

**An exploration of knowledge and risk
perceptions of cardiovascular disease from the
perspectives of prisoners and stakeholders to
guide the development of a cardiovascular risk
reduction intervention**

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Abstract

Background: Cardiovascular disease (CVD) is an important health concern in prison populations as they have an increased risk of the disease compared to the general population. However, there is a lack of interventions to reduce prisoners' cardiovascular risk, and little is known about the knowledge and risk perceptions of the disease in prison. This study aims to explore the knowledge and risk perceptions of CVD from the perspectives of prisoners and staff to guide the development of a cardiovascular risk reduction intervention for prisoners.

Methods: This was a qualitative, exploratory study. Semi-structured interviews were conducted with 16 prisoners and 11 staff, who were purposively recruited from a private prison in Scotland. Framework analysis was used to analyse the data.

Findings: The prisoners and staff had limited, non-expert knowledge of CVD. Common behavioural risk factors and cardiovascular events were identified, but gaps in knowledge were evidenced. There were similarities and differences in perceptions of prisoners' risk of the disease; risk was primarily assessed by judgements about the prisoners' current health status rather than their risk factor status. Prisoners' risk of CVD was attributed to negative health behaviours such as smoking and physical inactivity, and these were influenced by multiple factors that interacted across three levels of influence. Individual factors included self-efficacy and mental health problems, social factors included the prison culture and social interactions, and institutional factors included the prison regime and healthcare barriers. An ecological framework was designed to guide a cardiovascular risk reduction intervention that focuses on the multi-level influences of prisoners' cardiovascular risk.

Conclusion: Prisoners have limited knowledge and misconceptions of CVD, and engage in several risky behaviours. There are multi-level influences on prisoners' CVD risk and cardiovascular health. An ecological approach is recommended to address these influences to reduce the prisoners' risk of CVD.

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Abbreviations and Definitions

Absolute risk	The percentage chance of an individual having a cardiovascular disease event over a given period of time
BHF	British Heart Foundation
CHD	Coronary Heart Disease
CVD	Cardiovascular disease. An umbrella term that refers to the diseases of the heart and blood vessels and include conditions such as coronary heart disease (CHD), cerebrovascular disease (stroke) and peripheral artery disease
Cardiovascular risk	The risk of having CVD. Also referred to as CVD risk
HP	Health promotion. The process of enabling people to increase control over, and to improve, their health
NHS	National Health Service
PBC	Perceived behavioural control
Risk perception	The subjective assessment that people make about the characteristics and severity of risk
Self-care	The actions that people take for themselves or on behalf of others, to develop, protect, maintain and improve health
SIGN	Scottish Intercollegiate Guidelines Network
SPS	Scottish Prison Service
Staff	Any member of staff from the prison or National Health Service
WHO	World Health Organisation

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Chapter 1: Introduction

1.1 Why this study?

The aim of this thesis is to explore the knowledge and risk perceptions of cardiovascular disease (CVD) from the perspectives of prisoners and staff involved in prisoner healthcare, to guide the development of a cardiovascular risk reduction intervention for prisoners. A growing body of evidence shows that prisoners are disproportionately affected by CVD risk factors such as smoking and physical inactivity, and they therefore have an increased risk of the disease. The reasons for this are many, and include the fact that most prisoners come from socioeconomically deprived backgrounds. This means that they have poorer health compared to the general population, often engage in risky behaviours such as drug misuse, and have a high prevalence of mental health problems such as anxiety and depression. These are all contributing factors for CVD. Additionally, prisons tend to be high stress environments in which a prisoner's cardiovascular health can significantly decline.

Despite this, there are few interventions that specifically target cardiovascular risk reduction in prisoners. This means that little is known about what is needed to ensure that such interventions are effective and sustainable. There is a greater number of cardiovascular risk reduction interventions in the general population, and while much can be learnt from such interventions, the nature of these may not be suited to a prison environment because of contextual differences. From a UK perspective, there are only a few studies that have focused specifically on CVD or its risk factors in prisoners, and none of these have taken place in Scotland. Furthermore, there is no intervention developed with a primary aim of reducing prisoners' cardiovascular risk or promoting prisoners' cardiovascular health.

In the general population, cardiovascular risk reduction interventions tend to focus on high-risk populations and usually target health behaviours such as physical inactivity and unhealthy eating. It has been recognised that there are several factors that influence these behaviours, including the social environment,

income and education. Many of these factors have been explored in various high-risk populations, however this has been done to a lesser extent in prison populations, particularly those in the UK and in Scotland. Additionally, little is known about the knowledge and risk perceptions of CVD in this population. These two factors are known to influence health behaviours linked to CVD risk in the general population, and should be addressed when trying to develop an intervention aimed at reducing prisoners' cardiovascular risk. Thus, an exploration of all these factors within the context of the prison setting is needed to guide the development of such an intervention in this setting.

This qualitative study aims to explore the knowledge and risk perceptions of CVD in a Scottish prison from the perspectives of prisoners and staff who have a role in prisoner healthcare. The study also explores the factors that influence engagement in health behaviours and health promotion activities that could reduce prisoners' cardiovascular risk from the perspectives of both groups. It also proposes a theoretical framework to guide the development of an intervention to reduce cardiovascular risk in prisoners. This study will therefore contribute to gaps in the literature regarding knowledge and risk perceptions of CVD in prison, and the approach needed to target cardiovascular risk reduction in prisoners.

1.2 Background to the study

This qualitative study was forged from an idea that one of my academic supervisors had about developing an intervention to reduce prisoners' risk of CVD while imprisoned. This study, or rather, an earlier version of it, was proposed as an impact studentship and was co-funded by the University of Stirling and a National Health Service (NHS) Health Board in Scotland. I was drawn to this study as I had an interest in pursuing doctoral research that involved health behaviour change. The details of my reasons for pursuing this study can be found in Chapter 4, but I wanted to provide the reader with the story of the study here, so that they may have a better understanding of my journey with my PhD, and the development of this thesis.

The Health Board that co-funded this study has links with the prison in which the study was conducted, as it is responsible for providing healthcare to the

prisoners housed there. The prison itself is run by a company on behalf of the Scottish Prison Service (SPS), and is therefore classified as a private prison. It operates with a high level of security and houses remand, short-term and long-term male prisoners.

1.2.1 The steering group

Before I had begun the study, representatives from the University of Stirling and the NHS Health Board had met with representatives from the prison. The purpose of this meeting was to discuss the prospect of conducting the study in this particular prison. The prison representatives expressed an interest in the study, and a steering group was set up. This group was comprised of seven individuals: my two supervisors from the University of Stirling, one of my clinical supervisors from the NHS Health Board, two health promotion staff from the NHS Health Board who were based outside the prison, one healthcare manager from the NHS Health Board who was based in the prison, and one prison officer who was also a health education instructor.

1.2.2 Dealing with challenges to conducting research in prison

The steering group had several purposes. One of these was to help me get to know some key members of the prison staff better, or in other words, build relationships. I saw prison staff as 'gatekeepers' since they were in charge of allowing or denying access to prisoners, and could potentially have influence on me while I conducted research in their environment. Gatekeeping can be one of the biggest challenges to conducting research in prison (Waldram 2009), particularly for unknown or inexperienced prison researchers such as myself (Schlosser 2008). Building relationships with prison staff was essential to avoid the many problems reported by prison researchers in the literature such as difficulty in passing background checks for security purposes (Schollosser 2008), and experiencing lengthy waiting periods for sometimes unguaranteed access into prisons (Waldram 2009). I believe that the relationships built with the prison staff (facilitated through the steering group), enabled me to gain all the necessary security clearances, ethical approval with the SPS, training, easy entry into the prison each time I visited, and access to prisoners and prison staff. The details of

the procedures involved in the aforementioned events can be found in Chapter 4 of this thesis.

The steering group also helped with the identification of participants (both prisoners and staff) as described in Chapter 4. Identification of participants, particularly prisoners, could be challenging, particularly in a high security prison such as this one. Granting a researcher access to prison wings creates challenges for prison staff, as they are responsible for guaranteeing the researcher's (and prisoners') safety at all times. This means that a prison officer would always need to be around to escort the researcher, an option which is viewed as unfeasible in prison, as it could be a burden to those who manage and work in the prison by interrupting the prison regime (Cislo and Trestman 2013). In my case, the steering group unanimously decided that it was safer for me to not access prison wings to recruit participants, and instead helped me to identify members of staff and prisoners who could further identify other participants (see Chapter 4).

The use of the steering group to recruit prisoners and staff presented two major challenges for me during the data collection process – that of informed consent and coercion. I choose to highlight these two challenges here although they are further discussed in Chapter 4. Obtaining informed consent is common practice in most research involving human participants and involves two aspects: 1) participants must be informed of the purposes, procedures and any risks associated with the research, and 2) participants must voluntarily consent to take part in the research without coercion (Reamer 2001: 434). Researchers should always be concerned about the possibility of coercion in prison as generally, most prisoners have reduced autonomy due to inducements and influences from prison staff and other prisoners (Edens et al 2011). Added to this, prisoners may agree to participate in research because of ulterior motives such as demonstrating good behaviour to influence decisions on their future, or they believe that they will gain access to previously unavailable treatment (Carr et al 2011). Most prisoners also have low literacy levels, or suffer from mental health conditions, both of which can also affect their understanding of research information and decision-making (D'Eath 2012).

As the reader will see in Chapter 4, I took steps to ensure that all participants were properly informed about the study and that they were not coerced into participating. However, I cannot definitively say that there was no coercion, as I was not present when the participants were approached during the recruitment stage. I did however receive confirmation from participants at the start of each interview that they were taking part in the study of their own free will. I also went over the details of the study in simple terms for each participant before the start of each interview, and provided them with the opportunity to ask questions. These actions gave me the opportunity to determine whether or not prisoners had been coerced into participating in the study, and that their consent was informed.

Another challenge that I had to overcome was that of building trust and dialogue with the participants, prisoners and members of staff alike. Bosworth et al. (2005) highlight that building trust and sufficient rapport with prisoners who have been 'shut out from the world' for a period of time, or who have no idea of when they would be released from prison, can be extremely difficult. In my case, I only met each prisoner once when I interviewed them. This meant that I had no time prior to the interview to chat with them and gain their trust. Therefore, I knew that the first impression I gave to prisoners as they entered the interview room was very important. I gave a friendly smile, invited them to have a seat, spoke slowly and clearly so that they understood what I was saying, and tried to be as relaxed as possible while I listened with interest as they spoke to me.

Let me assure you, creating a comfortable interview environment was not easily accomplished in the first three interviews I conducted. I was very aware that I was a woman in a high security prison, interviewing men who may have committed very serious crimes. During the first three interviews, I admit that these thoughts were at the forefront of my mind, and inside I was extremely nervous. In conducting the interviews, there were times when I wanted to probe more into an issue that was mentioned, but felt uncomfortable to do so as I was unsure, and frankly afraid of how the prisoner may react. However, the first three prisoners that I interviewed were all polite, respectful and surprisingly very normal. I began to see them not as prisoners, but as men living in prison. After the first three interviews, I became more relaxed and felt more confident to probe more when

interesting things were mentioned. I found that with each successive interview, the dialogue between myself and each prisoner flowed more easily.

Ironically, building trust with staff members was harder to achieve than it was with the prisoners. I say ironically because I had assumed that staff would have been more open to the idea of the research study, and to being interviewed. After the first few interviews I conducted with staff, it became very apparent that there were some tensions between the prison staff and the NHS staff who worked in the prison. As the reader will see, these tensions were manifested in the dialogue from the interviews (Chapter 6). I believe that these tensions led to staff being more guarded in their responses, particularly when the conversation dealt with responsibility for the prisoners' health and wellbeing. I also believe that some prison and NHS staff felt that I was there to pass judgement on them, as some gave very defensive and abrupt responses to questions relating to their roles and the services offered to prisoners. There was no easy way of me dealing with this; as with the prisoners, I tried to be as relaxed and friendly as possible, but I honestly felt that I was not able to build a sufficient rapport with some of the staff members at the end of data collection for the study.

1.3 The journey so far

This study and the production of this thesis are the first steps in my journey as a prisoner health researcher. Throughout this study, I learned about prisoner health and the challenges of health behaviour change, particularly in the environment. This research has changed my perspectives on prisoners in general and the purposes of prison. Before I started the research, I gave little or no thought to prisoners – they were 'bad' people who committed 'bad' crimes and deserved to be punished for their actions. Thus, I viewed prisons as places of punishment. When striking up brief conversations to members of the public about my PhD such as taxi drivers or fellow passengers on a train, most appeared to have similar views of prisoners – they were 'bad' people and why should we care about their health?

As the reader will see in Chapter 2, prisoner health is part of public health, and we should all care. I read about why we should care in the literature before I

began my data collection, but only truly understood it when I began to interact with the prisoners and staff members. There are many reasons why people commit crimes and end up in prison, and yes, some of them should spend time in prison as result. However, this time spent in prison should be viewed as a form of rehabilitation as opposed to punishment. I understand now that prisoners are people who have feelings and emotions, and like us, have family and friends who care for them. I understand that there are many complex or complicated reasons why prisoners may find it difficult to achieve things that we who are free take for granted. I understand now that prisoners are people who, like us, get ill and have the right to the same healthcare that we on the 'outside' have.

I also understand that there are many prison and healthcare staff who do take the health of prisoners very seriously, and who work hard to improve and promote health in the prison. However, as the reader will hopefully understand from reading this thesis, the nature of the prison environment and regime is so complex, that healthcare is often pushed down the list of priorities in prison.

This research has made me realise that more researchers such as myself are needed to bring healthcare and health promotion higher up the list of priorities in prisons. I now take the opportunity when speaking to random members of the public and through dissemination, to convince them about why we all should care about prisoner health. I hope that in reading this piece of work, the reader will come to understand why this all matters.

1.4 Structure of the thesis

This thesis should be viewed as the background work to developing a future intervention to reduce prisoners' risk of CVD. It is comprised of nine chapters including this current chapter (chapter one).

Chapter two provides the context for the study. It begins by explaining the burden of CVD in prison populations from a global and Scottish perspective to highlight the need for cardiovascular risk reduction interventions in prison. Next, it reviews the importance of CVD risk perceptions and the factors that influence these in the general population, as little is known about these in the prison population. It then discusses the approaches used to reduce cardiovascular risk

in the general and prison populations in Scotland. Included in this is a discussion of the challenges to cardiovascular risk reduction in the prison setting. Finally, it presents my proposed approach to cardiovascular reduction in prison, based on the theory presented in this chapter.

Chapter three presents two reviews of studies examining interventions to improve the cardiovascular health of prisoners. The first is a systematic review of quantitative studies to determine the effectiveness of these interventions, and what components may be appropriate for a future intervention to reduce prisoners' risk of CVD. The second is a review of studies presenting qualitative findings of prisoners' experiences with such interventions and with cardiac services. Both reviews summarise the outcomes of the studies and highlight the gaps in research that still need to be filled.

Chapter four outlines the study's rationale and design, and describes the methods of data collection and analysis. This includes a justification as to why a qualitative approach and a critical realist perspective were used in this study. It also describes the setting of the prison in which this study was conducted, and provides an account of the sampling strategies, recruitment and ethical considerations for the study. Finally, it presents the method used for data analysis, framework analysis, which includes worked examples of how the themes, sub-themes and categories were derived.

Chapters five, six and seven are the results chapters, and present eight significant findings that were derived from the study.

Chapter five presents the findings that relate to the prisoners' knowledge of CVD, and the perceptions that the prisoners and staff had about prisoners' CVD risk. It is organised into two themes. The first theme discusses the different levels of knowledge of CVD that were demonstrated by the prisoners. The second theme discusses the way in which the participants assessed prisoners' risk of CVD, and the link between CVD risk and the prisoners' responses to imprisonment.

Chapter six discusses the findings that relate to the influences on prisoners' cardiovascular health. It describes how three overarching factors motivate or

demotivate prisoners to engage in health behaviours and self-care activities that may reduce their risk of CVD. These three overarching factors are presented as three themes: 1) the prisoners' readiness for changing their health behaviours, 2) the role of social interactions and identity in prison, and 3) the healthcare barriers that impact on the prisoners' ability to perform self-care activities while in prison.

Chapter seven describes the prisoners' and staff's feedback and opinions of a proposed intervention to reduce the prisoners' risk of CVD. These are presented as one theme which discusses the importance of including topics that are of personal relevance to the prisoners, and the potential benefits that a future intervention may have on prisoners' health and wellbeing.

Chapter eight synthesises the findings derived from this study into three main points, and discusses these points in relation to the relevant literature and policy on CVD risk reduction and prisoner health. Next, it outlines the implications of these findings for future research and policy. Finally, it presents the strengths and limitations of this study.

Chapter nine presents the recommendations for an ecological framework to be used to guide a future intervention to reduce prisoners' cardiovascular risk. It shows how this framework was derived from the study's findings, and identifies the factors to be targeted and the mechanisms that can be used to change these factors and assist in their reinforcement. This is followed by an account of the steps to be taken to further this research and develop an intervention to reduce prisoners' risk of CVD. This chapter ends with an overall conclusion of the study.

Chapter 2: Context of the study

2.1 CVD burden in prison populations

2.1.1 The global perspective

CVD is the world's largest killer and accounts for approximately 17.5 million deaths every year (WHO 2016). The majority of deaths are premature, i.e. occurring before the age of 75, and are due to coronary heart disease (CHD) and strokes. These are caused by atherosclerosis, which is the accumulation of fatty materials and plaque in arteries (Krantz and Lundgren 1998). Over 80% of CVD deaths occur in middle- and low-income countries (WHO Regional Office for Europe 2016). Within high-income countries, the majority of deaths occur in the most socioeconomically disadvantaged groups (Yeates et al 2015).

The majority of prisoners have socioeconomically deprived backgrounds (WHO 2003), and as such, tend to have poorer health than the general population (Fazel and Baillargeon 2011). Many prisoners also have multiple health and social care needs (Rutherford and Duggan 2009). For example, it is believed that most prisoners are likely to need advice on preventing communicable diseases, treatment for mental health issues and training on social and life skills, among other things (Hayton 2007). Prisoners are also more likely to engage in behaviours such as illegal drug use, alcohol misuse and smoking, which increase their risk of CVD (Fazel et al 2006; Fazel and Baillargeon 2011). All of these factors can contribute to prisoners' increased risk of CVD compared to the general population.

Little is known about the prevalence of CVD in the prison population. Arries and Maposa (2013) conducted an integrative review of 12 studies, most of which were based in high-income countries. These authors reported a prevalence of 35% for CVD in prisoners, making it the second most prevalent condition after mental health illness. Hypertension, smoking, physical inactivity and obesity were found to be the most common CVD risk factors (Arries and Maposa 2013). Hypertension was found to be significantly associated with imprisonment, with

sub-groups such as young offenders, ethnic minorities and women having a significantly higher risk of incident hypertension (Arries and Maposa 2013).

In addition to increasing the incidence of hypertension, imprisonment can have an impact on other aspects of a prisoner's cardiovascular health. Many prisoners cope with imprisonment by smoking, and this population tends to have much higher smoking rates compared to the general population. According to Plugge et al. (2014), approximately 64% to 92% of prisoners smoke; in some countries, this represents three times the prevalence of smoking in the general population (Ritter et al 2011). Many prisoners also tend to gain excessive weight upon imprisonment (Clarke and Waring 2012). There are many reasons for this; prisons have traditionally known to provide diets that are high in salt, fat, sugar and calories (Tammam et al 2012). Also, many prisoners are physically inactive due to limited opportunities to exercise, or because they are demotivated to do so due to boredom (Battaglia et al 2013). All of these factors can worsen cardiovascular and general physical health, and increase prisoners' risk of CVD and other chronic diseases including cancer and type 2 diabetes (WHO 2013).

There is a link between these behavioural risk factors and mental health problems (Mental Health Foundation 2017; Kerber and Rubenfire 2012). Life in prison is associated with high levels of emotional distress and negative feelings of fear and hopelessness. These feelings are compounded by several social and institutional factors including a lack of freedom, perceived lack of self-control, intimidation and bullying (Woodall 2010; de Viggiani 2006b). These factors can affect prisoners' self-esteem and contribute to or exacerbate pre-existing mental health problems such as anxiety and depression. There is considerable evidence that highlights a relationship between such conditions and CVD (Chaddha et al 2016). Therefore, there is a strong likelihood that prisoners have an increased risk of CVD, linked to mental health problems.

Not surprisingly, many prisoners suffer from multiple health problems and therefore have complex healthcare needs (Rutherford and Duggan 2009). These needs present considerable challenges for healthcare and health promotion services in prisons, and often prevent them being fully efficient in executing their duties (Condon et al 2007). Dealing with complex healthcare needs requires

coordinated care which is achieved through appropriate infrastructure and multiple health services working together (Schoen et al 2009). However, the health services in prisons have to operate in an environment that often prioritises security above prisoner healthcare (Condon et al 2007). Therefore, in many prisons, the healthcare and health promotion services often do not provide adequate care to prisoners, and the overall general and cardiovascular health of many prisoners decline as a result.

2.1.2 The Scottish perspective

In Scotland, CHD is the leading cause of deaths and accounted for 7142 deaths in 2015 (BHF 2017a). Although Scotland has consistently had the highest CHD mortality rates in the UK since 1969 (BHF 2017a), these rates have decreased steadily in the general population by 37.6% from 2006 to 2015 (ISD Scotland 2017). This decrease occurred for all deprivation categories, but was greatest in the least deprived (38.5%), and a lowest in the most deprived (31.3%) (ISD Scotland 2017). These decreases in CHD mortality rates have been attributed to an improvement in the treatment of CVD over the past decade, particularly of CVD risk factors such as blood pressure (Hotchkiss et al 2014). There was also a decrease in CHD incidence from 2006 to 2015 by 27.3% (ISD Scotland 2017).

Unfortunately, little is reported on the prevalence of CVD and its risk factors in Scottish prisons. CHD was recognised as one of thirteen areas of 'greatest clinical concern' and its prevalence was investigated in a health needs assessment of Scottish prisons by Graham (2007). It was suggested that a 2% prevalence of CHD was an underreported figure as the prescribing rates of drugs used to treat the condition were considerably higher in the prisons compared to the general population (Graham 2007). This needs assessment also found a higher prevalence of the factors that contribute to CVD risk in prison compared to the general population such as tobacco use, alcohol dependence, drug use and mental health problems (Table 1) (Graham 2007).

Table 1 – Prevalence of CVD risk factors in the Scottish prison population compared to the general population in 2007^a

CVD risk factor	Prevalence	
	Prison population	General population
Tobacco use	78.4%	26%
Alcohol dependence	13%	7.6% ^b
Drug dependence	48%	1.84%
Mental health problems	14%	8%

^ataken from Graham 2007 – *Scottish prison health needs assessment*

^bUK data; no comparable Scottish figures available

Since 2005, there has been a small but steady increase in older prisoners by approximately 5%, and a significant increase in female prisoners by 30% in Scottish prisons (Allen and Watson 2017). These two groups of prisoners are disproportionately affected by CVD risk factors compared to other groups (Arries and Maposa 2013).

The prison in which this study was conducted did not participate in the 2007 needs assessment as it did not use the same electronic system that was used to record medical data in other prisons. Therefore, a separate assessment for this prison was conducted between 2009 and 2010 (Pulford et al 2011). This involved a review of 179 out of 546 prisoner records which revealed that CHD was diagnosed in 1.1% of prisoners. However, there was a high prevalence of CVD risk factors: 81% of prisoners were current smokers, 21% were overweight or obese, 21% had a problem with alcohol use and 9.5% had a current diagnosis of depressive illness requiring medication. Additionally, 62% of prisoners used illicit drugs prior to imprisonment, with 41% of these having used heroin on a regular basis prior to incarceration (Pulford et al 2011).

It is possible that the prevalence of some CVD risk factors in this prison were higher, particularly for mental health problems as 56% of respondents reported experiencing anxiety and depression at some point (Pulford et al 2011). Such a high prevalence of CVD risk factors for approximately 33% of the prison

population is disturbing, and highlights the need for a cardiovascular risk reduction intervention in this prison.

2.2 Factors that influence CVD risk perception

2.2.1 CVD risk perception

The concept of CVD risk perception is important to cardiovascular risk reduction. Risk perception is an important component of the Health Belief Model (HBM) which theorises that an individual's health behaviours depend partly on their perceived susceptibility and severity of a threat (Champion and Skinner 2008). In theory, if an individual perceives a high risk of CVD, this should influence them to adopt preventative behaviours such as physical activity and healthy eating (Webster and Heeley 2010).

However, risk perception is a subjective concept, which means that different people can assess the same risk in different ways (Visschers and Meertens 2010). In reality, many people conceptualise CVD risk wrongly. CVD risk should be viewed as a sequence of events which starts with the presence of CVD risk factors and terminates with end-stage heart disease (Chrysant 2010). Instead, many people have a dichotomous view in which risk is considered as either present or absent (Webster and Heeley 2010).

This view of CVD risk as being either present or absent may explain why many people believe they are less susceptible to the disease and underestimate their risk (Webster and Heeley 2010). This underestimation tends towards what is known as 'unrealistic' or 'optimistic' biases, where people's risk of CVD is perceived to be much lower compared to their peers (Radcliffe and Klein 2002). This is also observed with high-risk individuals, including those with type 2 diabetes (Tovar and Clark 2015; van der Weijden et al 2007) and in those who have experienced an acute myocardial infarction (Abed et al 2015).

2.2.2 Knowledge of CVD and its risk factors

There are several reasons why people underestimate their CVD risk. It is generally believed that people cannot accurately judge the severity of a risk if

they lack sufficient knowledge of CVD and its risk factors (Weinstein 1999). As a result of this, CVD risk tends to be underestimated (Homko et al 2008). Several studies have found that people generally have inadequate knowledge of CVD (Ramya and Batra 2015; Panagiotakos et al 2013). This also applies to people who have a higher risk of the disease. For example, people with type 2 diabetes often do not know that their condition is a CVD risk factor, and therefore tend to underestimate their risk of CVD (Tovar and Clark 2015; Diaz et al 2012). As a result, it is believed that CVD education can increase people's knowledge of the disease and its risk factors, and in so doing, influence them to engage in positive health behaviours that can reduce their risk of CVD.

However, having adequate knowledge of CVD and/or its risk factors does not always guarantee that risk will be accurately assessed. Abed et al. (2015) and Choi et al. (2008) found that despite having sufficient knowledge of risk factors, high-risk individuals underestimated their risk of an acute myocardial infarction and CHD respectively, because of perceived good health. Both studies concluded that CVD education should target the salient aspects of CVD, such as its prevalence and its consequences, to increase the accuracy of participants' risk perceptions (Abed et al 2015; Choi et al 2008).

2.2.3 Health literacy

One factor that can influence a person's level of knowledge of CVD, and other disease-related knowledge is health literacy (Lee et al 2012). This is defined as the ability to obtain, process and understand basic health information and navigate health and social care services to make appropriate health decisions (Kindig et al 2004). Two key components of health literacy are literacy and numeracy (Nutbeam 2000).

People with limited health literacy generally have poorer health outcomes, and are less likely to self-manage long-term conditions such as type 2 diabetes (Schillinger et al 2002), and CVD (Safeer et al 2006). There are many reasons for this. Health information is often presented as written material, such as instructions for taking medication, or in a numerical format, such as blood pressure readings or CVD risk assessments (SIGN 2017; Safeer et al 2006).

Health information can also be verbally communicated by healthcare professionals. However, individuals with limited health literacy may not be able to understand, interpret and act on such information (D'Eath et al 2012). As a result, these individuals are less likely to seek out health information from healthcare professionals or services, engage in self-care activities or risk-reducing behaviours (Aaby et al 2017), and self-manage long-term conditions such as type 2 diabetes (Schillinger et al 2002), and CVD (Safeer et al 2006).

While it is acknowledged that an individual with high levels of literacy or numeracy may have limited health literacy (Easton et al 2010), in general most people who have low literacy and numeracy levels also have limited health literacy (D'Eath et al 2012). It is well known that most prisoners have low levels of literacy and numeracy due to low levels of educational attainment (Prisoners' Education Trust 2015; Natale 2010), and therefore most will have limited health literacy. This means that their ability to process and understand information about health conditions such as CVD may be limited. The implications of this are outlined in section 2.3.3.

2.2.4 Social factors

Research has also found that social influences play a significant role in CVD risk perceptions. Social media in the form of television and newspapers often presents information about CVD, which can influence people's views about who is at risk of CVD (Davison et al. 1991). Experiences with family members who have/had CVD can also shape the way people perceive CVD risk. For example, Emslie et al. (2001) found that some people who had witnessed the death of a close relative due to CHD, viewed heart attacks as a 'desirable' way to die compared to other diseases such as cancer. These beliefs prevented people from adopting healthier behaviours that could reduce their risk of CHD (Emslie et al. 2001).

2.3 Approaches to cardiovascular risk reduction in Scotland

2.3.1 The general population

Cardiovascular risk reduction involves the lowering of an individual's risk of a CVD event, for example, a heart attack or stroke. It is recommended that this risk be measured as an individual's overall level of 5- or 10-year risk, or 'absolute' risk, rather than measuring their individual risk factors (Webster and Heeley 2010).

From a global perspective, cardiovascular risk reduction is a priority as the burden of CVD is a major public health problem; it is estimated that the direct cost attributable to CVD is USD 863 billion globally, with a projected rise of 22% by 2030 (Karmali et al 2017; Bloom et al 2011). The World Health Organisation (WHO) has also made a commitment to prioritise the prevention and control CVD and other non-communicable diseases (Mendis et al 2011).

The prevention and treatment of CVD has been a priority for the Scottish Government for well over a decade (The Scottish Government 2014; The Scottish Government 2009; NHS Health Scotland 2004). A combination of a population based approach i.e., where the whole population is targeted, and a high-risk approach i.e., where individuals who have a high risk of CVD are targeted, has been recommended for the prevention of CVD (Lowther and Mordue 2006). Within a Scottish context, a 'high-risk' individual is defined as an individual without established CVD and shows no symptoms of CVD, but whose estimated risk of a CVD event over the next ten years is 20% or more (SIGN 2017). It is believed that high-risk individuals have the most to gain from risk factor reduction (SIGN 2017). However, most CVD events do not occur in high-risk individuals, but rather in those with a low to intermediate risk of CVD (JBS3 2014).

The latest national plan for the prevention and treatment of CVD in Scotland has prioritised high-risk individuals, particularly from socially deprived communities (The Scottish Government 2014). This is based on the disparities in CVD-related outcomes between the most and least deprived communities in Scotland. The latest statistics show that the least deprived communities experienced a decline in CHD mortality rates of 38.5% between 2006 and 2015;

this rate was 7.2% higher than that experienced by the most deprived communities during the same period (ISD Scotland 2017). The plan recommends that strategies be put in place to target high-risk individuals to help them lower their risk of CVD, but does not make specific mention to prisoners (The Scottish Government 2014).

In Scotland, the responsibility of CVD risk reduction lies primarily with the 14 regional NHS Health Boards, who are each required to develop their own local plans along with other partner organisations (The Scottish Government 2014). There is a recommendation that every Health Board adopts a network and person-centred approach to prevent CVD in their local populations (The Scottish Government 2014). The network approach is synonymous with the multi-sectoral action approach recommended by the WHO, which involves coordinated multiple stakeholder engagement to prevent and control non-communicable diseases including CVD (WHO 2013). This approach enables the use of a person-centred approach, which involves a holistic approach to the care of individuals through the integration of health and social care, and placing the individual at the centre of their care (The Scottish Government 2014). The person-centred approach is also recommended by the WHO, and is used by NHS Scotland in all aspects of patient care (Healthcare Improvement Scotland 2017).

With regards to the Health Board responsible for prisoner healthcare in the study prison, there are number of programmes and services to support CVD risk reduction in the local general population (NHS ██████████ 2015). For example, the 'Hearty Lives' programme run in partnership with the British Heart Foundation (BHF), funds cardiac psychologists to support patients with learning disabilities or mental health problems to cope with their existing heart problems (BHF 2017b). The programme has not been evaluated but reviews from service users indicate that the 'Hearty Lives' has helped them to cope with emotional distress and other mental health problems related to their heart problems (BHF 2017b).

This Health Board also runs 'Keep Well', an anticipatory care programme that was implemented in 2006 at a population level to target individuals most at risk of CVD and other chronic diseases (NHS Health Scotland 2014). As part of 'Keep

Well', trained NHS staff deliver health checks to screen for CVD risk factors such as high blood pressure and high cholesterol (Geue et al 2016). An evaluation of the effectiveness of 'Keep Well' at a national level found the programme only had a small impact on CVD outcomes such as mortality and hospitalisations due stroke and CHD (Geue et al 2016). However, the programme is still delivered in Scotland by the different NHS health boards (NHS Health Scotland 2014). Locally, the Health Board specifically targets people with moderate to severe learning disabilities, as this sub-group is known to have a higher risk of CVD in this locality (NHS ██████████ 2015).

Unfortunately, as will be explained in the following section, there is no evidence to suggest that most of the programmes targeting CVD risk reduction in the general population also occur in Scottish prisons.

2.3.2 The prison population

From November 2011 onwards, NHS Scotland assumed responsibility of prison healthcare in Scotland (Miller 2013). This meant that each regional NHS Health Board became responsible for the prevention and treatment of CVD in prisons within their boundaries. The transfer of care from the Scottish Prison Service (SPS) to the NHS was carried out to enable prisoners to receive the same level of and access to healthcare as the general population (The Scottish Government 2008), and to put Scotland in line with International and European standards for prisoner healthcare (Miller 2013). These standards are based on the overarching WHO 'healthy' settings approach to health promotion in prison (Hayton 2007; WHO 1995).

The principle behind the settings approach to health promotion in prison is in keeping with the principles of health promotion, i.e. to focus on all aspects of health, including individual, social and environmental determinants (WHO 2018). The settings approach in prison encourages healthcare providers, prison staff and other relevant groups to view prison as a setting that can initiate and stimulate health promotion (WHO 1995). It encourages these stakeholders to view health as not just an issue for healthcare teams, but as a matter for all groups occupying the prison setting, including prisoners. Prisons are therefore

encouraged to adopt a whole-prison approach, in which all services work together with prisoners to insure that prisoners' health needs are met, and that health is promoted (Hayton 2007). In 2002, the SPS formally adopted this whole-prison approach into its 'Health Promoting Prison' framework (SPS 2002), and reinforced the use of this approach in its subsequent 'Better health, better lives for prisoners' framework (Brutus et al 2012).

The 2002 Health Promoting Prison framework highlighted CVD as one of several major health needs to be addressed in prison, and to this end, identified four core topics as starting action points to prevent CVD and other health conditions (SPS 2002). These core topics were: eating for health, active living, tobacco use and mental health wellbeing, and contained actions such as supporting prisons to be more active and eat healthily while in prison (SPS 2002).

However, as highlighted in section 2.1.2, the 2007 needs assessment by Graham (2007) showed that there was a high prevalence of CVD risk factors in Scottish prisons compared to the general population. This suggests that for one reason or the other, the Health Promoting Prison framework was not successful in promoting a reduction in CVD risk factors such as physical inactivity. One likely reason for is that the whole-prison approach has been difficult to develop in Scottish prisons (section 2.3.3). Another possible reason is that there is no targeted approach for CVD reduction in Scottish prisons.

A review undertaken by myself of policy and other relevant documentation found no evidence of specific strategies to target cardiovascular risk in prisoners. One of the SPS Health Care Standards recommends that each prison should have a local HP Action group which has to identify a minimum of four HP initiatives that are line with the Scottish Government's plan to address health inequalities (SPS 2011b). Given that CVD prevention in high-risk populations, particularly in deprived communities, is a main focus for the Scottish Government (The Scottish Government 2014), it is expected that Scottish prisons should also be focused on this as most prisoners come from deprived communities.

There are a range of HP initiatives aimed at improving the general health and wellbeing of prisoners (Health and Sports Committee 2017), but these vary across institutions in the degree to which they are menu-driven and person-

centred (RCN 2016). Examples of such initiatives include smoking cessation services and weight-loss interventions (Sharp et al 2011). The main issue surrounding these initiatives in Scottish prisons is that overall, little is known about the different interventions offered across institutions or if any have specifically targeted prisoners' cardiovascular risk. Added to this, many interventions are not formally evaluated and therefore there is a lack of evidence in relation to their effectiveness in improving prisoner health and wellbeing. One known intervention that aimed to promote healthier lifestyles, 'Fit for Life', was adapted from 'Football Fans in Training', a successful weight loss intervention for men in Glasgow, Scotland (Maycock et al 2015b; Wyke et al 2015). However, the outcomes of 'Fit for Life' remain unpublished, and therefore the effectiveness of this intervention is not known.

The 'Keep Well' programme that runs in local communities was introduced to Scottish prisons in 2010. Trained NHS staff delivered these health checks and prisoners who were found to have CVD risk factors were provided with advice and interventions that targeted individual risk factors such as smoking and physical inactivity (Sharp et al 2011). They were also referred to prison-based health services, and those who were close to release were referred to services in the community. Overall, 98% of prisoners who attended the health checks received advice on diets, exercise and smoking among other topics, and 38% were given referrals to other services. Although the programme screened for CVD risk factors, no evaluation was done on its impact on the prisoners' CVD risk and related health behaviours.

Unfortunately, the programme was only funded by the Scottish government for a year, after which time it was decided that individual Health Boards would train prison staff to deliver the health checks to screen for CVD risk factors. While prison staff in the study prison were trained for this (NHS ██████████ 2015), data from these checks are not collected.

From the discussion above, it is clear that there is lack of evidence of specific strategies to target CVD risk reduction or improve prisoners' cardiovascular health in Scottish prisons. Nevertheless, as mentioned in section 2.1.2, there is a need for focus to be placed on prisoners' cardiovascular risk due to the high

prevalence of CVD risk factors in the Scottish prison population. However, as will be discussed in the following section, there are challenges to cardiovascular risk reduction in prisons which need to be considered when developing future interventions.

2.3.3 Challenges to cardiovascular risk reduction in prison

As already discussed, there are multiple factors that can impact on prisoners' cardiovascular health and reduce their motivation to engage in behaviours that may lower their risk of CVD. However, it can be difficult for prisons to tackle these multiple influences due to limited resources such as a limited number of adequately trained staff. For example, a recent report on the healthcare in Scottish prisons found that there were shortages in healthcare care staff who may have an important role in cardiovascular risk reduction such as general practitioners and mental health nurses (Health and Sport Committee 2017). Without these healthcare professionals, it may be difficult for other healthcare staff to recognise the presence of CVD risk factors and know how to support prisoners in reducing these factors.

Another challenge to cardiovascular risk reduction in the prison setting is that prisoners may not be able to successfully perform self-care activities. The concept of self-care is integral to cardiovascular risk reduction (Aaby et al 2017). Self-care involves the actions that people take to develop, protect, maintain and improve their health, and these actions can be for themselves or on behalf of others (Self Care Forum 2017). However, prisoners' abilities to perform self-care activities such as quitting smoking and adopting a healthier diet can be undermined by certain factors. Mental health problems, for example, which are highly prevalent in prison populations, can reduce the ability to self-care. Major depression has been shown to result in poor control of type 2 diabetes (Weinger 2007). Additionally, depression can also negatively affect self-efficacy beliefs related to positive health behaviours (Banman and Sawatzky 2017), and reduce motivation to engage these behaviours (Baumann and Dang 2012). Proposed actions within these topics relevant to CVD include supporting prisoners to use gym equipment and monitor their progress,

Health literacy also has an important influence on the ability to self-care as it involves the processing and understanding of health information (Kindig et al 2004). Aaby et al (2017) surveyed over 3000 people with established CVD and found that lower health literacy was associated with less engagement in self-care activities such as physical activity, not smoking and eating a healthy diet. Many prisoners have low levels of literacy and numeracy, and therefore may have limited health literacy which can impact on their ability to perform self-care activities such as choosing healthy food options. Additionally, low health literacy is related to limited knowledge of CVD which may result in prisoners having misperceptions of the disease.

The added complication of prisoners' limited health literacy is that many may not be aware of their health needs, or believe that their health status is good. This can lead to misperceptions of not being at risk to CVD and other health conditions. Prisoners may therefore not seek out professional help from healthcare staff. This, coupled with limited staff and resources in prison health services, means that many prisoners live with undiagnosed health conditions in prison, particularly mental health problems such as anxiety and depression (Reingle Gonzalez and Connell 2014). These mental health problems have been associated with CVD.

In adopting the whole-prison approach for health promotion, Scottish prisons are mandated to promote self-care (Brutus et al 2012; SPS 2002). However, a recent report on the review of healthcare in Scottish prisons revealed that there were difficulties in successfully implementing the whole prison approach (RCN 2016). This was due to limited communication and strained relationships between the SPS and the NHS (RCN 2016). NHS staff were reportedly unable to provide quality care to prisoners due to the prioritisation of security and found that prison staff often lacked understanding of prisoners' healthcare needs (RCN 2016). This conflict between the two organisations can negatively impact on the promotion of health in prison, thereby making it difficult for prisoners to find support to self-care (Hardie 2009).

The RCN report also highlighted that many nurses working in Scottish prisons lacked sufficient knowledge and/or skills to deal with chronic diseases and other

specific health needs of prisoners (RCN 2016). Healthcare providers' lack of knowledge and skills can undermine cardiovascular risk reduction as they may not be able to provide appropriate advice or treatment to patients (Wu et al. 2011).

One challenge to cardiovascular risk reduction that may occur in prisons that house male prisoners, is the concept of masculinity, or beliefs about the male gender role. Masculinity has been associated with the presence of physiological risk markers for CVD (Morrison 2011), and poorer health behaviours (Mahalik et al 2007). It is believed that many men embody the concept of a 'real man', and this reduces their likelihood of seeking help from professionals, or engaging in risk-reducing behaviour (Courtenay 2000). Such practices can result in males having an increased risk of CVD compared to females (Webster and Heeley 2010).

Within the prison context, masculinity tends to manifest as machismo and competitiveness (de Viggiani 2006), and may also result in the creation of hierarchies among male prisoners (Hsu 2005). Studies have consistently shown there is a common perception that most male prisoners primarily engage in exercise, mainly weightlifting, to appear more macho and imposing, and care less about their actual health and wellbeing (Woodall 2010; de Viggiani 2006). Additionally, the existence of hierarchies and the competitive nature of male prisoners could lead to intimidation and prevent other prisoners from accessing exercise facilities. Thus, masculinity within the prison context could be a barrier to risk-reducing behaviours of CVD such as physical activity, and researchers need to be aware of this.

These challenges to cardiovascular risk reduction in prison should not dissuade healthcare providers in Scottish prisons from developing strategies or interventions to reduce prisoners' risk of CVD. These would not only be useful in reducing cardiovascular risk and promoting cardiovascular health, they can also be useful in promoting overall health and wellbeing, and contribute to tackling the health inequalities in Scotland.

2.3.4 Proposed approach to cardiovascular risk reduction in prison

From the discussions in the previous sections of this chapter, it is clear that there are multiple factors that influence cardiovascular risk reduction in prison. Individual factors such as limited health literacy and mental health problems, social factors such as masculine interactions, and institutional factors such as the prioritisation of security over prisoner autonomy, all have the potential to impact on a prisoner's cardiovascular health. The existence of these multi-level factors means that no single approach is suited to cardiovascular risk reduction in prison.

In the general population, tailored, multi-level approaches have become increasingly popular in interventions seeking to increase engagement health behaviours such as physical activity (Buchan et al 2012). Ecological approaches in particular, which are based on ecological models, focus on the multi-level influences on health behaviours or conditions and their interactions (Sallis et al 2008). An ecological approach was used by Mudd-Martin et al (2014) to guide the development of a cardiovascular risk reduction intervention for a high-risk population in Kentucky, USA. The effectiveness of this intervention has not been reported, but it is thought that the ecological approach adopted appropriately targeted the multi-level factors influencing this population's cardiovascular risk (Mudd-Martin et al (2014). Therefore, an ecological approach may be suited to targeting cardiovascular risk reduction in prison.

2.5 Chapter summary

This chapter provided the context for this study in relation to the burden of CVD in prison populations, the factors that influence CVD risk perceptions and the challenges to cardiovascular risk reduction in the prison setting. There is a high prevalence of CVD risk factors in the prison population in Scotland, but despite this, there is no evidence of existing strategies to specifically target the lowering of CVD risk factors in this population. There may be several challenges to cardiovascular risk reduction in the prison setting. These include prisoners' limited ability to engage in self-care activities due to mental health problems, limited health literacy and limited autonomy in prison. Limited health literacy can

also impact on perceptions of general health status and knowledge of CVD, two factors known to influence risk perceptions of CVD.

Institutional factors can also pose a challenge to cardiovascular risk reduction in prisoners. Limited communication and tensions between the NHS and prison staff can affect the quality of care provided to prisoners, and hinder their ability self-care. Additionally, a lack of adequately trained staff to recognise and treat CVD risk factors effectively can undermine cardiovascular risk reduction. Furthermore, the difficulty in developing a whole-prison approach means that Scottish prisons are not working systematically to promote health and by extension, cardiovascular health among prisoners.

To conclude, it is in the best interest of healthcare providers in prisons to develop interventions to reduce prisoners' risk of CVD. However, there is a lack of evidence as to what types of interventions are successful in achieving this. To this end, the next chapter presents a systematic review of the quantitative and qualitative literature to determine what types of interventions can be used to successfully improve the cardiovascular health of prisoners, and examine prisoners' experiences with these interventions.

Chapter 3: A systematic review of interventions to improve the cardiovascular health of prisoners during imprisonment

3.1 Introduction

This chapter presents a systematic review of quantitative and qualitative literature, to explore interventions to improve the cardiovascular health of prisoners during imprisonment, and to explore prisoners' experiences with these interventions.

The review of quantitative studies was conducted to fill the gaps in the literature with regards to what types of interventions are effective in lowering the cardiovascular risk of prisoners while they are still living in prison. This review is presented in sections 3.2 – 3.5 of this chapter, and was also published online in the Journal of Cardiovascular Nursing (Mohan et al 2017). This publication was based on initial search for articles from inception to May 2016. A further search of the literature was undertaken between May 2016 and October 2017 based on the search strategy outlined in section 3.3.1 to update this review. This resulted in three additional studies being identified in the first stage of the search, however, only one of these studies met the criteria for this review and was incorporated into this chapter.

From this review, it was established that little was also known about prisoners' experiences with these interventions. A review of the qualitative literature was therefore conducted to address this, and is presented in section 3.6 of this chapter.

3.2 Background

Prisoners have an increased risk of cardiovascular disease (CVD) compared to the general population due to a high prevalence of modifiable CVD risk factors (Wang et al 2017; Arries and Maposa 2013). Prison life can be very stressful and contribute to mental health problems such as anxiety and depression (Fazel et al

2016), which have been associated with an increased risk of CVD (Chaddha et al 2016). Additionally, prisons have traditionally known to provide unhealthy diets and few opportunities for prisoners to engage in physical activity.

Although CVD and its risk factors are major health problems for prisoners, primary prevention and treatment for non-communicable diseases (NCDs) including CVD has largely been neglected (Plugge et al 2014). This is possibly due to a perception that, because the majority of prisoners are young, CVD may not be an issue (Enggist et al 2014). There is a need to challenge such perceptions and to implement interventions to promote the cardiovascular health for prisoners. Encouraging prisoners to change their health behaviours while imprisoned could potentially improve their cardiovascular and general health during imprisonment (Kinner and Wang 2014; Restum 2005), and help improve the health of those who are eventually released into the community.

In the general population, cardiovascular risk can be reduced by implementing interventions designed to target modifiable CVD risk factors (WHO 2013). Several guidelines exist which provide evidence-based recommendations to reduce these factors (NICE 2014; JBS3 2014; Eckel et al 2013). Behaviour change interventions in particular have been recommended in reducing these risk factors (Mendis et al 2011) Interventions which involved physician advice, individual counselling, teaching behavioural skills and those that were tailored to the individual's needs have shown to be effective in targeting these risk factors (Jepson et al 2010; Hillsdon et al 2005). Unfortunately, such interventions have been more geared towards the public domain from which prisons are usually excluded.

One recent systematic review identified 95 randomised controlled trials (RCTs) that evaluated interventions to improve the health of prisoners but only two of these focused specifically on cardiovascular health (Kouyoumdjian et al 2015). Kouyoumdjian et al. (2015) looked at RCTs but studies with this design can be difficult to conduct in a prison setting due to several factors including randomisation, anonymity and blinding.

This current systematic review of quantitative studies was therefore conducted to identify interventions used to improve the cardiovascular health of prisoners during imprisonment and to assess their effectiveness.

3.3 Methods

3.3.1 Search strategy and inclusion criteria

The search strategy followed PRISMA guidelines (Moher et al 2009) to identify all relevant articles. An electronic search for articles was performed in CINAHL, MEDLINE via OVID, PubMed, PsychINFO and the Knowledge Network from inception to May 2016. A further search was performed from May 2016 to October 2017. The following terms were used in individual searches: ‘prisoners’, ‘offenders’, ‘exercise’, ‘training’, ‘nutrition’, ‘diet’, ‘smoking cessation’, ‘cardiovascular’, ‘health promotion’, and ‘wellness’. Each individual search was then combined to identify articles. An example of a search using CINAHL is given in Table 2.

Table 2 – Example of search strategy used in CINAHL

Search #	specific term	no. of results
1	prisoners	9734
2	offenders	7872
3	1 OR 2	7872
4	exercise	94602
5	nutrition	109021
6	diet	79356
7	5 OR 6	79356
8	smoking cessation	16707
9	training	11192
10	4 OR 9	11192
11	wellness	14866
12	health promotion	70462
13	cardiovascular	450713
14	7 OR 8 OR 10 OR 11 OR 12 OR 13	450713
15	3 AND 14	33

The inclusion criteria for this review were peer-reviewed studies that were based in a prison setting and had participants who were current prisoners. In this review, the term 'prisoners' refers to people incarcerated in prisons, jails and other correctional institutions, including inmates and offenders.

As the nature of prison regimes makes it difficult to randomise prisoners, studies of differing designs (including RCTs) were included to not eliminate any potentially important studies. Studies had to observe outcomes of at least one of the following health factors and behaviours related to cardiovascular health as outlined by the American Heart Association (Go et al 2013): blood pressure; cholesterol levels; blood glucose levels; physical activity; diet; weight and smoking status. Studies were excluded if they only presented baseline results or if they measured outcomes after participants were released from prison as this review looked at the effect on prisoners while are incarcerated.

A full list of articles was obtained and then screened for duplicates. Abstracts were reviewed to identify the articles according to the inclusion criteria. Reference lists of relevant articles were searched by hand to identify any appropriate studies that could potentially be included in the review. The search strategy and selected full-text articles were reviewed and verified by another researcher. Any discrepancies were discussed. The search strategy is summarised in Figure 1.

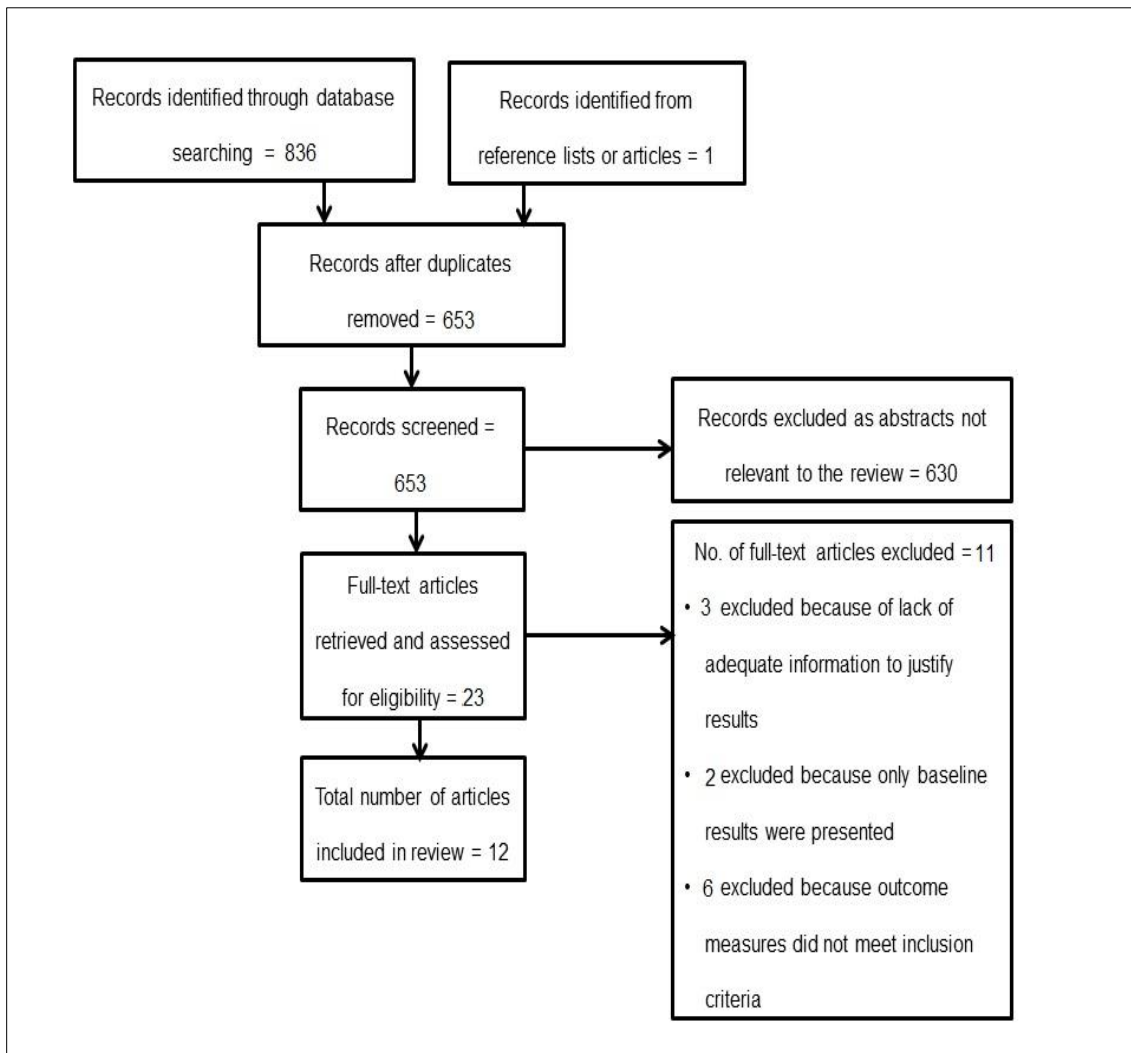


Figure 1. **Search strategy**

3.3.2 Narrative synthesis

Narrative synthesis was used to organize the evidence from the studies. This approach is used when studies are too methodologically diverse to be combined in a meta-analysis (Centre for Reviews and Dissemination 2009). Data were extracted from the studies using a data extraction template designed for use in the review. The studies were then grouped according to the type of intervention they described, and were presented in tabular form. For all studies, data were extracted on study design, sample size, sample characteristics, type of intervention, intervention duration and outcomes of the study.

3.3.3 Quality assessment

The quality of the studies was assessed using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (EPHPP) (EPHPP 1998a). A detailed definition of the tool is provided to clarify the assessment process (EPHPP 1998b). The EPHPP tool was selected above other tools such as the Cochrane Collaboration Risk of Bias Tool (CCRB) as it allows for the assessment of range of study designs, and therefore does not limit the number of studies that can be included in the review based on design (Armijo-Olivo et al 2012). All articles were independently assessed by two researchers and any discrepancies were discussed and resolved.

3.4 Results

In total, 836 articles were retrieved, and after removing duplicates, having screened abstracts and full-texts, 13 articles detailing 12 studies were included in this review. The results from one study were published in two papers (Cropsey et al 2008; Cropsey et al 2011). Twelve studies were all carried out in high-income countries: four in the U.S.A. (Amtmann et al 2001; Cropsey et al 2008; Cropsey et al 2011; Curd et al 2013; Gettman et al 1976); two in Australia (Cashin et al 2008; Richmond et al 2012); two in Spain (Gil-Delgado et al 2011; Pérez-Moreno et al 2007); and one each in Italy (Battaglia et al 2013); Belgium (Sioen et al 2009) and Canada (Elwood Martin et al 2013). Only one study was carried out in a middle-income country (Onyechi et al 2017). Nine studies included only males (Onyechi et al 2017; Battaglia et al 2013; Curd et al 2013; Richmond et al 2012; Sioen et al 2009; Cashin et al 2008; Pérez-Moreno et al 2007; Amtmann et al 2001; Gettman et al 1976); two included only females (Cropsey et al 2008; Cropsey et al 2011; Elwood Martin et al 2013); and one included both males and females (Gil-Delgado et al 2011).

3.4.1 Structured physical activity interventions

Four studies (Battaglia et al 2013; Amtmann et al 2001; Pérez-Moreno et al 2007; Gettman et al 1976) evaluated the effect of supervised structured physical activity interventions (Table 3). Changes in different clinical factors such as blood

pressure and cholesterol levels, and changes in physical fitness factors such as muscular endurance and strength were measured. Two studies compared a single intervention group which participated in an exercise program to a control group (Amtmann et al 2001; Pérez-Moreno et al 2007).

Table 3 – Summary of the studies using interventions based on structured physical activity only

Study; country	Study design; setting	Sample size (n) and characteristics	Intervention	Outcome
Battaglia et al. 2013; Italy	RCT; maximum security prison	n = 75 Male prisoners, ≤ 50 years, no medical conditions that would prevent participation in exercise.	Two intervention groups: 1) cardiovascular plus resistance training or CRT (n=25): aerobic exercises alternating with resistance strength exercises; 2) high intensity strength training or HIST (n=25): anaerobic exercises alternating with maximal strength exercises and active recovery. Duration and intensity of sessions for both groups were gradually increased. Sessions were 1 hour long, twice per week. Control group (n = 25) received no intervention and performed their habitual activities. Duration was 9 months.	CRT group: Significant differences between this group and the control group for oxygen saturation, HDL and all fitness variables except abdominal strength and endurance. No significant differences between this group and the control group for all other health status variables. Significant differences between this group and the HIST group for abdominal and upper body muscular strength and endurance. HIST group: Significant differences between this group and the control group for oxygen saturation, upper body muscular strength and endurance. No significant differences between this group and the control group observed for all other health status and fitness level variables.
Pérez- Moreno et	RCT; minimum security prison	n = 31	Cardiorespiratory and resistance training intervention (n=14). Sessions were 90 minutes long, 3 days per	No significant differences between the intervention and control groups.

al. 2007; Spain		Male prisoners, 30-55 years; had a sedentary lifestyle, co-infected with HIV/HCV co-infected but not immuno-compromised and had an opioid addiction.	week. Exercises focused on cardiorespiratory fitness and lower and upper body strength endurance. Control group followed usual sedentary lifestyle (n=13). Duration was 4 months.	
Amtmann et al. 2001; U.S.A.	Non-random- ised controlled trial; state prison	n = 94 Male prisoners, ≥ 40 years.	Exercise program for older prisoners to improve physical fitness (n=62). Sessions were 3 days per week. Each session included a warm up, stimulus and cool-down. Control group never participated in the program (n=32). Duration was 14 weeks.	Significant differences between intervention and control groups for body composition, resting HR and muscular endurance. No significant differences between the two groups for body weight, flexibility, resting HR and resting BP.
Gettman et al.1976; U.S.A.	RCT; county jail	n = 100 Healthy male prisoners, 20-35 years.	Three intervention groups: 1) 1-day group trained 1 day per week (n=24); 2) 3-day group trained 3 days per week (n=26); 3) 5-day group trained 5 days per week (n=30). All sessions were 30 minutes long and consisted of endurance-oriented walking and running, with the run to walk increasing significantly with advancing weeks.	5-day group: Significant differences between this group and the control group for TSF, percentage body fat, waist girth and all physical fitness variables except maximum HR and resting BP. Significant differences between this group and the 3-day group for resting HR and maximum treadmill performance time. Significant differences between this group and

Control group engaged in non-endurance, recreational activity for two days per week (n=20). Duration was 20 weeks.

the 1-day group for waist girth and all physical fitness variables except resting BP, maximum HR and V_2 max.

3-day group: Significant differences between this group and the control group for waist girth and all physical fitness variables except maximum HR and resting blood pressure. Significant differences between this group and the 1-day group for resting HR, maximum HR and V_2 max.

1-day group: Significant differences between this group and the control group for all physical fitness variables except maximum HR and resting blood pressure. No significant differences observed for body composition variables.

BP – blood pressure; HDL – high-density lipoprotein; LDL – low-density lipoprotein; HR – heart rate; TSF – total skinfold fat; V_2 max – maximum pulmonary ventilation

One study observed significant positive effects on the physical fitness of prisoners (Amtmann et al 2001), while the other study did not observe any significant effects (Pérez-Moreno et al 2007). Two studies compared two or more intervention groups to a control group (Battaglia et al 2013; Gettman et al 1976). One study which evaluated two different training protocols found that cardiovascular and resistance training was more effective in improving the physical fitness of prisoners compared to high intensity strength training (Battaglia et al 2013). The other study compared exercise frequency and found that more frequent exercise had more positive effects on body composition compared to less frequent exercise (Gettman et al 1976).

3.4.2 Nutrition interventions

Three studies (Curd et al 2013; Gil-Delgado et al 2011; Sioen et al 2009) evaluated the effect of nutrition interventions (Table 4). Two studies measured health-related outcomes such as BMI, abdominal perimeter, blood pressure and cholesterol levels (Gil-Delgado et al 2011; Sioen et al 2009). Both studies evaluated interventions in which the diet of prisoners were modified. One changed the entire diet of prisoners according to their health needs (Gil-Delgado et al 2011), while the other supplied a diet enhanced with fatty acids (Sioen et al 2009). The study that changed entire diets observed significant positive effects on the body composition of intervention participants (Gil-Delgado et al 2011), while the other study which used enhanced fatty acid supplementation only observed significant positive effects on diastolic blood pressure and high density lipoproteins in prisoners who smoked (Sioen et al 2009). The third study evaluated the impact of education and behavioural workshops on the nutrition practices of prisoners (Curd et al 2013). This study found that nutrition education and reinforcement of positive healthy nutrition habits had a significantly positive effect on prisoners' nutrition practices.

Table 4 – Summary of the studies using nutrition interventions

Study; country	Study design; setting	Sample size (n) and characteristics	Intervention	Outcome
Curd et al. 2013; U.S.A.	Case control study; minimum security state prison	n = 56 Male prisoners enrolled in a behavioural substance abuse program. Mean age was 35.2 for intervention group and 34.4 for control group.	Intervention group had 3 nutrition workshops based on nutrition and nutritional literacy. Group was taught how nutrition could help in the self-management of common chronic diseases and had their knowledge tested. Reinforcement of healthy nutrition practices occurred through a community vegetable garden project. The first 2 workshops were 4 times per week, 90 minutes long. The third workshop had 5 90-minute sessions (n=19). Control group did not participate in the nutrition workshops (n=37). Duration was 6 months.	Significant difference between intervention and control groups for improved nutrition practices.
Gil-Delgado et al. 2011; Spain	Cohort study; prison	n = 139 Male and female prisoners (mean age 44.7) who either had potential cardiovascular risk factors, cachexia due to	Changes to diets were made by a nutritionist. Changes were from a general diet to either a protection diet, a soft diet or a special diet (diabetic, vegetarian, Muslim).	Significant differences compared to baseline for body composition variables and DBP. Non-significant differences compare to baseline for all clinical variables except triglycerides, blood glucose and glycated

		HCV/HIV or were in need of special diets.	Participants were encouraged to increase physical activity frequency. Duration was 1 year.	hemoglobin. Significant reduction in the number of participants with metabolic syndrome according to IDF.
Sioen et al. 2009; Belgium	Cohort study; high security prison	n = 70 Healthy male prisoners, 22-65 years.	Participants given a standard diet for 6 weeks, and then supplied with an n-3 PUFA (polyunsaturated fatty acids) enriched diet for 12 weeks. The new diet contained 6.5g of n-3 PUFA/day compared to 4g of n-3 PUFA/day in the standard diet.	Significant differences compared to baseline for DBP and HDL in smokers. No significant differences compared to baseline for all other anthropometric and clinical variables.

IDF – International Diabetes Federation; DBP – diastolic blood pressure; HDL – high-density lipoprotein

3.4.3 Mixed interventions

Two studies (Elwood Martin et al 2013; Cashin et al 2008) evaluated mixed interventions that combined physical activity and education sessions (Table 5). Both studies used a prisoner or prisoners to lead part or all of the intervention. One study evaluated the effect of supervised physical activity combined with health education classes on the health of prisoners with chronic illness or risk factors for a chronic illness (Cashin et al 2008). Changes in anthropometric and clinical variables were measured including weight, blood pressure and blood glucose levels. Significant positive effects were only observed for resting heart rate and endurance.

The other study evaluated the effect of a nutrition and fitness program on the health and wellbeing of female prisoners (Elwood Martin et al 2013). The program incorporated the use of behaviour change techniques such as self-monitoring of eating behaviour and goal-setting to help prisoners track their personal fitness progress (Elwood Martin et al 2013). Changes in weight, BMI, waist-to-hip ratio and chest diameter were measured but only a significant positive effect was observed for chest diameter.

Table 5 – Summary of the studies using interventions based on physical activity and education sessions

Study; country	Study design; setting	Sample size (n) and characteristics	Intervention	Outcome
Elwood Martin et al. 2013; Canada	Before and after study; medium security prison	n = 28 Female prisoners ≥18 years.	Intervention was partly designed by prisoners through a participatory research process and led by a prisoner certified in health and fitness. Participants received a food guide and personalized food chart which were used to help self-monitor eating behaviour, and attended a nutrition education session once per week. Participants joined a group circuit class or followed personalized exercise plans. Duration was 6 weeks.	Significant improvement in chest measurement compared to baseline. No significant changes observed for weight, BMI and waist-to-hip ratio.
Cashin et al. 2008; Australia	RCT; maximum security prison	n = 20 Male prisoners ≥ 40 years who either had chronic illness or ≥ 2 risk factors for chronic illness.	Participants attended sessions on cardio-respiratory endurance, strength and flexibility training. Sessions were led by prisoner peer leaders. Exercise was group-based but each participant had a personal plan. Participants attended 3 health education classes on healthy	Significant differences between intervention and control groups for resting HR and endurance. A significant difference was observed between the two groups for DBP, with the control group seeing the greatest improvement after the intervention (this difference occurred on pre-testing). No significant differences observed for all other measured outcomes.

eating and self-management in the prison environment (n=20).

Control group continued with their usual exercise regime (n=20). Duration was 12 weeks.

DBP – diastolic blood pressure; HR – heart rate

3.4.4 Smoking cessation interventions

Three studies (Onyechi et al 2017; Richmond et al 2012; Cropsey et al 2008; Cropsey et al 2011) evaluated the effect of smoking cessation interventions on smoking abstinence in prisoners (Table 6). Two studies (Cropsey et al 2011; Cropsey et al 2008) used nicotine replacement therapy along with behavioural therapy to support smoking cessation. One of these delivered the intervention in a group setting and focused on mood management training to prevent smoking relapse based on previous cognitive-behavioural research (Cropsey et al 2008; Cropsey et al 2011). A significant positive effect on smoking abstinence one week after the quit date was observed, and this significant effect was sustained up to six months post intervention. The other study delivered two face-to-face brief cognitive-behavioural therapy (bCBT) sessions to prisoners and had support systems in place in the form of a telephone counseling service and self-help materials such as booklets and a quit calendar (Richmond et al 2012). This intervention had no significant effect on smoking abstinence.

The third study (Onyechi et al 2017) used a group-based cognitive behavioural health education programme to reduce cigarette smoking. The intervention involved five modules: cognitive restructuring, mindfulness training, self-modification training, impulse tolerance and emotional regulation training, and psychodrama (Onyechi et al 2017). A significant positive effect on cigarette smoking was observed immediately after the 10-weeks intervention.

Table 6 – Summary of the studies using interventions based on smoking cessation only

Study; country	Study design; setting	Sample size (n) and characteristics	Intervention	Outcome
Onyechi et al. 2017; Nigeria	Randomised before and after study; prison	n = 20 Male prisoners ≥ 19 years who had a habit of cigarette smoking.	Intervention group received 20 sessions of a group-based cognitive behavioural health programme that was based on CBT (n=10). Control group received conventional counselling (n=10). Duration was 10 weeks.	Significant difference between intervention and control groups for cigarette smoking, with the intervention group observing a greater reduction of the habit immediately after the intervention.
Richmond et al. 2012; Australia	RCT; prison	n = 425 Males prisoners >18 years who had moderate/high nicotine dependence and expressed a readiness to quit smoking.	Intervention group received 2 face-to-face bCBT sessions, active NOR, active nicotine patches and had access to a telephone counseling service and support tools. NOR given at the start of week 1 and smoking cessation date was set on week 3. Nicotine patches were given on week 3 (n=206). Control group received the same as the intervention group except that a placebo NOR was used (n=219). Duration was 12 weeks.	No significant differences between intervention and control groups for continuous abstinence and point prevalence abstinence at 3, 6 or 12 months.

Cropsey et al. 2008 & 2011; U.S.A.	RCT; prison	n = 360 Female prisoners (mean age 33.8) who smoked at least 5 cigarettes per day and expressed interest in smoking cessation.	Intervention group received mood management training to prevent smoking relapse. Training was group-based and included mood management skills and standard behavioural techniques for smoking cessation. Group attended 1 session per week for 10 weeks. Nicotine replacement started in week 3 of in the intervention and participants were asked to make quit attempts during weeks 3 and 4 (n=250). Control group were on a 6-month waiting list (n=289). Duration was 10 weeks.	One week after targeted quit date, there was a significantly greater increase in smoking abstinence for intervention group compared to control group. Significance in abstinence between groups remained until 6 months after completion of the intervention. For intervention group, there was a gradual decline in abstinence from week 5 till the 6-month follow-up point. 46% of intervention participants relapsed after 1 week of abstinence.
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bCBT – brief cognitive-behavioural therapy; CBT - brief cognitive-behavioural therapy; NOR – nortriptyline

3.4.5 Study quality

The studies varied in terms of overall quality (Table 7). Three studies received a strong overall rating (Gil-Delgado et al 2011; Sioen et al 2009; Pérez-Moreno et al 2007); four received a moderate overall rating (Battaglia et al 2013; Richmond et al 2012; Cropsey et al 2011; Cropsey et al 2008; Amtmann et al 2001); and five received a weak overall rating (Onyechi et al 2017; Elwood Martin et al 2013; Curd et al 2013; Cashin et al 2008; Gettman et al 1976). Most of the 'weak' studies had selection bias, did not report the withdrawal rates of participants or had high dropout rates of participants. Most studies received a strong rating for study design, considering confounders and using reliable data collection methods.

Table 7 – Ratings of items of methodological quality based on criteria by the EPHPP

	Selection bias	Study design	Confounders	Blinding	Data collection methods	Withdrawals and dropouts	Global rating
Onyechi et al. 2017	Weak	Strong	Weak	Weak	Moderate	Strong	Weak
Battaglia et al. 2013	Moderate	Strong	Strong	Weak	Strong	Moderate	Moderate
Elwood Martin et al. 2013	Weak	Moderate	Weak	Weak	Weak	Weak	Weak
Curd et al. 2013	Weak	Moderate	Strong	Weak	Weak	Strong	Weak
Richmond et al. 2012	Moderate	Strong	Weak	Moderate	Strong	Strong	Moderate
Gil-Delgado et al. 2011	Moderate	Moderate	Strong	Moderate	Strong	Moderate	Strong
Sioen et al. 2009	Moderate	Moderate	Strong	Moderate	Strong	Strong	Strong
Cropsey et al. 2008 & 2011	Strong	Strong	Strong	Moderate	Strong	Weak	Moderate
Cashin et al. 2008	Weak	Strong	Weak	Moderate	Strong	Moderate	Weak
Perez-Moreno et al. 2007	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong

Amtmann et al. 2001	Moderate	Strong	Strong	Moderate	Strong	Weak	Moderate
Gettman et al. 1976	Weak	Strong	Strong	Weak	Strong	Weak	Weak

3.5 Discussion

This is the first systematic review of interventions to improve the cardiovascular health of prisoners during imprisonment. Thirteen studies evaluating 12 separate interventions were included. All but one of these studies were conducted in high-income countries and most involved male prisoners. The interventions that were evaluated were classified into four types: structured physical activity, nutrition, mixed with physical activity and education sessions, and smoking cessation. Eight studies measured outcomes related to the health factors associated with cardiovascular health (Battaglia et al 2013; Elwood Martin et al 2013; Gil-Delgado et al 2011; Cashin et al 2008; Sioen et al 2009; Pérez-Moreno et al 2007; Amtmann et al 2001; Gettman et al 1976), while four studies measured outcomes related to behaviours associated with cardiovascular health (Onyechi et al 2017; Curd et al 2013; Cropsey et al 2011; Cropsey et al 2008). Most of these were short-term outcomes. The majority of studies received a moderate or weak quality rating.

There is a clear gap in the literature regarding interventions to improve the cardiovascular health of prisoners while incarcerated, as evident by the small number of studies identified. This is an important finding considering the high prevalence of modifiable CVD risk factors in this population (Arries and Maposa 2013). The small number of smoking cessation studies in particular is worth noting, considering that smoking could be up to two or three times more prevalent in prisoners compared to the general population (Baybutt et al 2014; Djachenko et al 2015).

3.5.1 Effectiveness of interventions

Given the small number of studies in this review, most of which were not of strong quality, there is limited evidence to support their overall effectiveness in improving the cardiovascular health of prisoners. However, the positive results from some of the studies indicate that interventions involving supervised structured physical activity, diet modification, nutrition education and smoking cessation can improve the cardiovascular health of prisoners while imprisoned.

The four physical activity interventions involved structured exercises that were supervised but differed in terms of duration, frequency, intensity and type of exercise. Three out of the four interventions had significant effects on three or more health-related and physical fitness outcomes (Amtmann et al 2001; Battaglia et al 2013; Gettman et al 1976). This suggests that supervised structured physical activity only can be used as an intervention to improve the cardiovascular health of male prisoners while imprisoned.

Regarding the nutrition studies, two evaluated interventions in which prisoners adopted a passive role where their diets were modified without their input (Gil-Delgado et al 2011; Sioen et al 2009). Both these interventions had significant positive effects on at least two measured outcomes. There can be benefits to providing diet modification interventions to prisoners as many correctional institutions provide diets that are high in salt and calories (Herbert et al 2012). However, the effectiveness of these interventions can be reduced where prisoners have access to canteens which provide foods that are usually high in sugar and fat (Tammam et al 2012). Additionally, many prisoners tend to make unhealthy choices regarding their food intake (Condon et al 2008), and therefore providing nutrition education and support to prisoners to help them make healthier dietary choices may be more feasible. The third nutrition intervention comprised of nutrition education workshops that allowed prisoners to adopt a more active role by taking part in a project and doing homework (Curd et al 2013). There was a significant improvement in nutrition practices for prisoners who received this intervention. Improved nutrition practices could benefit prisoners given that they are provided with healthy food options.

The two studies that evaluated mixed interventions had a positive significant effect on at least one measured outcome (Cashin et al 2008; Elwood Martin et al 2013). However, both studies had small sample sizes and were of weak quality, therefore their effectiveness could not be determined. Both studies usefully incorporated behaviour change techniques (BCTs) which can encourage positive behaviour change (van Achterberg et al 2011). However, neither study mentioned the use of behaviour change theory to guide the choice of BCTs used in their interventions, although one study did base its intervention on the self-identified

health concerns of its participants (Elwood Martin et al 2013; Elwood Martin et al 2009).

Of the three smoking cessation studies, two evaluated the effect of behavioural therapy combined with nicotine replacement on smoking abstinence in prisoners (Richmond et al 2012; Cropsey et al 2011; Cropsey et al 2008), while one evaluated the effect of a behavioural health education programme (Onyechi et al 2017). The interventions by Onyechi et al. (2017) and Cropsey et al. (2011 and 2008) had positive significant effects on reduced cigarette smoking in male prisoners and smoking abstinence in female prisoners respectively. A possible reason for this is that these prisoners received a greater number of support sessions. Intervention participants in the study by Onyechi et al. (2017) received 20 sessions over 10 weeks, while those in the study by Cropsey et al. (2011 and 2008) received 10 sessions. This is in comparison to participants in the study by Richmond et al. (2012), who only received two sessions. Another possibility is that the interventions by Onyechi et al. (2017) and Cropsey et al. (2011 and 2008) were delivered in a group setting; this strategy is considered to be more successful in improving long-term quit rates compared to self-help strategies (Zwar et al 2014). Unfortunately, Onyechi et al. (2017) did not follow-up participants in the long-term. Of the three studies, only Onyechi et al. (2017) gave details to justify the use of BCT, but Richmond et al. (2012) and Cropsey et al. (2011 and 2008) did make reference to previous research based on the use of behavioural therapy to support smoking cessation.

3.5.2 Implications for future research

The majority of studies included in this review were of weak or moderate quality which brings into question the validity of their findings. They were still included in this review as details of their interventions could be useful in the development of future, more robust studies to improve the cardiovascular health of prisoners. Additionally, most of the studies involved male prisoners only but there is a need for more studies involving female prisoners, particularly as they are a prisoner sub-group that is disproportionately affected with CVD risk factors, especially lack of physical activity (Arries and Maposa 2013; Plugge et al 2009). Furthermore, all but one of the studies were conducted in high-income countries, but there is a

need for more research in low- and middle-income countries as they bear the heaviest burden of CVD morbidity and mortality (Mendis et al 2011).

Although the two interventions in which prisoners adopted a more active role were of weak quality (Curd et al 2013; Elwood Martin et al 2013), there are benefits to incorporating this element in future interventions. By giving prisoners a more active role in interventions, for example, involving them in the intervention design, there can be promotion of self-empowerment, encouragement of communication and shared-decision making and other self-care skills which are traditionally difficult to foster in correctional settings (Plugge et al 2014).

Most studies did not describe the process of implementing their interventions, which, given the complexities and influence of the prison environment, is important. Factors such as security and the inflexible nature of the prison regime can create major challenges for prison research (Cislo and Trestman 2013). In this current review, details of security levels were given in six studies (Tables 3-6). Overall though, there was little detail provided on the difficulties of intervention implementation relating to security. One study was unable to directly assess an outcome because prisoners were not allowed to leave the prison to access the equipment required to carry out this assessment (Pérez-Moreno et al 2007). Another study attributed a lack of proper 'institutionalisation' on its difficulty to fully integrate the intervention into the prison regime, but did not explain what this meant (Gil-Delgado et al 2011). Describing the implementation process of these interventions could benefit future researchers who are seeking to improve the cardiovascular health of prisoners.

One limitation to this systematic review was that its quantitative nature did not allow for the exploration of prisoners' experiences with these interventions. Such exploration of prisoners' experiences would be useful in highlighting important issues to researchers who are planning future interventions in a prison setting. Examples of these issues include the benefits to be gained from participation other than improved physical health and behaviour modification, and the challenges and barriers to implementing interventions in prisons. In light of this, a review of qualitative studies examining the experiences of prisoners with

interventions or services that have the potential to either reduce their cardiovascular risk and/or improve their cardiovascular health was carried out.

3.6 Review of prisoners' experiences with interventions to improve cardiovascular health

3.6.1 Introduction

When it comes to the prison setting, there are relatively few qualitative studies in which the first hand experiences of prisoners are documented (Condon et al 2007; Patenaude 2004). While reviewing the literature to identify relevant studies for the quantitative systematic review above, it became clear that there were considerably fewer qualitative studies exploring the experiences of prisoners with interventions to improve their cardiovascular health. Nevertheless, these studies were selected and reviewed in detail. The aim of this review was to explore the experiences of prisoners who participated in interventions to improve cardiovascular health, or who used cardiac services in prison.

3.6.2 Method

The search strategy outlined in section 3.3.1 was also used to identify qualitative, mixed or multi-methods studies that explored prisoners' experiences with interventions to improve cardiovascular health or with cardiac services. The same inclusion criteria were also applied, except that people recently released from prisons, jails and other correctional institutions, were also included. Articles were excluded if they did not include accounts of prisoners' experiences with interventions of services in prison.

3.6.3 Results

In total, 836 articles were retrieved, and after removing duplicates, having screened abstracts and full-texts, 23 articles that included qualitative detail of prisoners' experiences were identified. After applying the exclusion criterion, six articles documenting six studies exploring the experiences prisoners with interventions to improve cardiovascular health, or with cardiac services, were

selected for further review (Table 8). Of these six studies, two (Elwood Martin et al 2013 and Amtmann et al 2001) were previously identified in the quantitative systematic review (section 3.4). Although both studies were not described as mixed or multi-methods studies, they presented some qualitative findings in addition to their quantitative results. The other four studies identified were purely qualitative in nature (Thomas et al 2016; Gallant et al 2015; Parker et al 2014; Gately et al 2006).

Four studies (Gallant et al 2015; Parker et al 2014; Elwood Martin et al 2013; Amtmann et al 2001) explored prisoners' experiences of interventions to improve cardiovascular health in prison. One study (Thomas et al 2016) explored the experiences of ex-prisoners on managing CVD and/or its risk factors while in prison, and included experiences with the health service in prison that sought to help with the management of CVD and/or its risk factors. One study (Gately et al 2006) explored the experiences of prisoners with an intervention and prisoners' experiences on managing long-term conditions in prison.

Table 8 – Studies reporting qualitative findings

Study	Prison type & participants	Aim & method	Findings
Thomas et al. 2016 Country: USA	Recently released ex-prisoners (male & female) who had been imprisoned in prisons with varying security levels	Aim: to explore participants' views on how CVD and/or its risk factors are managed in prison (special focus on health service's involvement) Method: in-depth interviews	There was lack of staff, particularly specialists to deliver specific training and advice about CVD and/or its risk factors. The multiple roles of healthcare providers undermined patient centred care. Participants increased their knowledge of CVD and its risk factors through informal support systems. The trade-off between prisoner security and patient autonomy undermined the successful management of CVD and/or its risk factors.
Gallant et al. 2015 Country: Australia	Male & females from 4 prisons: 3 with varying security levels and 1 with high security	Aim: to explore participants' perceptions of sports and recreation programmes Method: semi-structured interviews	Participants experienced: positive physical & mental outcomes, enhanced sense of emotional & mental wellbeing (feelings of happiness, less stress, etc.), sense of privilege to be able to participate in programmes and a sense of belonging & achievement. The programmes helped to bide time while in prison and helped participants to modify their behaviours & lifestyle. Participants improved their social skills through social interactions.

Parker et al. 2014 Country: England	Males from a young offender institution	Aim: to explore participants' perceptions of a multisport initiative Method: semi-structured interviews & participant observations	The programme helped participants to focus their thoughts & think about future i.e. life after prison. It also helped to bide time while in prison. Participants were provided an alternative to traditional form of exercise in prison i.e. weightlifting. Participants experience a sense of achievement & sense of belonging by being a valued member of a group. Participants' self-esteem & self-confidence were enhanced, and their social skills were improved through the building of relationships. The programme promoted model behaviour.
Elwood Martin et al. 2013 Country: Canada	Females from a medium security prison	Aim: to explore participants' perceptions of a nutrition & fitness programme led by another prisoner Method: open-ended questionnaire	Participants experienced an improvement in physical & emotional well-being. Participants had social support from working as a group. The use of fellow prisoner to deliver the programme made participants feel better understood. The prisoner who led to programme felt a sense of accomplishment from feedback by participants.
Gately et al. 2006 Country: England	Males from 2 category c prisons	Aim: to explore participants' perceptions of barriers and opportunities for managing long-term conditions in prison, and to explore their	The programme was of little use as there was little opportunity to practice behaviours in prison due to lack of access to exercise facilities & a healthy diet. The structured prison regime helped some participants to gain control over their lives.

		experiences with a lay-led self-care programme Method: semi-structured interviews	There was limited ability to access healthcare services & professionals.
Amtmann et al. 2001 Country: USA	Males from a state prison	Aim: to explore participants' views of a wellness programme Method: semi-structured interviews	Participants experienced improved physical and mental health. Participants felt they gained the ability to contribute to society (due to improvements in physical & mental health). The programme increased opportunities to socialise.

The four studies that explored prisoners' experiences with interventions (Gallant et al 2015; Parker et al 2014; Elwood Martin et al 2013; Amtmann et al 2001) mainly reported the prisoners' accounts of the benefits gained from participating in the interventions. Only Gately et al (2006) reported that there was little or no benefit gained from the self-care programme that was evaluated. Both Thomas et al (2016) and Gately et al (2006) reported the prisoners' accounts of the challenges or barriers to the effectiveness of a service or intervention in prison. Four main themes arising from these qualitative findings are presented below.

Interventions can enhance physical, mental, emotional and general wellbeing

Participants reported experiencing improvements to their physical and mental health, as well as their emotional wellbeing. Physical health improvements were based on participants' accounts of improved fitness capabilities (Amtmann et al 2001), weight loss and increased energy (Elwood Martin et al 2013; Amtmann et al 2001). Mental health improvements were based on participants reportedly feeling less stressed, anxious and depressed (Elwood Martin et al 2013; Amtmann et al 2001). Improved emotional and general wellbeing was based on accounts of increased feelings of happiness, self-esteem and self-confidence (Gallant et al 2015; Parker et al 2014), and improved sleeping patterns (Elwood Martin et al 2013). Additionally, many participants reported a sense of pride and achievement from participating in the interventions, which added to an improved sense of general wellbeing (Gallant et al 2015; Parker et al 2014; Elwood Martin et al 2013; Amtmann et al 2001).

Interventions can teach and/or improve essential social skills and behaviours

The participants' accounts revealed that the interventions were seen as opportunities to socialise with other prisoners (Gallant et al 2015; Parker et al 2014; Elwood Martin et al 2013; Amtmann et al 2001). Through these social interactions, participants reported that they had learnt how to interact better with other prisoners, develop respect for each other and become more sociable while

in prison. These social skills in turn helped to improve their mental and emotional wellbeing while in prison.

Young offenders in the study by Gallant et al (2015) reported that the intervention had provided an opportunity for them to learn model behaviour, which could benefit them upon release, such as being a role model.

Interventions can bring about a sense of purpose, belonging and shared identity

Participation in interventions also appeared to create a sense of purpose, belonging, and shared identity among participants. Being part of a group or team, and having opportunities to contribute to the team, for example, by providing social support, made participants feel as though they were valued and gave them a sense of purpose and belonging (Gallant et al 2015; Parker et al 2014; Elwood Martin et al 2013). A sense of belonging by contributing to groups or teams, and by feeling valued for being a part of these groups or teams. This was seen as especially beneficial to participants who had led isolated lives while in prison. In the study by Gallant et al 2015), participants with an Indigenous background appeared to have gained a sense of shared identity as a result of being on the same team.

Having a fellow prisoner lead an intervention also brought about a sense of purpose and shared identity in the study by Elwood Martin et al (2013). Some participants felt that they were better understood because it was one of their peers, and not an external individual, who had led the intervention. The prisoner who had led the intervention reported that she was told that her involvement in the intervention led to participants existing in peace with each other.

The nature of prison regime impedes prisoner autonomy and prisoners' abilities to manage CVD and/or its risk factors and other long-term conditions

Both Thomas et al (2016) and Gately et al (2006) reported on the barriers to or challenges of prisoners' abilities to self-care or self-manage CVD and other long-term conditions. In both studies, the nature of the prison regime, for example, high levels of security (Thomas et al 2016) and an inflexible regime

(Gately et al 2006) impeded prisoner autonomy and prevented them from performing self-care or self-management activities. For example, some participants who had serious long-term conditions such as type 2 diabetes, were not allowed to use needles to inject insulin in the study by Thomas et al (2016), as needles were considered to be a security risk in some prisons. In the study by Gately et al (2006,) participants reported that they were not allowed to practice what they had learnt in a self-care intervention as the inflexible prison regime did not allow them to carry out these activities such as eating a healthy diet and exercising.

3.6.4 Discussion

Section 3.6 provided a review of studies that qualitatively explored prisoners' experiences of interventions to improve cardiovascular health, or of cardiac services. Six articles detailing six studies were included. As with the studies reviewed in the systematic review above, all six studies were conducted in high income countries. Three studies explored the experiences of male prisoners only (Parker et al 2014; Gately et al 2006; Amtmann et al 2001), two explored the experiences of both male and female prisoners (Thomas et al 2016 and Gallant et al 2015), and one explored the experiences of female prisoners only (Elwood Martin et al 2013). The studies mostly reported on participants' accounts of the benefits gained from participating in interventions. Only two (Thomas et al 2016 and Gately et al 2006) reported on the barriers to and challenges of managing CVD and/or its risk factors, and other long-term conditions in prison.

The findings showed that prisoners experienced many benefits, not only to their physical and mental health, but also to their emotional wellbeing and personal development, as a result of participating in these interventions. These findings should be encouraging to prison researchers and stakeholders involved in healthcare and health promotion staff, as they show that such interventions can positively impact on prisoners, and are worth doing.

The benefits to prisoners' physical and mental health are expected, as these are more frequently reported in studies that have evaluated other health-related interventions (Kouyoumdjian et al 2015). On the other hand, the social benefits

that were reported by prisoners, such as improved social skills and a sense of purpose and belonging, are less-reported in the prison literature. This is most likely due to the existence of fewer qualitative studies exploring prisoners' experiences with interventions in general (Patenaude 2004). Thus, researchers should give some consideration as to how these benefits can be captured when evaluating interventions in prison.

One of the findings from this review highlighted the negative influence of the prison regime on preventing or managing long-term conditions such as CVD. This finding reinforces the point highlighted in section 3.5.2, that the nature of the prison environment poses a challenge to the successful implementation of interventions in this setting. This finding also shows that for prisoners to engage in self-care or self-management activities, they need a certain degree of autonomy which is rarely afforded in prison (Thomas et al 2016; Gately et al 2006). This has implications for the sustainability of interventions in prison, and shows the need for continued support for prisoners after interventions have ended.

Similar to the review of quantitative studies which found that there was little reporting on the implementation process of interventions, this review found that few studies explored prisoners' views on the implementation of the interventions. Only Elwood Martin et al. (2013) reported views on one prisoners' experience with the use of a peer to deliver the intervention, and the views of the peer leader's experience. Although this was just one study, it supports an increased recognition from prison researchers about the benefits to prisoners leading and supporting the delivering of interventions (Bagnall et al 2015; Woodall et al 2015).

To conclude, this review of studies presenting qualitative findings of prisoners' experiences with interventions to improve cardiovascular health or with cardiac services shows that there are benefits to be gained from such interventions. The small number of these studies highlight a need for more qualitative research so that prisoners' experiences can be considered and learned from. The review also highlights the need for prisoners' views into the implementation process of interventions, as this could help researchers to understand to better integrate interventions into the prison regime.

3.7 Chapter summary

This chapter reports the findings of two reviews: one was a systematic review of quantitative studies examining the effectiveness of interventions aimed at improving the cardiovascular health of prisoners during imprisonment. The other was a review of studies presenting qualitative findings on prisoners' experiences with interventions to improve cardiovascular health or with cardiac services.

The systematic review is the first of its kind to examine such interventions. Overall, the findings suggest that interventions involving supervised structured physical activity, diet modification, nutrition education and smoking cessation can improve some of these risk factors of CVD such as blood pressure, cholesterol levels and smoking status. However, more rigorous studies are needed to increase the evidence base as there was a lack of high quality studies. The majority of studies used male prisoners and assessed only the short-term effectiveness of the interventions. Although some studies incorporated behaviour change techniques, there was minimal reference made to behaviour change theory to justify the use of these techniques within the interventions.

The reviews of studies presenting qualitative findings of prisoners' experiences showed that there were benefits to be gained from introducing these interventions in the prison. Benefits include improved physical and mental health, improved emotional wellbeing and personal development. The review highlighted the need for more qualitative research to explore prisoners' experiences with interventions, as there were very few studies that currently did this.

Both reviews found that there was little information provided regarding the implementation process of interventions given the challenges of prison environments. Future studies should provide more detail on the intervention implementation process within the prison setting, as this information could help other researchers to understand and prepare for the challenges posed by the prison setting.

Future research should also include female prisoners, assess short-term and long-term outcomes to evaluate intervention effectiveness, and support the use of behaviour change techniques with evidence-based theory.

As there are still many gaps in the literature with regards to what is required for an intervention to reduce risk factors of CVD and improve cardiovascular health of prisoners, a qualitative enquiry is necessary to explore what may be needed for such an intervention. The next chapter presents the rationale and methods for this qualitative study.

Chapter 4: Study rationale and methods

4.1 Introduction

This chapter presents the rationale for the study, the philosophical underpinnings that guided the research, the study design and the procedure for data collection and analysis methods.

4.2 Study rationale and design

4.2.1 Rationale

The rationale for this study is based on four main points drawn from Chapters 2 and 3 of this thesis. First, prisoners are disproportionately affected by cardiovascular disease (CVD) risk factors and therefore have an increased risk of CVD compared to the general population. It was highlighted that Scottish prisoners had a high prevalence of CVD risk factors (Graham 2007), and that currently, there were no specific strategies or interventions that targeted the reduction of these risk factors during imprisonment.

Second, while the knowledge and risk perceptions of CVD from the perspectives of the general population have been explored, this has not been done in the prison population. Research has shown that there are multiple influences in the prison setting that can considerably impact prisoners' health and health behaviours, but little is known about how prisoners and prison staff view these in relation to CVD risk. Thus, an exploration of the knowledge of CVD and how CVD risk is perceived by prisoners and staff who have a role in promoting the health and wellbeing of prisoners.

Third, the effectiveness of existing interventions to improve prisoners' cardiovascular health cannot be determined, as these were few in number, generally lacked strong methodological quality and did not measure long-term behaviour change. Thus, little is known what specific components of such interventions are needed to achieve effective and sustainable cardiovascular risk reduction intervention in the prison setting.

Fourth, the concept of self-care is embedded in cardiovascular risk reduction (Riegel et al 2009), and therefore, it needs to be embedded within any future intervention aimed at reducing prisoners' risk of CVD. An individual's ability to self-care is influenced by a range of factors including self-efficacy and locus of control (Wilkinson and Whitehead 2009). However, in the prison setting where security is the main priority and prisoners' freedom is limited, it can be challenging to support self-care as a necessary component of cardiovascular risk reduction. It is therefore important that the barriers and challenges of the promotion of self-care within the prison environment be identified, so that they can be addressed.

4.2.2 Study design

This study was designed as an exploratory study. It takes a qualitative approach and used semi-structured interviews to collect data once from prisoners and staff who have a role in prison health promotion and healthcare.

From the rationale for the study, it was established that this research aimed to understand the views of participants regarding two main phenomena: CVD and CVD risk. The research also sought to explore how these views can be used to guide the development of a future intervention to reduce prisoners' risk of CVD. It was decided that a qualitative study would be most suitable for this purpose. Qualitative research seeks to describe phenomena in social and organisational contexts, and is concerned with meanings and interpretations (Silverman 2014; Lapan et al 2012). In this case, I was interested in understanding what participants knew about CVD and how they perceived prisoners' risk of CVD. A qualitative approach enables the understanding and interpretation of multiple perspectives, and was therefore considered to be most appropriate approach for this exploration.

4.2.3 Objectives

The overall aim of this study is to explore the knowledge and risk perceptions of CVD from the perspectives of prisoners and staff to guide the development of a future intervention to reduce prisoners' risk of CVD. To address this aim, the following objectives were identified:

1. To explore the prisoners' knowledge of cardiovascular disease.
2. To explore the prisoners' perceptions of their risk of cardiovascular disease.
3. To explore the staff's perceptions of prisoners' risk of cardiovascular disease.
4. To compare the prisoners' and staff's views on prisoners' cardiovascular risk.
5. To identify the factors that influence prisoners' cardiovascular health.
6. To obtain feedback and suggestions on a proposed intervention for cardiovascular risk reduction from the prisoners and staff.
7. To propose a theoretical framework to guide the development of a future cardiovascular risk reduction intervention for prisoners.

4.3 Philosophical underpinning

In a qualitative study, it is important for the researcher to outline their philosophical position as this is what guides the study's design and methods. The first philosophical position relates to ontology, which is the nature of existence and what constitutes reality (Gray 2014, p.19). In other words, the researcher seeks to explain if the phenomenon under investigation is real, i.e. if it exists independently of human belief or understanding, or if it is a construction of human belief.

4.3.1 Ontological position

Ontological positions can be considered as occurring along a 'spectrum' that is bordered by two extremes. At one extreme is positivism, which assumes that reality is external to human belief, can be observed and can be replicated under similar circumstances (Lapan et al 2012). At the other extreme lies interpretivism, which assumes that reality is socially constructed and based on beliefs and perceptions that arise out of interactions in social settings (Lapan et al 2012). With regards to this study, the main phenomena under investigation are CVD and CVD risk. Therefore, the following question was considered in relation to my ontological position: are CVD and CVD risk constructions of the beliefs or

perceptions of prisoners and staff, or are they real phenomena that occur independently of these beliefs?

CVD is an umbrella term for a group of chronic diseases, all of which are diagnosable, and widely documented in the literature (Mendis et al 2011). There is considerable information on the modifiable and non-modifiable risk factors of CVD, and the impact of these factors worldwide (Yusuf et al 2004; Yusuf et al 2001). Additionally, an individual's CVD risk can be quantified using several CVD risk calculators (HEART UK 2016). Therefore, CVD and CVD risk are real phenomena that exist independently of human belief or understanding, and people can be at risk of CVD, or have CVD whether they believe this or not.

However, human beliefs about CVD can be mediated by social influences such as social media and interactions with family members who have/had experiences with CVD (Clark et al 2007). These beliefs in turn can influence perceptions of CVD risk and related health behaviours (Emslie et al 2001; Reid and Clark 2001). Therefore, people's perceptions, attitudes and beliefs in relation to CVD need to be understood to fully explain the nature of both phenomena.

The two groups of participants in this study are prisoners and staff. Both groups share the same setting, but there will ultimately be differences in perceptions and experiences between and within these groups due to their different roles and experiences in and out of prison. Prisoners, unlike staff, live among other prisoners and there is a strong possibility that their knowledge, perceptions and behaviours can be influenced by their peers. Due to a strict prison regime, prisoners often have limited autonomy and this too can strongly influence behaviours and perceptions. Prisoners may also be influenced by staff, particularly those with whom they have regular contact. Likewise, staff can be influenced by their interactions with other peers and prisoners. It is then possible to see how knowledge and risk perceptions of CVD can be contextual given the multiple social influences in this setting. Therefore, both phenomena cannot be fully understood within the context of the prison without investigating the prisoners' and staff's perceptions.

From an ontological perspective, the assumption that a phenomenon is real but cannot be fully measured or known is reflective of a critical realist position.

Critical realism follows the view that “the way we perceive facts, particularly in the social realm, depends partly on our beliefs and expectations” (Bunge 1993: 231). Therefore, critical realists believe that reality exists independently of human beliefs, but is only understood through the perceptions and interpretations of individuals (Ritchie et al 2014). In this study, it is important to understand within the context of the prison setting, how CVD is understood, how CVD risk is perceived, and what are the potential influencing factors of the prisoners’ cardiovascular health. Gaining an understanding of these would help to guide the development of a future intervention to reduce prisoners’ risk of CVD.

Therefore, I approach this study from a critical realist perspective.

4.3.2 Epistemological position

The second philosophical position to be considered relates to epistemology or the theory of knowledge. This relates to how the phenomenon under investigation is known and learned. Ritchie et al. (2014) outlined several epistemological positions, of which the two main ones were inductive and deductive logic. Inductive logic is a ‘bottom-up’ approach that deals with building knowledge through observations, while deductive logic is a ‘top-down’ approach that applies theory to observations to test the strength of this theory (Ritchie et al 2014). In this study, the following question was considered in relation to my epistemological position: how can knowledge of CVD and perceptions of prisoners’ CVD risk within the prison context be understood?

The complexity surrounding the factors that contribute to cardiovascular risk is less investigated in prison populations compared to the general population. Therefore, we do not know if current theory and the knowledge that applies to the general population is applicable to the prison setting. For this reason, I adopted a combined approach using inductive and deductive logic to learn how CVD and CVD risk are understood and perceived by prisoners and staff. This approach allowed for the incorporation of existing theory relating to the main phenomena, and for new theory to emerge based on the data gathered. This combined approach was taken because there may be a gap between the pre-existing,

deductively derived knowledge of CVD and CVD risk, and the perceptions of these on the part of prisoners and staff.

4.4 Setting

This is a high security male prison operated by a company on behalf of the Scottish Prison Service (SPS). The daily regime of the prison is structured with fixed times for prisoners to eat, work and attend health promotion initiatives including the gym (Table 21, Appendix 1). A private company is contracted to provide all the food in the prison. The prisoners are served three main meals each day: breakfast, lunch and dinner. They are provided with meal choices from four menus, and are allowed to choose from one menu every day. There are a range of foods offered on these menus including salads, sandwiches and fried food, for example, fish and chips, and menus are usually changed every four weeks. There is also a canteen in the prison which most prisoners can access up to three times a week. This contains a wide range of food items including fruits, tinned meats, pasta and snacks such as chocolates and crisps. It also contains other items such as food supplements (e.g. vitamins and protein powders) and non-food items such as cigarettes and deodorants, and prisoners are allowed to buy any number of food items from the canteen once they can afford to do so.

4.5 Participants – prisoners

4.5.1 Population

The prison has a capacity for up to 500 prisoners aged 18 years and over. It houses four categories of prisoners: remand prisoners (those awaiting trial), short-term prisoners (sentenced to less than four years), long-term prisoners (sentenced to four years or more), and life prisoners. The percentages of each prisoner category within the overall prisoner population are shown in Figure 2 (based on a population of 488 prisoners at the beginning of September 2016). During talks with the steering group, I was informed that access to the remand and segregation prisoners (those who were placed in the segregation unit for

security reasons) was not possible. Thus, I was only allowed to recruit prisoner participants from the population of short- and long-term prisoners.

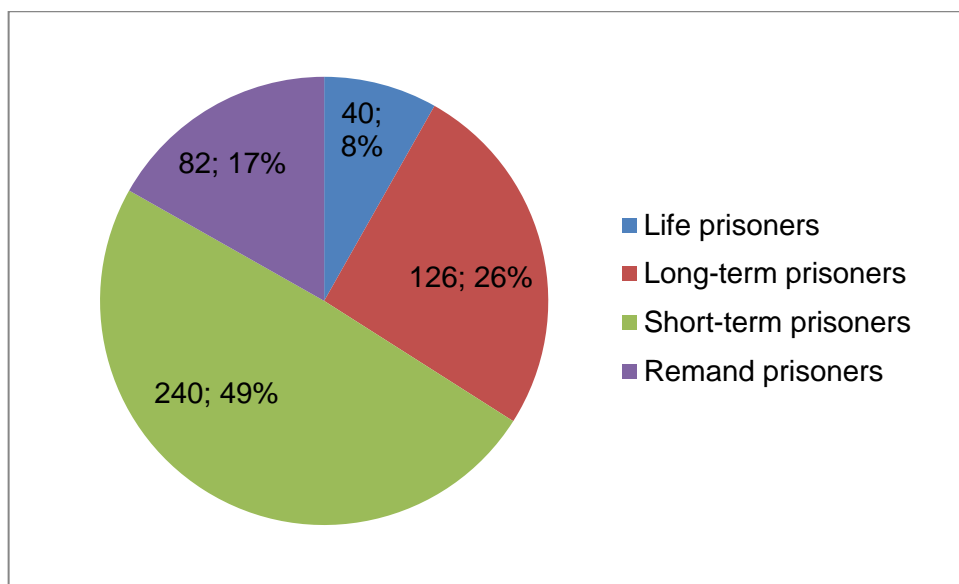


Figure 2. **Prisoner population at the beginning of September 2016**

Within this population, there are a small group of prisoners known as ‘health champions’. These were prisoners who underwent training and were awarded the Royal Society for Public Health (RSPH) Level 2 qualification in Health Awareness. They also received additional training in oral health and tobacco control by the local NHS board. Their role was to provide peer support to other prisoners who wished to make lifestyle changes, for example, encouraging prisoners to seek support from a professional. The health champions also supported the delivery of health promotion (HP) interventions in the prison. The health champions’ role made them of special interest to this research.

4.5.2 Inclusion and exclusion criteria

Inclusion criteria

Prisoners were eligible for inclusion in the study if they:

- expressed interest in participating in the study
- met the prison’s requirements of current good behaviour for participating in a study

Exclusion criteria

Prisoners were excluded from the study if they were:

- on remand, as they were awaiting trial and not allowed to participate in studies in the prison
- housed in the segregation unit, as they were placed there due to unfavourable behaviour and their participation in the study could risk the researcher's safety
- not English-speaking, as the number of these prisoners was very small and the study had a limited time frame

4.5.3 Sample, sampling strategy and recruitment

There are numerous factors that need to be considered when determining the sample size for a qualitative study (Baker et al 2012). These include the level of heterogeneity of the population, the number of selection criteria and the budget and resources available (Ritchie et al 2014). I was interested in recruiting a sample of prisoners who could provide a range of perspectives relating to the objectives of the study. In particular, a range of perspectives were needed to identify as many factors as possible that had the potential to influence prisoners' cardiovascular health. As identified in Chapter 2, some of these influencing factors include health behaviours such as physical inactivity, unhealthy eating and smoking. It was therefore important that the sample of prisoners was varied with regards to health behaviours. According to Biddle and Mutrie (2008), increased physical activity frequency has shown to be associated with increased motivation to engage in positive health behaviours. Using this logic, it was decided that a sample of prisoners with varying degrees of physical activity frequency be recruited, to increase the chances of gaining a range of perspectives. For the purpose of this study, self-reported exercise frequency was used as an estimate of physical activity frequency, and was classified as:

- high – five or more days of exercise per week
- medium – three or four days of exercise per week
- low – zero to two days of exercise per week.

According to Guest et al. (2006), 15 interviews are suitable for obtaining sufficient data for analysis in qualitative studies, however as little as six interviews maybe be adequate to obtain meaningful themes that reflect the extent of the phenomena under investigation. Many qualitative studies sample until saturation is achieved, and Green and Thorogood (2014) suggest that this is usually achieved after 20 interviews. On the basis of few selection criteria, the limited time frame for data collection and the intention to interview two groups of participants for the study, I aimed to recruit 20 participants; 10 prisoners and 10 members of staff.

In terms of the sampling strategy, a combination of purposive and snowball sampling was used to recruit prisoners who varied in terms of exercise frequency. I was not allowed to access the prison wings to recruit prisoners for security reasons, and therefore had to use other methods to recruit these participants. The steering group recommended that I interview the three health champions because they were potential information-rich sources due to their involvement with HP interventions in the prison and their interactions with other prisoners. The health champions were each sent a letter which contained information about the study and an invitation for them to participate (Appendix 2). They were also each sent a promotional poster, a flier containing information about cardiovascular disease, a participant information sheet and consent form (Appendix 2). A short 'lay' title was used on all materials to aid easy communication as some prisoners may have had low literacy levels. The health champions were asked to sign the consent form if they were interested in participating in the study, and to give the form to a key contact within the prison, i.e. a member of the prison staff who was provided with information about the study. This person then returned the signed consent forms to me via post in a prepaid envelope.

For the recruitment of other prisoners, promotional posters and fliers were displayed for three weeks in the main gymnasium area, healthcare unit and education centre within the prison as they were frequented by most prisoners on a daily basis. The prisoners who wanted to participate in the study were advised to express their interest to the key contact within the prison. Interested prisoners were then provided with information sheets and consent forms, and advised to return the signed consent forms to the key contact. Signed consent forms were

then sent to the researcher via post in pre-paid envelopes. Seven prisoners were recruited through this process.

After interviewing this sample of 10 prisoners, including the three health champions, it was determined that there was not enough variation among participants in terms of physical activity levels, as most of the prisoners reported exercising three to six days per week. To recruit prisoners with lower physical activity levels, i.e. zero to two days of exercise per week, the health champions were asked to identify potential participants who they knew to be less physically active. The health champions were given participant information sheets and consent forms to pass on to interested prisoners. Through this process, six additional prisoners were recruited giving a total sample size of 16 prisoners. Given that prison staff considered health champions to be charismatic and influential, there was a small possibility that the use of these health champions to recruit other prisoners may have resulted in some coercion. To reduce the chances of this, I made sure to ask each prisoner if their participation in the study was voluntary, and explained the purpose of the study and what was required of them before the start of each interview (section 4.5.5).

4.5.4 Informed consent

Written consent was obtained from all prisoners and health champions prior to starting the study. It was important that the prisoners had a clear understanding of the nature of their involvement in the study and that they did not feel coerced into participating. Therefore, all materials for prisoners, i.e. posters, fliers, participant information sheets and consent forms, were written in plain language to cater for low literacy levels (Prisoners' Education Trust 2015), and images were used wherever possible. The following steps were taken with regards to informed consent for prisoners:

- The prisoners were informed that participation in the study was entirely voluntary and they would be able to withdraw from the study at any point in time without giving a reason. They were advised that the prison administration would not be informed and that their stay in the prison would not be affected

if they chose to withdraw from the study, for example, any prospects of parole would not be affected.

- The use of a digital audio device to record interviews was highlighted to prisoners and they were advised that the information recorded would be kept strictly confidential and anonymous. However, they were made aware that if any of their responses at interview raised concerns about their health or safety, the safety of others or related to illegal activities, this information would need to be passed on to the prison staff.
- The prisoners were informed that they were not required to answer any questions that they did not wish to answer.
- The prisoners were informed that a prison officer would always be located outside the interview room in case the researcher required any assistance.

4.5.5 Data collection procedure

Semi-structured interviews were conducted with the prisoners in a room within the main gym area of the prison. This room was private which ensured the confidentiality of the interview. Interviews were conducted face-to-face and were either on a one-to-one basis or in groups, depending on the preferences of the prisoners. Before the start of each interview, I asked each prisoner if their participation was voluntary, and explained the purpose of the study and their involvement to them again. This was done to determine if there had been any coercion involved in their participation in the study.

I used a broad interview guide containing questions relevant to addressing the aims and objectives of the study (Appendix 3). The interviews with prisoners lasted between 15 to 50 minutes, and each participant was interviewed once. The sessions were recorded using a digital audio device and data were transcribed verbatim later. Each participant was assigned a unique identifying number which was associated with that individual's audio recording, transcript and set of field notes.

4.6 Participants – staff members

4.6.1 Population

The population of staff in the prison consists of members of the prison and NHS staff who had a role in promoting the health and wellbeing of prisoners. Members of staff belong to one of the following groups:

- Prison officers who work in health promotion (HP) and deliver HP initiatives and health education to prisoners in the main gym.
- Prison managers employed by the prison service who approved the running of health promoting activities in the prison and were familiar with the day-to-day running of the prison regime.
- NHS staff who have a role in the prisoners' healthcare. These include staff who work in the healthcare unit, the addictions unit and the psychology unit.
- NHS staff who work in HP but are not based in the prison. These include smoking cessation staff.

One of the four health-related services, the HP service, is managed by the prison with input from the HP staff from the NHS. The other three services, the healthcare, addictions and psychology units, are managed by the NHS.

4.6.2 Inclusion and exclusion criteria

Inclusion criteria

Staff were included if they belonged to anyone of the four groups mentioned above.

Exclusion criteria

NHS staff were excluded if they never had a role in HP interventions for prisoners. Prison staff, for example, prison officers, were excluded if they did not have a role in HP interventions for prisoners, or approval for them.

4.6.3 Sampling strategy and recruitment

Purposive sampling was used to obtain a sample of 10 staff members who could provide the richest data to satisfy objectives 3-6. Members of the steering group identified potential staff members and provided their contact information. The use of the steering committee to recruit staff members meant that I had minimal control over the recruitment process, and that there was an increased likelihood for coercion to participate in the study. However, steps were taken to determine if any coercion had taken place before the start of each intervention (section 4.6.5).

A letter of invitation to participate in the study was sent to the identified staff members via post (Appendix 2). The letters contained information about the study and staff members were instructed to contact me if they were interested in participating in the study. Those that contacted me were each sent a participant information sheet, consent form and prepaid envelope via post. The signed consent forms were then returned to me.

A week after the signed consent forms were obtained, the participants were contacted and a date and time to conduct the interview were arranged. In total 11 staff members were recruited: seven NHS and four prison staff. This number was considered suitable for the collection of data on the staff's perspectives of prisoners' CVD risk, the influencing factors of prisoners' cardiovascular health, and the proposed intervention.

4.6.4 Informed consent

Written consent was obtained from the staff before the start of the study. Staff were asked to sign the consent form and indicate their preference for a one-to-one or pair interview.

4.6.5 Data collection procedure

As with the prisoners, the staff participated in face-to-face semi-structured interviews that were either on a one-to-one or group basis, depending on their preferences. Similar to the prisoner interviews, I asked each staff member if their

participation was voluntary, and explained the purpose of the study and what was required of them before the start of each interview. Again, this was to determine if any coercion had occurred, particularly as these participants were recommended by the steering group.

A broad interview guide containing questions relevant to the staff sub-groups and to the aims and objectives of the study was used during interviews (Appendix 3). For staff based in the prison, interviews took place in the private room located within the main prison gym. For NHS staff based outside of the prison, interviews took place at the hospital of the local NHS Health Board in which they were based. The sessions lasted between 20 to 60 minutes and each participant was interviewed once. These sessions were recorded using an audio recorder and the data transcribed verbatim later. Each participant was assigned a unique identifying number which was associated with that individual's audio recording, transcript and set of field notes.

4.7 Ethical considerations

Ethical approval for the study was granted by three research and ethics committees: the School of Health Sciences Ethics Committee, the West of Scotland Research Ethics Committee, and the Scottish Prison Service (SPS) ethics committee. The SPS ethics guidance was designed to ensure the research proposal complied with the ethical codes of conduct pertinent to the prison setting. After approval was granted by the ethics committees, formal permission to conduct the study was granted by the management of the prison.

Ethical considerations relate to the nature and purpose of the study. Confidentiality, anonymity and safeguarding against risks were key considerations. As some of the study's participants were prisoners, I was required to take part in a training workshop for non-custodial staff. This provided information on the prison's rules and procedures for undertaking research in prisons. The researcher also had to obtain Enhanced Disclosure from Disclosure Scotland to certify that she was safe to work with prisoners.

4.7.1 Confidentiality and anonymity

In order to ensure the confidentiality of staff and prisoner identities and the information provided, the researcher followed the recommendations of the six Caldicott Principles (Caldicott Committee 1997). For example, minimal personal identifiable data were used, specific information was accessed on a strict need to know basis, and law outlined in the Data Protection Act 1998 was followed. The researcher ensured that no identifiable data for both staff and prisoner participants would be used in presentations, reports and publications.

4.7.2 Potential risks and safeguards for these risks

At the start of the study, the probability of any major risks to the participants was deemed to be low. There was a small chance that prisoners would become emotional when discussing certain topics, for example, when speaking about their health. To protect against this, a member of the healthcare staff who had experience in counselling was always on standby if such a situation arose. At the start of each interview, I also reminded the participants that they had the right to refuse to answer any questions if they were not comfortable.

There was a small chance that my safety would have been threatened when interviewing the prisoners. Through the non-custodial training workshop, I understood that it was my responsibility to ensure that I did not place myself into a situation that I deemed to be unsafe. I also undertook two sessions of personal protection training in which I learnt how to defend myself should I ever be threatened by a prisoner. Additionally, a prison officer was always located within hearing distance of the interview room, so that in the unlikely event that I was threatened, I would have been able to alert them immediately.

4.8 Data management and analysis

4.8.1 Introduction to Framework analysis

There are a number of approaches to qualitative analysis including thematic analysis and the grounded theory approach. Framework analysis was the approach used in this study to manage and analyse the data. It is a form of

thematic analysis, a method for “systematically identifying, organising and offering insight into patterns of meaning across a data set” (Braun and Clarke 2012, pg. 57).

Framework analysis was chosen over other forms of analysis in this study for many reasons. First, as explained in section 4.3, the study set out to explore the perspectives of prisoners and staff regarding CVD and prisoner’s CVD risk from a critical realist perspective. Therefore, I had knowledge of existing theory related to CVD before entering into data analysis. The grounded theory approach, which is more aligned to a social constructionist perspective, was not considered suitable in this context as it dealt with emerging issues (Lawrence and Tar 2013). Interpretative Phenomenological Analysis (IPA) was also considered, but it was ruled out as it involved a detailed examination of participants’ lived experiences (Smith and Osborn 2007), which was not the aim of this study.

Second, framework analysis was chosen as it enabled a systematic and transparent approach to thematic analysis of the data. In particular, it allows for the direct comparison of responses from different categories of respondents – step 5 (Table 9) involves the creation of matrices highlighting the similarities and differences in the perspectives of respondents. As one of this study’s objectives (objective 4) was to compare the prisoners’ and staff’s views on cardiovascular risk, the use of matrices in framework analysis was thought useful to aid this comparison.

Third, the steps of framework analysis ensure that the data analysis procedure remains grounded in the data (Ritchie et al 2014). In other words, as themes move from being more descriptive to more analytic in nature, the essence of the data is not lost. The steps taken to achieve this are described in section 4.8.3.

There are two versions of framework analysis. The first version outlined by Ritchie et al. (1994), appears to still be favoured version by researchers who use the method. This is based on searches I did to gather literature on the use of framework analysis in qualitative studies. There is a second version that was released by Ritchie et al. (2014) and is the version used in this study (Table 9). There are some differences between the 1994 and 2014 versions of framework

analysis (Table 9). The main difference is that the thematic framework is finalised at a later stage, and analysis of the data is treated as additional steps.

Table 9 – Comparison between the 1994 and 2014 version of framework analysis

Steps	First (1994) version	Second (2014) version	Comments for 2014 version
1	Familiarisation	Familiarisation	No change from first version
2	Identifying a thematic framework	Constructing an initial thematic framework	No change from first version apart from the name
3	Indexing	Indexing and sorting	Similar to first version, but the thematic framework is not finalised in this step
4	Charting	Reviewing data extracts	The thematic framework is reviewed and finalised
5	Mapping and interpretation	Data summary and display	Same as step 4 (charting) of the first version; charts are referred to as 'matrices'

Framework analysis has been increasingly used in health research within a variety of contexts, for example, in studies investigating the socioeconomic factors affecting cardiac rehabilitation (Pedersen et al 2017), disordered eating patterns in coeliac disease (Satherley et al 2017), and nursing students' learning regarding experiences of living with chronic conditions (Olson et al 2016). It has also been used to explore people's perspectives of managing long-term conditions in prison (Gately et al 2006).

The reader should note that there are two disadvantages to using framework analysis. First, the method is time-consuming and resource intensive. Second, it is believed that the successful use of framework analysis is dependent on a multi-disciplinary team lead by a qualitative 'expert' on the method (Gale et al 2013). Non-experts can carry out this process but there should be input by a researcher who has experience in qualitative data analysis (Gale et al 2013). This study was undertaken by me, a doctoral researcher, and was time-limited. However, the

study was guided by a team of four supervisors, two of whom were involved in the creation of the thematic framework. This helped to ensure the credibility of the research process (section 4.9).

4.8.2 Transcription

The tool 'Listen N Write' was used to transcribe all interview recordings. This tool included special features which were specifically designed for transcription (Download.com 2013). All transcription of interviews was done by myself and the transcripts were saved as Microsoft Word documents. Although this was a lengthy process, transcribing the interviews allowed me to become familiar with the data from the start. After each interview was transcribed, the document was double checked for errors and then uploaded into NVivo 11 (QSR International 2016). NVivo is a computer-assisted qualitative analysis software (CAQDAS) that is commonly used by researchers to enable the handling of large amounts of qualitative data (Ritchie et al 2014).

4.8.3 Management of data

The steps involved in the management of data are those described by Ritchie et al (2014).

Familiarisation

I became familiar with the data by initially listening to each interview recording and rereading its associated transcript and field notes. In total, 23 transcripts (13 from prisoner interviews and 10 from staff interviews) were examined. Eight transcripts, i.e. four prisoner and four staff transcripts, that were judged as the most representative of all the transcripts in terms of data coverage, were then selected for examination. Each of these transcripts were examined independently and in greater detail by myself and my two main supervisors.

Each researcher labelled data extracts from these eight transcripts, i.e. assigned phrases which gave meaning to the extracts. Following this, all labels that applied to the same broad area were grouped together. For the purposes of this analysis, an 'area' was a group of labels that related to the same concept or

idea. The term 'broad' was used in this early stage of the analysis process to connote my initial thoughts about the data and were descriptive in nature. These broad areas were based on the study's objectives, the questions in the interview guides and reoccurring topics throughout each transcript. After the researchers had completed this step independently, we came together to discuss the labels and broad areas that had been identified. Based on these discussions, seven broad areas were created at this initial stage:

1. Participant characteristics
2. Knowledge of CVD and its risk factors
3. Perceptions of prisoners' risk of CVD
4. Factors that facilitated or hindered engagement in health behaviours
5. Experiences of prisoners and staff with current or past HP interventions
6. Feedback on the proposed intervention
7. Miscellaneous

A miscellaneous area was created for all the labels that did not fit into one of the other seven broad categories.

Construction of initial thematic framework

A combined inductive and deductive approach was used to construct an initial thematic framework which was descriptive in nature. This approach involved the examination of each of the seven broad areas and their assigned labels from the familiarisation stage. This was based on a priori issues, emergent issues and analytic themes arising out of the data. During supervision meetings, the initial themes, subthemes and their meanings were discussed to ensure that they made sense and were relevant to the objectives of the study. Any subthemes that were not thought to be relevant to the study's objectives were removed from the framework. In this way, the construction of the initial thematic framework was an iterative process.

At this stage, all labels that occurred under the 'miscellaneous' broad area were incorporated into the other areas, and this area was removed. Each broad area was then renamed as an 'initial theme', and a description was added to ensure that data extracts were appropriately placed. Each initial theme was broken down into smaller, more coherent chunks, referred to as initial subthemes (Table 10).

Table 10 – Initial thematic framework

Initial themes	Initial subthemes
Participant characteristics Description: Characteristics of prisoners that are relevant to the study.	<ul style="list-style-type: none">• Length of prison sentence• Age group• Current health issues• Past health issues• Other
Prisoners' knowledge of CVD and its risk factors. Description: What prisoners know about CVD and its risk factors.	<ul style="list-style-type: none">• Knowledge of pathophysiology of CVD• Knowledge of cardiovascular events (heart attacks, stroke, angina, etc.)• Knowledge of risk factors (high cholesterol, smoking, family history of CVD, etc.)• Never heard of CVD or limited knowledge of it• Other
Prisoners' and staff's perceptions of prisoners' CVD risk. Description: Prisoners' perceptions of their risk of CVD while in prison, and staff's perceptions of prisoners' CVD risk.	<ul style="list-style-type: none">• Who is at risk of CVD• Personal reasons for being at risk of CVD• Institutional reasons for being at risk of CVD• Reasons for not being at risk of CVD• Other
Factors that facilitated or hindered engagement in health behaviours. Description: Factors that were a facilitator or barrier to a prisoner engaging in any health behaviour related to CVD risk or cardiovascular health.	<ul style="list-style-type: none">• Stages of a prison sentence• Factors that triggered sudden behaviour change• Interactions with other prisoners• Attitudes towards fitness and exercise• Interactions with family members• Interactions with prison staff and outside agencies• Factors related to the prison rules and regime• Institutional factors• Other

Initial themes	Initial subthemes
Experiences of prisoners and staff with current or past health interventions. Description: Experiences, both positive and negative, that prisoners and staff had with current or past health interventions in prisons.	<ul style="list-style-type: none"> • Intervention adherence and dropout rates • Communication techniques/strategies • Other
Opinions of the proposed intervention. Description: Opinions that prisoners and staff had about the proposed intervention. Includes what prisoners wanted to be covered as part of the intervention.	<ul style="list-style-type: none"> • Perceived personal benefits • Topics of interest • Other

Indexing and sorting

The initial thematic framework was then applied to the remaining 15 transcripts. Those parts of the data from the transcripts that were judged to be related to specific subthemes were assigned to these. Any data that did not match any of the existing subthemes were labelled as ‘other’ under the appropriate theme. Once this entire process was finished, all data extracts labelled as ‘other’ were given names and added to the list of subthemes under the relevant theme.

Reviewing data extracts

All data extracts were reviewed to ensure that no important themes or subthemes were excluded. At this stage, it was decided that the theme ‘participants’ characteristics’ would be removed, and instead, demographic and personal data would be added to quotes reported in the results (Chapters 5, 6 and 7). Additionally, two other themes from the initial framework, ‘experiences of prisoners and staff with current or past health interventions’ and views of the proposed intervention’ were merged. This was because participants often relayed their experiences of other health interventions while giving their views on the proposed cardiovascular risk reduction intervention. As a result, there was considerable overlap in the subthemes for both themes, and therefore both themes were merged. The thematic framework was then finalised.

Data summary and display

Matrices for each theme were generated in NVivo and then exported to Microsoft Excel for easier manipulation of the tables. In total there were four matrices, one for each of the themes identified in the final thematic framework. Each matrix displayed the relevant subthemes along with data extracts for both prisoners and staffs, and summaries for each data extract. Thus, each matrix allowed the researcher to compare the responses of prisoners and staff across each theme. An example of one matrix is shown in Table 11.

Table 11 – Matrix showing the prisoners and staff’s perspectives of prisoners’ CVD risk

Who is at risk	Reasons for being at risk	Reasons for not being at risk of CVD
<p><u>At personal risk because of high cholesterol and lacks specific knowledge about how to lower this risk.</u></p> <p><i>“I know I am because my cholesterol’s high and I’ve been trying to get that down. I don’t know really much about how to get that down. But don’t eat certain things, I know that. But the last time I checked it, it was up at five or six. So I need to do deal with that.”</i> [K02IR]</p>	<p><u>Linked CVD risk to mental health; stress and depression linked to smoking as a result of imprisonment. Never used to smoke in prison. Attributes smoking to depression. Regrets not being able to stop smoking and not exercising.</u></p> <p><i>“A good chance...I don’t know, just different things...I never used to smoke before I came into jail. Um, I think that it’s through stress I smoke...It’s a good boot up the arse I really need like, but I don’t know...I wish I didn’t smoke. I wish I was Mr. Fit, you know what I mean; taut body and that. I don’t know. I suppose it’s a wee bit of depression, isn’t? Stuck in jail.”</i> [K16IR]</p>	<p><u>Not at risk anymore because of improvements to health; feeling healthier than in the past.</u></p> <p><i>“Not anymore. I was back then, I was back then, but not anymore...Just my weight, my diet, everything was just wrong. So now that I’ve knocked everything on the head I’ve got much better shape and that.”</i> [K07IR]</p>
<p><u>Long-term prisoners who have sedentary lifestyles generally at risk of CVD.</u></p> <p><i>“Pending their sentence, pending the length of their sentence, definitely. Maybe not the short-term, not maybe people doing two or three years. But people doing lifers, fifteen years, twenty years...after the years, after not getting enough exercise and all the fat building up in your arteries, that’s just a recipe for disaster if you’re not getting active and moving about much.”</i> [K08IR]</p>	<p><u>At risk of CVD in prison because of being less active compared to the community. It’s easy to kick back and relax at the end of the day, and this seems to be a normal part of prison life.</u></p> <p><i>“I think so as well because I’m more inactive in here. For myself, that’s what I feel, because outside I’d be a lot more active, I’d be up on a rope, I’d be working all day, going to the gym at night time, do more sports. But here it’s just so easy just to go in your cell at night time, just kick back and relax and don’t do anything. It’s a big thing, isn’t it?”</i> [K11IR]</p>	<p><u>Not at risk because of engagement in exercise and feeling fitter. Feeling fit is equated to being healthy. Prisoners who are inactive or lazy generally at risk of CVD. It’s very easy to be lazy in prison.</u></p> <p><i>“Personally, if I keep going the way I’m going, I don’t know, because I am trying to get more CV work done and trying to keep myself a wee bit fitter. It’s the reason why I joined the ‘Fit for Life’ club which is on a Wednesday and the health promotion, which is twice a week just now. But, so personally, no, to be honest with you; if I keep doing what I’m doing I should be ok. But if I fail and I start getting lazy then oh aye, anybody would be, because it is easy within here to get lazy; too easy sometimes.”</i> [K05IR]</p>

Text underlined: researcher’s summary; *Text in italics*: direct quotes from participants; **Text highlighted in blue**: staff

Who is at risk	Reasons for being at risk	Reasons for not being at risk of CVD
<p><u>Certain prisoners have a personal risk of CVD because of pre-disposing factors that arose from being in the community. Prisoners more likely to see about their health in prison. Suggests that CVD risk can be reduced in prison because of this.</u></p> <p><i>“I think they have pre-disposing factors to it anyway because they have not potentially, not all of them, that’s very generalised, but having looked after themselves when they were in the community, and this is an opportunity for them to actually get healthcare and take that up, whereas it might not be a priority in the community for them.” [K11NS]</i></p>	<p><u>Prisoners at risk because of risky behaviours e.g. drug use, smoking. Can tell those who may be at risk of CVD because of their appearance. Can judge the health of a prisoner based on physical appearance.</u></p> <p><i>“But there’s a group of prisoners coming down there this afternoon (...) there’s like four or five of them that look like four or five broken people. You know, they were either limping or they were very pale, and you think, you know all the reasons that we just mentioned, the drug abuse and so on (...) you could imagine they would be at risk.” [K09PS]</i></p>	<p><u>Prisoners who see about their health by going to the gym are not at risk. Health status of prisoners appears to be equated to not being at risk of CVD.</u></p> <p><i>“I think there are prisoners who are risk, but there is also like a lot of prisoners who take their health quite seriously and they spend a lot of time in the gym. So for them guys, I’d say no, it’s not a problem.” [K08PS]</i></p>
<p><u>Identified one prisoner who is at risk due to excessive alcohol use. Has knowledge that this factor can increase the risk of CVD, but appears to be uncertain as to how this factor contributes to CVD risk.</u></p> <p><i>“I’m thinking about one chap in particular. And he is now serving his very first sentence, ok. He’s 50 years of age, and he’s serving his first sentence and he has been a dependent drinker for probably as long as he can remember... so with the alcohol use, I’m sure that has had some impact on his cardiovascular health...it’s bound to.” [K06NS]</i></p>	<p><u>The differences in the prisoners’ daily routine in prison compared to the community is not good for their mental health. Regime in prison is unhealthy as they ate large amounts of unhealthy snacks and skipped their regular meals. This increased their risk of CVD.</u></p> <p><i>“So from mental health having that structure, erm it was one of the things I noticed very quickly. Because you know they came from outside, and they have one sort of structure, and then have to go make another, and it wasn’t healthy one. They were eating crisps and chocolate. A lot of them complained about food in there. So they would basically, wouldn’t eat their dinners, and eat rubbish.” [K01NS]</i></p>	

Text underlined: researcher’s summary; *Text in italics*: direct quotes from participants; Text highlighted in blue: staff

4.8.4 Abstraction and interpretation

The last stage of the analysis process was abstraction and interpretation. This involved two steps: development of categories and development of the analytic thematic framework.

Development of categories

As this study was exploratory in nature, the analysis aimed to identify a range of perspectives relevant to the study's objectives, and to compare these between and across the prisoners and staff. This stage involved an examination of the descriptive thematic framework to understand what was happening in each theme and subtheme. This was done by first pulling out the data extract summaries from each matrix, and then listing elements which characterised and differentiated between responses for each summary were then listed. An example of how this was done using the summaries from the subtheme 'reasons for being at risk' is presented in Table 12.

Table 12 – Detected elements from the subtheme ‘reasons for being at risk’

Data summaries for subtheme: reasons for being at risk	Detected elements
Linked CVD risk to mental health; stress and depression linked to smoking as a result of imprisonment. Never used to smoke in prison. Attributes smoking to depression. Regrets not being able to stop smoking and not exercising.	<ul style="list-style-type: none"> • Decrease in mental wellbeing in prison • Development of mental health problems in prison • Uses smoking to cope with mental health problems • Lack of control over smoking habit • Regret over not being in control of health behaviours
At risk of CVD in prison because of being less active compared to the community. It's easy to kick back and relax at the end of the day, and this seems to be a normal part of prison life.	<ul style="list-style-type: none"> • Less active in prison compared to the community • Easy to kick back and relax in prison • Relaxing part of prison culture
Prisoners at risk because of risky behaviours e.g. drug use, smoking. Can tell those who may be at risk of CVD because of their appearance. Can judge the health of a prisoner based on physical appearance.	<ul style="list-style-type: none"> • At risk of CVD because of unhealthy behaviours • Can tell if a prisoner is at risk of CVD by their physical appearance • Health status is based on physical appearance
The differences in the prisoners' daily routine in prison compared to the community is not good for their mental health. Regime in prison is unhealthy as they ate large amounts of unhealthy snacks and skipped their regular meals. This increased their risk of CVD.	<ul style="list-style-type: none"> • Structure of daily routine different in prison compared to the community • Daily routine in prison worsens mental wellbeing • Eat unhealthily in prison • CVD risk attributed to unhealthy eating

The identified elements were then compared to see which of them related to the same idea or issue. Some of the elements for summaries placed under a particular subtheme were more related to other subthemes, and were thus moved to these. All related elements were grouped together under one label and referred to as categories. An example of this is provided in Table 13 using some of the detected elements derived from Table 12.

Table 13 – Categorisation of detected elements from the subtheme ‘reasons for being at risk’

Detected elements	Categories
<ul style="list-style-type: none"> • Decrease in mental wellbeing in prison • Development of mental health problems in prison • Uses smoking to cope with mental health problems • Daily routine in prison worsens mental wellbeing 	<p>All elements relate to mental health problems. Category name: Mental health problems</p>
<ul style="list-style-type: none"> • Lack of control over smoking habit • Regret over not being in control of health behaviours • Feels addicted to unhealthy snacks 	<p>All elements relate to feeling out of control or helpless. Category name: Powerlessness</p>
<ul style="list-style-type: none"> • Less active in prison compared to the community • Lack of activities in prison • Easy to kick back and relax in prison • Relaxing part of prison culture 	<p>All elements relate to having nothing to do and feeling bored Category name: Boredom</p>

Development of the analytic thematic framework

This step involved the development of analytic subthemes and themes (Table 14). First, the analytic subthemes were derived by examining groups of categories to determine the overall point or concept that best fit what they conveyed. In some instances, there was not enough data to warrant the formation of separate categories for a particular subtheme, but key emerging concepts were still identified. In a similar way, analytic themes were derived by examining the analytic subthemes to see what key concepts emerged from them.

Table 14 – Development of analytic thematic framework

Categories	Key emerging concepts	Subthemes	Key emerging concepts	Analytic themes
Unable to describe CVD Able to describe CVD (few details)	Two levels of knowledge demonstrated by prisoners	Limited knowledge of CVD	Knowledge that prisoners had about CVD	Knowledge of CVD
Able to describe CVD (more details)		Moderate knowledge of CVD		
Personal/Individual risk General risk	Two assessments of CVD risk	Assessment of CVD risk	What the different participants perceived about prisoner's CVD risk	Perceptions of CVD risk
Mental health problems Boredom Powerlessness	The prisoners' responses to the consequences of imprisonment linked to CVD risk	Responses to the consequences of imprisonment		

Categories	Key emerging concepts	Subthemes	Key emerging concepts	Analytic themes
The adjustment stage The routine stage The anticipation stage	Different perspective of each stage of a long-term prison sentence affect motivation to change health behaviours Instances or events that motivated engagement in positive behaviour change	Outlook on a long-term prison sentence Cues for positive behaviour change	Engagement in positive health behaviours only occurs when the time is right	Readiness for change
Physical appearance Embarrassment and intimidation	Interactions with prisoners characterised by masculinity Prisoners either see themselves as a role model or is identified as such by others	The masculine culture Being seen as a role model	Interactions with others and the way prisoners identify themselves on a social level influences engagement in health behaviours	Social interactions and identity in prison
Older age Equal fitness abilities	Prisoners form or join groups of the basis of a common identity	Group memberships		

Categories	Key emerging concepts	Subthemes	Key emerging concepts	Analytic themes
Equal access to prisoners Limited access to prisoners	Access to services that support self-care is not widely available to all prisoners NHS staff had limited knowledge of prison food, HP initiatives, etc. Different types of partnerships between health services in the prison	Accessibility of support for self-care in the prison NHS staff's knowledge of contextual factors Communication and partnership working between NHS and prison staff	Prison promotes self-care and enables it to an extent	Healthcare barriers to self-care in prison
	Prisoners were interested in relevant aspects of the intervention to themselves and the prison respectively	CVD education Nutrition and exercise education		Personal relevance

4.9 Addressing credibility

Regardless of the data analysis method, it is important that trustworthiness or credibility of the data analysis process is addressed. In qualitative research, credibility is addressed by discussing validity and reliability (Silverman 2014). Validity in this context refers to the accuracy of the findings, and the procedures involved in assuring accuracy, while reliability refers to the researcher's approach to data analysis, which should be consistent (Creswell 2014).

4.9.1 Validity

According to Creswell (2014), validity in qualitative research involves providing an account of how accuracy of the findings was achieved, and multiple strategies can be used to demonstrate this.

In this study, validity was ensured through the provision of rich, thick descriptions in the reporting of the study's findings. During the data collection process, I had noted all my observations about the participants and my surroundings. These included how I felt before and after each interview, my perceptions of how comfortable participants appeared while being interviewed, and other activities that were taking place in the general area of the interview location. My field notes were used in conjunction with the participants' quotes to convey meaning and feelings in order to provide readers with a more realistic view of the participants and the study setting.

Additionally, any discrepant information that ran counter to the themes or subthemes were presented. I ensured that any information that was contrary to the findings were presented by including descriptions or participants' quotes under the appropriate sections of the findings.

It is also important that my role as a researcher and any biases that this may bring to the study be highlighted. As I explained in Chapter one, this study was advertised as an impact PhD studentship. What drew me to apply for this studentship was my interest in health behaviour change which arose from pursuing a Masters of Public Health. I had never dealt with prisoners or been in a prison

before to this study, and therefore all of my initial biases arose from the stereotypes of prisoners portrayed in the media.

In preparation for this study and prior to data collection starting, I engaged with the relevant literature which highlighted issues about conducting research with prisoners. I also underwent training specified by the study prison, for engaging with prisoners. Such instances invoked a sense of apprehensiveness as many of the professionals I had engaged with had constantly reminded me of the dangers associated with prison research, particularly in dealing with prisoners. Ultimately, these experiences had an influence on my expectations of how interviews would be conducted. Specifically, I initially thought of prisoners as dangerous men who had committed serious offences, and thought that interviews with these participants would be intimidating. I also worried that this might impact on my ability to ask questions and probe for responses. To minimise the impact of these initial expectations, I noted my feelings and impressions before and after each interview in a diary. In doing so, I was able to reflect on the interview process and this helped to build my confidence in subsequent interviews with prisoners.

4.9.2 Reliability

Reliability in qualitative research refers to the researcher's approach to data analysis, which needs to be consistent throughout (Creswell 2014). This was achieved using four strategies: 1) the transcripts from each participant interview were double-checked, 2) themes and subthemes were cross-checked, 3) all themes and subthemes were given definitions, and 4) each stage of the analysis was supervised.

First, I double-checked all transcripts to ensure that there were no obvious errors that could cause me and/or my supervisors to misunderstand what participants had said.

Second, there was cross-checking of themes and subthemes. The first two steps of the framework analysis approach, familiarisation and constructing an initial thematic framework, were carried out independently by myself and two of my supervisors on a sample of transcripts. We then came together to compare

the labels they derived to check for consistency. Any differences were discussed and clarified.

Third, I added a definition to each label in NVivo to minimise the chances of misinterpretation of the meaning of any theme or subtheme during the analysis process. This ensured that I did not assign any irrelevant data extracts to specific themes or subthemes. During the fourth step of the analysis, reviewing of data extracts, I ensured that all extracts were relevant to the themes and subthemes that they were placed under.

Lastly, I met regularly with my supervisors to discuss the different stages of analysis process. This communication aided in the transparency of the data analysis process. My supervisors were therefore able to query any points they were unsure about and provide guidance at each stage.

4.10 Chapter summary

This chapter provided the rationale for the study, the research objectives, philosophical underpinning, the research design and methods. The study had an exploratory design and a critical realist approach was adopted to understand the perspectives of prisoners and staff regarding CVD and CVD risk. A combined inductive and deductive approach was used to learn how these phenomena were understood by the participants. Framework analysis, a systematic and transparent approach to data analysis, was used to identify the findings in terms of themes, subthemes and categories.

The study's findings will be presented in Chapters 5, 6 and 7.

Chapter 5: Results - Knowledge and risk perceptions of CVD in prison

5.1 Introduction

The overall aim of this study was to explore the knowledge and perceptions of cardiovascular disease (CVD) in prison to inform the development of a future cardiovascular risk reduction intervention for prisoners. This chapter presents the results relating to the prisoners' knowledge of CVD (objective 1), their perceptions of their cardiovascular risk (objective 2), the staff's perceptions of the prisoners' cardiovascular risk (objective 3), and the similarities and differences between the prisoners' and staff's perceptions of prisoners' CVD risk (objective 4).

As mentioned in Chapter 4, I intended to interview 10 prisoners and 10 staff members, however 16 prisoners and 11 staff members in total were interviewed. Of the 16 prisoners, three were health champions (men trained in the area of health and fitness). For anonymity purposes, the health champions were not identified as there were only three of the in the prison at the time of the study. The characteristics of these 16 prisoners are shown in Table 15.

Nine prisoners were aged 40 or over and all but one were serving a long-term sentence (five or more years). Half of the prisoners self-reported an exercise frequency of 2 – 4 days per week, and three reported not exercising at all. Four prisoners reported two or more health issues. The most commonly reported health issue was smoking, with seven prisoners being current smokers. The other health issues were being overweight (three prisoners), type 2 diabetes (two prisoners), and mental health problems (two prisoners). Four prisoners spoke of the death of a parent due to CVD which indicated a family history of the disease. Nine prisoners reported that their health had declined in prison, but of these, two said that their health had improved after a period of time.

Table 15 – Characteristics of prisoners

Participant #	Age group	Sentence duration	Exercise frequency (days/week)	Health issues	Family history of CVD	Health in prison versus the community
K01IR	≥40	Long-term	3	None		Improved
K02IR	<40	Long-term	6	Type 2 diabetes, overweight, smoker, high cholesterol		Declined
K03IR	≥40	Long-term	3-4	None; previous drug user		Declined then improved
K04IR	<40	Long-term	6	Smoker		Improved
K05IR	≥40	Long-term	2-3	Asthmatic	Yes	Improved
K06IR	<40	Long-term	6	None		Improved
K07IR	<40	Short-term	4-5	None		Declined then improved
K08IR	<40	Long-term	4-5	None	Yes	Improved
K09IR*	<40	Long-term	2	None		Declined
K10IR*	≥40	Long-term	2	Smoker		Stayed the same
K11IR*	≥40	Long-term	3	Overweight		Declined
K12IR†	<40	Long-term	0	Smoker	Yes	Declined
K13IR†	≥40	Long-term	2-4	Type 2 diabetes		Improved
K14IR	≥40	Long-term	3	Smoker, mental health problems; previous drug user	Yes	Declined
K15IR	≥40	Long-term	0	Overweight, smoker		Declined
K16IR	≥40	Long-term	0	Smoker, mental health problems		Declined

* Joint interview with three participants; † Pair interview with two participants

Regarding the staff members, 11 interviews were conducted with managers, health care staff and health promotion staff. For anonymity purposes, these staff were not identified by their profession as their specialised roles could make them easily identifiable. Instead, those who were employed by the prison were referred to as prison staff, and those employed by the National Health Service (NHS) were referred to as NHS staff (Table 16).

Table 16 – Characteristics of staff

Participant #	Employment
K01NS	NHS staff
K02NS [†]	NHS staff
K03NS [†]	NHS staff
K04PS	Prison staff
K05NS	NHS staff
K06NS	NHS staff
K07PS	Prison staff
K08PS	Prison staff
K09PS	Prison staff
K10NS	NHS staff
K11NS	NHS staff

[†] Pair interview with two participants

Regarding objective 1, the analysis sought to explore the knowledge that the prisoners had of CVD. These findings are presented as Theme 1 in section 5.2. Prisoners were asked to describe what they knew of CVD. For those who were unfamiliar with the term, or who said that they knew very little about the disease, a basic description of atherosclerosis was provided using visual aids (Appendix 2).

Regarding objectives 2, 3 and 4, the analysis sought to explore how prisoners and staff perceived prisoners' risk of CVD and the reasons for this. The perspectives of both groups were compared to identify any similarities or differences. These findings are presented as Theme 2 in section 5.3.

These themes comprise of sub-themes which are further divided into categories as shown in Table 17.

Table 17 – Themes, sub-themes and categories relating to knowledge of CVD and perceptions of prisoners’ CVD risk

Themes	Sub-themes	Categories
Prisoners’ knowledge of CVD	Limited knowledge of CVD	Unable to describe CVD Able to describe CVD
	Moderate knowledge of CVD	
Perceptions of CVD risk	Assessment of CVD risk	Personal/individual risk General risk
	Responses to the consequences of imprisonment	Mental health problems Boredom Powerlessness

5.2 Theme 1: Prisoners’ knowledge of CVD in prison

This theme concerns the findings regarding the knowledge that prisoners had about CVD. Overall, most prisoners had some knowledge of CVD as they knew it was related to the heart and identified common risk factors and cardiovascular events. The underlying mechanism of CVD, atherosclerosis, was rarely mentioned. Knowledge of CVD was mostly gained from the media and educational courses in the prison. Some prisoners also experienced the death of a relative due to the disease. In comparing the responses of the prisoners, two levels of knowledge of CVD emerged: limited (5.2.1) and moderate (5.2.2).

5.2.1 Limited knowledge of CVD

Two thirds of men demonstrated having limited knowledge of CVD as they were either unable to describe it or provided details about one risk factor or one cardiovascular event, namely heart attacks.

Unable to describe CVD

Three prisoners were unable to describe CVD, but two provided snippets of information that they had heard via the media and conversations with other people. One prisoner (K031R) who had heard about CVD, but said he knew little

about the disease, was unable to describe it. However, once provided with a description of the process of atherosclerosis, he was able to relay what he had learnt about heart attacks from speaking to other people. This was in relation to the cumulative effects of atherosclerosis on arteries:

“Well disease wise, I don’t know much about that (...) I’ve heard you can have heart attacks and you don’t really know you’ve had one...I’ve heard that can happen to you, you know what I mean...You had a wee small heart attack which maybe tends to build up to a big one which actually did the damage.” (K03IR, ≥40 years, long-term sentence)

Two prisoners had never heard of CVD and were therefore unable to describe it. Both relayed that they had never thought about the disease before and attributed their lack of knowledge to this. They both believed that CVD did not concern them. This is despite both self-reporting at least one CVD risk factor: K12IR reported a family history of the disease, while K13IR had type 2 diabetes:

“Aye, aye. Just not really gave it much thought. It’s not as if it comes up or I really need to know about it, really, you know what I mean.” (K12IR, <40 years, long-term sentence)

K13IR had associated heart attacks with old age, and therefore did not consider himself to be at risk of having one as he was only 40 years old. This belief was challenged after watching a television programme that younger people were also at risk of heart attacks:

“Never really thought of it. I thought it was mostly, I always thought like heart attacks were for old people; I thought old people would take heart attacks or strokes. And when I watched some programmes, I’ve seen these guys are young, everyone end up getting heart attacks or strokes. It’s something that I never thought could never happen to me.” (K13IR, ≥40 years, long-term sentence)

Able to describe CVD

Seven prisoners were able to provide descriptions of CVD, but these descriptions were varied and contained few details. They either spoke about the disease in relation to known CVD risk factors, or described it as relating to the heart and associated blood vessels.

Three prisoners described CVD in relation to two risk factors, namely smoking and unhealthy eating. For example, prisoner K14IR described CVD as smoking. This may have been due to his self-given status as a heavy smoker and having knowledge of the consequences of this behaviour as he had indicated having a family history of CVD:

“It’s like smoking, isn’t it? I’m a heavy smoker as well, very heavy smoker.” (K14IR, ≥40 years, long-term sentence)

Four prisoners described the disease as relating to the heart and associated blood vessels. Prisoner K05IR, who admitted having limited knowledge of the disease, referred to it as ‘heart disease’ and knew that it dealt with the heart and blood vessels. This may have been due to his mother having the disease:

“The term, I think straight away the heart, something with the veins, the arteries. I don’t know too much about cardiovascular disease but I lost my mum to heart disease years ago (...) I’ve not got too much understanding on it.” (K05IR, ≥40 years, long-term sentence)

Another prisoner, K02IR, also described CVD in a similar way to K05IR, but demonstrated an understanding of atherosclerosis without being provided a description of the process, which most of the other prisoners did not do. As will be shown in section 5.3.1, he was aware that high cholesterol was a risk factor of CVD, but did not explicitly link this risk factor to atherosclerosis:

“It’s the heart, ain’t it? It’s all the arteries and veins and things going to the heart. And it’s the build-up of fatty deposits, ain’t it? And that’s about it, ain’t it?” (K02IR, <40 years, long-term sentence)

Apart from K02IR, only one other prisoner, K15IR, provided a basic description of atherosclerosis. In a joint interview, he linked unhealthy eating to the disease process, and knew that it could lead to a stroke:

Researcher: *“Do you know what cardiovascular disease means specifically?”*

Participant 1: *“Um.”*

Participant 2: *“Heart disease.”*

Participant 1: *“Aye.”*

Participant 2: *“Heart disease and-”*

Participant 1: *“Just eating so much shite eh, if you eat too much shite-”*

Participant 2: *“Clogged arteries.”*

Participant 1: *“Yeah.”*

Participant 2: *“Blocks your arteries, you get strokes.”* (Participant 1: K16IR, ≥40 years, long-term sentence; participant 2: K15IR, ≥40 years, long-term sentence)

5.2.2 Moderate knowledge of CVD

A third of the prisoners demonstrated having moderate knowledge of CVD by identifying two or more risk factors and linking them to cardiovascular events. These men had acquired their knowledge through educational courses in the prison, or through fitness and health qualifications.

Three prisoners had learnt about CVD while pursuing a qualification from the Royal Society of Public Health (RSPH). One prisoner (K09IR) identified two CVD risk factors and knew that they could contribute to cardiovascular events such as heart attacks and strokes:

“I’ve been a health champ for the past three months. That’s a good course. You learn about the cardiovascular stuff. Like the different risk factors, like high cholesterol, sedentary lifestyle and stuff like that. And that it could cause things like heart attacks and strokes.”
(K09IR, <40 years, long-term sentence)

Two prisoners had acquired their knowledge of CVD through the completion of an educational course entitled ‘Health for Life’. One prisoner (K07IR) referred to

CVD as 'categories' which indicated an awareness for the variety of conditions that are referred to as CVD. Although it appeared that he did know more about these risk factors, symptoms, etc., he could not recall them during the interview:

"Well it comes under, well a lot of categories come under one. You've got like angina, high blood pressure, heart attacks, also it's to do with your cholesterol levels, em, just trying to think what else. No, they've all gone from my head. I know them all though." (K071R, <40 years, short-term sentence)

Another prisoner (K041R) who had learnt about CVD as part of his fitness qualification attempted to describe the disease by defining the word 'cardiovascular', but misinterpreted 'vascular' as relating to the lungs instead of blood vessels. However, he was able to identify three common behavioural CVD risk factors:

"Heart and lungs. Cardio is your heart and vascular is your lung. I've seen stuff like that. Cardiovascular for me would mean like probably a bad heart and it's about having a bad heart (...) But cardiovascular disease just means bad heart and bad lungs. Smoking could increase that, and a bad diet and non-activity, stuff like that." (K041R, <40 years, long-term sentence)

The first theme revealed that overall, prisoners were able to provide information about CVD to varying degrees. Two-thirds of prisoners had limited knowledge of the disease as they were only able to identify one CVD risk factor and/or cardiovascular event. The prisoners mostly identified common behavioural CVD risk factors or common cardiovascular events. Gaps in knowledge were evidenced regardless of level of knowledge and was demonstrated through the misinterpretation of the term 'cardiovascular', and an inability to distinguish between the different 'conditions' associated with CVD and such as risk factors, symptoms and cardiovascular events. The underlying mechanism of CVD, atherosclerosis, was barely mentioned.

Despite most prisoners having limited knowledge of CVD, all were able to assess their risk of the disease. Staff also provided assessments of prisoners'

CVD risk. These assessments along with reasons for them are explained in section 5.3.

5.3 Theme 2: Perceptions of CVD risk in prison

This theme concerns the findings regarding the participants' risk perceptions of prisoners' CVD risk and the reasons for these. The prisoners were asked whether they thought they were at risk of CVD and why. Those who indicated that they were not at risk were also asked if they thought other prisoners were and why. The staff were asked whether they thought prisoners were at risk of CVD and why.

Risk perception can be defined as an individual's perceived susceptibility to a threat (Ferrer and Klein 2015), and can be classified in several ways according to the context in which it is examined (Slovic and Weber 2002; Kallmen 2000). Regarding this study, the prisoners, unlike staff, were asked to consider risk from a more personal point of view. The participants' perspectives are presented below under two sub-themes: assessment of CVD risk (5.3.1) and responses to the consequences of imprisonment (5.3.2).

5.3.1 Assessment of CVD risk

This sub-theme was identified through the participants' assessments of prisoners' CVD risk. In comparing the responses of the prisoners and staff, both groups assessed risk as either personal/individual or general. However, there were some differences in the way NHS and prison staff assessed prisoners' risk. Many prisoners assessed their own risk of the disease by considering their own health status. Similarly, many staff judged prisoners' CVD risk based on their perceptions of the prisoners' health status. This factor appeared to have more of an influence on assessments of CVD risk than knowledge of CVD and perceived severity of the disease.

Personal/Individual risk

Prisoners who assessed CVD risk as personal believed that they were at risk of the disease and most were able to identify specific reasons for this. Most

attributed their risk of the disease to one risk factor even though some had reported having more than one risk factor. There was also variation in the way their beliefs about their CVD risk were expressed. Some had definitive feelings while others appeared to be more uncertain or were less concerned about this risk.

One prisoner (K02IR) who strongly believed he was personally at risk of CVD attributed this to high cholesterol. This was despite reporting having three risk factors of the disease including type 2 diabetes. In section 5.2.1, he demonstrated having limited knowledge of CVD and this may be why other factors were not considered as contributing to his personal risk. He was very concerned about this risk but lacked specific knowledge about how to reduce it:

“I know I am [at risk of CVD] because my cholesterol’s high and I’ve been trying to get that down. I don’t know really much about how to get that down. But don’t eat certain things, I know that. But the last time I checked it, it was up at five or six. So I need to do deal with that.” (K02IR, <40 years, long-term sentence)

Another prisoner (K04IR) who also expressed concern about this personal risk of CVD due to smoking knew that stopping the habit would reduce this risk. He appeared to consider his risk as being ‘present’ only when he was smoking, and was the only prisoner to think about the reduction of risk as a numerical concept. Although K04IR was aware of the benefits of stopping smoking, there was a sense that he was struggling to do so as he expressed feelings of regret for not being able to quit the habit:

“Aye, if you’ve been smoking you’re always at risk, and that’s why I want to stop smoking because I don’t want to be at risk. I know I’m probably at risk every time I have a fag but if I can stop smoking then my risk halves (...) and for that reason I’d like to stop smoking. But it puts me off that I smoke.” (K04IR, <40 years, long-term sentence)

In other instances, there were prisoners who appeared certain about their personal risk of CVD but did not definitively say why they believed so. Prisoner (K15IR) spoke about CVD being an ‘issue’ due to its invisible nature, which suggests an awareness of the severity of the disease. He did not specify why he

was at risk of the disease, but earlier in his interview he had reported experiencing problems with his weight and alluded to this as the reason for this risk:

“Yeah [I am at risk of CVD]. I think it’s an easier one to ignore because it’s internal, aye, you can’t see it. I think it’s an issue (...) It’s easier to see when you’re getting fat, you know. You go to the gym, you see your muscles getting bigger, you know how you’re doing and that, you can see.” (K15IR, ≥40 years, long-term sentence)

There were also prisoners who were certain about their risk but appeared to be less concerned about it compared to other prisoners. This was due to their attitudes towards attributable risk factors. For example, prisoner K10IR believed he was personally at risk of CVD because of his age and a high-salt diet, two factors that were out of his control. During an interview with his peers, one of them revealed that K10IR was a current smoker, and appeared to believe that this factor also contributed to his friend’s risk. However, K10IR did not appear to be concerned with his smoking habit since he considered it to be part of his lifestyle and thought it was less extreme compared to other prisoners. K10IR had also reported having no health issues earlier in his interview, and this may have also contributed to his lack of concern for his risk of CVD:

Participant 1: *“Well I’m more at risk because of the diet, my colleague already said that, because of the diet, there is a lot of salty foods. Aye. Personally, speaking for myself, I’m a bit older so-”*

Participant 2: *“You smoke a lot.”*

Participant 1: *“I do smoke, but not that much compared to a lot of guys.”*

Participant 3: *“Two cigs a day.”*

Participant 1: *“[Laughs] So, I tend to smoke, aye. Just a lifestyle in general.” (Participant 1: K10IR, ≥40 years, long-term sentence; participant 2: K09IR, <40 years, long-term sentence; participant 3: K11IR, ≥40 years, long-term sentence)*

Other prisoners who assessed their risk of CVD as personal did so with uncertainty based on words that were used in their responses, for example, ‘sometimes’ and ‘probably’. Many appeared to not be concerned about the possibility of this risk.

One prisoner (K12IR) identified his family history of CVD as a probable reason for his risk of CVD. Prior to entering prison and during the early stage of his sentence, he had made a decision to maintain his health by exercising regularly. This decision was influenced by his father's death due to a heart attack and the probable impact that this had on him. However, several factors including the passage of time since his father's death, perceived good health (no experience with major health problems), and age, all appeared to influence his current risk perception. He no longer engaged in physical activity and appeared to be less concerned about his personal risk:

"Well sometimes I do think like that because I know my old man, my father, he died of a heart attack and I know it runs in my family so I'm always a wee bit self-conscious about that. I think that's maybe why I used to try and keep myself fit all the time. But as I said, I'm getting older and I'm losing interest (...) But I've never really got any major issues, not that I know of anyway." (K12IR, <40 years, long-term sentence)

Another prisoner (K14IR) who acknowledged a possibility of personal CVD risk due to a family history of the disease, was also less concerned about this risk. Unlike K12IR who had felt a past desire to minimise his risk, K14IR did not express this desire because of a fatalistic attitude towards CVD and other diseases. This attitude originated from him witnessing the premature deaths of many family members from these diseases. This attitude coupled with a general lack of motivation in prison to engage in positive health behaviours appeared to remove any desire he may have had to reduce his personal risk of CVD:

"Probably, yeah. It [CVD] is in my family and all as well anyway, so it is. Cancers and strokes and stuff like that (...) Aye, my mother died young, my father and all, all my grandparents and all died young. They all died in their early 50s. It's looking like it's all going to be on the cards, but the motivation's not there, not in here." (K14IR, >40 years, long-term sentence)

One prisoner (K03IR) who had learnt about the link between social inequality and poor health through the media believed there was a chance that he was at risk of CVD because of where he had lived prior to prison. He was uncertain of

the nature of his risk and this may be due to his limited knowledge of the disease and its risk factors (section 5.2.1):

“I think I’d probably would be [at risk of CVD], aye (...) But that’s me listening to the television, and reading the newspaper (...) because they say things like certain parts of Scotland have got this amount of (...) If you live in Bearsden in Glasgow you might live longer because it’s affluent and it’s got private schools. Me, I come from Castlemilk, so it’s like chalk and cheese, you know what I mean (...) the rich, they live longer than the poor, that kind of thing. But I don’t know if that’s just scare tactics or if it’s a fact really, it’s a thing, you know what I mean.” (K03IR, ≥40 years, long-term sentence)

Despite being uncertain about this risk, K03IR believed there were measures he could take to reduce it. These measures were mainly related to lifestyle factors such as diet and exercise:

“My diet, staying away from drugs, and mild exercise; not too much heavy exercise but enough to get the heart moving and the heart beating, get a kind of sweat out it (...) I think that’s certainly worth targeting to stop me from getting, and I think a diet, a healthy diet, is better.” (K03IR, >40 years, long-term sentence)

A few staff, mainly NHS staff, expressed the view that CVD risk pertained to the individual, which was similar to the way the prisoners assessed personal risk. For example, one staff member (K06NS) provided an account of one prisoner whom she thought was at risk of the disease due to a history of excessive alcohol use. This demonstrated that she had some knowledge of CVD as she was able to identify this risk factor:

“Well again if you’re talking about maybe somebody who has been a dependant drinker for years (...) I’m thinking about one chap in particular. And he is now serving his very first sentence, ok. He’s 50 years of age, and he’s serving his first sentence and he has been a dependent drinker for probably as long as he can remember. Right, maybe for the past 30 years alcohol has been an issue to him. However, he hasn’t been locked up for it, but with the alcohol use, I’m

sure that has had some impact on his cardiovascular health; it's bound to." (K06NS, NHS staff)

Another staff member (K10NS) did not identify specific prisoners that were thought to be at risk of CVD, but believed individuals who had developed unhealthy lifestyles from being in the community had an increased risk:

"I suppose there could be an increased risk, but I suppose it depends on the individual, what their lifestyle is, was already like on the outside. Obviously if they don't work and they're not active on the outside, they don't lead a particularly healthy lifestyle, they're not necessarily going to fall out of that straight away when they come into prison." (K10NS, NHS staff)

K10NS suggested that CVD risk could be reduced in prison as prisoners were more motivated to improve their health because they had easier access to health services compared to the community:

"But then also I suppose, the other aspect is that on the outside, em, they may be less likely to visit a health centre (...) like healthcare that's in here, it's easier for them to access us (...) they're more inclined to come and speak to us while they're in here and maybe sort things out about their health whilst they're in here, you know what I mean?" (K10NS, NHS staff)

These beliefs were also echoed by another NHS staff member (K11NS) who believed CVD risk was not generalised to all prisoners. In her opinion, certain prisoners were pre-disposed to CVD because of 'factors' that arose from being in the community. She too believed that prisoners were more likely to prioritise their health in prison because of the availability of health services:

"I think they have pre-disposing factors to it anyway because they have not potentially, not all of them, that's very generalised, but having not looked after themselves when they were in the community, and this is an opportunity for them to actually get healthcare and take that up, whereas it might not be a priority in the community for them." (K11NS, NHS staff)

General risk

Prisoners who assessed CVD risk as general believed that either all or some prisoners in general were at risk. There was an overall belief that living in prison increased prisoners' risk of CVD. Assessment of risk was primarily based on feelings about physical fitness and judgements about physical appearance. Prisoners who viewed CVD risk as general did not believe that they were personally at risk because they felt physical fit and engaged in healthy behaviours.

One prisoner (K07IR) believed he had previously been at risk of CVD due to being overweight. It was only after receiving negative comments from a close friend about his weight that he felt motivated to adopt a healthier lifestyle by eating more healthily and exercising more frequently. Therefore, while he would have perceived a personal risk of CVD in the past, he did not at the time of this interview, because he felt physically fit and was engaging in healthy behaviours. He considered other prisoners who were overweight to be at risk of CVD, and passed judgement on them for their apparent lack of concern for this risk. This was all expressed in a depersonalised manner:

"[I'm] not anymore more [at risk of CVD]. I was back then (...) Just my weight, my diet, everything was just wrong. So now that I've knocked everything on the head I've got in much better shape and that (...) A few [men are at risk] (...) Well the fact that, the size of them for a start. You always know about being overweight and you never do anything about it." (K07IR, <40 years, short-term sentence)

Another prisoner (K05IR), after considering the steps he was currently taking to improve his fitness, concluded that he was not at risk of CVD. His slight deliberation of coming to this conclusion may have been due to his limited knowledge of CVD as he had admitted to knowing little about the disease (section 5.2.1). He believed that anyone living in prison would be at risk of CVD as it was 'too easy' for to be physically inactive in prison:

"Personally, if I keep going the way I'm going, I don't know [if I am at risk of CVD], because I am trying to get more CV work done and trying to keep myself a wee bit fitter (...) So personally, no, to be

honest with you; if I keep doing what I'm doing I should be ok. But if I fail and I start getting lazy then oh aye, anybody would be, because it is easy within here to get lazy; too easy sometimes.” (K05IR, ≥40 years, long-term sentence)

One prisoner (K01IR) who was serving a long-term sentence did not consider himself to be personally at risk of CVD, but believed that others serving long-term sentences were. This was because he considered himself to have an active lifestyle, whereas many long-term prisoners had sedentary lifestyles. He expressed control over his eating behaviour and demonstrated a resilience towards peer pressure from others:

“Eh, well with your long-term prisoners, definitely, because that is a rather sedentary lifestyle (...) I manage keep active. When I go out [to the canteen] I buy coffee, a roll-on deodorant, something else. But folk think I'm skinting. You don't have any money? No, I'm not picking that rubbish, you know what I mean. I've got self-control.” (K01IR, ≥40 years, long-term sentence)

Another prisoner (K06IR) shared K01IR's beliefs. His assessment of CVD risk was also influenced by feelings relating to his physical fitness and he believed most prisoners were at risk of CVD because they were physically inactive due to a lack of physical activity opportunities in the prison. This was attributed to the prison management's business-like approach and a perceived lack of concern for prisoners:

“...I'm alright in control and (...) I've got good fitness and that (...) In the jail I think [most prisoners are at risk of CVD], aye. The PT department is a good PT department; they're always putting things on for you (...) Above them, management, they've not got a clue, they're mad, they're just running this place like a business, that's what I say, they run it like business; they don't really care about guys in here as long as the business is running alright.” (K06IR, <40 years, long-term sentence)

Some staff, primarily those who were prison staff, also viewed CVD risk as general, particularly for prisoners who were physically inactive. This indicated that their assessment of prisoners' risk was based on judgements about physical

fitness, similar to prisoners' views of general risk. The word 'probably' was commonly used in many of the staff's responses, which may have been an indication of uncertainty in considering prisoners' CVD risk.

One staff member (K08PS) believed prisoners who took their health seriously were not at risk of CVD because they frequently accessed the gym. However, he believed those who did not use the gym, i.e. who were physically inactive, and by extension, less concerned about their health, were 'probably' at risk of the disease:

"I think there are prisoners who are at risk, but there is also like a lot of prisoners who take their health quite seriously and they spend a lot of time in the gym. So for them guys, I'd say no, it's not a problem. But for all the other guys that just don't use the gym, that just sit about, then aye, they're probably at risk." (K08PS, prison staff)

Another staff member (K04PS) shared similar beliefs to K08PS. He believed prisoners who did not use the gym were more at risk of CVD compared to those who did. According to his calculations, approximately 40% of men living in prison were at risk of CVD:

"And probably the best way describing this problem [risk of CVD] is, say there's 500 prisoners in here. That's an average of 200 through here a day, but out of the 500 there's probably only 300 of them use the gym, so it's sort of 200 down - these are the ones that are at most risk of developing that." (K04PS, prison staff)

K04PS suggested that prisoners who were physically inactive and had other negative behaviours had brought these habits with them from the community. Thus, CVD risk was considered to be developed in the community, but could be exacerbated in prison if these negative behaviours were continued.

"I would say I don't know about developing it, but they could continue to develop it from when they come in from the community. Guys out in the community, they commit a crime, could be sitting about doing nothing, right, taking drugs, heavy smokers, bad eating habits, come in here and continue to be the same. So their lifestyles just stay the same." (K04PS, prison staff)

Another member of the prison staff (K07PS) also believed that prisoners were ‘probably’ at risk of CVD. This opinion was based on the knowledge she had gained while helping to deliver an intervention in prison that targeted sedentary behaviours:

“[Breathes in deeply]. That’s a hard one. I dare say, based on the stuff that we do on sedentary behaviour, then yeah, they probably are, if they’re allowed to be, if they’re left to it.” (K07PS, prison staff)

One staff member (K09PS) knew there was a high prevalence of CVD risk factors in prison populations and therefore considered prisoners in general to be at risk of CVD:

“Well I mean I don’t have a medical background but I guess, if you think about it, what is it, something like 70 or 80% of prisoners smoke, for example, obviously a lot higher than 80% of prisoners come into prison with drugs in their system in some shape or form, and obviously there is extensive use of alcohol is it, and I’m guessing that those are all contributing factors to cardiovascular disease, a high risk.” (K09PS, prison staff)

K09PS made referenced to a group of men whom he suggested could be at risk of CVD based on judgements about their physical appearance:

“But there’s a group of prisoners coming down there this afternoon (...) there’s like four or five of them that look like four or five broken people. You know, they were either limping or they were very pale, and you think, you know all the reasons that we just mentioned, the drug abuse and so on (...) you could imagine they would be at risk.” (K09PS, prison staff)

5.3.2 Responses to the consequences of imprisonment

This sub-theme was identified through the prisoners’ and staff’s responses regarding attributable causes of prisoners’ CVD risk. All participants directly linked negative health behaviours to this risk. In this context, a health behaviour is any behaviour that may or is believed to affect a prisoner’s physical health either in a positive or negative way. The most commonly mentioned behaviours

were smoking, unhealthy diet, physical inactivity and sedentary lifestyles. Prisoners mainly engaged in these behaviours as a response to three perceived consequences of imprisonment: mental health problems, boredom, and powerlessness.

Mental health problems

Many participants believed that imprisonment had either caused prisoners to develop mental health problems or exacerbated pre-existing ones. The most commonly mentioned problems were stress, anxiety and depression. Often, smoking, unhealthy eating and sedentary lifestyles were used to cope with these problems. Thus, mental health problems were linked to CVD via these risk factors. These problems were often associated with negative emotions such as frustration, regret or guilt.

One prisoner (16KIR) who suggested that smoking was a possible reason for his personal CVD risk, only started to smoke after entering prison. He started the behaviour to cope with stress and depression, which he regarded as consequences of imprisonment. He also acknowledged that he lacked motivation to attend the main gym, which may have been due his mental health problems. There was an overall tone of regret as he tried to rationalise his lack of motivation for exercise and perceived lack of control over his smoking behaviour:

“I mean, I never used to smoke before I came into jail. Um, I think that it’s through stress I smoke (...) I mean you [referring to another participant] go down to the gym and that as well. It’s a good boot up the arse I really need like, but I don’t know (...) I smoke about 20 to 30 [a day]. It’s stupid that I smoke (...) I wish I didn’t smoke (...) I suppose it’s a wee bit of depression, isn’t? Stuck in jail.” (K16IR, ≥40 years, long-term sentence)

One staff member (K01NS) directly linked mental health problems to prisoners’ CVD risk. This was based on an opinion that the ‘structure’, i.e. daily life routine of prisoners, was healthier in prison compared to the community. She considered this change in routine upon entering prison to be a contributing factor to prisoners’ mental health problems:

“Yeah [prisoners are at risk]. Because they turn day into night, night into day. Erm, the sort of structure, so from mental health having that structure, erm it was one of the things I noticed very quickly. Because you know they came from outside, and they have one sort of structure, and then have to go make another, and it wasn’t healthy one.” (K01NS, NHS staff)

Mental health problems were also linked to isolation. In this context, isolation refers to prisoners disassociating themselves from others and from the social aspects of prison life. Both groups of participants shared similar beliefs that prisoners who suffered from conditions such as depression often used isolation as a coping mechanism. In so doing, they adopted sedentary lifestyles and were physically inactive; these two factors put them at risk of CVD.

One prisoner (K10IR) explained that personal problems in prison such as receiving bad news could lead to depression, which in turn, could lead to isolation:

“Depression. Sometimes something happens: bad news – sometimes they go for a visit and get bad news at a visit; making a phone call, finding out their girlfriend’s got somebody else. Bad news; that can pin you down, that can make your shut your door, that can make you just isolate yourself.” (K10IR, ≥40 years, long-term sentence)

One staff member (K05NS) believed that several of the prisoners she worked with were possibly at risk of CVD. This was because many suffered from depression and chose to isolate themselves to cope with this. K05NS believed that majority of prisoners spent most of time in their cells and therefore lived mostly sedentary lifestyles. Although she admitted to not being ‘clued up’ about CVD, she understood that this behaviour could put them at risk of the disease:

“I’m not like clued up too much [about CVD], but certainly from a lot of the guys that I’ve worked with, potentially yeah [they are at risk of CVD] (...) Mental health wise as well, they’ll fall maybe sort of into depression, sort of regress into themselves so they’ll just tend to spend their time sort of lying in their cells. So yeah, potentially there is probably a risk of developing that with unhealthy habits.” (K05NS, NHS staff)

Another staff member (K02NS) expressed similar beliefs regarding the link between mental health, isolation and increased CVD risk. From his experiences in working with prisoners, he believed many of them did not want to deal with the reality of life in prison. Isolation was their coping mechanism, and they chose to disassociate themselves from other prisoners as a way of denying their reality:

“Within the prison (...) there's other people who's got a lot more going on in their life, sort of in their head, but especially within the prison setting (...) A lot of people within in the prison will isolate themselves. I suppose it's reality that they don't want to face, the reality that they're in a jail. So they just isolate and remove themselves from mixing with their peers if you like in the jail. So I guess then there is a kind of increased risk of cardiovascular disease.” (K02NS, NHS staff)

Boredom

Another consequence of imprisonment was boredom which was perceived to be a result of the lack of activities in the prison, and resulted in a sub-culture of physical inactivity. Prisoners and some staff, particularly NHS staff, assigned blame to the institution for this. In response, many prisoners engaged in negative health behaviours and often felt as though they lacked control over these, as it was difficult for them to stop engaging in them. The prisoners were comforted by these behaviours and used them as coping mechanisms for dealing with boredom. Many shared similar attitudes towards these behaviours; they knew that they were unhealthy but were unwilling to give them up because there would be nothing else for them to do. Thus, boredom led to a lack of motivation to engage in positive behaviours.

For example, one prisoner (K12IR) who believed he was possibly at risk of CVD due to his family history (section 5.3.1), viewed smoking and unhealthy eating as the only two options available to cope with boredom. Although he chose to smoke, he also expressed an intention to quit the habit, but was not motivated to do so because, in his opinion, there was no other way to spend his 'free time':

“But I keep saying I'm going to stop [smoking]. I've got patches and all of that up there as well but I've just not started using them yet.”

But I will. I don't smoke inside, I don't. I probably have about maybe one or two fags a day outside. It's just in here because there's nothing else to do. You've got a lot of free time on your hands. It's either I smoke or eat all sorts of rubbish; one of the two, you know what I mean. It's something to do really.” (K12IR, <40 years, long-term sentence)

Unlike K12IR, many prisoners reported engaging in multiple risky behaviours to cope with boredom. This was also observed by one staff member (K01NS), who, like K12IR, thought that there were very few options available to prisoners to help them pass their time in the prison and this boredom was a significant barrier to positive behaviour change:

“They have nothing else to do with their time, but sit in the tip, watch tele and eat rubbish (...) Smoking was, a lot of them took it as an opportunity to stop smoking, but found it a bit difficult because again what do they do with their time, how do they, what do they instead? What, eat crisps and chocolate and general rubbish?” (K01NS, NHS staff)

K01NS believed that mental health problems and boredom were linked, as both of these consequences resulted in negative health behaviours that increased prisoners' risk of CVD:

“So, I think, you know, looking at the whole spectrum of mental health and boredom, physical activity and diet – the three very much work together.” (K01NS, NHS staff)

Many prisoners also mentioned several sedentary activities that they engaged in to seek comfort and to cope with boredom. These included watching television and playing with a game console. Although there was an acknowledgement that some activities were available in the prison, for e.g. snooker and cards, the number of these activities were considered to be insufficient:

“But going about the hall, there's not much you can do in the hall. You can play pool, play snooker, play cards, so there's not much that you can do in the hall itself. So a lot of people prefer to stay in their room, play their computer or watch the tv; wherever you feel

comfortable as well. I think that's the reason a lot of men will stay in their cell (...) I don't think it's anything much to do with, I think lack of boredom might be part of it as well right enough, because people get bored too easily." (K05IR, ≥40 years, long-term sentence)

While the prisoners identified a lack of activities to be the reason for their boredom, often it was a lack of "preferred" activities that seemed to be the main reason for this. As one prisoner (K09IR) explained, there were a lot of activities but these mainly occurred in the form of a sport, which did not interest many men:

"But there are things that you can do in here, there's a lot of sports things you can do, but there's not really much that you can do. You can do wee bits and bobs but you can't control much." (K09IR, <40 years, long-term sentence)

Access to other types of physical activity was often not possible. For example, one prisoner (K14IR) spoke of his enjoyment of outdoor activities such as fishing and walking in the community. He was aware of the different physical activity options available in the prison, but was not interested in any of them because they were not what he preferred:

"So coming off the wing, I know there's a small gym up on the wing up there (...) They do an over 40s programme as well (...) I have no interest in it. My sport outside is fishing, so we'd walk or, we would be walking a good bit when we're going fishing and stuff, and we'd be out and about in the fresh air and on your feet all day, walking the dogs." (K14IR, ≥40 years, long-term sentence)

As a result of this lack of preferred activities, K14IR did not engage with any physical activity opportunities in prison which led to him feeling bored and anxious. He used smoking as a way of coping with the consequences of imprisonment. From his account below, it is apparent that he lacked the motivation and intention to engage in positive behaviour change:

"Just anxiety and stuff that has me constantly smoking, and boredom. I have to be active. Like outside, I have businesses and stuff going on, as I said a while ago there. In here, you're hanging about the wing there and there's nothing to do. There's intent

basically, intent to do nothing.” (K14IR, ≥40 years, long-term sentence)

Monotony of the daily prison regime could also lead to boredom. One prisoner (K03IR) who tried to stay physically active on a regular basis explained that boredom from doing the same exercise routine resulted in him stopping exercising for a period of time. At the time of this study, he was participating in a health promotion intervention, with the hope that he would become motivated to restart his own personal exercise routine:

“I was using it [the gym] all the time and then I stopped for a couple of months, but with this ‘Fit for Life’, it’s kind of kicking it back again to start doing it again, so I’m going to start doing it again. [Researcher asked why he had stopped using it]. Boredom really, it was just boredom, you know what I mean.” (K03IR, >40 years, long-term sentence)

A big talking point for both the prisoners and staff in relation to boredom was comfort eating. Unhealthy snacks such as sweets and crisps, were readily available from the prison canteen, and served as a source of comfort for many prisoners. These food items were mostly consumed in the evenings, after prisoners received dinner at 4:30 in the afternoon, and when they were locked in their cells at night. Comfort eating appeared to be accepted as part of prison life, and was therefore a social norm:

Participant 1: *“But here it’s just so easy just to go in your cell at night time, just kick back and relax and don’t do anything. It’s a big thing, isn’t it?”*

Participant 2: *“Aye, eat sweeties.”*

Participant 1: *“Comfort eating, boredom. When that door gets locked, that’s you.” (Participant 1: K10IR, ≥40 years, long-term sentence; Participant 2: K11IR, ≥40 years, long-term sentence)*

Powerlessness

The daily prison regime outlined in Appendix 1 highlights the many restrictions applied to prisoners while imprisoned. Restrictions on movement and lack of decision-making regarding food led to a sense of powerlessness, which in turn

led to a loss of control over behaviours, particular eating. Many prisoners reported comfort eating and had limited control over the type and number of unhealthy snacks they consumed. There was a seemingly unlimited availability of junk food from the canteen as, unlike other prisons, individuals were allowed to physically view the food choices that were available up to three times a week. Ultimately, the canteen was portrayed as a source of temptation, and those who visited to buy other things, for e.g. cigarettes, often ended up buying junk food:

“See when you go out to the canteen, the choice is quite good in this jail (...) In any other jail we get a form like that [demonstrates using a piece of paper] and you need to fill out what you want, so you don’t physically see the confectionary. In this jail you get taken out to a wee, it’s like going to an ice cream van (...) We’ll look through the grill gate and you’ve got all the shelves full of sweeties. And even if they’re going to buy their tobacco, they come back with a big bag of chocolate because it’s there looking at them.” (K01IR, ≥40 years, long-term sentence)

As they had no control over the food available, the prisoners assigned blame to the institution for this sub-culture of comfort eating, and ultimately for their lack of control over the behaviour. However, some acknowledged that while the institution was partly responsible for this temptation and associated uncontrolled eating, prisoners were also equally responsible for this. There was a shared belief among the prisoners that there would be a resistance to positive changes in the canteen, such as restricting the number of unhealthy snacks that could be bought.

One prisoner (K07IR) believed that if a restriction on the number of unhealthy snacks was introduced, there would be ‘less risk’ of CVD in the prison. However, he also believed that many prisoners did not wish to change their uncontrolled eating habit because the habit comforted them. Therefore, he believed that they would oppose measures to limit the amount of food bought from the canteen. He acknowledged that prisoners’ beliefs and attitudes (i.e. their ‘demeanour’) needed to be challenged in order for positive change to occur:

“There’s no limit to what you can buy. If you want 40 mars bars you can go and buy 40 mars bars. If there was a limit maybe it would have been better but then people would moan because you can’t buy

40 mars bars (...) But if there was a limit and they said you can't buy junk, it would probably be less risk [of CVD]. I don't know because like there is quite a big fuss to like stop and get fit, but I think it would mean they change their actual demeanour, well to see if they wanted to change." (K07IR, <40 years, short-term sentence)

This culture of temptation often made the prisoners feel powerless and resulted in them purchasing more items on their trips to the canteen than was originally intended. As one prisoner (K05IR) explained, he was never able to buy only one of the same food item, and needed to eat all in one go, demonstrating again the lack of control over eating in the prison:

"When it comes to sweets, I can't just buy one chocolate bar, I always buy two. Same with packets of sweets, if I've got them sitting there I will eat them. If they're not there I won't bother but if they're there I'll eat them." (K05IR, ≥40 years, long-term sentence)

Another prisoner (K16IR) claimed to have an addiction to chocolate, and recalled how many chocolates he had the night before. He was disgusted by how many he had eaten and perceived a lack of control over this eating and spending habits. Although he knew that this was bad for his health, his 'addiction' to chocolate had more of influence on his behaviour than his feelings of disgust towards this habit. He implied that if there were restrictions on what he could buy, he would not eat as many chocolates, but at the same time, suggested that this was 'easier said than done', indicating the difficulty of implementing such restrictions:

"I think I'm addicted to chocolate as well. You wouldn't believe what I ate last night in my bed (...) Well you get these cheap twixes right. I had four of them, and I had a packet and a half of the gold biscuit chocolate things. Fucking hell, you know what I mean. That's nine of the biscuit chocolate things and eight fingers of the bloody twix. That's shocking, ain't it? (...) I could do that every day, aye, but it's not good for me, but it's dessert, see, you're not getting it. If they turned around and said you're not getting it, well, easier said than done (...) I'd probably do the same tonight." (K16IR, >40 years, long-term sentence)

While many prisoners believed that the institution was responsible for their feelings of powerlessness, some staff, mainly prison staff, believed that it was the prisoners who were responsible for their own choices.

For example, one staff member (K04PS) acknowledged that while most of the food items sold in the canteen ran counter to health promotion messages in the prison, there were still 'healthy' options available such as tuna and fruit. As many prisoners still chose to buy unhealthy snacks, he believed that it was their personal attitudes towards healthy food that influenced their eating behaviour, and it was these attitudes that needed to be changed:

"There's a lot of prisoners can buy chocolate and cigarettes and stuff from the canteen, so that side of things obviously goes against the messages we're trying to deliver [about healthy eating], although there's some guys that will buy your tuna, your healthy stuff, your fruit and things like that from the canteen (...) So change in behaviours about healthy stuff is needed." (K04PS, prison staff)

Another prison staff member (K07PS) admitted that there was a level of temptation for the prisoners because of the daily availability of unhealthy food options such as chips. However, there were healthy options available and in her opinion, unhealthy choices came from the prisoners' limited knowledge:

"Well, what I can say to everybody about nutrition in the jail is you could choose to be healthy (...) Where the problem comes is, it's very easy to have chips every day (...) You know, I'm not saying every time I go to the canteen I'm always gonna take the salads, um, but at the same time, the lack of knowledge that some prisoners have got, whether it be their background, their upbringing, or they just don't know, that could be it." (K07PS, prison staff)

On the other hand, NHS staff members believed that the institution did have an impact on the prisoners' perceptions and choices relating to food. One of these staff members (K05NS) believed that there were few healthy eating options for the prisoners, and that this tended to 'trap' prisoners into gaining weight after entering prison:

“I would say quite a large proportion of the guys do tend to follow sort of, their eating habits in here – there’s not sort of a lot of healthy options eating wise. I would say, so they tend to fall in a trap of maybe gaining a bit more weight coming in here, unhealthy eating.” (K05NS, NHS staff)

The second theme revealed that the participants assessed prisoner’s CVD risk as both personal/individual and general, however, NHS staff tended to view this risk as individual, while prison staff viewed it as general. Assessments of personal CVD risk was based on perceived severity and susceptibility to CVD, and attitudes and beliefs regarding health, illness and health behaviours. Most prisoners who viewed their CVD risk as personal were uncertain about this, and level of knowledge CVD appeared to have some influence in such cases. Assessments of general CVD risk were based on as feelings or judgements about physical fitness and physical appearance.

Mental health problems, boredom and powerlessness, which were perceived consequences of imprisonment, were linked to CVD risk via health behaviours, which were used as coping mechanisms for these consequences. Importantly, these consequences were linked to each other and resulted in a perceived lack of control and reduced motivation to engage in positive behaviour change. Prisoners strongly believed the institution was responsible for these consequences and in extension, prisoners’ CVD risk.

Staff believed many prisoners developed CVD risk factors in the community which were then exacerbated in prison. NHS staff attributed this exacerbation to the institution but some also thought that CVD risk could be reduced in prison due to better healthcare opportunities compared to the community. However, prison staff believed CVD risk was exacerbated because of prisoners’ unhealthy choices and not because of the institution as there were opportunities for a healthier lifestyle in prison.

5.4 Chapter summary

This chapter presented the findings relating to the prisoners' knowledge of CVD, and theirs and the staff's perceptions of prisoners' CVD risk. Four significant findings emerged from this chapter.

Finding 1

Overall, most prisoners knew the disease was related to the heart and identified common behavioural risk factors and cardiovascular events. However, two-thirds of prisoners were only able to provide details about one risk factor or one cardiovascular event, and therefore had limited knowledge of CVD. One third of prisoners had moderate knowledge of CVD, evidenced by an ability to recall more risk factors, symptoms or cardiovascular events. Gaps in knowledge of CVD were evidenced throughout the prisoners' accounts of the disease, regardless of their level of knowledge of the disease. These gaps were evidenced through a limited ability to recall information about the disease, misinterpretation of the term 'cardiovascular', a lack of recognition of self-reported factors as established CVD risk factors and misconceptions about CVD risk. There was also a lack of referral to atherosclerosis, the underlying mechanism of CVD. Staff had non-expert knowledge of CVD, as evidenced by their admissions to knowing little about the disease or a lack of explanation as to how CVD risk factors contributed to the prisoners' risk.

Finding 2

Attitudes towards a prisoner's current health status had a significant influence on CVD risk assessment above other factors including knowledge of CVD and a family history of the disease. Overall, prisoners made decisions about their CVD risk based on theirs or others' current health status. Physical fitness and physical appearances were the main criteria by which a prisoner's health status was determined. Most prisoners who viewed risk as personal were uncertain or lacked concern about this risk because they perceived their current health status as good. Similarly, most of the prisoners who believed they were not at risk of CVD attributed this to their good health and feelings of physical fitness. Prison staff

also assessed prisoners' CVD risk in a similar manner. Their risk assessments were based on judgements of a prisoner's current health status and fitness level.

Finding 3

Prisoners' risk of CVD was directly linked to negative health behaviours such as smoking and physical inactivity. These behaviours were mainly used as mechanisms for coping with the perceived consequences of imprisonment, namely mental health problems, boredom and powerlessness. These three consequences were interconnected as one often led to another to impact on the prisoners' attitudes and perceptions of health behaviours. In particular, many prisoners found it difficult to stop engaging in unhealthy behaviours and therefore perceived a lack of control over them. The consequences of imprisonment also demotivated prisoners from engaging in positive health behaviours. Prison sub-cultures of physical inactivity and comfort eating led to the creation of subjective norms where these behaviours were seen as acceptable by prisoners. Institutional factors, particularly the lack of activities and the wide availability of unhealthy snacks from the canteen, were viewed as major contributors to these prison sub-cultures.

Finding 4

There were similarities and differences between the views of the NHS and prison staff regarding attributable causes of prisoners' CVD risk. NHS staff believed institutional factors were primarily responsible for the continuation of unhealthy lifestyles, which contributed to CVD risk in prison. These included a lack of physical activity opportunities and the provision of unhealthy food. In contrast, prison staff believed that there were opportunities for prisoners to improve their health such as access to the gym and the provision of healthy food options. They therefore believed that prisoners were responsible for their own unhealthy choices, and attributed these to the prisoners' limited knowledge of nutrition and their attitudes towards healthy eating. Additionally, while some prison staff believed many prisoners made choices that worsened their health, NHS staff generally believed that prisoners were more likely to prioritise their health because of easier access to healthcare services in the prison compared to the community.

In conclusion, these four findings relate to the participants' knowledge, assessment of CVD risk, and attributable causes of this risk. It should be noted that while the factors directly linked to CVD risk, i.e. negative health behaviours, were mainly used as responses to the consequences of imprisonment, other factors also influenced engagement in these behaviours. Conversely, many participants presented narratives on their engagement in positive health behaviours and activities that could improve prisoners' cardiovascular health. As improved cardiovascular health can contribute to a reduction in the prisoners' cardiovascular risk, these positive influences were also important. The next chapter will present the findings of these negative and positive influences on prisoners' cardiovascular health.

Chapter 6: Results – Influences on prisoners’ cardiovascular health

6.1 Introduction

This chapter presents the findings of the factors that influence prisoners’ cardiovascular health (objective 5). As explained in Chapter 5, the participants discussed the negative health behaviours that were directly linked to CVD not only in relation to the disease, but also in relation to other topics. Participants also discussed the factors that had a positive influence on cardiovascular health. The analysis therefore sought to explore the factors that influenced engagement in health behaviours and health promotion (HP) activities that impact on the prisoners’ cardiovascular health.

The findings are presented under three main themes. Theme 1, readiness to change, discusses the factors that prompt prisoners to be ready to change their behaviours or lifestyle (section 6.2). Theme 2, social interactions and identity in prison, discusses how the prisoners’ identities influence engagement in health behaviours and HP activities (section 6.3). Theme 3, healthcare barriers to self-care in prison, discusses how institutional factors influence the prisoners’ abilities to perform to self-care activities (section 6.3). These themes comprise of sub-themes which are further divided into categories as shown in Table 18.

Table 18 – Themes, sub-themes and categories of the factors influencing engagement in health behaviours linked to perceived CVD risk and positive cardiovascular health

Themes	Sub-themes	Categories
Readiness to change	Outlook on a long-term prison sentence	The adjustment stage The routine stage The anticipation stage
	Cues for positive behaviour change	
Social interactions and identity in prison	Masculine culture	Physical appearance Embarrassment and intimidation
	Being seen as a role model	
	Group memberships	Older age Equal fitness abilities
Healthcare barriers to self-care in prison	Accessibility of support for self-care	Equal access to prisoners Limited access to prisoners
	NHS staff's knowledge of contextual factors	
	Communications and partnership working between NHS and prison staff	

6.2 Theme 1: Readiness to change

This theme concerns the factors that influenced prisoners' readiness to engage in positive health behaviours and HP activities. Many prisoners already engaged in negative health behaviours such as smoking and unhealthy eating, which the NHS and prison staff believed were brought with them from the community. There was a common belief among all participants that prisoners were only motivated to engage in positive behaviours when the time was right, or in other words, when they were ready to change. The findings indicated that two major factors

influenced when this readiness to change occurred: the prisoners' outlook on a long-term prison sentence (6.2.1) and triggers for positive behaviour change (6.2.2).

6.2.1 Outlook on a long-term sentence

Most of the prisoners interviewed were serving long-term sentences (five years or more) and they spoke about changes in their attitudes towards their health as their sentence progressed. There was a general view that long-term prisoners, in contrast to short-term ones, cared more about their health and were more motivated to engage in healthy behaviours because they knew they would spend many years in prison. However, this motivation depended on the stage these prisoners were at in their prison sentence.

The adjustment stage

The initial stage of a long-term prison sentence, which was defined by the prisoners as the first few years a sentence, was all about adjusting to life in prison. From the prisoners' perspectives, their main priority during this stage was coming to terms with their circumstances, whether it was the prospect of life in prison, and/or accepting the crime they had committed. This stage was considered emotionally difficult and was associated with feelings of disbelief and denial. These negative feelings often prevented prisoners from being able to envisage a future, instead only living from day to day. Their focus in this stage was more about surviving rather than living in prison, and most prisoners paid minimal attention their health.

One prisoner (K10IR) who was serving his first sentence reported that it took time for him to come to grips with his situation and adjust to life in prison. The feelings of disbelief and denial that he had experienced had been so overpowering that he had been unable to focus on anything else other than trying to survive. It was difficult for him to find the energy to engage in activities including attending the gym and instead, he had passed his time by sleeping:

“Well, personally speaking for myself, when I first came into jail, I had been given a long sentence and I’ve never been to jail before in

my life and it took me a wee while to get my head around about what was happening. And within that time, I mean I couldn't see out with anything else. I was just sleeping (...) You're still in disbelief and denial. All these things are strong emotions. You're emotionally strained and you can't get proper exercise when you're like that." (K10IR, ≥40 years, long-term sentence)

Another prisoner (K09IR) serving his first sentence, believed that during this adjustment stage, it was inconceivable that he would have been able to engage in any activity that promoted health, as this was not a priority for him. As with K10IR, this adjustment took time and it was only after this stage had passed that he was able to engage in activities such as going to the gym:

"It took me about two years before I decided to pick myself up and start going to the gym. I was trying some different things, like interacting with some of the sports down here, but before that you just don't want to do nothing. First couple of years for me anyway, I just didn't want to; I had bigger things to worry about." (K09IR, <40 years, long-term sentence)

One prisoner (K14IR) who had served eight months of his sentence thus far, felt no desire to engage in behaviours or activities that could improve his health and appeared to have little concern for his health. In Chapter 5 (section 5.3.1), he expressed a fatalistic attitude towards diseases such as CVD and cancer, and this was possibly why he did not seem concerned about his health. However, he also attributed this lack concern to the duration of his sentence:

"No, because I'm kind of doing a long-term sentence like, so I just couldn't be bothered [with physical activity]." (K14IR, ≥40 years, long-term sentence)

The routine stage

Most prisoners worked as part of their daily routine for the working week. There were several who reported developing a routine around their work that involved frequenting the main gym for weightlifting or engaging in other forms of exercise. However, they were motivated to do this only after they had come to accept their circumstances and had adjusted to life in prison, i.e. after the 'adjustment' stage.

The main gym not only provided an opportunity for them to exercise; it also gave them a chance to spend time away from their cells and wings. This routine was considered important to maintaining their health and wellbeing. This indicated that there was a change in some prisoners' attitudes towards their health during this stage of their sentence. Establishing this routine was a slow process for most, but once formed, it was regarded as instrumental in helping the prisoners to cope with life in prison:

“Slowly and slowly, I got into a routine. Jail’s all about a routine. The quicker you learn to get into that routine, the quicker you feel as if you can see a wee bit more ahead of yourself. So, it takes a bit of time to adjust, but eventually you get there.” (K10IR, ≥40 years, long-term sentence)

However, there were challenges of adhering to this healthier regime. One institutional factor identified in Chapter 5, i.e. the monotony of the prison regime, led to periods of time when prisoners stopped exercising. The duration of these periods varied, with some prisoners finding it easier to get back into their routine than others. Those who reportedly adhered to their routines for extended periods of time did so because of the benefits they experienced from engaging in positive behaviours and activities. The benefit that many seemed to value above all was an enhanced sense of wellbeing, as it resulted in an increased ability to cope with stressful situations and an improved sleeping pattern at night. At times, this enhanced sense of wellbeing encouraged the prisoners to exercise self-control over other health behaviours and promoted maintenance of frequent physical activity. This so-called ‘feel-good’ factor is what kept prisoner KO8IR motivated to stick to his routine in prison:

“What motivates me? (...) It’s just you enjoy it, I just enjoy it. I think [long pause], I don’t really know the answer to that. It’s just something you enjoy, you just keep repeating, don’t you? (...) There’s a feel-good factor as well. See there’s a lot of stress in places like this, and the feel-good factor, the release of these endorphins and that, that’s important in this place to try and kind of keep a level of composure.” (K08IR, <40 years, long-term sentence)

In contrast, there were other prisoners, who, even after the 'adjustment' stage, did not develop a healthier routine around their daily work routine. Instead, they developed what was described as a 'lazy' routine, where they adopted physically inactive or sedentary lifestyles. There were many reasons for this. As was highlighted in Chapter 5 (section 5.3.1), perceived good health and increasing age influenced one prisoner's (K12IR) decision to stop engaging in physical activity. He had also indicated that there were times he intended to develop a routine around his work, but this was never achieved due to the inflexibility of the prison regime.

The inflexibility of the prison regime also affected engagement in HP interventions, for which special times during the week were allotted. This was important as some prisoners who were interested in changing their behaviours often saw HP interventions as a way of enabling this. Prisoner K13IR attributed his early withdrawal from an HP intervention to the nature of the intervention which was a result of the inflexibility of the prison regime. Although the intervention ran both in the morning and afternoon of selected days, the inability to choose when to participate in its activities dissuaded him from adhering to it:

"I've done a programme with the gym (...) I've done it for seven weeks and I thought it's not for me. And the PTI said 'you know we only have three weeks left'. I said it was enough for me. It was the point of getting up early in the morning and coming down in the morning (...) It put me off. Sometimes it was in the morning, sometimes it was in the afternoon. In the afternoon you want to just sit back and watch the tele, and I just want to chill." (K13IR, ≥40 years, long-term sentence)

While the inflexibility of the prison regime posed a challenge to prisoners' motivation to adhere to their routines, some acknowledged that it helped to add stability to their lives. For example, K13IR believed that the set times for the main meals allowed him to gain control of his eating habits in prison:

"Yes, I'm in control over my health in here because you can't abuse your body in prison and just stick to regular types of and meals, breakfast, lunch and dinner, and you can't even eat in between meals"

(..) So it's healthier that way, so it is." (K13IR, ≥40 years, long-term sentence)

The anticipation stage

Only one of the prisoners interviewed (K03IR) was making preparations to leave prison as he knew when his release date was. This final stage of his prison sentence appeared to be diametrically opposite to the 'adjustment' stage of a long-term sentence, as it was characterised by feelings of anticipation and hope due to him being able to envisage a future. Although he was already maintaining a healthy lifestyle which involved eating healthily and staying physically active, he wanted to further improve his health in anticipation of his release. Thus, he had enrolled into an HP intervention in the prison that was running at the time of this study:

"At one point doing a life sentence you couldn't control it [your life], because you don't know when you were getting out. But now I've been given a day, it's the 24th of November next year, so I can control it, it's down to me if I want to get out then. It's just a case of me keeping on the straight and narrow." (K03IR, ≥40 years, long-term sentence)

6.2.2 Cues for positive behaviour change

There were specific events that occurred during a prisoner's time in prison that caused them to reflect on their lifestyle and prompted a readiness to change. Two examples of cues were provided: physical injury and negative feedback.

Prisoner K03IR had experienced a back injury that he attributed to the excessive weight he had gained after entering prison. This injury caused him intense pain, affected his ability to walk and ultimately reduced his quality of life at the time. The injury acted as a wakeup call because it prompted him to commit to a healthier lifestyle to prevent a similar injury from occurring in the future:

"When I first came to prison in 2001, I was about 10 stone and I was pretty active outside and then I came in here and I kind of let it go. And at one point I was 21 stone up until about four years ago. Then I just, my back went, and I couldn't walk properly. So I just

restricted my diet from then onwards, and then just started kind of eating healthier and looking after myself a wee bit better and the weight just fell off me and now I've got to about 14 stone and I'm pretty happy with that, you know what I mean (...) what motivated me, I had to have an accident before I got into my own routine.” (K03IR, ≥40 years, long-term sentence)

This commitment to changing his lifestyle prompted K03IR to acknowledge that he was responsible for his own health. He began to engage in self-care activities, for example, seeking out information about how to improve his health from others such as health champions:

“It's down to me at the end of the day. And the gym is always on, you can always get to the gym at least once a day, every day, if that's what you want to do, you know what I mean (...) If I need any information I could always ask; I'm not shy to ask him [health champion] if I need it. And they're always here, they're approachable, and that's part of the thing.” (K03IR, ≥40 years, long-term sentence)

Conversely, some prisoners reported that physical injuries stopped them engaging in physical activity, although the duration of this varied considerably. Those who recalled their injuries admitted that once an injury had healed, it was harder for them to reengage with their exercise routines as before, due to a lack of motivation.

For example, one prisoner (K15IR) who had received an injury to his cheek bone had stopped his routine of frequent exercise. He admitted that the recovery advice he had received from a doctor was used as excuse to not exercise at all. Once this injury had healed, a lack of motivation had made it difficult for him to restart his routine:

“Aye, I stopped for a while really, you know, because (...) one of my cheek bones broke. I had to go to the hospital, and the doctor told me, he said that I need an operation to get a plate in to fix it. He said it won't heal itself. I said, don't worry, I know. He said don't go to the gym until it healed, you know. I gave myself an excuse, took a couple of months off you know. I took a wee bit longer than I thought. I started

back about three weeks ago, started back about three weeks ago.”
(K15IR, ≥40 years, long-term sentence)

Negative feedback about a prisoner's physical appearance was another cue for change. One prisoner (K07IR) felt motivated to change his lifestyle when a close friend had commented on his increasing weight during a prison visit. Following this, he had made a conscious effort to have a healthier diet and attend the gym regularly:

“I got a visit one day and one of my close pals said I was getting fat. So that sort of just made me just get up and go to the gym and do something about it. And that would probably would be the best part of my motivation was my visit and the negative feedback, so, aye.” (K07IR, <40 years, short-term sentence)

In summary, this first theme revealed that prisoners were more likely to engage in positive health behaviours and HP activities when they were ready to change. This change depended on their attitude towards their health. For those serving a long-term sentence, this was more likely to occur after an initial period of emotional distress in which there was little concern for personal health. Change also occurred during the final stage of a sentence where anticipation and hope drove motivation to improve health. Attitudes towards health were also brought about by cues, i.e. events in a prisoner's life that prompted a readiness for change. A key factor that influenced a lack of motivation to either engage in or sustain positive behaviour change was the inflexible prison regime.

6.3 Theme 2: Social interactions and identity in prison

This theme concerns the influence of social interactions on prisoners' engagement with health behaviours and HP activities. It also concerns the way in which individual prisoners identified themselves in social situations, and how this influenced their engagement with health behaviours and HP activities. Three main factors helped to shape these identities: the masculine sub-culture of the prison (6.3.1), being seen as role model (6.3.2) and group memberships (6.3.3). These three factors arose out of the social interactions the prisoners had with other prisoners or family members, and impacted on several personal or

individual factors, including the prisoners' self-efficacy to perform specific activities and their attitudes towards health and health behaviours. These individual factors either motivated or demotivated prisoners' engagement in behaviours or activities that could improve their cardiovascular health such as exercise and healthy eating.

6.3.1 The masculine sub-culture

As mentioned in Chapter 4, in addition to conducting interviews with participants, I also recorded field notes. These notes mainly consisted on my reflections of the data collection process, but also consisted of my observations and perceptions of what was happening around me during my time in the prison. As the interview room was located within the vicinity of the main gym, I had the opportunity to observe prisoners (not participants) who used the gym while I was there. There was a very masculine atmosphere about the gym; this was not due to it being used by only men, but due to what I perceived as male posturing by the prisoners. There was a lot of flexing of muscles and male banter, and many of the prisoners gave off the impression that they were an 'alpha' male. The data collected from the interviews confirmed what I had observed, i.e. that there was a dominant masculine sub-culture in the prison.

This masculine sub-culture in the prison which was shaped by the daily interactions of prisoners as men with other prisoners. It was characterised by an overwhelming emphasis on physical appearance and feelings of embarrassment and intimidation. This came out of interviews with the prisoners and staff, but they also came out of observations that I made with respect to the few prisoners interviewed who had said they did little or no exercise at all. These men had appeared uncomfortable when entering the general area of the gym, and it was quite possible that this discomfort may have been due to their perceptions of the gym and feelings of intimidation. Interestingly, a few staff mentioned that this intimidation was due to a hierarchical system created by prisoners, but this did not emerge from the discussions with the prisoners.

Exercise, in particular, weightlifting, was a popular topic for all prisoners therefore most of the examples relating to the impact of the masculine sub-culture in the prison were about this activity.

Physical appearance

In Chapter 5, judgements about a prisoner's physical appearance and physical fitness level influenced the participants' perceptions of prisoners' CVD risk. Most of the prisoners interviewed made references to their physical appearance which indicated that this mattered most to them. Several expressed a desire to improve their physical appearance by either reducing their body fat or building muscle, which prompted them to seek out activities that could help them achieve this. Thus, an improved physical appearance was a motivator for engagement in physical activity and participation in HP activities offered in the prison.

For one prisoner (K02IR) who had type 2 diabetes, his main motivator for participating in an HP intervention was to improve his physical appearance. He appeared to give this a higher priority over his weight and type 2 diabetes:

“I’m not happy with my weight. It’s a total, my belly – I want to lose my belly. I’m not even caring about my weight, I just want to lose a bit of my beef (...) I was coming to the gym every time I could and things like that, and then I stopped it, and I ended up going up from 14 and a bit stone to 21 stone, and I want to get back to about 15, 16 stone and be fitter (...) I’ve got diabetes so I need to get better anyway, eat well and that.” (K02IR, <40 years, long-term sentence)

The staff interviewed recognised that prisoners' physical appearance was important to them and facilitated engagement in HP interventions. Physical appearance was also used as platform for both NHS and prison staff to communicate information to the prisoners about the consequences of negative behaviours such as smoking and unhealthy eating.

One staff member (K03NS) discussed the use of an age progression computer software that allowed prisoners to visualise how their smoking habit could impact on their physical appearance in the future, as part of a smoking cessation intervention. Being able to visualise their future physical appearance was

reportedly effective in capturing the prisoners' attention and motivating them to attempt quitting:

*"We did a wee talk around this, smoking and oral health (...) They [prisoners] did this age progression as well, where it shows you the effects of smoking, like as you age sort of thing, sort of enclosing things like that, which was quite well received by the prisoners."
(K03NS, NHS staff)*

This short-term smoking cessation intervention was not formally evaluated and so the staff did not know how it impacted on the participants' quit rates. However, physical appearance was additionally used as a platform to facilitate discussions about the barriers and triggers of smoking in the prison, and this was believed to enhance the prisoners' understanding of the consequences of smoking:

*"That allowed us to then enable us to discuss what their triggers and their barriers to what possibly quitting smoking might be for them. You know, just kind of give us something to say, well if you're not able to overcome these barriers or triggers, and to know this is a continual thing that's going to happen, that you're going to age progressively like that, and if we can support you to overcome these triggers or barriers, then you can potentially reverse the effects that it can have, and you can make the change."
(K02NS, NHS staff)*

Both prisoners aged 40 and over and the staff reported that muscle-building was common in prison. Interestingly, none of the younger prisoners in this study spoke explicitly of 'bulking up' but many did make references to the importance of having suitable levels of protein in their diets:

*"Plenty of carbohydrates, but I think that's where the problem is in the jail, you've not really got a lot of protein, it's just lots of carbs for their meals. So if you kind of balance your diet out, it seems to be sort of alright. Get a lot of supplements, get a lot of protein powders and that."
(K08IR, <40 years, long-term sentence)*

There were prisoners who had negative views on 'bulking up' in the prison. Many prisoners aged 40 and over, based on their observations of younger

prisoners' mannerisms, were adamant that 'bulking up' was only done to improve physical appearance and not health:

"Like some of them go to the gym to build-up their muscles and all that kind of stuff. Outside, half of them are not even doing it for the health side of it; it's just to make themselves look 'grrrr' [mimics muscular man]." (K14IR, ≥40 years, long-term sentence)

As muscle-building was so common, the most popular form of exercise was weightlifting, but prisoners who were not accustomed to performing this exercise were often disillusioned with the prospect of exercise in general. Many of them developed unrealistic expectations of exercise, where, for example, they thought they had to lift heavy weights and physically wear themselves out to become physically fit. One prisoner (K09IR) believed that the social norm of weightlifting, along with a lack of knowledge of exercise affected some prisoners' self-efficacy to engage in other physical activity opportunities outside of the gym:

"But I think what puts people off fitness as well is what they see [at the gym] (...) they think to get fit you need to be in here, sweating buckets and that; they don't want to go there and they don't want to be running around like that. But it's just wee things to get you to that stage like maybe getting out your cell, walking about the landscape a few times or maybe up and down the route (...) But they get put off by what they think they're going to have to do in there." (K09IR, <40 years, long-term sentence)

One staff member (K01NS) made a similar observation to K09IR. In her opinion, the stereotypes that prisoners created about exercising prevented them from engaging in the activity:

"You mention to people about physical exercise and they think, oh my lord I'm going to have to get the trainers, the lycra and you know, do everything big. And then they just don't do it." (K01HP, external staff)

Embarrassment and intimidation

At times, the emphasis on physical appearance caused some prisoners to feel embarrassed or intimidated, although most were reluctant to admit this. These

emotions often resulted from crude comments made by other prisoners about an individual's physical appearance or performance capabilities in the gym. Embarrassment and intimidation also resulted from the prisoners' limited knowledge of exercise and low self-efficacy to perform certain exercises. At times, these emotions prevented prisoners from exercising, either in a group setting or on their own.

A few prisoners referred to one person, S, who was particularly embarrassed and intimidated from the insensitive comments made by other prisoners about his weight. According to prisoner K03IR, S did want to reduce his weight, but would only exercise on his own as he lacked the confidence to do so in a group setting. As a result, he did not join the HP intervention that was currently running, although he had initially expressed an interest in doing so:

"Like there's a big guy in the hall about 25 stone and (...) I've seen a couple of guys say wee snide things to him (...) He's got an awful chip in his shoulder about people putting him down because of the size of him. And he keeps mentioning that to me and I keep trying to say to him, S, it's not about them, it's about what you want." (K03IR, >40 years, long-term sentence)

Prisoner K03IR suggested that for people who suffered from low self-confidence as S did, interventions should offer an individualised element. He believed that this could eliminate any potential feelings of embarrassment and increase the likelihood of prisoners seeking support:

"So I think if you were to get everyone individually (...) they'll be more likely to approach you themselves, you know what I mean. That's what I think a lot of guys need. They might not say that but personally, I think that." (K03IR, >40 years, long-term sentence)

Several of the prisoners believed that others were often embarrassed in the main gym because they were unable to perform as well as others. Those who had limited knowledge of gym-related exercises and low self-efficacy to perform these were less willing to continue attending the gym:

"Aye, self-confidence. It can be intimidating, (...) like if you want to do a wee bit of weights, there's people's loading up the 5kg and

they're struggling, and people's lifting like 30s and things like that, and they feel sullied because they would be using the wee light weights, but you need to start somewhere." (K09IR, <40 years, long-term sentence)

One prisoner (K13IR) recalled initially feeling embarrassed about not being able to perform as others did, but his determination to improve his health motivated him to continue exercising. Through this process, both his knowledge of exercise and self-efficacy was improved:

"See when you come down here in the weights room, guys that are in here, you watch them exercise and you're like, quite embarrassed; I could only do that and he's doing that. Then you think to yourself, but that person's also probably like me at one time and probably not done much, and then he's bulked himself up gradually to do what he's doing. It's good to understand because just sticking to it and doing it and keeping active, it works." (K13IR, ≥40 years, long-term sentence)

6.3.2 Being seen as a role model

Being seen as a role model by others often motivated the prisoners to maintain their engagement in positive health behaviours and HP activities. Prisoners either identified themselves as role models from interactions with family members, or, from other prisoners. Being seen as a role model was important to the prisoners' identity, and those who embraced it expressed positive attitudes, beliefs and values in relation to their health and wellbeing, and towards their time in prison.

Prisoners who spoke about sharing their health and fitness achievements with their family members reported receiving positive feedback. This motivated them to continue engaging in behaviours such as physical activity and healthy eating. These interactions with family members generated feelings of pride, respect and admiration, and instilled in them a sense of responsibility for their personal health. In some cases, the prisoners reported that their actions inspired their family members to engage in HP activities. Thus, family members were important in framing some prisoners' identities as a role model, and in providing emotional support to them.

One prisoner (K13IR) recalled feeling pride during an interaction with his children where they had complimented him on his improved physical appearance. This positive feedback and the belief that they were able to learn from his experience, prompted him to identify as a role model. As a result, he was motivated to maintaining a healthy lifestyle and had a positive attitude towards frequent exercise and healthy eating:

“And my family as well. My wife and my wee daughter, or my two daughters and my son. You’re looking healthy, dad. What you have you been doing? And I take pride in that. They must see the difference already. I learn a lot from them, as well as them through me. And it keeps you occupied as well, so it does.” (K13IR, ≥40 years, long-term sentence)

Another prisoner (K06IR) also expressed pride in being seen as an inspiration to his nephews. Through his involvement with rugby in the prison, he motivated his nephews to take up the sport in the community. He also expressed a sense of responsibility for his family, and this enhanced his desire to remain healthy so that he could have a future with them after his release:

“But aye, just want to look good and stay fit and healthy, and when I get out, to be fit for my family, my wee nephews and that. I’ve got them playing rugby and they’re playing for a team now and that’s with just coming in to see me and doing whatever. So aye, definitely, to be fit for them, that’s what keeps me motivated, aye.” (K06IR, <40 years, long-term sentence)

In addition to family members, other prisoners also provided emotional support and helped to embed a sense of responsibility for personal health. One prisoner (K05IR) who had recently started attending the gym after taking a break from it, spoke of the practical and emotional social support he received from the health champions. Practical support occurred in the form of giving advice on exercise and nutrition, and demonstrating how to perform certain exercises. Emotional support occurred through words of encouragement and praise, and expressions of genuine care and concern:

“Well, see like that, there’s a couple of health champions in. One of them (...) he’s very motivational towards you. If he sees you’re doing something he’ll encourage you, he’ll let you know right, you’re doing good, keep going, push yourself. They make sure they let you know what you’re doing, what you can do to help yourself get better, what you’re doing wrong (...) So there’s a lot of great understanding between the health champs and the people who are taking part, especially myself.” (K05IR, <40 years, long-term sentence)

The support that the health champions provided resulted in other prisoners viewing them as role models. Prisoner (K071R) who had observed the health champions in action felt inspired to become one himself. This was also probably driven by his own achievement with changing his lifestyle for the better (section 6.2.2):

“I spoke to a health champ, so now I know like obviously they are motivating people to get them to down to the gym. But you don’t got a health champ anywhere else in any of the other jails; it’s just here. So it’s quite a good thing because I’ve seen people that I’m quite surprised with that have actually come down to the gym. I would have never ever think that they would have come to the gym.” (K071R, <40 years, short-term prisoner)

Another prisoner (K031R) who had also changed his lifestyle for the better after experiencing a painful physical injury (section 6.2.2) also identified as a role model and felt compelled to help one of his peers to become healthier:

“So when we were out on the pitch yesterday, he was walking with himself and I just caught up with him and started walking round with him and explaining how I was his size at one time, and you can get it down. So I’m going to pull him into a wee regime and try and motivate him to keep it going even if it’s just walking around the hall, you know what I mean.” (K031R, ≥40 years, long-term sentence)

6.3.3 Group memberships

Some of the prisoners were members of a groups that exercised together. Each of these groups was formed on the basis of a common identity, where

members shared either a social category, for example, older age, or some other commonality such as equal fitness abilities. Membership of a group was reported to help increase prisoners' motivation to engage in positive behaviours and HP activities, and at times, increase adherence to these on a long-term basis. Group membership also helped the prisoners to increase their knowledge and understanding of physical fitness and to boost their self-efficacy to perform certain exercises or lift heavier weights in the gym.

Older age

Many older prisoners considered their age to be an important part of their social identity. One formal group that was organised by prison staff was the over 40s group, out of recognition that there were differences in the preferences of older prisoners versus younger ones. Generally, older prisoners were less competitive than younger prisoners. They also did not like training when the gym was crowded and had different music preferences to younger ones. The over 40s group therefore provided a comfortable environment in which older prisoners could exercise:

“When we spoke to a few of the prisoners that are over kind of high 30s, over 40, they are like, ‘I’m not wanting to train with these young boys’. That was kind of the gist of what we got. So we then opened it up and offered the over 40s - you had to be over 40 to use this class (...) It’s a session that’s quiet, it’s civilised, there’s no banging music (...) It’s a very different mentality with the prisoners that are over 40.” (K07PS, prison staff)

This group also provided an opportunity for older prisoners to socialise with each other. Socialising appeared to be important for these prisoners and was considered to be more beneficial to their general health and wellbeing compared to exercise:

“It [over 40s group] is just being able to get, as I said, away from the wing and coming down and mixing with the other guys, and I use it as a sociable time (...) You know, I’m over 50 now. If I just go down and have a card with the guys, I enjoy myself. I know I’m doing myself good coming down here, playing badminton and everything, and a bit

of cardiovascular stuff is doing me good, so aye. But I treat it as a sociable thing and I think most of the over 40s do that.”(K10IR, ≥40 years, long-term sentence)

One prisoner (K16IR) had an intention to exercise but he lacked the motivation to do so. He expressed a desire to belong to a group such as the over 40s as he believed having company to exercise would increase his motivation to do this:

“With me it’s like if you don’t know people, I find it’s a bit harder going to the gym, if you don’t know anybody, you know what I mean. But see when you’re outside it’s different. Like you’ve actually, you’ve got friends outside and stuff (...) In here it’s not everybody wants to go down to the gym if they don’t know anybody here (...) I was saying last week I’m going one day, I’m going one day (...) I don’t know why (...) I want to change, definitely I do. I think if I joined a group like the over 40s, then maybe?” (K16IR, ≥40 years, long-term sentence)

Equal fitness abilities

An example of one group that was organised by prisoners who shared equal fitness abilities was provided by prisoner K11IR. These prisoners were interested in improving their fitness and capabilities in the gym, and a camaraderie was formed because they shared a common identity and a common goal. They benefited from the emotional and practical support that this provided. As a result, their knowledge and understanding of physical fitness improved and their self-confidence to perform in the gym increased:

“I workout with a couple of boys in the hall and every time we do something, we say, right, week by week, and once you’re doing that, we put on another couple of discs, just like one and a half kilos, one and a quarter kilos. Once we can do that easy enough then we’ll just say don’t worry about what everybody else is lifting, it’s all about what you’re getting from it. Everything’s achievable and it’s level by level.” (K11IR, ≥40 years, long-term sentence)

Another group of prisoners who had the same level of fitness was organised as part of an HP intervention. These prisoners shared a common goal in that they were interested in reducing their weight and improving their health. As one staff

member (K07PS) observed, the prisoners felt more confident to make decisions together when presented with the same problems. Thus, from her perspective, group membership within the prison helped to facilitate better engagement with health promotion interventions:

“What we found with the ‘Fit Fans’, because it’s a group, the last one in particular I think, working with each other and they’re able to bat a couple of ideas back and forward and make decisions (...) The majority of the times, because they’re working as a group, it does, it does work a lot better.” (K07PS, prison staff)

This second theme revealed that social interactions had considerable influence on prisoners’ motivation to engage with positive behaviours and HP activities that could help to improve their cardiovascular health. Negative influences from a masculine sub-culture, for example, ‘bulking up’ and intimidation, affected attitudes and subjective norms related to exercise. In contrast, positive influences resulted in positive attitudes to exercise, increased knowledge of exercise and increased self-efficacy to perform certain exercises. These influences arose out of positive interactions with family members and other prisoners; these influences helped prisoners to identify as a role model and motivated them to take more control over their personal health and wellbeing.

6.4 Theme 3: Healthcare barriers to self-care in prison

This theme concerns the healthcare barriers that had the potential to impact on the prisoners’ ability to successfully perform self-care activities in the prison. These activities were those that helped prisoners to achieve, maintain or promote optimal health in prison and included making healthy food choices, learning how to improve sleeping patterns and coping with addictions and peer pressure. The ability to successfully perform activities could have a positive impact on the prisoners’ cardiovascular health. This theme was identified through the work-related experiences of the staff working in the four health-related services. These were: 1) the healthcare unit, 2) the addictions and substance misuse service, 3) the psychological service, and 4) the health promotion (HP) service. The first

three were managed by the NHS whereas the fourth was managed by prison staff with input from the NHS.

Chapter 5 highlighted that most prisoners had limited knowledge of CVD. They also had limited knowledge in relation to nutrition and exercise (section 6.3). Overall, the prisoners believed the institution needed to provide more support to help them make informed decisions about these matters. However, the staff, particularly prison staff, noted that such support was widely available in the prison. This support occurred in the form of teaching self-care skills, providing lifestyle advice and providing HP initiatives that targeted specific issues such as sedentary behaviours. However, there were three main factors that had the potential to affect the prisoners' abilities to successfully self-care: the accessibility of support for self-care (6.4.1), the NHS staff's knowledge of contextual factors (6.4.2), and communication and partnership working between the NHS and prison staff (6.4.3).

6.4.1 Accessibility of support for self-care

All prisoners had access to the healthcare unit and the HP service, however only prisoners with specific behavioural and substance misuse issues had access to the psychology and substance misuse units. Regardless of the accessibility of these services, there were shortcomings which impacted on the efficiency at which self-care was promoted and enabled, particularly with regards to CVD prevention.

Equal access to prisoners

The healthcare unit provided primary care services including GP and mental health services, to which all prisoners had access. For those who had a diagnosed long-term condition (LTC) such as type 2 diabetes or hypertension, there was a LTC clinic that they could attend. Nurses comprised the majority of staff working in this unit and were often involved in providing lifestyle advice on a one-to-one basis to prisoners who wanted to improve their health or manage their LTCs and other health-related problems. However, there was considerable pressure placed on the nurses to administer medication to prisoners to treat a variety of health conditions. Most of the nurses' time was spent doing this, and

therefore less time was spent on their other duties including encouraging prisoners to take care of their own health, i.e. preventative care.

Staff reported that they used an ‘independence’ approach to healthcare, where they encouraged prisoners to take responsibility for their personal health. This meant that the staff did not actively seek out prisoners who had specific health conditions that needed to be addressed. Instead, these prisoners had to approach the healthcare service on their own accord to seek help for a particular condition:

“I suppose if somebody had, like if they were overweight and they weren’t leading a particularly healthy lifestyle, em, it would really be up to them to approach us, for us to recognise and offer any advice. But they’ve really got to [want to do it], and we’re promoting independence (...) We would give them as much advice and information as much as we possibly we can, but it’s kind of up to themselves to really show interest.” (K10NS, NHS staff)

It was recognised that this ‘independence’ approach presented dilemmas for prisoners who had an increased risk of CVD. This was demonstrated through the contradiction in one staff member’s account (K11NS) of the actions, or lack therefore, that the healthcare unit would take with regards to a prisoner who had an increased risk of CVD:

Somebody who is at increased risk of developing cardiovascular problems (...) we would probably initiate, I don’t know [sighs]. It’s quite difficult (...) waiting increases their chances of developing these kind of problems so we could give them all the advice that we could. But as I said, it’s really up to themselves to approach us.” (K10NS, NHS staff)

Another service to which all prisoners had access to was the HP service. This was managed by the prison staff and all its activities mainly occurred in the prison’s main gym. All prisoners had access to the gym regardless of their status, i.e. remand, short- or long-term and high-protection. While there were scheduled times for each prison wing to access the gym (Table 21, Appendix 1), arrangements were made for prisoners who could not make these times to

access the gym when it was not in use. This provision showed that there was room for flexibility within the structured prison regime.

HP prison staff often provided support for self-care in the form of advice relating to weight loss, exercise and nutrition. This often occurred on a one-to-one basis, thus enabling privacy and confidentiality. However, this was only provided to prisoners who regularly attended the gym. Given that only about 60% of prisoners ever attended the gym, 40% missed out on these opportunities (Chapter 5, section 5.3.1).

The HP interventions provided often involved teaching prisoners how to perform self-care activities. Examples of these interventions include weight loss management, the health champions initiative and smoking cessation. However, most of these interventions had a capacity for only a small number of participants, or some prisoners were simply not interested in participating in them.

All the interventions apart from the health champions initiative and smoking cessation ran once a year and lasted between four to 10 weeks. This meant that prisoners who took part in these were left without formalised support for several months, and for several years if they chose not to participate in such interventions again. For some prisoners, this lack of formalised support resulted in a return to their original lifestyles before participating in the intervention:

“It [intervention] was good while it lasted, but then when it finished then there was no, it would be alright if it continued but – (...) I’ve done my course and got a certificate and I’ve not stayed, I’ve not kept at it. I think that the people that done the course, I think they knew a lot of people wouldn’t obviously stick to it.” (K16IR, ≥40 years, long-term sentence)

Additionally, some HP interventions had inclusion criteria that restricted who could participate in them. For example, one HP weight management intervention that ran once a year reportedly sought prisoners who had sedentary lifestyles. This meant that prisoners who were concerned about their weight but who were still managing to keep active were excluded from the intervention. Prisoner K11IR expressed frustration over these restrictions, as he believed that he could have benefited from this intervention:

“I tried to get on to it [HP intervention] the last time it was on but they say because I come to the gym anyway, it's more for people who don't go to the gym. They said it was for people who are more slightly overweight. I'm like, I'm overweight [laughs] (...) It's always the same people that seem to be on things. Other people cannot get a chance to get in here.” (K11IR, ≥40 years, long-term sentence)

Limited access to prisoners

Unlike the healthcare unit, the two other NHS managed-services were not accessible to all prisoners. Instead, they offered programmes that were geared towards individuals with health or behavioural issues related to addictions and substance misuse. Prisoners were unable to refer themselves to these services. Instead, only staff who were involved in the prisoners' integrated care management were able to do so. Both services offered similar forms of support that was mainly on a one-to-one basis and involved teaching self-care skills.

One of these services taught self-care skills such as interpersonal, coping and problem-solving skills to promote resilience to peer pressure. It also helped prisoners to identify alternatives to substance misuse as a way of dealing with stressful situations while imprisoned. As the effectiveness of the programme was not formally evaluated, there was some uncertainty as to the extent to which the skills provided were utilised by participants of the programme:

“We certainly sort of place a lot of emphasis on interpersonal skills so assertiveness, being able to challenge peer pressure. We give them skills in being able to challenge their cravings, so give them distraction techniques, relaxation (...) So we just give them sort of techniques like that to use. Whether they use them or not, we don't know [laughs]. But they say they do. But it's giving them those options.” (K05NS, NHS staff)

The other NHS-managed service offered similar support to the prisoners who had addiction problems. Unlike the healthcare unit where prisoners were expected to indicate their desire for support, the majority of those who had addictions were monitored regularly and approached if a member of staff became concerned. Similar to the healthcare unit, the staff promoted personal

responsibility, in this case regarding managing addictions, but unlike the healthcare unit, the staff helped prisoners to set goals:

“So 90% of guys that are listed for the drug and alcohol group, they tend to be allocated a worker, so we’re still kind of checking in with them (...) What we try to do, or what I certainly do if it’s one-to-one support, I’ll maybe try and set them a goal. It’s adults that we’re dealing with, so they’ve got to take some responsibility, so you’re setting them a goal.” (K06NS, NHS staff)

6.4.2 NHS staff’s knowledge of contextual factors

The NHS staff interviewed reported that they would provide advice to prisoners in relation to a managing their health and wellbeing in the prison, such as eating healthily and exercising frequently. However, many of these staff had limited knowledge of contextual factors such as what type of food was served to prisoners, or what suitable physical activity opportunities were available to prisoners. This limited knowledge meant that they would not give tailored advice to the prisoners who sought their support.

For example, when asked about the prisoners’ food choices, K10NS assumed there were limited healthy options but was unsure about this. This lack of awareness of the prisoners’ food was because NHS staff were not responsible for and did not input into decisions regarding this. Instead, this responsibility lay with the prison staff who contracted an outside company to provide the prisoners’ food:

“Em, probably that there’s not so much of a healthy choice; I don’t necessarily know, it will be more of the [company’s] staff that could tell you what kind of food that are available for them. I know that there’s separate menus on certain days, and I know that it may not be particularly healthy options that they may be not be able to purchase outside (...) I don’t really know.” (K10NS, NHS staff)

Similarly, another NHS staff member (K11NS) was unable to specify what healthy choices were available to the prisoners. There was also a sense that there was an underlying tension between the NHS and prison staff on the matter:

“For prisoners. I think there’s choices and options available to them. I don’t know exactly what they are having to eat, em, but I certainly know that there are healthy options that are available but it depends on how many healthy options that are available and if they don’t like that healthy option. I really don’t want to comment specifically on this, because it’s not our area.” (K11NS, NHS staff)

NHS staff also advised prisoners within their care to attend the gym as part of promoting self-care. For example, the substance misuse service recommended that prisoners attend the gym, as they hoped this would help them form a regular daily routine and cope with their addictions. However, they were not aware of the different HP initiatives offered by the prison service. The ‘independence’ approach that they adopted meant that prisoners had to have enough motivation to seek out this information on their own, and sign up to these initiatives:

“What I do try to promote is because, obviously, for the kind of fitness aspect of it, but it’s also it’s really important that people have daily positive routine. And obviously, we’re limited to what we can offer within here, but the gym is one of the things that we will try and promote. I’m not sure specifically what they [HP service] have, but the guys [prisoners] have to want to do it themselves.” (K06NS, NHS staff)

6.4.3 Communication and partnership working between NHS and prison staff

The NHS staff’s limited knowledge of contextual factors may be attributed to the limited communication and partnership working between the NHS and prison staff. At times, these factors resulted in tensions between the two groups of staff and impacted on the healthcare provided to the prisoners.

For example, prisoners who were unable to work because of their mental health problems were often advised to attend the gym, as the NHS staff believed this would help them to cope with their problems. However, such cases often caused ‘conflict’ with the prison management, as they believed that prisoners who were capable of attending the gym were also capable of working:

“We can refer them to the gym if, even from a mental health point of view, if they feel that it will help their mental health, because that can be a problem in the prison when somebody’s mental health isn’t that great. So they’re maybe not going to their work, but they still go to the gym, and there’s a conflict that goes on between the prison management team and healthcare in relation to well if you can’t go to your work, why can you go to the gym? But you know what it’s actually good for them to go to the gym, so mmmm.” (K11HC, internal staff)

Some members of the prison staff were aware that better partnership working between the NHS and prison could improve the quality of care provided to prisoners by developing formal referral pathways through which the healthcare service could easily refer prisoners to the gym and vice versa:

“We’ve identified there’s a need for us to start working away at this sort of stuff (...) and I guess it’s just to develop them, developing the working partnerships. At the minute, we’re trying to develop the working partnership with our internal primary care services (...) because I’ve run all these different types of initiatives that are so complementary to the primary care services, but we don’t marry up (...) They could be saying, right, this guy’s got an issue, that guy’s got an issue; we are referring these guys to that programme.” (K04PS, prison staff)

Positively, there was a more established partnership between the prison and NHS staff who worked in HP. Both groups often worked together to provide strategic plans to improve the prisoners’ health and wellbeing. Included in such plans were the designing and implementing of HP interventions. They also organised events such as HP days where services in the prison and outside organisations were invited to promote awareness of various initiatives among the prisoners. This partnership made it easy for the NHS staff to operate within the prison, as time was specially allocated within the regime for their HP initiatives to run:

“Yeah, in relation the actual setting within the gym though, there’s always time that’s kind of set aside within the prison for the [HP]

programmes. So usually a Wednesday or a Thursday afternoon is kept free, so the gym's available to run health improvement initiatives on these times, these time slots.” (K02NS, NHS staff)

However, even with this more established partnership between these two HP providers, there were times when things did not run according to plan. As K03NS explained, the nature of the prison regime and a breakdown in communication at times affected prisoner adherence to interventions:

“It was really just sometimes (...) it's just getting the prisoners over to the gym, sort of thing (...) like getting staff to bring them over or take them back is just sometimes the only obstacle that you see. So sometimes you may be have folk that don't turn up to a group and you maybe don't think that they're motivated to continue sort of thing. But you maybe find out that it's just because of them not being able to go over.” (K03NS, NHS staff)

The third theme revealed that positive work was being done by the prison to promote self-care and responsibility for personal health, but three main healthcare factors had the potential to affect this. First, all health-related services were not accessible to prisoners which resulted in some prisoners being unable to access useful knowledge and self-care skills. Second, the NHS staff had limited knowledge of the contextual factors related to prisoners' health such as food and HP initiatives. They therefore could not provide tailored lifestyle advice to prisoners. Third, limited communication and partnership working between the NHS and prison staff contributed to tensions between these two groups and had the potential to negatively impact the quality of care provided to the prisoners.

6.5 Chapter summary

This chapter presented the findings of the factors that influenced prisoners' cardiovascular health. These factors were either individual, social or institutional. Three significant findings emerged from this chapter.

Finding 5

Prisoners were only motivated to change their behaviours when they were ready to do so. Their attitudes towards personal health had a significant influence on when this readiness for change occurred. In the initial stage of a long-term sentence, which was characterised by emotional distress due to adjusting to life in prison, there was a lack of concern for personal health. In contrast, in the final stage of a sentence, which was characterised by anticipation and hope for a future of life after prison, there was an increased motivation to improve personal health. The readiness to change and the motivation to maintain this change during the middle stage of a prison sentence depended on several factors. Benefits from health behaviours such as exercise and healthy eating, helped to promote positive attitudes towards the behaviour and helped prisoners to sustain it. Cues in the form of physical injury and negative feedback also prompted positive behaviour change in some instances, while institutional factors such as the inflexible prison regime demotivated prisoners from being ready to engage in this change.

Finding 6

Social interactions and identity had significant impacts on engagement in health behaviours and HP activities. Negative interactions mainly arose from the masculine sub-culture, which was characterised by an emphasis on physical appearance and feelings of embarrassment and intimidation. These negatively affected some prisoners' attitudes towards health and exercise. Conversely, positive influences from interactions on an individual or group basis had a positive impact on attitudes towards health and exercise. Groups that shared an identity helped to motivate engagement in exercise by helping to increase knowledge and self-efficacy related to the behaviour. Positive interactions with other prisoners and family members also led prisoners to identify as a role model and inspired them to take responsibility for their personal health.

Finding 7

The prison promoted self-care by encouraging prisoners to take responsibility for their health, however there were some healthcare barriers that had the potential to prevent prisoners from successfully performing self-care activities. The limited access to some services meant that some prisoners could not benefit

from the HP initiatives or skills that these services offered. Where there was equal access to services, the limited knowledge that NHS staff had of contextual matters prevented them from providing tailored advice to the prisoners. There was also limited communication and partnership working between the NHS and prison staff which resulted in tensions between the two groups and had the potential to negatively impact on prisoner healthcare. Despite these barriers, there were opportunities to improve the promotion of self-care in the prison.

In conclusion, these findings show that there were many individual, social and institutional factors that influenced the prisoners' engagement in health behaviours and health promotion activities that could impact on their cardiovascular health. Many of these factors did not work in isolation, but instead, interacted with each other to influence prisoners' motivation.

Chapter 7: Results – Feedback of the proposed intervention

7.1 Introduction

This chapter presents the findings relating to the prisoners’ and staff’s feedback and suggestions of the proposed intervention (objective 6). The participants were provided with a brief, verbal description of the proposed intervention (Appendix 3). It was described as a 12-week tailored programme that aimed to provide prisoners with knowledge of cardiovascular disease (CVD) and to support them to perform self-care activities. All participants were asked their views on the intervention, and prisoners were asked about what they wanted to be included. The findings are presented as one theme: personal relevance (section 7.2). This theme comprises of two sub-themes as shown in Table 19.

Table 19 – Themes and sub-themes of feedback of the proposed intervention

Themes	Sub-themes
Personal relevance	CVD education
	Nutrition and exercise education

Overall, there was a positive response from all participants towards the proposed intervention, as it was considered to be benefit to prisoners. The prisoners believed that it would help to boost self-confidence and self-esteem, and motivate them to adopt healthier lifestyles. Many of the staff also shared this view and welcomed the intervention as another health promotion (HP) initiative that was needed due to a lack of such initiatives in the prison.

7.2 Personal relevance

All of the prisoners interviewed said they or other prisoners would be interested in participating in the intervention. They were interested in issues that were personally relevant to them. In particular, they were interested in learning more about CVD (7.2.1) and nutrition and exercise (7.2.2).

7.2.1 CVD education

Regardless of the prisoners' level of knowledge of CVD, they thought it was important to be educated about the disease. They believed that CVD education would help to increase knowledge and promote awareness of the consequences of the disease, and motivate them to adopt healthier behaviours such as healthy eating and physical activity. Most thought that the serious nature of the intervention's focus, CVD, would appeal to many prisoners:

“See that, there’s a lot of prisoners come down, want to get involved in games. I can see if you’re coming at it from it from a more serious angle, like from a kind of medical viewpoint (...) I can see that appeal to a lot of them, you know what I mean. You seem to come with it from a more serious aspect, like a genuine interest.” (K01IR, ≥40 years, long-term sentence)

One staff member believed that having a specific focus to the intervention would spark interest among the prisoners, as they were often accustomed to interventions targeting general lifestyle behaviours:

“It’s a specific focus and guys will be interested. I dare say, what the guys do in here, it’s worth helping changing behaviours that reduce the risk of CHD and stuff.” (K04PS, prison staff)

A few of the prisoners who had appeared unconcerned about their personal CVD risk were also interested in receiving CVD education. K12IR who had believed his health was good even though there was a possibility of personal CVD risk due to a family history, thought that such an intervention would help lower his risk:

“I know heart attacks and things like that are big in my family, so I think probably I could learn more. The more knowledge I have about it the more risk I can cut it happening to me, you know what I mean. That would be a big part of it for me.” (K12IR, <40 years, long-term sentence)

Another prisoner (K08IR) whose father had recently died from a heart attack believed that many prisoners were not aware of how serious CVD and its

consequences. He believed that CVD education was key to promoting an awareness of this:

“It’s just trying to make folk more aware. But I don’t think a lot of folk realise the dangers. What is it, the biggest killer in the, or the second biggest killer?” (K08IR, <40 years, long-term sentence)

There was also a shared view among prisoners that an awareness of the seriousness of CVD would arouse fear in others and motivate them to engage in healthier behaviours:

“The diseases; how bad they can hurt themselves if they don’t do it [engage in healthier behaviours]. Scaring them when you’re doing it. Not scaring them, but giving them the facts, you know what I mean, this will happen if you do this, and this will happen if you don’t do this. I think that’s aye, I would put that bit across big time.” (K03IR, ≥40 years, long-term sentence)

7.2.2 Nutrition and exercise education

In addition to learning more about CVD, the prisoners were also keen to learn more about nutrition and exercise. There was a common belief that many prisoners wanted to engage in fitness activities outside of the gym, and that the intervention would provide them with opportunities to do so. Some thought that introducing prisoners to a fitness component first would make them more likely to engage in the educational aspects of the intervention:

“See if you people coming down can get a bit of fitness and then they start doing the educational stuff, they maybe will like it. They maybe will be like, oh right, and then think, oh I like this, this is interesting (...) I think it [proposed intervention] is a good thing.” (K06IR, <40 years, long-term sentence)

As many prisoners had limited knowledge what exercises to perform away from a gym setting, it was thought they should be shown exercises to do in their own time in their cells:

“I think you should teach them how to exercise in the cells, ‘cause many guys don’t like the gym and they don’t know how to do those

things, like having wee exercise inside the cell, you know what I mean.” (K03IR, ≥40 years, long-term sentence)

Many prisoners were also very interested in learning about the nutritional value of the food available to them, and wanted support for making healthier choices with regards to their main meals. For example, K02IR who had a particular interest reducing his high cholesterol to lower his CVD risk, was frustrated over the lack of support to help him put together his meals, and wanted the intervention to offer this practical support:

“I wouldn’t mind getting to know how to get my cholesterol down through diet (...) Like structured meals in a day, maybe say, three different things in a day, maybe three days’ worth. And then you can just mix and match, you know what I mean (...) Because nobody ever does that. Aye, you need to eat this, you need to eat that, but nobody says well here’s a menu and here’s a menu, and here’s a menu. Pick things from there and you can make it up yourself. Nobody does that.” (K02IR, <40 years, long-term sentence)

The first theme revealed that prisoners were interested in the proposed intervention. The serious nature of the topic of the CVD appeared to appeal to many; it was believed that CVD education would promote awareness of the seriousness about the disease, and prompt prisoners to engage in positive behaviour change due to fear arousal. Prisoners were interested in learning about issues that were personally relevant to them, for example, how to lower their risk of CVD, how to eat healthier and how to perform exercises in their cells.

7.3 Chapter summary

The chapter presented the findings regarding participants’ feedback and suggestions about the proposed intervention. One significant finding emerged.

Finding 8

The idea of an intervention to reduce prisoners’ risk of CVD was positively welcomed by both the prisoners and staff, who believed that a specific focus on CVD would appeal to prisoners. In particular, the salient nature of CVD and its

consequences was identified as an important topic to be covered in a future intervention. The participants believed such an intervention would help to improve the prisoners' health and reduce their risk of CVD by encouraging them to change their health behaviours and lifestyle while in prison.

Chapter 8: Discussion

8.1 Introduction

This study aims to explore the knowledge and risk perceptions of cardiovascular disease (CVD) from the perspectives of prisoners and staff to guide the development of a future cardiovascular risk reduction intervention for prisoners. It is an exploratory study that uses a qualitative design informed by a critical realist approach to collect and analyse data gathered from semi-structured interviews with prisoners, prison staff and NHS staff. This study was undertaken to inform the development of a future cardiovascular risk reduction intervention for prisoners.

Three key reasons drove this study. First, prisoners have an increased risk of CVD compared to the general population, and there is a need for a cardiovascular risk reduction intervention in this population. Second, the systematic review of quantitative studies conducted as part of this study (Chapter 3), revealed that supervised structured physical activity, diet modification, nutrition education and smoking cessation interventions all have the potential to improve the cardiovascular health of prisoners. Most of these studies evaluated the short-term effects of the different interventions on measured these health factors and behaviours. Therefore, there is insufficient evidence to demonstrate the effectiveness and sustainability of these interventions on long-term outcomes for prisoners. There is a need for more targeted interventions to achieve a higher impact on these outcomes. Third, little is known about how CVD and CVD risk is understood and perceived by prisoners and staff working within the prison system. It is important that these are identified and incorporated into a theoretical framework to guide the development of an intervention to reduce cardiovascular risk in prisoners. Such factors will help to inform the development of an intervention to assist in recognising and modifying the factors that contribute to CVD risk reduction and non-adherence to behaviours that can improve prisoners' quality of life during imprisonment.

To the best of my knowledge, this is the first study to explore the knowledge and risk perceptions of CVD from the perspectives of prisoners and staff working

in prison in Scotland or elsewhere. A previous study conducted in the USA explored how CVD and its risk factors were managed in prison from the perspectives of recently released prisoners with diagnosed CVD or CVD risk factors (Thomas et al 2016). Other qualitative studies have explored how prisoners conceptualise their general health or illness (Pulford et al 2013; Woodall 2010; Plugge et al 2008; Smith 2002), but none have focused specifically on conceptualisations of CVD risk. Therefore, the findings from this study that relate to the knowledge and risk perceptions of CVD are unique and contribute to the gaps in the literature regarding this.

In total, eight significant findings were derived from this study and were outlined at the end of Chapters 5, 6 and 7. These findings can be synthesised as follows:

- Finding 1 revealed that the prisoners had limited knowledge of CVD and its risk factors. Common behavioural risk factors and cardiovascular events were identified, but gaps in knowledge were evidenced. Additionally, the staff mostly had non-expert knowledge of CVD, demonstrated by their uncertainty about how some risk factors contributed to prisoners' CVD risk. The prisoners' and staff's knowledge of CVD appears to be comparable to what is highlighted in the literature as lay knowledge of CVD in the general population have about the disease.
- Finding 2 revealed that there were several factors that influenced how CVD risk was assessed by both the prisoners and staff. However, most of the assessments of prisoners' CVD risk were based on judgements about a prisoner's current health status, rather than the individual's risk factor profile.
- Findings 3-7 revealed that there were multi-level influences on the prisoners' cardiovascular risk and cardiovascular health. Findings 3-4 pertain to the prisoners' use of certain negative health behaviours as coping mechanisms to help counteract boredom and powerlessness, and to deal with mental health problems. Findings 5 - 7 pertain to other influencing factors of these behaviours, namely a readiness for change, social interactions, prisoners' social identities, and the healthcare barriers to self-care in the prison. All of these factors occurred on three main levels of influence: individual, social and institutional.

- Finding 8 revealed that the idea of a future intervention to reduce the prisoners' risk of CVD was welcomed by both prisoners and staff. Both groups believed that a focus on the salience of CVD would attract prisoners to such an intervention. They also believed that prisoners would benefit from participating in the intervention; these benefits included increased engagement in health behaviours and improvement in prisoners' health and wellbeing.

This chapter first presents a discussion of the synthesis of these findings in relation to the current literature and relevant policy regarding CVD and prison health (section 8.2). This is followed by a discussion of the implications of the study's findings for future research and policy (section 8.3). Next, the strengths and limitations of this study are outlined (section 8.4), followed by a summary of the chapter (section 8.5).

8.2 Synthesis of findings

8.2.1 Participants' knowledge of CVD appears comparable to the lay knowledge of the general population

Overall, the prisoners' knowledge of CVD appears comparable to the published literature on lay knowledge of CVD in the general population. Studies have shown that most people have limited or basic knowledge of CVD (Reiner et al 2010; Homko et al 2008; Potvin et al 2000). This includes young adults (Lynch et al 2006), women (Mosca et al 2009) and medically underserved individuals with an increased risk of CVD (Homko et al 2008). According to Plugge et al. (2008), most prisoners spend their lives in the general population, and as such, their knowledge and perceptions will reflect this.

There are three possible explanations as to why most of the prisoners in this study had limited knowledge of CVD. First, some prisoners mentioned that they never had to think about the disease before they participated in this study. This was despite them reporting having at least one risk factor for CVD.

Second, the prisoners with limited knowledge of CVD did not have any 'formal' education of the disease, unlike those who had moderate knowledge. Instead

their knowledge appeared to have been gained via the media and through conversations with other people. Thus, when the prisoners acquired this knowledge, they may not have been consciously seeking more information about CVD and were less likely to store details of what they had learnt. Instead, they may have only stored bits of information that interested them. This was evidenced when some prisoners who reportedly knew little about the disease were able to produce snippets of what they had 'heard' from elsewhere.

In contrast, the prisoners who had acquired their knowledge of CVD through educational classes were able to recall more details about the disease. Given that this education was a necessary requirement for their qualifications, it is possible that they would have actively processed and stored information about the topic, resulting in a greater ability to recall what they had learnt. However, while they appeared to have more knowledge of CVD compared to other prisoners, they did not necessarily have an in-depth understanding of the topic. This was evidenced through misconceptions and a lack of distinction being made between risk factors, symptoms and cardiovascular events.

A third possible reason why most prisoners had limited knowledge of CVD or a limited ability to retain factors about the disease may have been due to their level of educational attainment. While the educational status of the participants was not known, it is recognised that most prisoners in the UK have low educational attainment (Prisoners' Education Trust 2015; Natale 2010), and there is a positive association between this and a limited ability to recall CVD risk factors (Lynch et al 2006; Potvin et al 2000).

As low educational attainment is associated with limited health literacy (Reyna et al 2009), it was possible that the prisoners may have had limited health literacy. This may also explain why prisoners with moderate knowledge of CVD demonstrated having misconceptions and no in-depth understanding of the disease. Often, people with limited health literacy can readily talk about health issues, but have difficulty in understanding written or verbal information about these issues (Easton et al 2010). Limited health literacy would make it difficult for prisoners to interpret information about CVD and its risk factors, and to learn and perform adequate self-care activities, such as goal-setting and planning exercise

or dietary regimes (Safeer et al 2006). This means that it is important to consider the prisoners' level of educational attainment and health literacy when communicating information about CVD and its risk factors to them. In interventions, this can be achieved by tailoring written materials to appropriate reading levels and using visual items such as colour codes to emphasise key points (Lee et al 2012).

This study also found that the prisoners mainly identified behavioural risk factors of CVD such as smoking and physical inactivity; this is consistent with other research on people's familiarity with these factors (Webster and Heeley 2010; Potvin et al 2000). These authors highlight that people are less likely to identify metabolic risk factors such as high blood pressure and high cholesterol, compared to behavioural ones. Only one study was found in which most of the participants from socially marginalised groups in the USA 'recognised' high blood pressure and cholesterol as CVD risk factors (Bryant et al 2010). However, it is not clear if these metabolic risk factors were identified without being prompted. The use of prompts when asking participants to identify contributing factors of illness are more likely to elicit 'correct' responses (Weinstein 1999).

The lack of reference to metabolic risk factors by the prisoners in this study is important as many of the identified behavioural risk factors, for example, unhealthy diet and physical inactivity, could contribute to factors such as high cholesterol and blood pressure. Additionally, the mental health problems which some prisoners reportedly experienced, such as anxiety and depression, could contribute to the development or exacerbation of metabolic risk factors (Chaddha et al 2016). More on the link between mental health and CVD risk is discussed in section 8.2.3.

An important finding from this study is that the prisoners who reported having type 2 diabetes did not identify this as a CVD risk factor, and did not consider this when assessing their CVD risk. This finding is consistent with previous research that has shown people who have type 2 diabetes are often unaware that it is a CVD risk factor (Kilkenny et al 2017; Wartak et al 2011), and tend to underestimate their personal risk of CVD as a result (Diaz et al 2012; van der Weijden et al 2007). This is a concern because people with type 2 diabetes are

two to four times more likely to develop CVD compared to people without the condition (World Heart Federation 2017). Given that most of the prisoners reported risk factors common to both type 2 diabetes and CVD, there is a need to educate prisoners, regardless of their health status, about the association between type 2 diabetes and CVD.

Information of the link between type 2 diabetes and CVD should have been provided to prisoners with type 2 diabetes by the healthcare staff who support them in managing it. While it is possible that such information may have been provided but was not understood or forgotten, it is also possible that the nurses in the healthcare unit did not inform these prisoners about their increased risk of CVD.

Another explanation may be that due to the role of the nurses in the prison. They were responsible for administering medicine, treating minor ailments and providing general lifestyle advice related to health behaviour change. This suggests that they had more of a 'generic' role in the prisoners' healthcare, and would not have had specialist skills or knowledge regarding CVD or type 2 diabetes. This explanation seems plausible as a recent report on the review of healthcare in Scottish prisons highlighted that there was a lack of nurses with skills to deal with special prisoner issues such as chronic conditions (RCN 2016).

In this study, the nurses and other staff had non-expert knowledge of CVD. They either indicated that they were not an expert on the matter, or seemed uncertain about how certain factors, for example, excessive alcohol use, contributed to prisoners' risk of the disease. This finding was unexpected as the staff were not directly asked about their knowledge of CVD.

It is understandable that the staff would have had non-expert knowledge of CVD given most had non-clinical or non-specialist roles. However, most of them worked within one of the four health-related services in the prison, all of which promoted healthy lifestyles. Research has found that healthcare providers' limited knowledge and skills sets could negatively impact on the promotion of health and preventative care (Burke and Fair 2003). In this study, for example, some of the NHS staff had a role in supporting prisoners with alcohol and other substance misuse problems. Both excessive alcohol and illicit drug use are CVD risk factors

(Mendis et al 2011; Devlin and Henry 2008), and both are highly prevalent in Scottish prison populations (Graham 2007). Therefore, the staff should have adequate knowledge of how these factors can contribute to prisoners' CVD risk, in order to provide the prisoners with the appropriate advice on how to reduce this risk.

Overall, these findings show that prisoners are in need of CVD education to address their limited knowledge of CVD. The prisoners' educational status and health literacy levels should be considered when delivering this education. These findings also highlight the need for CVD education for staff to help them to better understand about prisoners' cardiovascular health, and how to best educate and support the prisoners in lowering their risk of CVD.

8.2.2 CVD risk assessment in prison is primarily determined by a prisoner's current health status

The findings of prisoners' and staff's perceptions of prisoners' CVD risk is a novel finding as this has not been previously explored, and therefore adds to the literature on risk perceptions in high-risk populations. These findings complement other studies' findings from which have shown there is no one factor that determines how CVD risk is perceived and that there is complexity surrounding how people respond to CVD risk (Webster and Heeley 2010). These findings may be explained by the fact that in general, people have different perceptions of the same risk (Visschers and Meertens 2010).

All the prisoners interviewed were able to assess the risk of CVD despite having differing levels of knowledge of the disease. Knowledge is regarded as important part of risk assessment (Johnson 1993), and it is generally believed that people are unable to judge the severity of a risk without adequate knowledge (Weinstein 1999). This notion is consistent with this study's findings that found many of the prisoners who had limited knowledge of CVD were uncertain about their own personal CVD risk. It is possible that some prisoners may have underestimated their risk since people with limited knowledge of CVD tend to do this (Haidinger et al 2012; Homko et al 2008).

However, this study found that knowledge of CVD appeared to be less important than other factors when considering a prisoner's risk of CVD. This is consistent with other research. For example, Abed et al. (2015) measured the perceived and actual risk of an acute myocardial infarction in high-risk individuals, and found that knowledge of the risk factors for this cardiovascular event only accounted for minimal variation between the individuals' perceived and actual risk.

In this study, the most important factor when assessing risk appeared to be prisoners' beliefs about their own and other prisoners' current health status. Those who had no prior health issues or engaged in positive health behaviours on a frequent basis, either believed that they were not at risk of CVD, or were not concerned about their personal risk because they all felt healthy. This has also been found in other studies. Choi et al. (2008) reported that people with type 2 diabetes who believed their health to be good, perceived their risk of coronary heart disease (CHD) to be low. Similarly, Meischke et al. (2000) found that people with an increased risk of myocardial infarctions who believed their health to be good, perceived themselves to have a low risk of the cardiovascular event.

Many of the staff also assessed prisoners' CVD risk based on judgements about a prisoner's current health status. Both they and the prisoners determined health status based on a prisoner's fitness level and physical appearance. This is similar to what Woodall (2010) found in his study on the conceptualisations of health in three English male prisons. These prisoners equated health to fitness and strength, and therefore focused on building and shaping muscle to appear physically strong (Woodall 2010). This means that the determination of CVD risk based on health status may be exaggerated in male prisons due to the emphasis on physical appearances in this environment.

There are dangers in using fitness levels and physical appearances to judge health status, and in assessing CVD risk based on health status. CVD risk should be viewed as a sequence of events which starts with the presence of CVD risk factors and culminates with end-stage heart disease (Chrysant 2010). People with a high risk of CVD, or who have the disease, may not know this until they experience a cardiovascular event such as a heart attack or stroke (JBS3 2014).

Asymptomatic individuals at risk of CVD can therefore appear physically healthy. This means that the presence of CVD risk factors rather than perceived health status is a better indicator of risk, and this needs to be communicated clearly as part of prison healthcare, especially the promotion of cardiovascular health and risk factor reduction.

Another danger in assessing personal CVD risk based on current health status is that it mainly results in a lack of engagement in risk reducing behaviours and this was the case for some prisoners who had CVD risk factors. Lowther and Mordue (2006) explained that the incidence of CVD is determined by a complex interaction of risk factors acting over the life-course of an individual. Therefore, by not engaging in risk reducing behaviours because of perceived good health, many prisoners are inadvertently ignoring their potential cardiovascular risk.

Besides perceived good health status, a fatalistic attitude towards CVD and other diseases also prevented engagement in risk reducing behaviours. Such an attitude was expressed by one prisoner who had witnessed the premature deaths of his parents and grandparents due to CVD, which resulted in a lack of concern towards his personal CVD risk. Mudd-Martin et al. (2014 and 2015) similarly found that fatalistic attitudes prevented engagement in risk reducing behaviours for a high-risk population who lived in rural Kentucky, USA.

These findings therefore highlight the need to address prisoners' perceptions of cardiovascular risk. In addition to providing prisoners with general knowledge about CVD and its risk factors, they need to be educated about the salient aspects of the disease to increase their understanding of its consequences as part of a future intervention. This is supported by finding 8 of this study, which showed that the prisoners and staff believed that knowledge of the severity of CVD and its consequences would help to motivate prisoners to be more responsible for their health. This is also supported by Abed et al. (2015) who concluded that individuals with an increased risk of myocardial infarction should be educated about the salience of this cardiovascular event in order to correctly understand their increased susceptibility.

These findings also show the need to address the prisoners' perceptions of health as this was the most influential factor in determining their personal risk of

CVD. This is supported by finding 5 of this study which showed that prisoners' readiness to engage in positive behaviour change was influenced by their attitudes towards their personal health.

The staff in this study also tended to assess prisoners' risk of CVD by judging their current health status. This indicates that they too need to be provided with more in-depth knowledge about the disease and its risk factors as part of preventative care.

8.2.3 There are multi-level influences on prisoners' cardiovascular health

This study found that there were multiple factors that influenced the prisoners' cardiovascular health, and had the potential to increase or decrease their risk of CVD. These factors occurred on three main levels of influence: individual, social and institutional. Many of these factors acted across their respective levels to influence each other. This complicated interplay of factors impacted on the prisoners' motivation to engage and maintain health behaviours, be they positive or negative. The context of these three levels of influence is discussed below.

Individual context

In sections 8.2.1 and 8.2.2, three key individual-level influences on CVD risk were highlighted: perceptions of CVD risk, perceived health status, and knowledge of CVD. Five additional factors that appeared to have a notable influence on CVD risk and cardiovascular health were attitudes towards behaviour, self-efficacy, perceived behavioural control, subjective norms, and mental health problems.

Attitudes towards behaviour, which were derived from the prisoners' beliefs of and experiences with certain behaviours, influenced their motivation to engage in and sustain these behaviours. For example, a positive attitude towards exercise appeared to promote sustained engagement in the behaviour. On the other hand, negative attitudes towards specific forms of exercise such as weightlifting, was a barrier to engagement in exercise in general in the prison. In the literature, attitude towards behaviours has found to be a powerful predictor of intentions to engage in positive health behaviours, particularly physical activity (Chatzisarantis

et al 2005; Hagger et al 2002). Therefore, reinforcing positive attitudes towards exercise and other behaviours in prisoners could potentially reduce their risk of CVD.

Prisoners who reported that they were confident in performing activities that could lower their risk of CVD, for example, putting together healthy meals, using the gym facilities, etc., reported engaging in healthier behaviours. This finding is consistent with previous research that has examined the influence of self-efficacy on prisoners' health. For example, Loeb et al. (2011) found that self-efficacy to manage personal health in older prisoners in the USA was positively correlated to health-promoting behaviours such as eating healthily and avoiding smoking. Loeb and Steffensmeier (2006) also reported similar findings. Increasing people's confidence to perform self-care activities, i.e. self-efficacy to self-care, is recommended to improving their ability to take control of their health (Department of Health 2008). Therefore, increasing the prisoners' confidence to perform self-care activities could encourage more engagement in positive health behaviours and potentially reduce their risk of CVD.

In this study the prisoners' perceived ease or difficulty in engaging with specific behaviours, was another important individual-level factor. This perceived behavioural control (PBC) appeared to be linked to knowledge and self-efficacy. For example, the prisoners who had the opportunity to put together their own meals and were confident in their ability to do so because they had sufficient knowledge about nutrition, reported having healthier eating habits. In the literature, PBC has found to be a strong predictor of intentions to engage in positive health behaviours (Armitage and Conner 2001). Therefore, supporting prisoners to increase the ease by which they can engage in positive health behaviours can facilitate cardiovascular risk reduction. However, increasing PBC could be challenging in a prison setting where limited autonomy results in prisoners' perceiving a lack of choice and control over their behaviours (Woodall et al 2013). It is important that opportunities to increase prisoners' autonomy are identified so that they can feel supported and empowered to engage in positive behaviours and self-care activities.

The prisoners' beliefs about what behaviours were acceptable or not within the prison, i.e. their subjective norms, were barriers to them engaging in positive health behaviours. For example, in the prison, there was a general acceptance for comfort eating as a coping mechanism for boredom during imprisonment. As a result, there were reports of prisoners buying large amounts of unhealthy snacks from the prison canteen. Unlike the other factors discussed above, subjective norms have been found to be weaker predictors of intentions to engage in positive health behaviours compared to the other components in the literature (Armitage and Conner 2001). This has been attributed to studies using inconsistent measures to quantify the component (Armitage and Conner 2001). Nevertheless, this study showed that subjective norms have an influence on cardiovascular risk, which means they should be targeted as part of cardiovascular risk reduction and general health promotion.

A key factor that influenced the individual's PBC, attitudes to behaviour and other individual-level factors was mental health problems such as anxiety and depression. These problems were constantly mentioned by both the prisoners and NHS staff as influencing the prisoners' behaviours, such as smoking and physical inactivity, to cope with imprisonment. There were also triggers to these behaviours such as receiving bad news and dealing with life in prison. While prisoners at different stages of their long-term sentence reported experiencing anxiety and depression, the initial stage of a sentence was one notable period when the prisoners experienced considerable emotional distress. These mental health problems resulted in the prisoners' lack of concern for personal health and demotivated them from engaging with behaviours to improve or maintain their personal health.

This finding that mental health problems were barriers to engagement in positive health behaviours and self-care activities is consistent with the literature. For example, in the general population, mental health problems have shown to reduce an individual's ability to perform self-care activities in diabetes (Weinger 2007) and in heart failure (Riegel et al 2011). It is thought that depression and anxiety can impair cognition, and depression in particular can interfere with the ability to learn or make decisions (Riegel et al 2009). Thus, depression can reduce a person's confidence to manage their health and lead to a feeling of

powerlessness. As demonstrated in this study, it can also lead to harmful coping mechanisms such as smoking and comfort eating (Riegel et al. 2009). Therefore, it is important that prisoners who have mental health problems are supported to deal with these issues, in order to improve their chances of successfully performing self-care activities and reducing their risk of CVD, regardless of what stage of their prison sentence they are at.

This study found that in most cases, prisoners' self-reported mental health problems were linked to CVD risk via behavioural risk factors such as smoking and sedentary lifestyles. This is not surprising since depression and anxiety have been associated with an increased likelihood of such behavioural risk factors (Kerber and Rubenfire 2012). However, it is well-established that mental health problems impact on metabolic factors which can increase the risk of CVD (Steptoe and Kivimäki 2012; Ibishi et al 2009). For example, depression can increase the rate of atherosclerosis and cortisol levels which can lead to increased blood pressure and blood sugar levels (Chaddha et al 2016). Depression is highly prevalent in patients with established CVD (Carney and Freedland 2017); people with the condition are three times more likely to have CVD (Peralta 2015). Also, the relationship between depression and CVD is bidirectional; depression can increase the risk of CVD, but CVD also increases the risk of depression (Riba et al 2011).

This study found that both prisoners and staff would benefit from more information on CVD and the link between mental health and CVD. This education could highlight the importance of recognising and coping with mental health problems. The majority of prisoners come from socially deprived areas in Scotland, whose populations are disproportionately affected by mental health illness (The Scottish Government 2008). Additionally, the 2008-2009 Health Needs Assessment for this prison reported that 56% of prisoner respondents had experienced mental health problems at some point during their imprisonment (Pulford et al 2011). While these were not diagnosed cases of mental health problems, it is known that poor mental health is highly prevalent in prison populations (Fazel et al 2016). Furthermore, the prison environment can exacerbate these mental health problems (Al-Rousan et al 2017).

Social context

The results of this study indicate that the social aspects of prison life can have a positive and negative influence on individual-level factors, and in so doing, influence engagement in positive health behaviours. These social aspects were the prison culture, interactions with others and prisoners' social identities.

There are two dominant sub-cultures in the prison which appear to be diametrically opposed. The first is characterised by physical inactivity and comfort eating, while the second focuses on masculinity with an overwhelming emphasis on building muscle and physical appearances. Both sub-cultures influenced several individual-level factors including subjective norms and attitudes towards behaviour.

The first sub-culture relates to physical inactivity and comfort eating, and led to these behaviours being seen as socially acceptable and therefore influenced norms of behaviour on an individual level. This explained why many of the prisoners thought it was easy to be lazy and to give into temptation, and felt unmotivated to change their behaviours. From this study, it appears that both the prisoners' mindset and institutional factors, namely a lack of activities for prisoners and the canteen system, helped to shape this culture.

The second sub-culture relates to muscle building and physical appearance which led many prisoners to believe that they should lift weights and consume large amounts of protein. This study also found that embarrassment and intimidation were embedded in this culture, as many prisoners had reported instances in which others were subjected to these taunts. Such experiences often reduced the prisoners' self-confidence, thereby hindering engagement in exercise. These occurrences are reflective of a masculine culture, which is common to male prisons (Hsu 2005). For example, de Viggiani (2006) found that the culture of an English male prison was characterised by machismo, competitiveness and intimidation, and for some prisoners, these were barriers to using the gym and taking part in other physical activities. Similar to this study, de Viggiani (2006) also reported that older prisoners disliked this masculine culture as they found it irritating and unpopular.

The study's findings show that despite the existence of a dominant masculine culture in the prison, male prisoners did have different preferences when it came to physical activity. Therefore a 'one size fits all' approach may not be effective or sustainable for promoting engagement in behaviour change in male prisons. The findings also highlight that prisoners need a comfortable environment in which they feel supported to engage in activities that are suited to their physical capabilities.

While the masculine culture at times led to interactions between prisoners that reduced motivation to engage in physical activity, there were times when these interactions facilitated engagement in and maintenance of this behaviour. For example, there were instances where prisoners belonged to groups whose members shared a common social identity such as older age or equal fitness abilities. Membership of such a group boosted motivation to exercise and led to increased self-confidence to engage in and sustain the behaviour. This led to improved mental health and wellbeing for some prisoners and helped to combat the norms created from the sub-culture of physical inactivity.

Another common identity that emerged from this study was that of a role model. A few prisoners identified themselves as role models from their own personal experiences with positive behaviour change, and they tried to motivate others to do the same. Other prisoners were identified as role models through positive interactions with their family members and other prisoners, and this inspired them to continue engaging in positive behaviours. This finding is supported by Woodall (2010) who found that such relationships were sources of emotional support for prisoners, and helped to maintain their personal health and wellbeing.

These findings suggest that positive social interactions and shared identities could be used to facilitate engagement in and maintenance of behaviours that could lower prisoners' risk of CVD. One framework that incorporates these elements is the social identity approach (Haslam 2004). This approach theorises that the more an individual identifies with a group to which they belong, the more likely their behaviour will mimic that of the group (Stevens et al 2017). This means

that groups with a strong social identity can be used to reinforce positive behaviours in their group members.

Investigators have adopted key elements of the social identity approach in research. For example, Wyke et al. (2015) trialled a 12-week weight loss intervention on Scottish men who shared an identity of being a football fan. After a 12-month follow up, there was a 5% difference in weight loss between the intervention and control groups (Wyke et al 2015). Following on from this, the intervention was trialled in two Scottish prisons, but the positive results that were observed were not replicated in this setting (Maycock et al 2015a). The main reason given for this was that many prisoners did not identify themselves as football fans, and therefore the relevance of using the sport to engage them in physical activity was lost. This intervention has since been adapted to exclude the football element, but it still involves prisoners working in groups (Maycock et al 2015b). The extent to which the adapted intervention has been successful in maintaining health behaviours and improving outcomes in prisoners is unknown as the results have yet to be published.

The social identity approach may be a useful mechanism by which prisoners can be motivated to engage in healthy behaviours. Results from this study suggest that prisoners can work well together in groups that share a common social identity. Thus, for a future intervention, it may be useful to establish a new common identity by working together with participants. Prisoners' family members, close friends and health champions could be used to embed a sense of identity as part of future interventions and provide social support to participants (Stevens et al 2017). Additionally, health champions could be trained as peer leaders to deliver parts of the intervention, as a recent review as found that peer interventions are associated with positive health in prisoners (Bagnall et al 2015).

Institutional context

The results from this study indicate that the structured and inflexible prison regime and healthcare barriers to self-care have the potential to demotivate prisoners and hinder their engagement in positive health behaviours.

Most prisoners reported that aspects of the prison regime, particularly the fixed times for exercising, the restriction of their movement and the provision of unhealthy or unappetising food, made them feel as though they had limited choices in relation to managing their health. These factors contributed to feelings of boredom and helplessness, which influenced social-level factors such as the sub-culture of physical inactivity and comfort eating, and individual-level factors such as perceived behavioural control. The NHS staff also reported similar views to the prisoners, while conversely, the prison staff attributed the prisoners' behaviours to their own personal choices.

The institutional impact on prisoners and the resultant feelings of boredom and helplessness in UK prisons have been reported elsewhere. For example, Choudhry et al. (2017) reported that prison nurses attributed weight gain and obesity to male prisoners spending most of the time in their cells due to boredom. Woodall et al. (2013) found that the structured prison regime and limited autonomy led male prisoners to feel as though they lacked control and choice whilst imprisoned. This lack of control was universally accepted by both prisoners and prison staff, and left prisoners feeling frustrated and anxious (Woodall et al 2013). Similarly, de Viggiani (2007) reported that prisoners and prison staff found the inflexible regime contributed to feelings of boredom and disempowerment, which in turn impacted on prisoners' physical and mental wellbeing.

Dealing with boredom and helplessness in prison appears to be difficult given that these two issues are frequently reported in the prison literature. While obvious solutions may include providing more activities for prisoners and increasing their autonomy, it is difficult for prisons to achieve this due to limited budgets, availability of prison staff, and the prioritisation of security. Nevertheless, researchers continue to advocate for prisons to become more flexible to empowering prisoners to take control and responsibility of their lives and health (Woodall et al 2014; Woodall et al 2013; de Viggiani 2006a).

For over a decade, the Scottish Prison Service (SPS) has advocated for the empowerment of prisoners by recommending prisons support and encourage prisoners to take responsibility of their health (SPS 2002a). This study found that this prison's four health-related services adopted the philosophy of promoting

responsibility for health by using an 'independence' approach to prisoner healthcare. This approach involved prisoners taking responsibility of their health by seeking out services they require. These services provided a variety of health promotion initiatives, taught prisoners self-care skills and provided them with lifestyle advice. However, two of these services, the psychology and addictions units, were only available to prisoners with specific needs, for example, those with alcohol and other substance misuse problems. This highlights a missed opportunity for the promotion of self-care in the prison, as the skills offered in these programmes could benefit other prisoners who did not have these specific health issues.

In effect, the 'independence' approach means that prisoners have to seek out support on their own accord. The NHS staff believed that prisoners were more inclined to do this because of an increase in prisoners' motivation to manage their health while imprisoned. However, nearly half of the prisoners in this study indicated that their health had declined in prison (Table 15, Chapter 5), and the study revealed that there were several multi-level factors that reduced their motivation to engage in positive health behaviours. The 'independence' approach also assumes that prisoners are able to understand which services they require. However, the ability to successfully navigate health services requires a sufficient level of health literacy (D'Eath et al 2012). If the prisoners mostly have limited health literacy as suspected, this will be a challenge for the successful implementation of the 'independence' approach.

With regard to diseases such as CVD, the 'independence' approach assumes that prisoners can recognise when they are at risk of the disease and perceive the risk of a threat to their health. However, as this study's findings revealed, most prisoners had limited knowledge of CVD and many were uncertain about the extent to which they were personally at risk of the disease.

The staff's lack of knowledge of CVD is a barrier to cardiovascular risk reduction in prisoners, while their limited understanding of the complexity surrounding prisoners' motivations to improve their health is a potential barrier to self-care in general. According to Baumann and Dang (2012) and Kennedy et al. (2007), professionals' lack of understanding of the context in which healthcare is

provided impacts on their ability to provide adequate support to self-care. The NHS staff also had limited awareness of the food that was provided to the prisoners, and of the various health promotion initiatives offered by the gym. Thus, any advice they provided to the prisoners in relation to diet and exercise is not tailored to prison setting as such, and so is less likely to be fully effective in helping prisoners to make informed decisions about their personal health (Self Care Forum 2014).

The NHS staff's limited awareness of the prison context, i.e. awareness of food and HP initiatives, was due to the limited communication and partnership working with the prison staff. These two factors go against SPS policy on promoting prisoner health (Brutus et al 2012; SPS 2002a), and are potential barriers to self-care. NHS staff reported that at times, there was conflict and tension with prison staff, which impacted on the care provided to some prisoners, such as those with mental health problems. This finding is consistent with a study conducted by Hardie (2009), who identified that a lack of communication between both organisations in this prison resulted in confusion and frustration among NHS staff. This in turn impacted on the delivery of health promotion initiatives for prisoners (Hardie 2009).

The NHS staff's limited awareness of the prison context, and the limited communication and partnership working between the NHS and prison staff, and the tensions between these two organisations, are not unique to this prison. A recent review of the transfer of prison health to the NHS in Scottish prisons revealed that NHS nurses felt they lacked specific training for the prison context, and that they felt that prison staff lacked an understanding of the requirements of healthcare (RCN 2016).

The RCN (2016) report also highlighted that in many prisons, the relationship between both organisations was strained (RCN 2016). This may explain why I felt that it was difficult to build sufficient rapport with staff in this study (section 1.2.2). In particular, I had got the sense that the NHS staff did not want to appear as though they were overstepping their boundaries within the prison, and perhaps they may have been worried that what they had said would have got back to the prison staff (despite my reassurances of confidentiality).

The tensions between the two organisations may partly be due to the differences in the roles of their staff. NHS staff operate on the principles of person-centred care, where an individual is centre of care and is involved in decisions about their care (Healthcare Improvement Scotland 2017). They are therefore trained to view prisoners as patients (RCN 2016). However, the prison staff, despite their involvement in health promotion, often have to prioritise security over prisoners' health (RCN 2016). The almost opposing roles of the NHS and prison staff, and the limited communication between both organisations could present major challenges to partnership working in the prison. Improving the communication between organisations by encouraging open and honest dialogue, could help to increase the understanding of their respective roles and how they can work together to advance healthcare and health promotion in the prison.

On a positive note, a year after the data were collected for this study, the researcher returned to the prison to discuss the preliminary findings from the study with a member of the steering group. During this visit, it was reported that a formal partnership had been formed between the prison staff and NHS staff based in the healthcare unit, which involved the referral of prisoners from the long-term conditions clinic to the gym and vice versa. This was encouraging and showed that efforts were being made to improve prisoner healthcare. This was also encouraging from my perspective of a researcher planning to develop a future intervention in partnership with prisoners and prison staff (section 9.2).

From the above discussion, it is clear that institutional-level factors influence the ability of prisoners' to take personal responsibility of their health, and to self-care, not just in relation to CVD, but to general health as well. The literature on self-care in the general population outlines the need for a whole systems approach, in which all involved parties work in sync to encourage and support self-care (Kennedy et al 2007). The same principles are applied in theory to prison healthcare in what is known as the whole-prison approach (Brutus et al 2012; SPS 2002a). However, this approach had been difficult to implement for many reasons, and not just in this prison. The lack of communication and partnership working between the NHS and prison staff, and the limited knowledge of NHS staff about the prison setting have been highlighted by the RCN (2016)

as occurring in other Scottish prisons. By dealing with these barriers, prisons could be more facilitative of promoting prisoners to take responsibility of their health.

This study has shown that there are multi-level barriers to a whole systems approach and its fuller implementation in the prison setting. However, with prisoners at the centre of healthcare, it is proposed that more can be done to address the individual, social and institutional factors that contribute to prisoners' CVD risk. Other investigators have identified the benefits of a multi-level approach to cardiovascular risk reduction. For example, Mudd-Martin et al. (2014), in a study of influences of CVD risk in rural Appalachians in Kentucky found that several multi-level factors contributed to the participants' risk of the disease. A social-ecological framework which targeted these factors was recommend to guide an intervention to reduce the Appalachians' risk of the disease (Mudd-Martin et al. 2014). However, details of the intervention's success have not yet been published.

8.2.4 There are benefits to be gained from a cardiovascular risk reduction intervention in prison

Finding 8 of this study revealed that the prisoners and staff welcomed the idea of a future intervention to reduce the prisoners' risk of CVD. Interest for prisoners' participation in such an intervention was borne out of personal relevance, was many prisoners wanted to learn more about the disease and how to lower their risk of it. Prisoners also thought that there were benefits to be gained from participating in the intervention, such as improved health and wellbeing, and improved knowledge of exercise and nutrition.

These beliefs that there were benefits to be gained from a cardiovascular risk reduction intervention are encouraging. The review of qualitative studies exploring prisoners' experiences with such interventions in Chapter 3 highlighted that improvements to the prisoners' health and wellbeing did occur. This review also showed that some of the proposed benefits of the intervention that were highlighted in section 8.2.3, were reportedly experienced by prisoners in these studies.

For example, it was proposed that a social identity approach within a group setting could encourage a sense of shared identity among prisoners, and motivate them to engage in positive health behaviours. Studies by Gallant et al (2015), Parker et al (2014) and Elwood Martin et al (2013) reported that prisoners gained a shared identity from working in groups, and felt a sense of belonging and purpose by being treated as a valued member of the group. These studies also reported that the social interactions that the prisoners had with others helped to improve their social skills and in some cases, helped them from feeling less isolated, and less anxious or depressed. As outlined in the findings and discussion, anxiety, depression and isolation were major issues in this prison. It is encouraging to know that prisoners could potentially be helped to deal with or overcome these issues through a cardiovascular risk reduction intervention.

Overall, there are potentially numerous benefits to be gained from a future intervention of this nature. To increase the likelihood of such benefits to be experienced, the intervention needs to be carefully designed and successfully delivered. Thoughts on how the design and delivery process are discussed in Chapter 9.

8.3 Implications for future research and policy

This study is unique in that it contributes to a gap in the literature on the reduction of cardiovascular risk for prisoners in Scotland. As highlighted in Chapter 2, data on CVD and its risk factors are not routinely collected in Scottish prisons, despite this being outlined in latest national prisoner health needs assessment (Graham 2007). Such data are useful to researchers, the NHS and the prison service, for identifying and flagging issues to be dealt with in this high-risk population.

As Chapter 3 highlighted, there is also a need for more interventions to reduce prisoners' risk of CVD in Scotland and elsewhere. Given that all of the studies identified in the systematic reviews of quantitative and qualitative studies occurred in high-income countries (Mohan et al 2017), more research needs to focus on middle- and low-income countries as they bear the highest burden of CVD morbidity and mortality (Mendis et al 2011). This applies not only to

interventions for reducing prisoners' risk of CVD, but to understanding their knowledge and risk perceptions of the disease.

From a Scottish perspective, this study shows that a greater focus is needed on the cardiovascular health of Scottish prisoners. The NHS has a mandate to prioritise CVD prevention, particularly in high-risk individuals and socially-deprived communities (The Scottish Government 2014), both of which are applicable to the majority of prisoners. While the NHS has been increasingly promoting prevention strategies in the general population, this study suggests that there is no specific strategy for CVD prevention in Scottish prisons. This is contrary to the principle that prisoners should be provided with the same level of, and access to healthcare, as the general population (The Scottish Government 2008), and is contrary to the Scottish Government's strategy for the prevention of CVD (The Scottish Government 2014).

There is a possibility that other interventions have been trialled in Scottish prisons that could impact on prisoners' CVD risk. However, there is a lack of publications which make it difficult to ascertain what the structure, effectiveness and sustainability of these interventions were. It is important that such research is published so that researchers and other stakeholders such as the NHS and SPS can further promote preventative care, as part of prison healthcare and health promotion. Additionally, researchers owe it to the prisoners and staff who have participated in their studies, to publish their results to help inform policy and practice.

This study also contributes to the wider debate about looking at the multiple determinants of prisoners' health. Both Woodall et al. (2014) and de Vigianni (2006) advocate for a move away from a biomedical model approach to prisoners' health, to a whole systems approach in which the wider influences of prisoners' health are targeted. The multi-level approach to cardiovascular risk reduction recommended in this study is aligned to this.

8.4 Strengths and limitations of the study

8.4.1 Strengths

There are advantages of having conducted this qualitative study. First, conducting a qualitative enquiry prior to developing an intervention for a topic that has been under-researched is important. It allows for the tailoring of an intervention through the identification of key factors to be targeted and of mechanisms to change these factors. It also allows for the users' inputs to be captured and incorporated into the intervention design (Craig et al 2008). The exploration of both the prisoners' and staff's perspectives is also in keeping with recommendations on how to drive health promotion in the prison setting (WHO 1995).

Another strength of this study is that it used a qualitative approach to investigate knowledge and risk perceptions of CVD. Other studies have used questionnaires to assess knowledge of CVD (Wartak et al 2011; Homko et al 2008). These questionnaires often provide a list of potential risk factors for people to choose, and can therefore prompt the recall CVD risk factors. They also limit understanding of the extent to which participants understand the disease and risks associated with it (Wartak et al 2011). This study was not limited in this regard and importantly, it allowed for any misconceptions and misinterpretations to be identified, which strengthened the case for providing CVD education to prisoners. Additionally, using self-administered questionnaires may be difficult as many prisoners have low educational attainment.

A qualitative exploration also allowed the researcher to observe the how the prisoners received and processed information about CVD and other issues. For example, it was observed that the prisoners used simple terminology when describing CVD, which indicates that all aspects of an intervention should be communicated simply and in a 'language' that prisoners can understand. It also allowed the researcher to observe first-hand the usefulness of visualisation as a technique to be used as part of an intervention, through the use of a visual aid to explain the process of atherosclerosis.

8.4.2 Limitations

This study has some limitations. First, all but one of the prisoners interviewed had long-term sentences. This may be explained by the use of health champions to recruit prisoners to the study after an initial lack of response to promotional posters and fliers. As the health champions were all serving long-term sentences themselves, they could have spread word of the study to other long-term prisoners whom they share a wing with. The perspectives of short-term prisoners may have differed from long-term ones. In this study, both the prisoners and staff had indicated that short-term prisoners viewed health and life in prison differently from long-term prisoners. Therefore, the short-term prisoners' perspectives may have resulted in additional contributing factors to CVD risk.

Second, the prisoners' cardiovascular risk was not objectively measured. Instead, the prisoners self-assessed their risk of CVD and commented on the possible risk of other prisoners. It has been highlighted in the literature that many people either underestimate or overestimate their actual CVD risk (Webster and Heeley 2010). It would therefore have been useful to see how the prisoners' perceptions of their personal risk of CVD compared to their actual risk.

Third, while it is speculated that the prisoners had limited health literacy (section 8.2.1), their actual levels of health literacy were not measured. The health literacy of prisoners is important as a study in Kentucky revealed that health literacy independently predicted 10-year CVD risk in male prisoners (Miller et al 2012). Therefore, it would have been useful to compare the prisoners' level of health literacy to see how this may have impacted on their responses regarding CVD knowledge and risk perception.

Fourth, the study was conducted in a private prison, which may differ from other Scottish prisons. Some prisoners in this study who had been to other prisons had indicated there were differences, for example, in terms of the process of buying items from the canteen. Therefore, it is possible that some of the findings in the study may not be generalised to other Scottish prisons. However, as was indicated in the discussion, some of the institutional barriers such as the healthcare barriers identified in this study were also common to other prisons.

8.5 Chapter summary

In summary, the findings from this study show the need for a multi-level, systematic approach to prisoners' cardiovascular risk reduction due to the interplay of several individual, social and institutional influences on prisoners' CVD risk and cardiovascular health. As several of these factors interact across their respective levels of influence to impact on other factors, the systematic targeting of these should help to motivate and empower prisoners to engage in behaviours and self-care activities to reduce their risk of the disease.

The study's findings also reveal a mismatch between policy and practice in relation to the prevention of CVD and the healthcare of prisoners. The lack of a specific strategy to target cardiovascular risk reduction in prisoners is contrary to the Scottish government's implementation plan on the prevention of CVD in high-risk populations. It is also contrary to the prison service's commitment to provide the same level of care to prisoners as the general population. From a research perspective, this study has contributed to a gap in the literature on knowledge and CVD risk in prisoners, but more research is needed.

This study has also highlighted that prisoners' health literacy and educational attainment levels need to be considered in the promotion of cardiovascular health and health in general. The limited understanding and misconceptions of CVD, misperceptions of CVD risk and limited ability to self-care demonstrated by many prisoners in this study, suggest that prisoners possibly had limited health literacy and low educational attainment. This study therefore shows a need for prisoners' healthy literacy and educational status to be incorporated into the delivery of information provided in any future interventions in the prison.

To conclude, this study recommends the use of a multi-level approach, in which the influences on CVD are systematically targeted, to encourage prisoners' engagement in behaviours and self-care activities that can lower their risk of the disease. This approach also needs to be contextually relevant and tested within the prison setting. As a step towards this, the next chapter of this thesis presents a theoretical framework, based on the study's findings, to guide the development of a future intervention to reduce prisoners' risk of CVD.

Chapter 9: Recommendations and Conclusion

9.1 Introduction

This chapter presents the recommendations for an ecological framework to guide the development of a future cardiovascular risk reduction intervention for prisoners (section 9.2). This addresses objective 7 of this study, which relates to the proposal of the theoretical framework to guide the development of such an intervention. This chapter also presents an overall conclusion to this study (section 9.3).

9.2 Ecological framework for cardiovascular risk reduction in the prison setting

Interventions that are guided by theory are thought to be more effective in changing people's behaviours compared to those that are not (Brewer and Rimer 2008). Chapter 3 identified that most interventions to improve the cardiovascular health of prisoners were not informed by a theoretical framework. This study therefore makes a significant contribution to the literature on cardiovascular risk reduction in prisoners by proposing such a framework.

This section presents an ecological framework for cardiovascular risk reduction in prisoners. A brief background on the use of ecological models is presented to provide context for the ecological framework (section 9.2.1). The development of the framework is guided by the 'Six Steps for Quality Intervention Development' or '6SQuID', as proposed by Wight et al. (2015) (Appendix 4). This provides useful and practical guidance on the development of interventions but are also applicable to theoretical frameworks. Only the first four steps of 6SQuID are used here as a guide as they are specific to the development of a framework/intervention, and are presented in section 9.2.2. The future steps to be taken regarding the development of an intervention are also outlined (section 9.2.3).

9.2.1 Ecological models

This study showed that there are multiple individual, social and institutional factors that contribute to prisoners' risk of CVD, and these factors interact across their respective levels of influence. Thus, behavioural models that solely focus on individual characteristics such as the Theory of Planned Behaviour, or social influences such as Social Cognitive Theory, may not be appropriate to guide a cardiovascular risk reduction intervention in the prison setting. Instead, a holistic perspective is needed, in which the various multi-level factors are systematically targeted to bring about a change in prisoners' behaviours to reduce their risk of CVD. One framework that adopts such a perspective is based on ecological models of health (McLeroy et al 1988).

Ecological models focus on the multi-level influences on health behaviours or conditions and their interactions (Sallis et al 2008). There is no set blueprint for these models as their design is based on the nature of the problem and the context under investigation. However, the principles on which these models are based remain the same; they focus on multi-level factors and their interactions of these across different levels (Sallis et al 2008), and are most effective when tailored to individual health behaviours or conditions (Elder et al 2007).

For example, Elder et al. (2007) used a socioecological model to promote physical activity in adolescent girls in the USA. They focused on social resources such as social support, and environmental barriers such as the limited accessibility to physical activity programmes (Elder et al. 2007). Sallis et al. (2003), also in the USA, used an ecological model to increase physical activity and reduce fat intake in middle school students. They focused on environmental factors such as increasing the number of physical activity equipment and policy factors such as the promotion of physical activity throughout the school day (Sallis et al. 2003).

Ecological models have also been used in cardiovascular risk reduction for over three decades (McLeroy et al 1988), but none of these have been applied to the prison setting. Recently, Balcazar et al. (2015 and 2012) developed an intervention to reduce the CVD risk of Hispanics in Texas based on an ecological model. The intervention resulted in significant improvements to risk-reducing

behaviours such as exercise frequency and cholesterol and fat consumption (Balcazar et al 2015).

The main benefit of using ecological models in the studies mentioned above is that it allowed for a tailored, holistic approach in which multiple interacting factors were targeted to improve participants' outcomes in varied settings, such as schools (Elder et al. 2007; Sallis et al. 2003), and communities (Balcazar et al. 2015). In the same way, this ecological approach can be useful to achieving a holistic approach to cardiovascular risk reduce in the prison setting.

Although not explicitly stated, an ecological approach is embedded in the WHO 'healthy' settings or whole prison approach to healthcare and health promotion in prison. The settings or whole prison approach takes into account all of the factors that have the potential to influence prisoners' health and what can be done to promote health in prisons. These factors include individual factors such as health education, environmental or social factors such as the prison environment and institutional or police factors such as prison policies that promote health (Hayton et al 2007). Therefore, just as ecological models are used to target multi-level factors to bring about health behaviour change, so too does the whole prison approach to health promotion.

The ecological framework derived from this study's findings is presented below.

9.2.2 Definition of the problem and factors to be targeted, and mechanisms of change

Cardiovascular disease (CVD) is a major health concern, and there is a higher prevalence of CVD risk factors in the prison population compared to the general population. There were several CVD risk factors found in this study. Non-modifiable risk factors included a family history of CVD and increasing age. Modifiable risk factors included smoking, physical inactivity, unhealthy diet, sedentary behaviours and mental health problems. Not only can these factors increase prisoners' risk of CVD, they can also increase their risk of other chronic diseases such as type 2 diabetes and cancer, and reduce their physical and mental wellbeing in prison. This can place a considerable burden on the

resources of the prison healthcare services, which can be extended to healthcare services in the community upon release from prison.

The ecological framework (Figure 3) for cardiovascular risk reduction in prisoners is derived from this study's findings. The key principle of this framework is that it considers all the influences of prisoners' cardiovascular health and cardiovascular risk as important and worthy of tackling to reduce prisoners' risk of CVD and to promote positive cardiovascular health.

The framework outlines the individual, social and institutional factors to be targeted. These factors are identified and defined in Table 20. The framework theorises that these factors can interact across their different levels to influence each other, therefore it assumes that by targeting and affecting one factor, other factors will also be affected (Figure 3). The framework also theorises that once certain factors are targeted, reinforcement will increase the likelihood of any positive changes being sustained. The mechanisms of change that could be used to target these factors and assist in their reinforcement are also incorporated into the framework. Two specific mechanisms of change have been identified: the social identity approach and partnership working and communication. Examples of how the multi-level factors can be targeted, and mechanisms of change can be used are given below Figure 3.

The framework operates on the premise that the systematic targeting of the multi-level factors will result in prisoners' increased motivation to engage in positive health behaviours and self-care activities, and ultimately promote cardiovascular risk reduction in prisoners.

Table 20 – Contextual factors and mechanisms for change in the proposed intervention

Factors	Definition
Individual-level	
1. Knowledge of CVD	The knowledge/understanding of CVD and its risk factors
2. Risk perceptions of CVD	Judgements about the susceptibility to and severity of CVD
3. Perceived health status	Judgements about what constitutes good health
4. Attitudes towards behaviour	Beliefs about the expected outcomes or value of a change in a behaviour
5. Self-efficacy	Confidence in own ability to perform a specific activity or task
6. Perceived behavioural control	Perceived ease or difficulty in performing a behaviour
7. Subjective norms	Expected behaviours of prisoners that arise as result of the prison culture
8. Mental health problems	Range of issues that impact on mental wellbeing e.g. stress, anxiety, depression, emotional distress
Social-level	
1. Social interactions	Any interaction between a prisoner and others e.g. prisoners, family members, friends, prison staff, external agencies
2. Prison culture	Accepted norms of the prison e.g. masculinity, comfort eating, physical inactivity, etc.
Institutional-level	
3. Regime barriers	Any factors related to the prison regime that prevents or makes it difficult for prisoners to perform self-care activities e.g. structured daily regime
4. Healthcare barriers	Any factors related to the prison's healthcare services that prevents or makes it difficult for prisoners to perform self-care activities e.g. limited communication and partnership working between NHS and prison staff; limited knowledge of NHS for prison setting

Individual-level factors

As indicated in sections 8.2.1 and 8.2.2, the prisoners' knowledge of CVD, their risk perceptions and perceived health status need to be targeted. This could be done through CVD and general health education. There should be a particular focus on the salience of CVD and its consequences in order to increase their perceptions of the disease. The prisoners could also be taught about personal risk assessment. Appropriate teaching and communication techniques which cater to varying degrees of literacy could be used to help reinforce the knowledge provided (Figure 3). One technique that was found to be useful in this study was visualisation. This involved the use of imagery to facilitate the teaching of health-related issues to prisoners. Research has shown this technique to be effective in communicating information about type 2 diabetes to patients with low literacy (Negarandeh et al 2013). Therefore, it could also be used to communicate information about CVD, for e.g. the process of atherosclerosis, to the prisoners.

Section 8.2.3 indicated that attitudes toward behaviour, self-efficacy, perceived behavioural control and subjective norms also need to be targeted to reduce the prisoners' risk of CVD. These factors have the potential to influence each other, and targeting one may bring about a positive change in another. For example, increasing self-efficacy to perform exercise in different settings, such as the gym or a prison cell, may help prisoners to feel more in control of the behaviour. The prisoners could be taught how to perform positive behaviours and self-care activities, and behaviour change techniques such as action planning and goal-setting can be used to reinforce these (Michie et al 2011). Support systems in the form of positive social interactions (see section below) and referral pathways for them to access appropriate health services should be put in place to facilitate positive behaviour change. CVD and health education, and the social identity approach can also be used to reshape attitudes towards behaviour, subjective norms, etc. (Figure 3).

Section 8.2.3 also indicated that mental health problems should be targeted as these have considerable influence on other individual-level factors. There should be a specific focus on helping prisoners to improve their mental wellbeing. In addition to the use of support systems and the promotion of positive health

behaviours, techniques to help with relaxation could be used. One example of such a techniques is mindfulness, a cognitive tool that has had a positive impact on anxiety and depression (Goyal et al 2014) and cardiovascular health (Loucks et al 2015).

Social-level factors

Section 8.2.3 indicated the positive influence of social interactions on the prisoners' motivation to engage in positive health behaviours and self-care activities. These interactions between prisoners and others should be encouraged and used as a form of emotional and practical support. Prisoners may be encouraged to share their experiences with others including health champions, family members and staff, who in return could be encouraged to provide praise or positive feedback to the prisoners. This could also include promoting a sense of them being a role model to others, as this identity facilitated sustained engagement in positive health behaviours in this study.

The social identity approach could be used to establish a common identity among prisoners and promote a sense of belonging to a group. As demonstrated in this study, groups who shared a common identity were helpful in improving the prisoners' knowledge and self-efficacy related to exercise. Therefore the social identity approach could be used to reinforce individual-level factors such as attitudes towards behaviour and self-efficacy (Figure 3). Once identified, this common identity could be further embedded into the mindset of prisoners by the health champions and others.

The prison sub-cultures of physical inactivity and comfort eating, and masculinity often demotivated prisoners from engaging in positive health behaviours. These sub-cultures could be difficult to change. However, positive social interactions and the social identity approach can be used to buffer the effects of this culture. The prisoners could be helped to build their resilience to the negative influences of the prison's sub-cultures through the provision of skills such as coping and problem solving.

Institutional-level factors

Section 8.2.3 showed that the structured prison regime made it difficult for prisoners to engage in positive health behaviours. The prison regime is one factor that cannot be targeted as it is integral to the running of the prison. This means that a future intervention to reduce the prisoners' CVD risk needs to be flexible so that it can work alongside the prison regime. This can be achieved by collaborating with prisoners, NHS and prison staff to identify opportunities to empower prisoners to engage in self-care activities and positive health behaviours at different times during the working week and on weekends.

Additionally, the healthcare barriers identified in section 8.2.3 could be targeted to improve the prisoners' chances of successfully performing self-care activities such as putting together a healthy diet or taking measures to stop smoking. A first step to dealing with these barriers could be to establish a partnership between the NHS and prison staff. This could help to improve the communication between both groups of staff, and help in the establishment of referral pathways through which prisoners can access services easily. In so doing, this partnership working and communication between the NHS and prison staff could be useful in buffering the effects of the institutional barriers to self-care. Reinforcement of individual-level factors such as attitudes to behaviour and self-efficacy could also help to buffer the effects of the institutional barriers (Figure 3).

All staff involved in the delivery of a future intervention should be trained to ensure that they can deliver adequate advice and support to prisoners. This training would involve CVD education and making the staff aware of contextual factors such as food and physical activity opportunities, so that they can provide tailored advice to the prisoners.

In theory, the systematic targeting of the multi-level factors may result in prisoners' increased motivation to engage in positive health behaviours and self-care activities, which with the ultimate aim of promoting cardiovascular risk reduction in prisoners. These behaviours and activities should be reinforced through the use of appropriate behaviour change techniques and other mechanisms for change, as mentioned above.

9.2.3 Next steps

This ecological framework could be used to guide the development of a future cardiovascular risk reduction intervention. While the findings from this study have identified factors to be targeted and mechanisms of change that can be used to achieve this, there have been changes in the prison during this study. The next stage of this research would involve a presentation of the study's findings to prisoners, NHS and prison staff, and other potential collaborators. Representatives from each group are needed to form a steering group, which will guide the development of the intervention. The structure and design of the intervention, including its core components, outcomes, measures, baseline characteristics and evaluation methods, need to be determined, and a pilot study will be needed to trial the intervention on a small scale initially.

9.3 Conclusion

In conclusion, this study showed that prisoners have limited knowledge of CVD and this is comparable to lay knowledge of the disease in the general population. The prisoners had more awareness of common behavioural risk factors such as smoking and physical inactivity, and cardiovascular events such as heart attacks and stroke. However, there were gaps in their knowledge about metabolic risk factors, and to the process of atherosclerosis, and a lack of understanding of CVD was demonstrated through misconceptions of the disease.

There were similarities and differences in the way the prisoners and staff perceived CVD risk. Some prisoners believed that they were personally at risk of CVD, and similarly, some staff, particularly the NHS staff, viewed risk as pertaining to individual prisoners. On the other hand, there were prisoners and staff who believed that CVD risk was general, and prisoners who were not physically fit were at risk of the disease. Overall, CVD risk was assessed by a prisoner's current health status and not their risk factor status. These findings show the need for CVD and general health education to be provided to prisoners, with a specific focus on the severity of the disease to target their risk perceptions of the disease. The findings also highlight the need for CVD education to be provided to staff.

The prisoners' CVD risk was linked to negative health behaviours such as smoking and physical inactivity. The factors that influenced these occurred on three main levels. Individual factors including self-efficacy and mental health problems; social factors including the prison culture and social interactions; and institutional factors including prison regime and healthcare barriers, interacted with each other to influence the prisoners' CVD risk and cardiovascular health.

The above findings indicate that there is a need for a tailored cardiovascular risk reduction intervention in this prison and the need for a holistic approach in which all these influences are systematically targeted. This recommendation is consistent with research based on other high-risk populations that targeted the multi-level influences on CVD risk to improve health outcomes. An ecological framework was developed to show how these multi-level influences can be targeted to encourage positive health behaviours and self-care activities, and in so doing, reduce the prisoners' CVD risk. The mechanisms of change include CVD education, the social identity approach and partnership working, but further work is needed to fully develop and pilot-test the intervention.

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Appendix 1 – Prison context

An average prisoner’s daily routine for the working week is presented in Table 21. While these days were structured, the weekends were unstructured.

Table 21 – Daily prisoner regime

Time	Activity	Details
07:00-08:00	Breakfast	
08:00-08:30	Route movement	
08:30-11:30	Work/education/gym	
	1 st morning session: 08:30-09:30	All sessions focus on physical activity
	2 nd morning session: 09:30-10:30	
	3 rd morning session: 10:30-11:30	
11:30-12:00	Route movement	
12:00-13:30	Lunch	
13:30-14:00	Route movement	
14:30-16:00	Work/education/gym	All educational sessions
16:00-16:30	Route movement	
16:30-18:00	Dinner	
18:00-19:00	Gym session	Recreational
19:15-20:15	Gym session	Recreational
21:00-07:00	Lights out	Prisoners confined to their cells

On an average weekday typically begins with prisoners waking up at 7am, and being served breakfast around 7:30am. They then prepare for the route movement, which is the mass movement of prisoners to and from any their places of work, education or the main gym. The first route movement of the day occurs between 8 – 8:30am. Each route movement is supervised by several prison officers. Prisoners who go to work or education remain there from 8:30 – 11:30am, while those who go to the main gym only stay there for one hour and are then escorted back to their wings. There are three morning sessions in the gym with each session having prisoners from a different wing. Prisoners who work have the opportunity to go the gym between 10:30 – 1:30am without losing pay. Prisoners then go back to their wings to have lunch between 11:30am – 1:30pm.

In the afternoons, the route movement takes place from 1:30 – 2pm. Similar to the morning periods, prisoners either go to their place of employment, education or the gym. They remain at these locations until approximately 4pm and then return to their wings where they are served dinner at 4:30pm. Following this, those who wish to use the gym can either attend a session from 6 – 7pm or from 7:15 – 8:15pm. They also have the option to go to the library in the evenings. The period between 9pm till the next morning is known as 'lights out' where prisoners are confined to their cells.

On the weekend, there is no structured regime for prisoners to follow. Their main meals are served the same times as during the week. No services operate on the weekend, therefore prisoners spend nearly of all of their time on their respective wings.

Appendix 2 – Recruitment and interview material

Reducing cardiovascular risk in prisoners



The University of Stirling is conducting a study in the prison. We are interested in introducing a programme to reduce cardiovascular disease risk factors in prisoners. Please take a flier to find out more on CVD and the risk factors.

What would we like to find out from you?

We would like to ask you questions about:

- how programmes are planned to fit into your daily activities
- how you feel about your health and risk factors to cardiovascular disease
- what things make you take part in activities to improve your health
- how you feel about the programme we would like to introduce

What do you have to do if you choose to take part in the study?

- ✓ We will ask you some questions in a private interview
- ✓ Only you and the researcher will be at the interview
- ✓ You do not have to answer any questions if you do not want to

About taking part

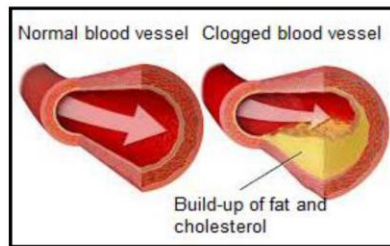
Taking part is entirely voluntary. Everything you tell us will be kept strictly confidential, and your stay in prison will not be affected at all. We will protect your identity and keep your answers safe and confidential. **However, if you tell us something that puts your safety, or the safety of others at risk, we will have to tell the prison staff.**

If you are interested in finding out more, we will have an information session that you should come to. Look out for details about the session shortly.

Reducing cardiovascular risk in prisoners

What is cardiovascular disease?

Cardiovascular disease (CVD) is a group of diseases of the heart and blood vessels. They are caused by the clogging of blood vessels. A build-up of fat and cholesterol is what clogs the blood vessels. This causes the heart and blood vessels to stop working properly.



CVD is a serious problem – it can cause serious health problems and even death. Two of the main problems of CVD are:

- heart disease – when blood flow to the heart is blocked
- stroke – when blood flow to the brain is blocked

What are the risk factors for CVD?

A CVD risk factor is a factor that gives a person an increased chance of getting CVD. There are many CVD risk factors.

- ✓ smoking
- ✓ lack of physical activity
- ✓ drinking harmful amounts of alcohol
- ✓ unhealthy eating
- ✓ high blood pressure
- ✓ high cholesterol

Who is suitable to take part in the study?

You will be suitable to take part in the study if you:

- are NOT on remand
- have been in the prison for more than 1 month

If you want to find out more about the study, please come along to the information session. Look out for details about the session.

We will keep everything you tell us strictly confidential. However, if you say something that puts your safety or the safety of others at risk, we will have to tell the prison staff.

THANK YOU!

Appendix 3 – Interview schedule for participants

Feasibility of introducing a cardiovascular intervention in prison

Interview guide for prisoners

The following is the draft of the interview guide that will be referred to when interviewing prisoners.

Perceptions of health and motivations

1. Can you tell me about your health since you have been in prison? (probe if there is anything specific like long-term conditions, co-morbidity, modifiable risk factors: overweight, cholesterol, physical inactivity)
2. Do you think that you have control over your health and health behaviours?
3. Can you tell me what you know about CVD (define) and whether anything can be done to prevent it?
4. Do you think you are at risk of CVD in prison? (If yes or no, ask why).
5. Can you tell me if you take part in any form of physical activity in the prison?
6. If answer to (6) is yes: how often do you do it? Why do you do it?
7. If answer to (6) is no, can you tell me why? (probe: factors that hinder)
8. Has a health champion ever spoken to you about your health or exercise? Can you tell me about that experience? (Adapt question to: 'Can you tell me what you as a health champion and describe some of the experiences you had with other prisoners since becoming a health champion?')

Experiences with health promotion programmes

1. Can you tell me about any programmes designed to improve your health that you have taken part in while in prison? (probe: what was it about, who delivered it, how long was it for, what did they have to do)
2. Can you please describe how the programme fit into your daily schedule?
If participant did participate in programmes, ask questions 3-5.
3. What made you decide to join the programme?
4. Is there anything about the programme that you did not like? (probe: how it was delivered/who delivered it/length of it)
5. Do you think that the programme helped you to [achieve its purpose]?
6. Do you carry out any self-care activities on your time that might prevent ill health/improve your health?

Feedback on BCVRR intervention

1. Is there anything in relation to your health that you would like to learn more about or understand better? (probe: exercises, nutrition, etc.)

We are planning an intervention to improve the cardiovascular health of prisoners by helping reduce their risk factors for CVD. The aim of the intervention is to help prisoners to look after their own cardiovascular health by teaching them skills they will need to achieve this. We plan on running the programme for 12 weeks. There will be two components of the intervention involving physical activity and educational classes and/or self-care activities. The classes and activities are designed to increase the prisoner's understanding of what is CVD and how it might be prevented. For the physical activity component, prisoners will either exercise as a group or on their own, but we will ask them to set their own action plans and goals. The educational classes will be conducted as a group, possibly two times a week for 12 weeks. For these sessions, we plan to cover topics that encourage and support behaviour change in areas such as smoking, diet and physical activity. These may help prisoners to develop coping strategies and confidence to address the barriers to risk factor management.

Can you give me your opinions on this?

Feasibility of introducing a cardiovascular intervention in prison

Interview guide for healthcare and health promotion staff

Health-related interventions in the prison

1. Can you tell what your role as a member of the healthcare staff/health promotion staff entails?
2. Can you describe any intervention that you have been involved in at the prison that is related to prisoner health? (prompt about who the intervention targeted, what resources were used and what were their roles in the intervention)
3. Can you explain to me which other staff were involved in introduction of the intervention and about its objectives (who decided the intervention was needed, why the decision was made)?
4. Can you describe what strategies were used to encourage prisoners' participation in the intervention, and to keep them motivated to continue? (prompt: behaviour change or other types)
5. How would you describe the response of the prisoners the intervention? Why would you say this?
6. Was the intervention successful? Why do you say this?

Prisoner health and motivations

1. Do you think that prisoners are at risk of developing CVD while in prison? Why do you say this?
2. Is there anything in addition to what is being done already that might help with risk factor management and motivate the prisoners towards CVD risk factor reduction whilst in prison?

Feedback on BCVRR intervention

As you know, we are planning an intervention to improve the cardiovascular health of prisoners by reducing their risk of cardiovascular disease (CVD). The aim of the intervention is to encourage prisoners to look after their own health better by teaching them skills and techniques that encourage and support positive behaviour and lifestyle. At present, we plan on having a 12-week programme which had two main components involving physical activity and education classes/sessions aimed at increasing the prisoner's understanding of what is CVD and the association between CVD and risk prevention. They will be asked about their self-care activities, beliefs and behaviours about their health and what they know about the modifiable risk factors for CVD. Following the assessment of their CVD risk factors and 10-year risk of getting the disease, we will use motivational interviewing techniques, personalised action plans and goal setting to encourage positive behaviour change. For the physical activity component, prisoners will either exercise as a group or on their own, but again we will ask them to set their own exercise plans and goals as part of person-centred care and building self-esteem. The educational classes will be conducted as a group. We are interested in your views about the proposed programme and the feasibility of introducing it with the prison, and its acceptability from a healthcare/health promotion perspective. Can you give me your opinions on this?

Feasibility of introducing a cardiovascular intervention in prison

Interview guide for prison officers

The prison regime

1. Can you describe what your role as a prison officer entails?
2. Can you describe what typical day for the average prisoner might be like on any day during the week?
3. Can you describe any health promotion intervention that you have assisted with in the prison? (prompt: purpose, who it targeted, staff involved, resources used)
4. What was your specific role in the intervention?
5. How did the intervention fit into the daily schedule of prisoners?
6. Do you know if the intervention was successful? Why do you say this? (prompt: facilitators and barriers)

Feedback on BCVRR intervention

As you know, we are planning an intervention to improve the cardiovascular health of prisoners by reducing their risk of cardiovascular disease (CVD). The aim of the intervention is to encourage prisoners to look after their own health better by teaching them skills and techniques that encourage and support positive behaviour and lifestyle. At present, we plan on having a 12-week programme which had two main components involving physical activity and education classes/sessions aimed at increasing the prisoner's understanding of what is CVD and the association between CVD and risk prevention. They will be asked about their self-care activities, beliefs and behaviours about their health and what they know about the modifiable risk factors for CVD. Following the assessment of their CVD risk factors and 10-year risk of getting the disease, we will use motivational

interviewing techniques, personalised action plans and goal setting to encourage positive behaviour change. For the physical activity component, prisoners will either exercise as a group or on their own, but again we will ask them to set their own exercise plans and goals as part of person-centred care and building self-esteem. The educational classes will be conducted as a group. We are interested in your views about the proposed programme and the feasibility of introducing it with the prison, and its acceptability from a prison officer's perspective. Can you give me your opinions on this?

Assessing the feasibility and acceptability of introducing a BCVRR intervention into a Scottish prison

Interview guide for prison managers

The prison regime

1. Can you describe what your role as a prison manager entails?
2. Can you describe what a typical day for the average prisoner might be like on any day during the week?
3. Can you describe any health promotion intervention/programme that you have approved for running in the prison? (prompt: staff involved, partnerships with other organisations)
4. What factors did you take into consideration before approving the intervention/programme? (prompt: security, staff, resources, etc.)
5. How did the intervention/programme fit into the daily schedule of prisoners?
6. Was the intervention/programme was successful? Why do you say this? (prompt: facilitators and barriers)

Feedback on BCVRR intervention

As you know, we are planning an intervention to improve the cardiovascular health of prisoners by reducing their risk of cardiovascular disease (CVD). The aim of the intervention is to encourage prisoners to look after their own health better by teaching them skills and techniques that encourage and support positive behaviour and lifestyle. At present, we plan on having a 12-week programme which had two main components involving physical activity and education classes/sessions aimed at increasing the prisoner's understanding of what is CVD and the association between CVD and risk prevention. They will be asked about

their self-care activities, beliefs and behaviours about their health and what they know about the modifiable risk factors for CVD. Following the assessment of their CVD risk factors and 10-year risk of getting the disease, we will use motivational interviewing techniques, personalised action plans and goal setting to encourage positive behaviour change. For the physical activity component, prisoners will either exercise as a group or on their own, but again we will ask them to set their own exercise plans and goals as part of person-centred care and building self-esteem. The educational classes will be conducted as a group. We are interested in your views about the proposed programme and the feasibility of introducing it with the prison, and its acceptability from a management perspective. Can you give me your opinions on this?

Appendix 4 – Participant information sheets

Participant Information Sheet (for prisoners)

We would like to invite you to take part in our study. Before you decide, we would like you to understand why the study is being done and what you would have to do. We will go through this information sheet with you and answer your questions. This should take about 15 minutes. Ask us if there is anything that is not clear. This study is being done as part of an educational qualification.

In this study, we would like to introduce a programme to reduce the risk factors of **cardiovascular disease (CVD)** in prisoners. CVD is a group of diseases of the heart and blood vessels which are caused by the clogging of blood vessels. Risk factors of CVD increase the chances of a person getting CVD. Some risk factors are: smoking, unhealthy eating, lack of physical activity and drinking too much alcohol.

We would like to understand your experiences and opinions on health programmes in the prison. In order to do this, we need to understand:

- how programmes fit into your daily schedule
- how you feel about your health and risk factors to CVD
- what things make you take part in activities to improve your health
- how you feel about the programme we would like to introduce

The information we get from this study will help us to develop a programme for prisoners that will fit into their daily activities.

Why have I been invited to take part?

You have been invited to take part in this study because you will be able to give us some useful information. By speaking to you, we will be able to understand:

- the things that help or prevent prisoners from taking part in activities such as physical activity
- how prisoners feel about their health while they are in prison

Do I have to take part?

No, taking part in the study is entirely voluntary – it is up to you to decide if you wish to take part or not. We will describe the study, and if you agree to take part, we will then ask you to sign a consent form.

- You are free to stop taking part in the study at any time, without giving a reason.
- No one will be told if you stop taking part – this will not affect your stay in the prison in any way.

What will happen if I take part in this study?

You will be invited to an interview with the researcher. This interview will take place in a private location in the prison, so all your answers will be kept confidential. It will be a face-to-face interview, with yourself and the researcher.

The researcher will ask you questions about:

- ✓ your health
- ✓ what you understand by the term 'cardiovascular disease' and risk factors for it
- ✓ the things that help or prevent you from doing activities that help to improve your health in the prison
- ✓ your experiences with health champions
- ✓ your experiences with past health programmes in the prison
- You will take part in one (1) interview only – this should to take between 45 to 60 minutes.
- The interview will be recorded using an audio recorder which will be kept secured at all times with the researcher

What are the disadvantages of taking part in the study?

We do not think that there are any major risks with taking part in the study, but there is a chance that you may:

- | | | |
|---|---|--|
| • be uncomfortable with some questions we ask | → | • just let us know and we will move on to another question |
| • become emotional when talking about your health | → | • just let us know and we will get a member of the healthcare staff to comfort you |

A prison officer will be located close to the room where you will be questioned. This is to ensure that should something happen during the interview, the researcher will be able to alert the officer to call for help.

We can't give you any medical advice but if there is something you'd like to see a health professional about, we will alert the healthcare staff.

What are the benefits of taking part?

There are no direct benefits to you in this study. However, the information that you give us will be helpful in creating a programme that may help to reduce CVD risk factors in prisoners. It may also help to improve the general health of prisoners.

Will my taking part in the study be kept confidential?

Yes. Your identity will be protected and all information provided by you will be kept strictly confidential. Everything will be stored safely on a password-protected computer and in a locked cabinet. Only the researcher will be able to access all this information.

You should know that if any of your answers put your safety or the safety of others at risk, or relate to illegal activities, we will have to tell the prison staff – we will let you know about this before we speak to anyone else.

What will happen to the results?

The results will be used in the researcher's thesis, scientific papers and presentations. All the information will be anonymised – that means that no personal information such as your name or prisoner number will be used.

What will I receive for taking part in the study?

We will be giving people who can take part in the study a dental pack as a "thank you" for taking the time to be a part of our study.

What if there is a problem?

If you have a concern about this study, you should contact [REDACTED], who is located in the prison. She will be able to contact the researcher if necessary. If you wish to complain formally, she will help you to contact the head of the department to which the researcher belongs.

Who has approved the study?

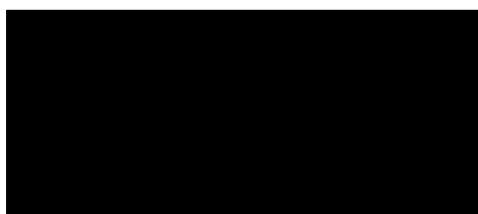
All research is looked at by an independent group of people, called a Research Ethics Committee (REC), to protect you. This study has been looked at and approved by: 1) the School of Health Sciences (of the University of Stirling) REC, 2) NHS West of Scotland REC, 3) the Scottish Prison Service (SPS) REC, 4) the management of [REDACTED] and 5) the management of [REDACTED].

What should I do if I want to take part?

We will invite you to attend an information session about the study. Once we know that you have understood everything, you should sign the consent form that will be given to you at the session, put it in the envelope provided and drop it off to [REDACTED].

Contact details

Details of independent contact:



Feasibility of introducing a cardiovascular intervention in prison

Participant Information Sheet (for prison staff)

We would like to invite you to take part in our study. Before you decide, we would like you to understand why the study is being done and what it would involve for you. We will go through the information sheet with you and answer your questions. This should take about 15 minutes. This study is being done as part of an educational qualification.

What is the purpose of the study?

The purpose of the study is to assess the feasibility of introducing a behavioural intervention to reduce cardiovascular disease (CVD) risk factors in prisoners. CVD is the group of diseases of the heart and blood vessels caused by blockages of blood flow. The risk factors of CVD include smoking, unhealthy eating, lack of physical activity and drinking too much alcohol.

We would like to find out how the intervention will be able to fit into the daily workings of the prison regime. In order to do this, we would like to understand:

- your role and experiences in relation to health promotion interventions in the prison
- the resources and strategies used in health promotion interventions in the prison
- how health promotion interventions are fitted into the daily prisoner routine
- your opinion on the proposed intervention and its components

The information we get from this study will help us to develop an intervention for prisoners that will fit into the prison system and the daily activities of prisoners.

Why have I been invited to participate?

You have been invited to participate in this study because you have direct knowledge of the daily workings of the prison regime, and a clear understanding of how health promotion interventions fit into this regime. By interviewing you, we will be able to understand how health promotion interventions are introduced into the system, and what factors and measures have to be taken into consideration when introducing them.

Do I have to take part?

No, you should know that taking part in the study is entirely voluntary. It is up to you to decide if you want to participate. We will describe the study, and if you agree to participate, we will then ask you to sign a consent form. You are free to withdraw at any time, without giving a reason.

What will happen to me if I take part in the study?

You will be invited to take part in either an individual or group interview with the researcher. The group interview will include up to two other members of staff who have a similar job description as you. The decision to participate in a group or an individual interview is based on your preference. The researcher will ask you questions based on your knowledge of and experiences with the daily workings of the prison regime, and the factors that are considered when fitting interventions into the regime. You will only be asked to participate in a single session, and we expect the session to take between 45 to 60 minutes. The session will be recorded using an audio recorder, which will be kept secured at all times by the researcher.

What are the disadvantages of taking part?

There are no major disadvantages should you decide to take part in the study. We understand that the information you disclose is sensitive, and ensure that everything you say will not be disclosed to anyone outside of the research team. However, should you feel uncomfortable with a particular question, just let the researcher know and she will move on to another one.

What are the benefits of taking part?

There are no direct benefits to you in this study. However, the information that you will provide will be useful in developing and implementing an intervention that may help to improve the general and cardiovascular health of prisoners.

Will my taking part in the study be kept confidential?

Yes. Your identity will be anonymised and all information provided by you will be kept strictly confidential and stored in a secure environment. Once you have signed and returned the informed consent form, a copy of it will be stored securely in a locked cabinet that will only be accessible by the researcher.

You should know that if any of your answers put your safety or the safety of others at risk, or relate to illegal activities, we will have to tell the prison management – we will let you know about this before we speak to anyone else.

What will happen to the results of the study?

The results from the study will be used to develop a behavioural intervention to help reduce the CVD risk factors in prisoners. The results will be published in the form of a scientific paper in a peer-reviewed journal, as well as in the researcher's thesis. The results will also be presented in presentations and internal reports to the research team.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researcher who will do her best to answer your questions [01786 46 6116]. If you remain unhappy and wish to complain formally, you can do this by contacting the head of the School of Health Sciences, [REDACTED]

Who has reviewed the study?

All research conducted by students is looked at by an independent group of people, called a Research Ethics Committee (REC), to protect your interests. This study has been reviewed and approved by: 1) the School of Health Sciences (of the University of Stirling)

REC, 2) NHS West of Scotland REC, 3) the Scottish Prison Service (SPS) REC, 4) the management of [REDACTED] 5) the management of [REDACTED]

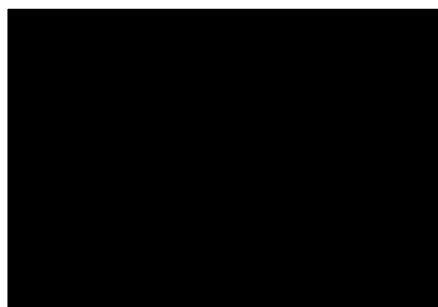
What should I do if I want to take part?

Once you have considered and understood the information that is in this sheet, we will ask you to sign the consent form and return it to the researcher using the pre-paid envelope provided. Once the researcher receives the consent form, she will contact you to organise a date for the interview.

Further information and contact details

Should you wish to discuss the study further, the details of the researcher and of an independent contact person are:

Andrea Mohan
School of Health Sciences
University of Stirling
Stirling FK9 4LA
Tel: 01786 46 6116
Email: a.r.mohan@stir.ac.uk



Appendix 5 – Guidance used for the development of the proposed intervention

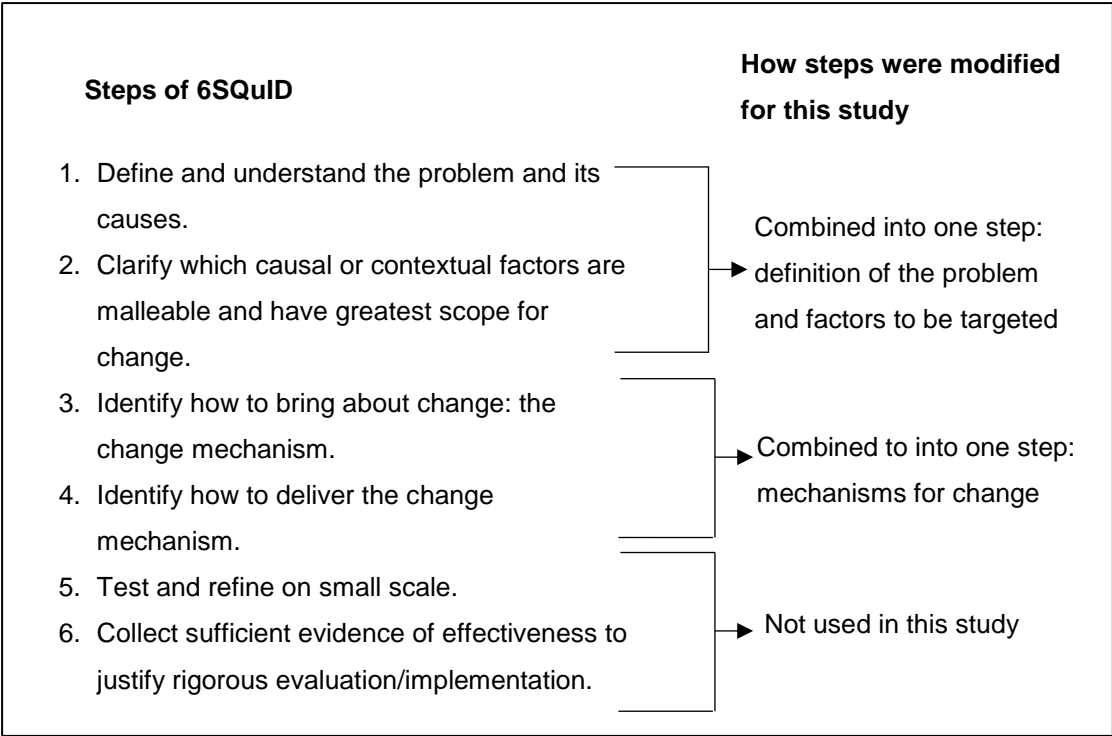


Figure 4. **Six Steps in Quality Intervention development (6SQulD) by Wight et al. (2015)**