (0.8), compared with the Usual Treatment group (0.3) (Figure 17).

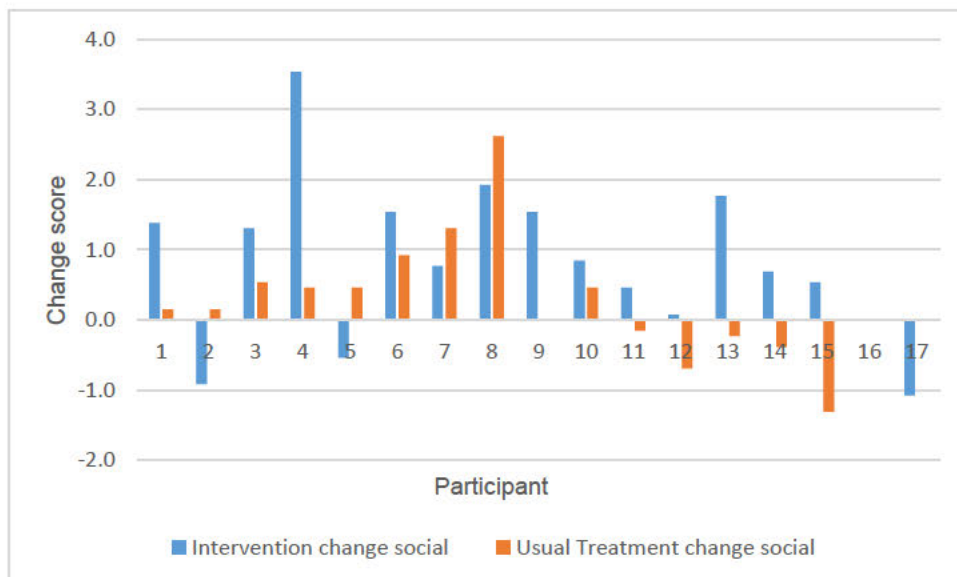


Fig 17. Change difference score social domain Intervention and Usual Treatment group.

4.10 Focus Group Quality of Life Scores

The quality of life change difference scores for the individual focus behaviour groups are shown in Table 16. Four of the five focus groups had a positive score difference for their emotional quality of life. The greatest improvement was made by the focus groups 'becoming smoke-free' and 'reducing stress and anxiety' with a positive change difference score of 2.5 and 1.5. In comparison 'modifying diet' had a negative change score of -0.1 representing a decrease in quality of life. All groups made an improvement in their physical quality of life. Change difference scores ranged from 0.1 for 'modifying diet' to 1.9 for 'becoming smoke-free'. All focus groups made an improvement in their social quality of life score. The smallest improvement was made by 'modifying diet' (0.2) compared to the greatest improvement made by 'becoming smoke-free' (1.9). Overall the focus group 'modifying diet' made the smallest improvements in their overall quality of life compared to all other groups. The group 'becoming smoke-free' made the greatest improvement in all three domains. Of note are the size of the groups. The group 'becoming smoke-free' only had one participant, 'modifying diet' and reducing anxiety' had three each, 'increasing physical activity' and reducing weight had five participants each.

Table 16. Quality of life change difference scores for individual focus behaviour groups.

Focus Group	Emotional	Physical	Social
Increasing physical activity	0.6	0.8	0.9
Reducing weight	0.4	0.6	0.5
Modifying diet	-0.1	0.1	0.2
Becoming smoke-free	2.5	1.9	1.9
Reducing anxiety and stress	1.5	1.3	1.8

4.11 Differences between the Intervention and Usual Treatment Groups

There was no statistically significant difference between the Intervention and Usual Treatment groups for the initial and final data for risk factor scores, BMI, waist circumference, systolic blood pressure and units for daily fruit and vegetable unit consumption, although the difference for the quality of life physical domain approached significance (Intervention group mean 0.79 vs Usual Treatment group 0.19; $p=0.09$).

4.12 Lifestyle Behaviour Change Maintenance.

Participants from the Intervention group were asked to respond to three open ended questions on the quality of life questionnaire, with a focus on the sustainability of their lifestyle behaviour change.

Question one. Why did you choose that risk factor?

Increasing physical activity

The majority of participants in this focus group felt that exercise was an important lifestyle behaviour to support their heart health following their myocardial infarction

Reducing weight

Three of the five participants in this group identified being overweight as a detrimental factor to their health. One participant had always wanted to lose weight, but their love of food had been a barrier to this.

Modifying diet

All of the participants identified unhealthy diets as contributing to poor health. One participant believed that it was the easiest focus change to deal with and had learnt to read food labels.

Becoming smoke-free

The sole participant in this focus group directly attributed cigarette smoking to their heart condition and recognised it as a factor in reducing the chance of having another heart attack.

Reducing stress and anxiety

There were various reasons for choosing this lifestyle behaviour. Two of the three participants had no other significant risk factors; one stated they had the least control over their stress and one felt improving stress and anxiety would benefit their physical and mental health. The third participant had been living with depression for 25 years and felt this was the leading cause of their poor health.

Question two. How easy was it to make that risk factor change?

Increasing physical activity

The majority of participants stated that it was easy to make this lifestyle change. One participant viewed exercise as a priority for their health and that regular physical activity was an important way to prevent a further heart event.

Reducing weight

Four of the five participants found that losing weight was easy once they were committed to doing it. One participant reported having to really focus on not eating takeaways and putting in personal strategies such as taking their own meals with them when staying away from home. Reducing their plate size for portion control was also a strategy used to reduce consumption.

Modifying diet

All participants in this group stated that it was easy to modify their diet. One participant stated that after a while, previous poor food choices had started to come back into their daily eating routine.

Becoming smoke-free

This participant found it "very hard" to stop smoking, although they did reduce their daily rate from 20 cigarettes to three.

Reducing stress and anxiety

All participants stated that this was not an easy behaviour change to manage at first. One participant stated that once they learnt how to manage their stress, it became routine and a healthy part of their life. Another participant stated that some situations made it more difficult to manage their stress.

Question three. Did you have any issues on maintaining the lifestyle change you chose, and what did you do to manage these issues?

Increasing physical activity

All participants stated that they had no issues in maintaining daily levels of physical activity.

Reducing weight

All participants in this group persevered with their behaviour change. Only one participant reported having issues that impacted on them losing weight. This included a physical injury, which was a barrier to physical activity and subsequent weight gain at the conclusion of the study, which caused frustration for them. They concentrated on reducing their alcohol intake and making healthy food choices to counterbalance their physical inactivity.

Modifying diet

The majority of participants did not report any issues in managing this lifestyle change. One participant did report that once they had started back at work and looking after their children, it was more difficult to focus on making healthy food choices.

Becoming smoke-free

Although there was regular temptation to smoke cigarettes, this participant felt that “subliminal messages” from the follow up telephone calls by the researcher and the use of nicotine replacement therapy helped decrease the number of cigarettes smoked each day.

Reducing stress and anxiety

Two of the three participants felt that there were no issues in maintaining this change, with one participant stating that managing their stress was a strong focus for them, which they did by keeping busy with their daily routine. One participant did state that it was difficult to find the time to relax during their busy day.

4.13 Comparison between focus groups

The majority of participants in each focus group identified their chosen lifestyle behaviour change as an important factor for improving their health. Of the five focus groups, the results show that the majority of participants who chose increasing physical activity, reducing weight and modifying diet as their focus, found their lifestyle behaviour change manageable. Those participants who chose reducing stress and anxiety and becoming smoke free found behaviour change the most difficult. The majority of participants in all focus groups did not have any issues with maintaining their lifestyle change. There were no barriers to making and sustaining the behaviour change for participants who focused on increasing physical activity. Participants in all focus groups that reported issues with maintaining their behaviour change, identified or had instigated strategies to reduce barriers to sustain their lifestyle change.

4.14 Treatment Fidelity

A checklist was used to enhance the validity and reliability of the intervention (Resnick et al., 2005). Actions were tracked using a checklist for the Intervention group, which ensured the process of administering the intervention was identical for each participant.

Table 17. Treatment fidelity checklist for the Intervention group.

Action	Participant 1-17
Initial telephone call to participant on receiving invitation to participate	yes
Clarify study and gain consent during home visit	yes
Ask participant to choose a self-determined behaviour change	yes
Provide participant with daily behaviour log and explain how to use. Provide heart foundation booklets 'A guide to recovery after a heart attack' & 'Taking control my plan for heart health'	yes
Discuss follow up telephone contact by researcher after one week, then every two weeks thereafter	yes
Ask participant to complete initial QOL questionnaire and mail back to researcher in self-addressed envelope	yes
Complete initial risk factor profile	yes
Allow for participant questions	yes
Revisit participant after twelve weeks	yes
Ask participant to complete final QOL questionnaire and mail back to researcher in self-addressed envelope	yes
Complete final risk factor profile	yes
Allow for participant questions	yes

4.15 Summary

This chapter has presented the results of the research. The results show that although both groups had more males than females, there were differences between groups for gender composition. The Intervention group had a greater percentage of males versus

females compared to the Usual Treatment group. Both groups reduced their average risk factor profile scores following the study period. Movement from higher to lower risk categories was seen by participants in both groups. Quality of life scores improved for both groups over the study, however the Intervention group had showed a greater improvement in all three domains of their quality of life. Qualitative responses from the focus behaviour groups have shown that in general they were able to maintain their lifestyle behaviour change over the twelve-week period. Treatment fidelity ensured that all participants in the Intervention group received the same treatment. It is important to note that the number of participants in the focus groups were small and generalised conclusions of the findings cannot be made.

Chapter Five - Discussion

5.0 Sample Demographics

The average age of participants in the Intervention and Usual Treatment groups were similar which appears to be comparable with New Zealand figures for CAD from Elliott and Richards (2005). They suggest that the over 65 years' age group does not represent the majority of individuals presenting with a myocardial infarction to New Zealand hospitals. The authors comment on the annual increase in myocardial infarctions across the age spectrum, with the greatest percentage increase seen in people aged between 24 to 34 years. Participants in this study were predominantly male with a greater number of males than females in the Intervention group than the Usual Treatment group (60% vs 40%). In New Zealand, more men than females are diagnosed with CAD (Ministry of Health, 2014a). Although there were only eight females in the study sample, Elliott and Richards (2005) suggest that in New Zealand the incidence of myocardial infarction may be increasing at a faster rate in women than men. It is recognised that post-menopausal women and women who have had preeclampsia during pregnancy are at an increased risk of developing CAD (Tan, Gast, & van der Schouw, 2010). Non-gender specific risk factors including smoking, hypertriglyceridaemia and low high-density lipoprotein levels have a greater impact on women than men in the risk of developing CAD (Tan et al., 2010).

There were differences in ethnicity and gender of the study cohort, however due to the small sample size, the researcher was unable to balance the groups. This small sample size was not truly representative of the region's ethnic diversity. It did not include participants who identified as Pacifica, for whom CAD is a leading premature cause of death along with Māori in the study region (McElnay, 2014).

5.1 Risk Factor Profiles

The initial risk factor profiles showed that the majority of participants in both groups had a BMI greater than 25 and larger waist circumference than the thresholds used in this study to categorise risk (male less than 100cm and female less than 90cm).

Internationally, there is no standardized protocol on waist circumference threshold and risk for developing CAD, however previous studies have suggested that there is increased risk if waist circumference for a male is greater than 102cm and female greater than 88cm (Balkau et al., 2007). Balkau et al. (2007) have noted the increased prevalence of global obesity rates and waist circumference, with an associated increased risk of CAD for the populace. The authors recommended including waist circumference with BMI to assess CAD risk, as obesity and more importantly

abdominal fat increase an individual's risk for developing CAD. However, the importance of this risk factor remains unrecognised in risk assessments. This is evident in the current guidelines for five year cardiovascular risk assessment in New Zealand (Ministry of Health, 2013a), which does not include waist circumference or BMI for risk factor profile assessment. For the majority of participants in this study, an increased BMI and waist circumference appeared to be the most important risk factors for having a myocardial infarction.

The initial risk factor profiles of all participants showed that the majority in both groups met the recommended levels of physical activity, fruit and vegetable intake, alcohol consumption and processed food consumption. The majority of participants were smoke free. The smoking rate in New Zealand is decreasing and the rate of obesity increasing. Obesity is predicted to surpass smoking as the most important risk factor in the development of CAD by 2016 (Ministry of Health, 2014a). The majority of participants had an increased BMI and waist circumference, confirming the suggested trend by the Ministry of Health (2014a).

5.2 Risk Factor Profile Scores and Risk Categories

The average risk scores for both groups decreased over the study period which reflected a change in their lifestyle behaviours. The Intervention group had a slightly larger risk reduction compared to the Usual Treatment group, with participants in both groups moving from high risk categories to lower risk categories.

A limitation of this study was that the sample size was small and the intervention duration was only twelve-weeks. However, a comparison could be made with the results of a longitudinal study by Newsom et al. (2012), looking at health behaviour change relative to cigarette smoking rates, alcohol use and physical activity levels. They concluded that the majority of participants did not change their health behaviours. However, the study found that 40% of people with CAD stopped smoking, with the greatest reduction in daily smoking rates seen in this group. The findings showed that the minority of people changed their smoking behaviour to better their health, however the majority (60%) did not change and sustainability of the behaviour change was poor. In the current study, the sole individual in the Intervention group did significantly reduce their daily smoking rate from 20 per day to three cigarettes, but did not quit.

Twardellaa et al. (2006) also found that individuals diagnosed with a myocardial infarction had higher rates of smoking cessation. The authors suggested that this may have resulted from increased self-awareness of mortality and the emotional impact

from experiencing a myocardial infarction, compared to other chronic disease without an immediate threat to life.

The current study results show the majority of participants in both groups did not reduce their alcohol consumption, which is comparable to the Newsom et al. (2012) study, although one participant in the Intervention group started consuming alcohol on a daily basis. The level of alcohol consumption for the cohort completing this study may arise from conflicting messages on the cardio-protective benefits of alcohol through publicity as well as public perception (Sellman et al., 2009).

Conversely, in the current study, the majority of participants in both groups increased their physical activity levels while those in the study with Newsom et al. (2012) did not. For the Intervention group, this could be a reflection on the regular contact that they received and support provided over the twelve weeks.

5.3 Focus Groups

No participants chose to reduce their alcohol intake as a focus behaviour change, which is a known risk factor for CAD (Salim et al., 2004). This study has found that the participants who chose to focus on increasing their physical activity were all successful in achieving their behaviour change. Four of the five participants reduced their risk factor profile scores and had the greatest average risk score change. In comparison, the focus groups 'reducing stress and anxiety' and 'reducing weight' made the second greatest change in risk with 'modifying diet' and 'becoming smoke-free' making no change. However, the participant who chose to become smoke free had significantly reduced their daily cigarette rate and the short duration of the study may have had a limiting effect on the results. Among current smokers the majority want to quit, however, cigarette smoking is highly addictive and often requires smoking cessation measures including counselling and medication, which can double the likelihood of becoming smoke-free (World Health Organisation, 2015c). This participant was using nicotine replacement therapy (NRT) over the course of the study.

The results suggest that an individual focusing solely on increasing their daily level of physical activity has the greatest effect on reducing risk factor scores and risk category in comparison with other lifestyle behaviours. Interestingly the Conn et al. (2002) meta-analysis concluded that the inclusion of self-monitoring and regular contact with individuals by HP's are important interventions to support the increase of physical activity levels. The authors also suggested that when a behaviour change was recommended, general health information may be a barrier to making a change. They stated that focusing on an individual behaviour change and providing information

specific to that behaviour, could have a greater impact on risk factor modification compared to providing health information on multiple lifestyle behaviour changes, which could overwhelm them. This could be a reflection on why the focus group 'increasing physical activity' had the greatest reduction in their risk scores as they focused on doing physical activity. In comparison, the group 'modifying diet', were required to analyse and modify the type of foods they were consuming as well as reading food labels. The focus group 'reducing weight', involved monitoring their diet and doing physical activity. These behaviours may have been more complex to change. Furthermore, there appears to be a relationship between regular telephone call follow up and physical activity levels in this study. This is supported by Hanssen et al. (2009) who found that patients increased their daily physical activity levels with regular telephone contact by a nurse, compared to usual care.

5.4 Quality of Life

This study showed that quality of life results for the Intervention and Usual Treatment groups were similar, with an approaching statistical significance of improved physical quality of life for the Intervention group. Quality of life improved in each domain, except for the Usual Treatment group who had a reduction in their physical quality of life. The current study found that focusing on smoking cessation and managing stress and anxiety improved overall quality of life compared to other risk factor behaviour modifications. However, these focus groups had small participant numbers, which affect the generalisability of the findings. The literature suggests that smokers have a reduced quality of life compared with non-smokers following a myocardial infarction (Pepic et al., 2011), however, this improves for individuals who reduce and quit smoking (Shields, Garner, & Wilkins, 2013). Reduced quality of life has also been found in individuals who smoke greater than 15 cigarettes per day compared with those who smoke less, suggesting a dose related effect on quality of life outcomes (Guitérrez-Bedmar, Seguí-Gómez, Gómez-Gracia, Bes-Rastrollo, & Martínez-González, 2009).

Both 'becoming smoke-free' and 'reducing stress and anxiety' focus groups made the greatest improvement in their emotional quality of life. Other important risk factor improvements made for these groups were a reduction in blood pressure, waist circumference and BMI. Strik, Denollet, Lousberg, and Honig (2003) suggest emotional distress or anxiety is considered to have the same impact on an individual's risk as having depression and is an important predictor of future cardiac events and increased health care use, following a myocardial infarction. Strik et al. (2003)

recommended that assessment of anxiety be included when providing risk factor modification interventions.

In comparison, the focus group 'modifying diet' had a reduction in their emotional quality of life. The majority of the group increased their BMI, waist circumference and one participant started consuming alcohol daily. This is consistent with the Leifheit-Limson et al. (2012) longitudinal study on the role of emotional support and patients following a myocardial infarction, and adhering to risk factor modification recommendations. Their study found that participants who had low emotional support and quality of life did not adhere as closely to medical treatment or risk factor modification, compared with those who had a higher level. These findings support the results of the current study as the Intervention group had an average increase in their emotional quality of life. It appears that providing emotional support is an important strategy when supporting risk factor behaviour change. Improvement in quality of life for the Intervention group may be related to regular telephone follow-up calls they received from the researcher. There is support for this finding in the Hanssen et al. (2009) study, who concluded there was a positive improvement in quality of life for patients who received regular telephone follow-up support from a nurse following a myocardial infarction.

5.5 Statistical Analysis

An unpaired t-test was applied to variables to determine if there were statistically significant differences between the Intervention and Usual Treatment groups. Variables included initial and final risk factor scores, BMI, systolic blood pressure, waist circumference, units of daily fruit and vegetable consumption and quality of life domain averages. This research showed that there was no statistical significance between the Intervention and Usual Treatment groups as a result of a self-directed lifestyle behaviour change. However, the physical domain of quality of life for the Intervention group approached significance. These results may be a reflection of the small sample size used in this research.

5.6 Maintenance of Behaviour Change

This study reports on the maintenance of behaviour change, which is limited in the international literature and is recommended as an important focus on interventional studies on behaviour change (Fjeldsoe et al., 2011). The current study showed the majority of people found it easy to make a lifestyle behaviour change, although the participants who chose to stop smoking and reduce their stress and anxiety, found it less manageable. However, although the focus group 'modifying diet' all reported the

change to be manageable, the majority increased their BMI and waist circumference indicating that this behaviour change could be more complex. Hill (2009) comments on the limited long term success in treating growing obesity rates through dramatic lifestyle changes as this requires significant dietary changes and increases in physical activity to keep the weight off. They suggest an alternative focus being providing interventions that prevent weight gain, not weight loss. They recommend focusing on small changes that include self-conscious small reductions in energy intake and increasing physical activity to stabilize an individual's weight, with a gradual reduction in weight over time.

There were no significant issues reported by the Intervention group on sustaining their behaviour change and those that did, developed strategies to manage them. An example of this was one participant who focused on reducing their weight took a home cooked meal with them when visiting relatives, instead of buying takeaways. Fjeldsoe et al. (2011) comment on the increased likelihood of a behaviour change occurring if the intervention period is 24 weeks. They also suggest that there is limited literature on the reporting of behaviour change maintenance. This study's duration was twelve-weeks, which may be a limitation. The regular telephone contact by the researcher may have had an impact on the participants maintaining their behaviour change. The literature supports the inclusion of regular follow-up contact by HP's following a myocardial infarction (Cobb et al., 2006; Fjeldsoe et al., 2011). The ability to choose a behaviour to change and encouragement to self-monitor were key components in monitoring the behaviour change for the participants. There is limited literature on specific interventions that focus on lifestyle behaviour change and further research in this area is required.

5.7 Hawthorne Effect

The results of this study may have been affected by the Hawthorne effect. The Hawthorne effect occurs when there is no blinding in a study, and participants may be aware that they are being observed, so may change their behaviour (Walker, 2005). Participants in this study knew that they were being observed by the researcher and some participants did mention to the researcher that they did not want to let the researcher down, which may have motivated them to change their behaviour and therefore impacted on the results.

Of note, is that both groups received educational material in hospital on CAD, as part of their usual care. It is possible that the information that they received in hospital had already established thinking around behaviour change and therefore placed further

emphasis on the information provided at the commencement of the study, which may have had an impact on the findings.

5.8 Empowerment

A theme that emerged from the literature review is that patients may become disempowered following a myocardial infarction (Anderson & Funnell, 2005; Lawn et al., 2014; Pulvirenti et al., 2011). HP's may believe that they know what is best for the individual and become frustrated when patients do not follow their recommendations (Anderson & Funnell, 2005). The intervention for this study was designed to empower participants to make a lifestyle behaviour change by allowing them to make a self-determined choice and self-monitor their new behaviour through the use of a daily log, with reference to the information provided to them on CAD. It appears that the intervention has had a positive effect on people making a lifestyle behaviour change and improving their risk factor profile. The short duration of this study may reflect the small differences found in the findings, between the two groups. Further research with a longer duration is recommended to examine this intervention.

5.9 Treatment Fidelity

A treatment fidelity plan was used in this study as a process to ensure that all participants in the Intervention group received the intervention as designed. A checklist included information specific to the intervention provided at the beginning and on conclusion of the study. Dates of telephone call contacts were entered onto the individual participant's telephone log, with future telephone call reminders entered into the researchers' diary. Actions of the intervention for all participants were tracked, which monitored and enhanced the validity and reliability of the intervention. It is recommended that treatment fidelity is used in behavioural intervention studies to monitor and enhance validity and reliability of the intervention and that a treatment fidelity plan be developed to ensure the intervention is carried out over the study period (Bellg et al., 2004)

5.10 Implications for Nursing

The Nursing Council of New Zealand is responsible for setting the standards for nursing practice (Nursing Council of New Zealand, n.d.). These include the scope of practice and competencies for Registered nurses, which is required by the Health Practitioners Competency Assurance Act 2003, to ensure public safety is upheld (New Zealand Government, 2003). Included in these competencies is the requirement to provide appropriate health education to consumers, which is relevant to their health needs and in a manner which they are able to understand (Nursing Council of New

Zealand, 2012). It is a requirement that nurses provide culturally safe practice to patients and their families/whanau in a manner which honours the principles of the Treaty of Waitangi in providing care for Māori, as well as for people of all ethnicities (Nursing Council of New Zealand, 2012). Cultural safety is defined by the Nursing Council of New Zealand (2011) as

The effective nursing practice of a person or family from another culture, and is determined by that person or family. Culture includes, but is not restricted to, age or generation; gender; sexual orientation; occupation and socioeconomic status; ethnic origin or migrant experience; religious or spiritual belief; and disability (p.7).

The aims of practicing in a culturally safe manner enables nurses to develop an understanding of the theory of the balance of power within interpersonal relationships with patients and their families/whanau and its association with poor health outcomes (Nursing Council of New Zealand, 2011). The Nursing Council of New Zealand (2011) also suggest that not empowering individuals/families/whanau as well as the beliefs, policies and practices of health services may act as a barrier to individuals accessing health care and following recommended treatments. This is important when planning and implementing care to address inequities of health particularly for Māori health consumers, as they are over represented in poor health statistics locally, compared with non-Māori (McElnay, 2014).

Nurses are in a position to support people to change their health behaviours following a myocardial infarction. This study has emphasised the importance of empowering individuals to make self-determined choices on managing their health. Individuals and their families/whanau need to be included in decisions on their health and supported to practice self-management. Nurses should reflect on their own beliefs and values when they engage with patients and provide recommendations which support education as well as health promotion. Nurses need to integrate into their practice education as well as health promotion including an individual's cultural perspective or understanding of their health when providing nursing care to people with CAD. It is important that nurses and other HP's integrate into their clinical reasoning skills why an individual has developed poor health and not solely focus on the presenting illness and giving advice on how to remediate it. Nurses need to be able to support and inspire people to manage their health and make positive changes.

Chapter Six - Summary and Conclusions

6.0 Introduction

This chapter will summarise the research and findings. Recommendations for nursing practice and further research will be made.

6.1 Aims of the Research

The aim of this research was to measure the effect of a twelve-week voluntary behaviour change on a person's health following a myocardial infarction. An experimental quantitative research design was used to measure the effect on an individual's risk factor profile, their quality of life and the maintenance of their behaviour change. The sample for this study included 32 participants. The demographics of the sample showed the majority were male, New Zealand European and the average age was greater than 60 years. Each participant had an initial and final risk factor profile assessment and their quality of life was measured using a valid and reliable quality of life questionnaire. Behaviour change maintenance was assessed from participants answering three open ended question at the end of the questionnaire.

6.2 Summary of the Research

This is a New Zealand study aimed at people who have had a myocardial infarction, with a specific focus on empowering people to self-manage their health. Research has shown that people who are empowered to make a self-determined lifestyle behaviour change improve their risk factor profiles with a reduction in their risk. The findings also show that quality of life improves with a self-determined lifestyle change. Supporting a self-determined behaviour change appears to have a positive impact on the sustainability of the behaviour.

The findings from this study suggest that empowering people to make a self-determined lifestyle change had a slightly greater impact on improving an individual's risk factor profile and reduced risk for a future myocardial infarction. People who focused on increasing their level of physical activity had a greater reduction in their risk factor profile and risk category. This may have been due to the individual's choosing a less complicated behaviour change as other lifestyle habits such as smoking or modifying diet may be a more complex and difficult process for individual's to undertake. This study concluded that the majority of people following a myocardial

infarction can make a lifestyle change, compared with the international literature which suggested that the majority of people do not (Newsom et al., 2012).

Increased BMI and waist circumference appeared to be the most important risk factors for people developing CAD and having a myocardial infarction in this study. This was an important finding as the New Zealand literature suggests that obesity will surpass cigarette smoking as the leading cause of chronic disease including CAD by 2016.

This study concluded that the majority of participants who consumed alcohol daily did not reduce their intake. No participants chose reducing their alcohol intake as a focused behaviour change. The harmful use of alcohol including binge drinking and regular alcohol consumption can increase an individual's risk of CAD (Salim et al., 2004; Sellman et al., 2009). Public perceptions on the cardio protective benefits may have been a contributing factor for participants not viewing alcohol as an important risk factor (Sellman et al., 2009).

The findings from this study showed a slightly greater improvement in quality of life for the Intervention group and suggest that people who focus on modifying their diet have a reduction in their quality of life. Anxiety has been highlighted as an important predictor of future cardiac events and should be integrated into the clinical assessment when reviewing people following a myocardial infarction. Including emotional support when recommending risk factor modification interventions should be considered (Leifheit-Limson et al., 2012; Strik et al., 2003). The current study results found that those participants who chose to modify their diet had lower emotional quality of life than other focus groups. These finds would suggest that emotional support be provided by HP's to support a dietary behaviour change for people who identify their eating habits as impacting on their health. However, it is important to note that generalised conclusions cannot be drawn from the findings as the participant numbers in the focus groups were small.

The literature review has shown there is limited research on behaviour change maintenance. Behaviour change maintenance for the majority of people in this study was found to be manageable, with no significant issues reported by the participants. It would appear from this study that empowering people to self-manage their health, the inclusion of regular telephone follow up contact, and promoting self-monitoring are important interventions when addressing risk factor modification.

Finally, understanding an individual's perspective on their current health should be included in the nursing assessment. This will support interventions implemented by the

nurse in conjunction with the individual and their family/whanau to enable a better understanding of their condition and foster improved health outcomes.

6.3 Recommendations for Practice

This study has highlighted the need for key interventions by HP's when addressing risk factor modification for people following a myocardial infarction. Engaging with people on their health and asking them what is important to them will help establish a power balance within the HP/patient relationship. Empowering people to make a self-determined lifestyle change and to practice self-management are important steps in supporting them to reduce the progression of CAD and prevent a further myocardial infarction. It is recommended that HP's include waist circumference and BMI when assessing an individual's risk factors for CAD.

Promoting self-monitoring of a behaviour change is recommended as part of a person's self-management plan which will support their motivation to maintain their new behaviour. Health provider organisations need to include the promotion of self-care management as an effective strategy to support people with CAD. This could be achieved through the development of practice policies for self-care management as well as providing resources and specific training for HP's on self-care management and CAD. This study has highlighted the need for HP's to include regular follow-up of their patients as part of their management plan. This could be done over the telephone, at the individuals' home or in the clinical environment; however, it is important that this is mutually discussed with the patient/family.

The literature states that anxiety is common for people who experience a myocardial infarction and can have a negative impact on their health outcomes (Strik et al., 2003; Wenru & Devi, 2012). Implementing a standardised anxiety assessment tool as standard management following a myocardial infarction would enable early identification of anxiety and provide early treatment and support for the individual/family. The inclusion of emotional support with interventions is recommended if appropriate as this could support the improvement of quality of life and reduce the risk of future cardiac events.

Simply promoting physical activity as a lifestyle change could be an important starting point for those who are wanting to lose weight and are unsure on what behaviour changes they should make to support their health. It is also recommended HP's discuss alcohol as an important risk factor for CAD when engaging with patients and provide recommendations on consumption, if this is identified as increasing their risk of a future myocardial infarction.

6.4 Recommendations for Further Research

This study has identified gaps in the research which highlight recommendations for further research. It is recommended that further research on interventions to support lifestyle behaviour change specific to people who have had a myocardial infarction is undertaken as the majority of research has focused on interventions for other chronic conditions. Further research with a larger sample size and longer duration is recommended to look at the sustainability of a behaviour change including behaviour change maintenance reporting. This would provide a greater understanding of the effect of specific interventions, in relation to the intervention used. Further interventional studies on behaviour change should include the use of treatment fidelity as a way to strengthen the validity and reliability of the research.

6.5 Conclusion

Supporting a self-determined lifestyle behaviour change appears to improve risk factor profile, quality of life and reduce risk, compared to usual care, although the researcher was unable to demonstrate a statistically significant improvement in any variables for the Intervention group, which may have been impacted by the small sample size and study duration. The use of a treatment fidelity plan in this study provided assurance that the participants received the intervention equally, increasing the validity of the study. Finally, from this study it would appear that increasing physical activity as a lifestyle behaviour change is more manageable than other lifestyle choices.

This study had highlighted the importance of empowering people to self-manage their health and improve their risk factors following a myocardial infarction. Empowering people to make self-determined health choices is an important strategy in addressing this growing public health issue. This research not only highlights the need to support an individual's physical health within health care practice, but also places an emphasis on the importance of quality of life and its impact on health outcomes. The promotion of self-care management is one strategy that can be implemented by health providers to support this.

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Appendix 1 Research Ethics and Approvals Committee Eastern Institute of Technology



Reference Number 18/15

3 August 2015

Paul Scofield
Masterate Student
C/- School of Nursing
EIT

Dear Paul

I am pleased to inform you that your research project "*Behavioural change maintenance following a myocardial infarction*" was received and approved by the Research and Ethics Committee at their meeting held on 31 July 2015.

You are commended for preparing a clear and comprehensive proposal.

You are reminded that should the proposal change in any significant way, then you must inform the Committee. Please quote the above reference number on all correspondence to the Committee.

The Committee wishes you well for the project.

Yours sincerely

Jeanette Fifield
Secretary – Research Ethics & Approvals Committee

Appendix 2 Hawkes Bay District Health Board Locality approval

Health Services



HAWKE'S BAY
District Health Board

12 August 2015

Institutional Approval

Paul Scofield

Dear Paul

RE: Hawke's Bay District Health Board Research Application - Reference 15/07/208

Thank you for your application to conduct research within the Hawke's Bay District Health Board. The Research Office has had the opportunity to review your study and has given approval for your research project to be conducted within HBDHB.

This Institutional Approval is dependant 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 Ethical Committees (as required) and the Research Office up to date and have the appropriate approvals. HBDHB approval may be withdrawn for your study if you do not keep the Research Office informed of the following:

- Any amendment to study documentation
- Study completion, suspension or cancellation

Conclusion of your Research

At the conclusion of your research you will be required to provide a written report of your research findings to the HBDHB Research Office.

Please find enclosed a signed copy of your application. Should you have any queries during your research, please do not hesitate to contact me during normal working hours.

Regards

Sally Houlston RN, RM, MN
Nurse Consultant
On behalf of the
HBDHB Research Office

DEPARTMENT OF NURSING

Health Services - Hawke's Bay District Health Board

Private Bag 4614, Hastings, New Zealand

Telephone: 06 878 8129 extn: 4365 Fax: 06 878 1372 Email: research@hbdhb.govt.nz

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Appendix 3 Letter of support HB DHB Maori Health service



7th July 2015

Tēnā Koe Paul,

RE: "Behaviour change maintenance following a myocardial infarction"

Thank you for the opportunity to review your application for the above clinical research trial.

The Maori Health Service is happy to support the research above. If you require any assistance in regards to engagement with Maori participants, then please contact Denal Meihana, Service Manager Maori Health Service on (06) 878 1654 extn: 2887.

We look forward to receiving a copy of your research findings.

Noho ora mai rā

Denal Meihana
Kaiwhakahaere
Māori Health Services
Hawke's Bay Hospital

Appendix 4 Information for Research Participants

Information for Research Participants

Date:	24/07/2015
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Project Title:	Behaviour change maintenance following a myocardial infarction
To:	Research participants
Researcher(s):	Paul Scofield
Affiliation:	Eastern Institute of Technology

Description of the research:

This study will measure the effect that a self-determined behaviour change following a heart attack has on your risk of a further heart attack and your quality of life. Your experience of making a behaviour change will also be explored.

What will participating in the research involve?:

You will have an assessment of your risk of a further heart attack. This will involve recording your weight, height, waist circumference and blood pressure, as well as asking you some questions on your lifestyle, such as whether you smoke and how much physical activity you do. You will also be asked to complete a quality of life questionnaire at the beginning and at the end of the study. This will take approximately 30 minutes of your time at a place that is convenient to you. You will receive standard written information on heart disease from the New Zealand Heart Foundation.

Everyone who agrees to participate will then be randomly allocated to one of two groups. One group will continue with their life as normal (the Control Group) and will then be re-evaluated after 3 months. The other group (the Intervention Group) will be asked to make a lifestyle change that is on their own terms. They will have regular phone contact with the nurse and be asked to log the lifestyle change. They will be re-evaluated 3 months later.

After 3 months those people in the Control Group will then be offered the same intervention (discussion of risk factors, phone call support) as the Intervention Group.

What are the benefits and possible risks to you in participating in this research?

The benefits of participating in this research are reducing your possible risk of having a further heart attack. There are no foreseeable risks to your health or wellbeing by participating in this research study. However, if completing the questionnaire raises any feelings that affect you in a negative way, then please contact your General practitioner or Practice nurse, if you wish to discuss this.

Your rights:

- You do not have to participate in this research if you do not wish to.
- Once you have completed the research you have a two period within which you can withdraw any information collected from you.
- You are welcome to have a support person present (this may be a member of your family/whanau or other person of your choice).
- You may request a summary of the completed research.

Confidentiality:

Identifiable information about you will not be made available to any other people without your written consent. All information that you provide will be securely stored in a safe locked place at the researchers' residence until May 2016. Your personal details such as your name will not be published in the final summary.

If you wish to participate in this research, or if you wish to know more about it, please contact

Contact Person:	Paul Scofield		
Work phone #		Email address	
Mobile phone #			

Supervisor Name(s): (if applicable)	Professor Bob Marshall		
Work phone #		Email address	

Head of School/Manager:	Thomas Harding		
Work phone #		Email address	

For any queries regarding ethical concerns, please contact:

Chair, Research Approvals Committee, EIT. [REDACTED]

This study has been approved by the Eastern Institute of Technology ethics committee on July 31st 2015, Reference # 18/15.

Appendix 5 Quality of Life Questionnaire

Name:

Please place an X in the box for each question that best represents how you have felt following your heart event.

	All of the time			Some of the time			None of th time
1.	In general, how much of the time during the last two weeks have you felt frustrated, impatient or angry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	How often during the past two weeks have you felt worthless or inadequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	None of the time			A good bit of the time			All of the time
3.	In the past two weeks, how much of the time did you feel very confident and sure that you could deal with your heart problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All of the time			Some of the time			None of th time
4.	In general, how much of the time did you feel discouraged or down in the dumps during the last two weeks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	None of the time			A good bit of the time			All of the time
5.	How much of the time during the past two weeks, did you feel relaxed and free of tension?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All of the time			Some of the time			None of th time
6.	How often during the last two weeks have you felt worn out or low in energy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Very dissatisfied, unhappy most of the time			Generally satisfied, pleased			Extremely happy, coul not have been more satisfied or pleased
7.	How happy, satisfied, or pleased have you been with your personal life during the past two weeks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All of the time			Some of the time			None of th time
8.	In general, how often during the last two weeks have you felt restless, as if you were having difficulty trying to calm down?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Extreme shortness of breath			Moderate shortness of breath			No shortness of breath
9.	How much shortness of breath have you experienced during the last two weeks while doing your day to day physical activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All of the time			Some of the time			None of the time
10.	How often during the last two weeks have you felt tearful, or like crying?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	How often during the last two weeks have you felt as though you were more dependant than you were before your heart problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	How often during the last two weeks have you felt unable to do your usual social activities, or social activities with your family?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All of the time			Some of the time			None of the time
13.	How often during the last two weeks have you felt as if others no longer have the same confidence in you as they did before you had your heart problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	How often during the past two weeks have you experienced chest pain while doing your day to day activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	How often during the last two weeks, have you felt unsure of yourself or lacking in self-confidence?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	How often during the last two weeks have you been bothered by aching or tired legs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Extremely limited			Moderately limited			Not limited at all
17.	During the last two weeks how much have you been limited in doing sports or exercise as a result of your heart problem?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	All of the time			Some of the time			None of the time
18.	How often during the last two weeks have you felt apprehensive or frightened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	How often during the last two weeks have you felt dizzy or lightheaded?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. In general, during the last two weeks, how much have you been restricted or limited as a result of your heart problem?	Extremely limited			Moderately limited			Not limited at all
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. How often, during the last two weeks, have you felt unsure as to how much exercise or physical activity you should be doing?	All of the time			Some of the time			None of th time
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. How often during the last two weeks have you felt as if your family is being overprotective toward you?							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. How often, during the past two weeks, have you felt as if you were a burden on others?							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. How often during the last two weeks have you felt excluded from doing things with other people because of your heart problem?							
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. How often during the last two weeks have you felt unable to socialize because of your heart problem?	All of the time			Some of the time			None of th time
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. In general, during the last two weeks, how much have you been physically restricted or limited as a result of your heart problem?	Extremely limited			Moderately limited			Not limited at all
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. How often during the last two weeks, have you felt your heart problem limited or interfered with sexual intercourse?	All of the time			Some of the time		None of the time	N/A
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please complete the following questions

Why did you choose that risk factor?

How easy was it to make the risk factor change?

Did you have any issues on maintaining the life style change you chose, and what did you do to manage these issues?

Appendix 6 Treatment Fidelity Plan

Participant Intervention Group Checklist

Name/ study number: _____

1	Initial telephone call to participant on receiving invitation to participate	
2	Clarify study and gain consent during home visit	
3	Ask participant to choose a self-determined behaviour change	
4	Provide log book for self-determined behaviour change and explain how to fill out the log book. Provided heart foundation booklets 'Recovery post MI & Taking Control' for heart health'	
5	Discuss regular telephone contact by researcher after week one then every two weeks there after	
6	Ask participant to complete initial study QOL questionnaire and mail back to researcher in self-addressed envelope	
7	Complete initial risk factor profile	
8	Allow for participant questions	
9	Revisit participant after twelve weeks	
10	Ask participant to complete final study QOL questionnaire and mail back to researcher in self-addressed envelope	
11	Complete final risk factor profile	
12	Allow for participant questions	

Other contacts:

Appendix 7 Participant Self-Log Sample

Name:

Behaviour Change: I want to modify my diet.

Helpful tips on eating and drinking can be found in 'Taking Control: My Plan for Heart Health' booklet pages 30-41.

Week Beginning:

Day of the Week	Have you set yourself a goal for eating for a healthy heart today? (pg. 14)	Did you consume any fruit and vegetables? (pg. 36)	Have you read any food package labels? (pg. 39)	How much alcohol have you consumed today? (pg. 40)	Have you had any takeaways, junk foods or sugary drinks today (pg. 38)
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

